Section : 1205
Site 20903-5640 (White Oak)
Doc. #: 0007 Vol IV

N60921.AR.000324
NSWC WHITE OAK
5090.3a

RCRA Facility Investigation

for

Sites 2, 3, 4, 7, 8, 9 and Paint Branch

Naval Surface Warfare Center White Oak

Silver Spring, Maryland

VOLUME IV – APPENDIX H

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Contract Task Order 0298

October 2000

TETRA TECH NUS, INC.

APPENDIX H

SUPPORTING INFORMATION FOR THE HUMAN HEALTH RISK ASSESSMENT

SITE 2

RISK ASSESSMENT CALCULATIONS

SITE 2 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 2 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors from Water in On-site Ditches	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 2 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	0.009	J	0.009	J	mg/kg	2SS1090100	1/20	0.011 - 0.056	0.009	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
108-88-3	Toluene	0.006	J	0.006	J	mg/kg	2SS1020100	1/20	0.011 - 0.013	0.006	NA	1600	N	0.6 650	SSL_MIGR SSL_INH	No	BSL
83-32-9	Acenaphthene	0.079	J	1.3	J	mg/kg	2SS1180100	4/20	0.36 - 0.44	1.3	NA	470	N	29	SSL_MIGR NA	No	BSL
120-12-7	Anthracene	0.1	J	2.9	J	mg/kg	2SS1180100	4/20	0.36 - 0.44	2.9	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.04	J	7.2		mg/kg	2SS1180100	15/20	0.37 - 0.39	7.2	NA	**0.87**	C	**0.08**	SSL_MIGR NA	Yes	ASL
50-32-8	Benzo(a)pyrene	0.056	J	5.7		mg/kg	2SS1180100	13/20	0.37 - 0.44	5.7	NA	**0.087**	C	**0.4**	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.042	J	9.5		mg/kg	2SS1180100	15/20	0.37 - 0.44	9.5	NA	**0.87**	C	**0.2**	SSL_MIGR NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.04	J	0.9	J	mg/kg	2SS1180100	6/20	0.36 - 0.44	0.9	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.04	J	4.1		mg/kg	2SS1180100	8/20	0.36 - 0.44	4.1	NA	8.7	C	**2**	SSL_MIGR NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.086	J	1.8		mg/kg	2SS1170100-D	2/20	0.36 - 3.6	1.8	NA	46	C	180 31000	SSL_MIGR SSL_INH	No	BSL
85-68-7	Butylbenzyl Phthalate	0.14	J	0.45		mg/kg	2SS1170100-D	1/20	0.36 - 3.6	0.45	NA	1600	N	810 930	SSL_MIGR SSL_INH	No	BSL
86-74-8	Carbazole	0.087	J	1.4	J	mg/kg	2SS1180100	4/20	0.36 - 0.44	1.4	NA	32	C	**0.03**	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.049	J	7.5		mg/kg	2SS1180100	15/20	0.37 - 0.44	7.5	NA	87	C	8	SSL_MIGR NA	No	BSL
84-74-2	Di-n-butyl phthalate	0.052	J	0.052	J	mg/kg	2SS1160100	1/20	0.36 - 3.6	0.052	NA	780	N	270 2300	SSL_MIGR SSL_INH	No	BSL
117-84-0	Di-n-octyl phthalate	0.16	J	0.16	J	mg/kg	2SS1170100-D	1/20	0.36 - 3.6	0.16	NA	160	N	10000 10000	SSL_MIGR SSL_INH	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.1	J	0.72	J	mg/kg	2SS1180100	3/20	0.36 - 0.44	0.72	NA	**0.087**	C	**0.08**	SSL_MIGR NA	Yes	ASL
132-64-9	Dibenzofuran	0.88	J	0.94	J	mg/kg	2SS1100100	2/20	0.36 - 0.44	0.94	NA	31	N		NA NA	No	BSL
206-44-0	Fluoranthene	0.04	J	19		mg/kg	2SS1180100	18/20	0.37	19	NA	310	N	210	SSL_MIGR NA	No	BSL
86-73-7	Fluorene	0.072	J	1.4	J	mg/kg	2SS1180100	3/20	0.36 - 0.44	1.4	NA	310	N	28	SSL_MIGR NA	No	BSL
67-72-1	Hexachloroethane	0.084	J	0.26	J	mg/kg	2SS1000100	9/20	0.37 - 3.6	0.26	NA	46	C	**0.02** 55	SSL_MIGR SSL_INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.058	J	2.2	J	mg/kg	2SS1180100	7/20	0.36 - 0.44	2.2	NA	**0.87**	C	**0.7**	SSL_MIGR NA	Yes	ASL

SITE 2 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
91-20-3	Naphthalene	0.87	J	0.87	J	mg/kg	2SS1180100	1/20	0.36 - 1.4	0.87	NA	160	N	4	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.041	J	17		mg/kg	2SS1180100	14/20	0.36 - 0.39	17	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.049	J	11		mg/kg	2SS1180100	16/20	0.37 - 0.39	11	NA	230	N	210	SSL_MIGR NA	No	BSL
72-54-8	4,4'-DDD	0.0026	J	0.0078		mg/kg	2SS1180100	3/22	0.0004 - 0.033	0.0078	NA	2.7	C	0.8	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.00075	J	0.23	J	mg/kg	2SS1240100	9/24	0.0035 - 0.033	0.23	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.0017	J	0.24	J	mg/kg	2SS1240100	7/23	0.0035 - 0.033	0.24	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	Alpha-Chlordane	0.0017	J	0.0096		mg/kg	2SS1170100-D	5/24	0.0018 - 0.017	0.0096	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11097-69-1	Aroclor-1254	0.047		0.35		mg/kg	2SS1170100-D	3/29	0.035 - 0.34	0.35	NA	**0.32**	C		NA NA	Yes	ASL
11096-82-5	Aroclor-1260	0.02	J	3.5	J	mg/kg	2SS1020100	21/29	0.037 - 0.34	3.5	NA	**0.32**	C		NA NA	Yes	ASL
319-85-7	beta-BHC	0.0018	J	0.0018	J	mg/kg	2SS1100100	1/29	0.0018 - 0.017	0.0018	NA	0.35	C	**0.0001**	SSL_MIGR NA	No	BSL
60-57-1	Dieldrin	0.00052	J	0.01	J	mg/kg	2SS1100100	3/28	0.0035 - 0.034	0.01	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
33213-65-9	Endosulfan II	0.0046		0.12	J	mg/kg	2SS1200100	8/25	0.0035 - 0.034	0.12	NA	47 (8)	N	0.9	SSL_MIGR NA	No	BSL
1031-07-8	Endosulfan Sulfate	0.01		0.01		mg/kg	2SS1170100-D	1/26	0.0035 - 0.034	0.01	NA	47 (8)	N		NA NA	No	BSL
72-20-8	Endrin	0.0029	J	0.035	J	mg/kg	2SS1220100	5/23	0.0036 - 0.034	0.035	NA	2.3	N	0.05	SSL_MIGR NA	No	BSL
7421-93-4	Endrin Aldehyde	0.0037	L	0.15	J	mg/kg	2SS1200100	8/22	0.0036 - 0.034	0.15	NA	2.3 (9)	N		NA NA	No	BSL
53494-70-5	Endrin Ketone	0.0053		0.02	J	mg/kg	2SS1180100	2/27	0.0035 - 0.034	0.02	NA	2.3 (9)	N		NA NA	No	BSL
5103-74-2	Gamma-Chlordane	0.0011	J	0.0091		mg/kg	2SS1170100-D	4/25	0.0018 - 0.017	0.0091	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.00071	J	0.00071	J	mg/kg	AFI-SO-02	1/29	0.0018 - 0.017	0.00071	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
72-43-5	Methoxychlor	0.021		0.021		mg/kg	2SS1170100-D	1/25	0.002 - 0.17	0.021	NA	39	N	8	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	2130	J	18100	J	mg/kg	2SS1110100	20/20	0	18100	NA	**7800**	N		NA NA	No	BKG
7440-38-2	Arsenic	1.3	K	4.3	K	mg/kg	2SS1190100	20/20	0	4.3	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	15.5	J	231		mg/kg	2SS1040100	20/20	0	231	NA	550	N	**82** 690000	SSL_MIGR SSL_INH	No	BSL, BKG

SITE 2 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-43-9	Cadmium	0.42		1		mg/kg	2SS1070100	2/20	0.04 - 0.15	1	NA	7.8	N	**0.4** 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	300	J	52800	J	mg/kg	2SS1130100	20/20	0	52800	NA	NA			NA NA	No	NUT
18540-29-9	Chromium (total)	7.4	J	118	J	mg/kg	2SS1000100	20/20	0	118	NA	23 (10)	N	**2** 270	SSL_MIGR SSL_INH	Yes	ASL
18540-29-9	Chromium (hexavalent)	0.24	J	0.57		mg/kg	2SS1210100	3/8	0.35 - 1.3	0.57	NA	23	N	2 270	SSL_MIGR SSL_INH	No	BSL
7440-48-4	Cobalt	2.3		22.8		mg/kg	2SS1040100	19/20	4.1	22.8	NA	470	N		NA NA	No	BSL
7440-50-8	Copper	6	J	186		mg/kg	2SS1070100	20/20	0	186	NA	310	N		NA NA	No	BSL
7439-89-6	Iron	5670	J	29600	J	mg/kg	2SS1040100	20/20	0	29600	NA	**2300**	N		NA NA	Yes	ASL
7439-92-1	Lead	7.8		214		mg/kg	2SS1090100	20/20	0	214	NA	400 (11)			NA NA	No	BSL
7439-95-4	Magnesium	369		16500		mg/kg	2SS1000100	20/20	0	16500	NA	NA			NA NA	No	NUT
7439-96-5	Manganese	50.4		777	J	mg/kg	2SS1040100	20/20	0	777	NA	**160 (12)**	N		NA NA	Yes	ASL
7439-97-6	Mercury	0.06		1.1		mg/kg	2SS1170100-D	17/20	0.06	1.1	NA	2.3 (13)	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL
7440-02-0	Nickel	5.3	J	243		mg/kg	2SS1000100	20/20	0	243	NA	**160**	N	**7** 13000	SSL_MIGR SSL_INH	Yes	ASL
7440-09-7	Potassium	218		5550		mg/kg	2SS1040100	20/20	0	5550	NA	NA			NA NA	No	NUT
7782-49-2	Selenium	0.65	L	5.9	L	mg/kg	2SS1030100	3/20	0.62 - 1.4	5.9	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL
7440-22-4	Silver	0.17		3.4		mg/kg	2SS1070100	4/20	0.15 - 0.18	3.4	NA	39	N	**2**	SSL_MIGR NA	No	BSL, BKG
7440-23-5	Sodium	21.9		206		mg/kg	2SS1150100	10/20	38.6 - 248	206	NA	NA			NA NA	No	NUT
7440-62-2	Vanadium	8.7		55.9		mg/kg	2SS1110100	20/20	0	55.9	NA	**55**	N	300	SSL_MIGR NA	Yes	ASL
7440-66-6	Zinc	19.1		275	J	mg/kg	2SS1070100	20/20	0	275	NA	2300	N	620	SSL_MIGR NA	No	BSL
99-35-4	1,3,5-Trinitrobenzene	0.12	J	0.12	J	mg/kg	2SS1170100-D	1/20	0.25	0.12	NA	230	N		NA NA	No	BSL
99-99-0	4-Nitrotoluene	0.2	J	0.2	J	mg/kg	2SS1070100	1/20	0.25	0.2	NA	78	N		NA NA	No	BSL
121-82-4	RDX	0.053	J	0.053	J	mg/kg	2SS1050100	1/20	0.5	0.053	NA	5.8	C		NA NA	No	BSL
	Acid-Insoluble Sulfide	110		280		mg/kg	2SS1180100	4/8	50	280	NA	NA			NA	No	NTX
	BOD-5day (total)	45	L	130	L	mg/kg	2SS1240100	3/7	22 - 23	130	NA	NA			NA	No	NTX
	Chemical Oxygen Demand	14		140		mg/L	2SS1210100	6/8	10	140	NA	NA			NA	No	NTX

SITE 2 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
TTNUS17	pH	4.41		7.8			2SS1180100	11/11	0	7.8	NA	NA		NA	No	NTX
TTNUS22	Total Organic Carbon	1800		29000		mg/kg	2SS1240100	8/8	0	29000	NA	NA		NA	No	NTX

Associated Samples:

2SS1000100 2SS1160100
2SS1010100 2SS1170100
2SS1020100 2SS1170100-AVG
2SS1030100 2SS1170100-D
2SS1040100 2SS1180100
2SS1050100 2SS1190100
2SS1060100 2SS1200100
2SS1070100 2SS1210100
2SS1080100 2SS1220100
2SS1090100 2SS1230100
2SS1100100 2SS1240100
2SS1110100 2SS1250100
2SS1120100 AFI-SO-01
2SS1130100 AFI-SO-01-D
2SS1140100 AFI-SO-02
2SS1150100 AFI-SO-03

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan II and Endosulfan Sulfate as Endosulfan.
9 Endrin Aldehyde and Endrin Ketone as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 2 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 2- APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	0.009	J	0.009	J	mg/kg	2SS1090100	1/30	0.01 - 0.056	0.009	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
108-88-3	Toluene	0.006	J	0.006	J	mg/kg	2SS1020100	1/30	0.01 - 0.013	0.006	NA	1600	N	0.6 650	SSL_MIGR SSL_INH	No	BSL
83-32-9	Acenaphthene	0.079	J	1.3	J	mg/kg	2SS1180100	4/30	0.34 - 0.44	1.3	NA	470	N	29	SSL_MIGR NA	No	BSL
120-12-7	Anthracene	0.1	J	2.9	J	mg/kg	2SS1180100	4/30	0.34 - 0.44	2.9	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.04	J	7.2		mg/kg	2SS1180100	16/30	0.34 - 0.41	7.2	NA	**0.87**	C	0.08	SSL_MIGR NA	Yes	ASL
50-32-8	Benzo(a)pyrene	0.056	J	5.7		mg/kg	2SS1180100	13/30	0.34 - 0.44	5.7	NA	**0.087**	C	**0.4**	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.042	J	9.5		mg/kg	2SS1180100	15/30	0.34 - 0.44	9.5	NA	**0.87**	C	**0.2**	SSL_MIGR NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.04	J	0.9	J	mg/kg	2SS1180100	6/30	0.34 - 0.44	0.9	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.04	J	4.1		mg/kg	2SS1180100	8/30	0.34 - 0.44	4.1	NA	8.7	C	**2**	SSL_MIGR NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.086	J	2.9		mg/kg	2SU1020800	5/30	0.34 - 3.6	2.9	NA	46	C	180 31000	SSL_MIGR SSL_INH	No	BSL
85-68-7	Butylbenzyl Phthalate	0.14	J	0.45		mg/kg	2SS1170100-D	1/30	0.34 - 3.6	0.45	NA	1600	N	810 930	SSL_MIGR SSL_INH	No	BSL
86-74-8	Carbazole	0.087	J	1.4	J	mg/kg	2SS1180100	4/30	0.34 - 0.44	1.4	NA	32	C	**0.03**	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.039	J	7.5		mg/kg	2SS1180100	16/30	0.34 - 0.44	7.5	NA	87	C	8	SSL_MIGR NA	No	BSL
84-74-2	Di-n-butyl phthalate	0.048	J	0.052	J	mg/kg	2SS1160100	2/30	0.34 - 3.6	0.052	NA	780	N	270 2300	SSL_MIGR SSL_INH	No	BSL
117-84-0	Di-n-octyl phthalate	0.16	J	0.16	J	mg/kg	2SS1170100-D	1/30	0.34 - 3.6	0.16	NA	160	N	10000 10000	SSL_MIGR SSL_INH	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.1	J	0.72	J	mg/kg	2SS1180100	3/30	0.34 - 0.44	0.72	NA	**0.087**	C	**0.08**	SSL_MIGR NA	Yes	ASL
132-64-9	Dibenzofuran	0.88	J	0.94	J	mg/kg	2SS1100100	2/30	0.34 - 0.44	0.94	NA	31	N		NA NA	No	BSL
206-44-0	Fluoranthene	0.04	J	19		mg/kg	2SS1180100	19/30	0.34 - 0.41	19	NA	310	N	210	SSL_MIGR NA	No	BSL
86-73-7	Fluorene	0.072	J	1.4	J	mg/kg	2SS1180100	3/30	0.34 - 0.44	1.4	NA	310	N	28	SSL_MIGR NA	No	BSL
67-72-1	Hexachloroethane	0.084	J	0.26	J	mg/kg	2SS1000100	10/30	0.34 - 3.6	0.26	NA	46	C	**0.02** 55	SSL_MIGR SSL_INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.058	J	2.2	J	mg/kg	2SS1180100	7/30	0.34 - 0.44	2.2	NA	**0.87**	C	**0.7**	SSL_MIGR NA	Yes	ASL
91-20-3	Naphthalene	0.87	J	0.87	J	mg/kg	2SS1180100	1/30	0.34 - 1.4	0.87	NA	160	N	4	SSL_MIGR NA	No	BSL

SITE 2 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 2- APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
85-01-8	Phenanthrene	0.041	J	17		mg/kg	2SS1180100	15/30	0.34 - 0.41	17	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.039	J	11		mg/kg	2SS1180100	18/30	0.34 - 0.41	11	NA	230	N	210	SSL_MIGR NA	No	BSL
72-54-8	4,4'-DDD	0.0026	J	0.0078		mg/kg	2SS1180100	3/32	0.0004 - 0.033	0.0078	NA	2.7	C	0.8	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.00075	J	0.23	J	mg/kg	2SS1240100	9/34	0.0034 - 0.033	0.23	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.0017	J	0.24	J	mg/kg	2SS1240100	7/33	0.0034 - 0.033	0.24	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0013	J	0.0096		mg/kg	2SS1170100-D	6/34	0.0018 - 0.017	0.0096	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11097-69-1	Aroclor-1254	0.047	J	0.35		mg/kg	2SS1170100-D	3/39	0.034 - 0.34	0.35	NA	**0.32**	C		NA NA	Yes	ASL
11096-82-5	Aroclor-1260	0.02	J	3.5	J	mg/kg	2SS1200100	23/39	0.034 - 0.34	3.5	NA	**0.32**	C		NA NA	Yes	ASL
319-85-7	beta-BHC	0.0018	J	0.0018	J	mg/kg	2SS1100100	1/39	0.0018 - 0.017	0.0018	NA	0.35	C	0.0001	SSL_MIGR NA	No	BSL
60-57-1	Dieldrin	0.00052	J	0.01	J	mg/kg	2SS1100100	3/38	0.0034 - 0.034	0.01	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
33213-65-9	Endosulfan II	0.0046		0.12	J	mg/kg	2SS1200100	8/34	0.0034 - 0.034	0.12	NA	47 (8)	N	0.9	SSL_MIGR NA	No	BSL
1031-07-8	Endosulfan Sulfate	0.01		0.01		mg/kg	2SS1170100-D	1/36	0.0034 - 0.034	0.01	NA	47 (8)	N		NA NA	No	BSL
72-20-8	Endrin	0.0029	J	0.035	J	mg/kg	2SS1220100	5/33	0.0034 - 0.034	0.035	NA	2.3	N	0.05	SSL_MIGR NA	No	BSL
7421-93-4	Endrin Aldehyde	0.0037	L	0.15	J	mg/kg	2SS1200100	9/32	0.0034 - 0.034	0.15	NA	2.3 (9)	N		NA NA		BSL
53494-70-5	Endrin Ketone	0.0053		0.02	J	mg/kg	2SS1180100	2/37	0.0034 - 0.034	0.02	NA	2.3 (9)	N		NA NA	No	BSL
5103-74-2	gamma-Chlordane	0.0011	J	0.0091		mg/kg	2SS1170100-D	4/35	0.0018 - 0.017	0.0091	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.00071	J	0.00071	J	mg/kg	AFI-SO-02	1/39	0.0018 - 0.017	0.00071	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
72-43-5	Methoxychlor	0.014	L	0.021		mg/kg	2SS1170100-D	2/35	0.002 - 0.17	0.021	NA	39	N	8	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	2130	J	19200	J	mg/kg	2SU1080600	30/30		19200	NA	**7800**	N		NA NA	No	BKG
7440-36-0	Antimony	1	L	1.1	L	mg/kg	2SU1010800	2/30	0.59 - 1.1	1.1	NA	3.1	N	**0.3**	SSL_MIGR NA	No	BSL
7440-38-2	Arsenic	0.9	K	4.3	K	mg/kg	2SS1190100	30/30		4.3	NA	**0.43**	C	**1** 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	15.5	J	250	J	mg/kg	2SU1040600	29/30	40.2	250	NA	550	N	**82** 690000	SSL_MIGR SSL_INH	No	BSL

SITE 2 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 2- APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-41-7	Beryllium	0.71	K	2.4		mg/kg	2SU1000800	4/30	0.01 - 0.71	2.4	NA	16		3 1300	SSL_MIGR SSL_INH	No	BSL
7440-43-9	Cadmium	0.42		1		mg/kg	2SS1070100	2/30	0.04 - 0.15	1	NA	7.8	N	**0.4** 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	176	J	52800	J	mg/kg	2SS1130100	26/30	42.5 - 155	52800	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	5.4	J	118	J	mg/kg	2SS1000100	30/30		118	NA	**23 (10)**	N	**2** 270	SSL_MIGR SSL_INH	Yes	BKG
18540-29-9	Hexavalent Chromium	0.24	J	0.57		mg/kg	2SS1210100	3/8	0.35 - 1.3	0.57	NA	23	N	2 270	SSL_MIGR SSL_INH	No	BSL
7440-48-4	Cobalt	2.3		22.8		mg/kg	2SS1040100	29/30	4.1	22.8	NA	470	N		NA NA	No	BSL
7440-50-8	Copper	5.5	J	186		mg/kg	2SS1070100	30/30		186	NA	310	N		NA NA	No	BSL
7439-89-6	Iron	5670	J	49000		mg/kg	2SU1020800	30/30		49000	NA	**2300**	N		NA NA	Yes	BKG
7439-92-1	Lead	3.2		214		mg/kg	2SS1090100	30/30		214	NA	400 (11)			NA NA	No	BSL
7439-95-4	Magnesium	128	J	16500		mg/kg	2SS1000100	30/30		16500	NA	NA			NA NA	No	NUT
7439-96-5	Manganese	37.4		1920		mg/kg	2SU1040600	30/30		1920	NA	**160 (12)**	N		NA NA	No	ASL
7439-97-6	Mercury	0.06		1.1		mg/kg	2SS1170100-D	22/30	0.05 - 0.06	1.1	NA	2.3 (13)	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL
7440-02-0	Nickel	3.8	J	243		mg/kg	2SS1000100	30/30		243	NA	**160**	N	**7** 13000	SSL_MIGR SSL_INH	Yes	ASL
7440-09-7	Potassium	138		8420		mg/kg	2SU1010800	30/30		8420	NA	NA			NA NA	No	NUT
7782-49-2	Selenium	0.65	L	5.9	L	mg/kg	2SS1030100	4/30	0.58 - 1.5	5.9	NA	39	N	**0.3**	NA NA	No	BSL, BKG
7440-22-4	Silver	0.17		3.4		mg/kg	2SS1070100	4/30	0.15 - 0.18	3.4	NA	39	N	**2**	SSL_MIGR NA	No	BSL, BKG
7440-23-5	Sodium	21.9		354		mg/kg	2SU1070400	18/30	18.7 - 248	354	NA	NA			NA NA	No	NUT
7440-28-0	Thallium	1.4	K	3.4	K	mg/kg	2SU1010800	5/30	1.2 - 1.5	3.4	NA	**0.55**	N	**0.04**	SSL_MIGR NA	Yes	ASL
7440-62-2	Vanadium	5.7		55.9		mg/kg	2SS1110100	30/30		55.9	NA	**55**	N	300	NA NA	No	BKG
7440-66-6	Zinc	19.1		275	J	mg/kg	2SS1070100	29/30	9.4	275	NA	2300	N		NA NA	No	BSL
99-35-4	1,3,5-Trinitrobenzene	0.12	J	0.12	J	mg/kg	2SS1170100-D	1/30	0.25	0.12	NA	230	N		NA NA	No	BSL
606-20-2	2,6 Dinitrotoluene	0.089	J	0.23	J	mg/kg	2SU1020800	2/30	0.25	0.23	NA	7.8	N	**0.00003**	SSL_MIGR NA	No	BSL

SITE 2 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 2- APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
99-99-0	4-Nitrotoluene	0.2	J	0.2	J	mg/kg	2SS1070100	1/30	0.25 - 0.83	0.2	NA	78	N		NA NA	No	BSL
121-82-4	RDX	0.053	J	0.2	J	mg/kg	2SU1020800	2/30	0.5	0.2	NA	5.8	C		NA NA	No	BSL
	Acid-Insoluble Sulfide	110		280		mg/kg	2SS1180100	4/8	50	280	NA	NA			NA	No	NTX
	BOD-5day (total)	45	L	130	L	mg/kg	2SS1240100	3/7	22 - 23	130	NA	NA			NA	No	NTX
	Chemical Oxygen Demand	14		140		mg/L	2SS1210100	6/8	10	140	NA	NA			NA	No	NTX
TTNUS17	pH	4.41		7.8			2SS1180100	11/11		7.8	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	1800	*	29000		mg/kg	2SS1240100	8/8		29000	NA	NA			NA	No	NTX

Associated Samples:
2SS10001(2SS1200100
2SS10101(2SS1210100
2SS10201(2SS1220100
2SS10301(2SS1230100
2SS10401(2SS1240100
2SS10501(2SS1250100
2SS10601(2SU1000800
2SS10701(2SU1010800
2SS10801(2SU1020800
2SS10901(2SU1030800
2SS11001(2SU1040600
2SS11101(2SU1050400
2SS11201(2SU1060400
2SS11301(2SU1070400
2SS11401(2SU1080600
2SS11501(2SU1090800
2SS11601(AFI-SO-01
2SS11701(AFI-SO-01-AVG
2SS11701(AFI-SO-01-D
2SS11701(AFI-SO-02
2SS11801(AFI-SO-03
2SS1190100

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan II and Endosulfan Sulfate as Endosulfan.
9 Endrin Aldehyde and Endrin Ketone as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 2 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
78-87-5	1,2-Dichloropropane	1.4		1.4		µg/L	2GW32	1/11	1	1.4	NA	**0.16**	C	5	FED-MCL	Yes	ASL
67-64-1	Acetone	1.6	L	3.6	L	µg/L	2GW102	9/9	0	3.6	NA	61	N	NA	NA	No	BSL
71-43-2	Benzene	1.1		1.1		µg/L	2GW104	1/11	1	1.1	NA	**0.36**	C	5	FED-MCL	Yes	ASL
108-90-7	Chlorobenzene	1		1		µg/L	2GW101	1/11	1	1	NA	11	N	100	FED-MCL	No	BSL
67-66-3	Chloroform	0.41	J	0.96	J	µg/L	2GW100	3/11	1	0.96	NA	**0.15**	C	80	FED-MCL	Yes	ASL
74-87-3	Chloromethane	0.29	J	0.29	J	µg/L	2GW32	1/11	1	0.29	NA	2.1	C	NA	NA	No	BSL
75-09-2	Methylene Chloride	0.65	J	1.9	J	µg/L	2GW32	2/11	2	1.9	NA	4.1	C	5	FED-MCL	No	BSL
79-01-6	Trichloroethene	0.86	J	35	J	µg/L	2GW32	9/11	1	35	NA	**1.6**	C	**5**	FED-MCL	Yes	ASL
156-59-2	cis-1,2-dichloroethene	0.31	J	7.1		µg/L	2GW102	6/11	1	7.1	NA	**6.1**	N	70	FED-MCL	Yes	ASL
117-81-7	Bis(2-Ethylhexyl)phthalate	1.1	J	2.1	J	µg/L	2GW103	3/11	3.2 - 5	2.1	NA	4.8	C	6	FED-MCL	No	BSL
84-74-2	Di-n-butyl phthalate	1.7	J	25		µg/L	2GW104	2/11	5	25	NA	370	N	NA	NA	No	BSL
7429-90-5	Aluminum	2000		24700		µg/L	2GW31	5/11	22.5 - 733	24700	NA	**3700**	N	**50-200(7)**	FED-MCL	No	BKG
7440-38-2	Arsenic	2.8		15.2		µg/L	2GW32	4/11	1.5	15.2	NA	**0.045**	C	50	FED-MCL	Yes	ASL
7440-39-3	Barium	39.7		730		µg/L	2GW102	11/11	0	730	NA	**260**	N	2000	FED-MCL	Yes	ASL
7440-41-7	Beryllium	7		7		µg/L	2GW32	1/11	0.1 - 3.2	7	NA	7.3	N	**4**	FED-MCL	No	BSL, BKG
7440-70-2	Calcium	2300		205000		µg/L	2GW32	11/11	0	205000	NA	NA		NA	NA	No	NUT
18540-29-9	Chromium	13.1		39.1		µg/L	2GW105	5/11	2.3 - 10	39.1	NA	11 (8)	N	100	FED-MCL	Yes	ASL
7440-48-4	Cobalt	4.4		132		µg/L	2GW32	8/11	3.3	132	NA	220	N	NA	NA	No	BSL
7440-50-8	Copper	3.6		59		µg/L	2GW31	8/11	2.4	59	NA	150	N	1300	FED-MCL	No	BSL, BKG
7439-89-6	Iron	40.3	L	41800		µg/L	2GW31	10/11	87.4	41800	NA	**1100**	N	**300 (7)**	FED-MCL	No	BKG
7439-92-1	Lead	7.2		20.2		µg/L	2GW31	5/11	1	20.2	NA	**15**		**15**	FED-AL	No	BKG
7439-95-4	Magnesium	1160		130000		µg/L	2GW32	11/11	0	130000	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	214		24700		µg/L	2GW32	11/11	0	24700	NA	**73 (9)**	N	**50 (7)**	FED-MCL	Yes	ASL
7487-94-7	Mercury	0.92		2.4		µg/L	2GW32	2/11	0.2	2.4	NA	**1.1 (10)**	N	**2**	FED-MCL	Yes	ASL
7440-02-0	Nickel	9.9		206		µg/L	2GW32	9/11	7.5	206	NA	**73**	N	**100**	FED-MCL	No	BKG
7440-09-7	Potassium	2000		34400		µg/L	2GW32	11/11	0	34400	NA	NA		NA	NA	No	NUT
7440-23-5	Sodium	3970		4720000		µg/L	2GW32	11/11	0	4720000	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	11.5		25.7		µg/L	2GW31	3/11	2.1	25.7	NA	26	N	NA	NA	No	BSL, BKG
7440-66-6	Zinc	36.3		411		µg/L	2GW32	5/11	7.7 - 40.9	411	NA	1100	N	5000 (7)	FED-MCL	No	BSL, BKG
606-20-2	2,6 Dinitrotoluene	0.26		0.26		µg/L	2GW102	1/11	0.2 - 0.4	0.26	NA	3.7	N	NA	NA	No	BSL
2691-41-0	HMX	1.1		8.6		µg/L	2GW45	3/11	0.5	8.6	NA	180	N	NA	NA	No	BSL
121-82-4	RDX	0.87		0.87		µg/L	2GW103	1/11	0.5 - 3.7	0.87	NA	**0.61**	C	NA	NA	Yes	ASL
	Ammonium Perchlorate	5.89		5.89		µg/L	2GW101	1/11	5	5.89	NA	NA	N	18 (11)	NA	No	BSL

SITE 2 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
8 Hexavalent Chromium
9 Manganese-Nonfood
10 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Nocarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:

For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 2 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	1.6	J	3.5	J	µg/L	2SW101	4/4		3.5	NA	61	N		NA	No	BSL
108-90-7	Chlorobenzene	2		2		µg/L	2SW103	1/14	1	2	NA	11	N	20	NRWQC	No	BSL
67-66-3	Chloroform	0.25	J	0.54	J	µg/L	2SW112	4/14	1	0.54	NA	**0.15**	C	5.7	NRWQC	Yes	ASL
75-09-2	Methylene Chloride	0.52	J	0.87	J	µg/L	2SW100	2/14	2	0.87	NA	4.1	C	4.7	NRWQC	No	BSL
127-18-4	Tetrachloroethene	0.31	J	0.31	J	µg/L	2SW112	1/14	1	0.31	NA	1.1	C	0.8	NRWQC	No	BSL
79-01-6	Trichloroethene	0.26	J	1.6		µg/L	2SW108	10/14	1	1.6	NA	**1.6**	C	2.7	NRWQC	Yes	ASL
156-59-2	cis-1,2-dichloroethene	0.99	J	0.99	J	µg/L	2SW113	1/14	1	0.99	NA	6.1	N		NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	1.7	J	6.5		µg/L	2SW101	3/14	5	6.5	NA	**4.8**	C	**1.8**	NRWQC	Yes	ASL
7429-90-5	Aluminum	297		663		µg/L	2SW103	5/14	77.4 - 257	663	NA	3700	N		NA	No	BSL
7440-39-3	Barium	15.4		65.7		µg/L	2SW111	14/14		65.7	NA	260	N	1000	NRWQC	No	BSL
7440-43-9	Cadmium	3.9		5.6		µg/L	2SW102	2/14	2.7	5.6	NA	**1.8**	N		NA	Yes	ASL
7440-70-2	Calcium	14800		32700		µg/L	2SW103	14/14		32700	NA	NA			NA	No	NUT
7440-50-8	Copper	22.2		28.4		µg/L	2SW113	3/14	9.8 - 17.7	28.4	NA	150	N	1000	NA	No	BSL
57-12-5	Cyanide	3.2		7.2		µg/L	2SW101	5/14	2.7	7.2	NA	73	N	700	NRWQC	No	BSL
7439-89-6	Iron	165	J	1110	J	µg/L	2SW103	14/14		1110	NA	**1100**	N	**300**	NRWQC	Yes	ASL
7439-92-1	Lead	1.6		19		µg/L	2SW103	5/14	1	19	NA	**15 (7)**			NA	No	BKG
7439-95-4	Magnesium	1900		12600		µg/L	2SW109-D	14/14		12600	NA	NA			NA	No	NUT
7439-96-5	Manganese	11.9		735		µg/L	2SW108	12/14	5.7 - 9.2	735	NA	**73 (8)**	N	**50**	NRWQC	Yes	ASL
7439-97-6	Mercury	0.38		0.38		µg/L	2SW113	1/14	0.2	0.38	NA	**1.1 (9)**	N	**0.05**	NRWQC	No	BSL
7440-02-0	Nickel	7.7	L	11.4	L	µg/L	2SW100	9/14	7.5	11.4	NA	73	N	610	NRWQC	No	BSL
7440-09-7	Potassium	3040		9750		µg/L	2SW100	14/14		9750	NA	NA			NA	No	NUT
7440-23-5	Sodium	21900		141000		µg/L	2SW108	14/14		141000	NA	NA			NA	No	NUT
7440-28-0	Thallium	3.1		3.1		µg/L	2SW100	1/14	2.9	3.1	NA	**0.26**	N	**1.7**	NRWQC	Yes	ASL
7440-66-6	Zinc	19.1	K	84.3		µg/L	2SW103	14/14		84.3	NA	1100	N	5000	NRWQ	No	BSL
TTNUS21	Total Dissolved Solids	48000		670000		µg/L	2SW109	12/14	10000	670000	NA	NA		**250**	NA	No	NTX
	Total Suspended Solids	6000		21000		µg/L	2SW104	4/14	4000	21000	NA	NA			NA	No	NTX

Associated Samples:
2SW1000001
2SW1010001
2SW1020001
2SW1030001
2SW1040001
2SW1050001
2SW1060001
2SW1070001
2SW1080001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential tap water use is presented. The value is based on a

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

SITE 2 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
2SW1090001																
2SW1090001-D																
2SW1100001																
2SW1110001																
2SW1120001																
2SW1130001																

target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).

6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.

7 Action level at the TAP(USEPA, October 1996).

8 Manganese-Nonfood

9 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

NRWQC = National Recommended Water Quality Criteria (USEPA, April 1999)

Rationale Codes:

For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 2 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-66-3	Chloroform	0.001	J	0.002	J	mg/kg	2SD111	11/14	0.012 - 0.014	0.002	NA	100	C	NA	NA	No	BSL
75-09-2	Methylene Chloride	0.002	J	0.002	J	mg/kg	2SD106	1/14	0.012 - 0.015	0.002	NA	85	C	NA	NA	No	BSL
83-32-9	Acenaphthene	0.049	J	0.57	J	mg/kg	2SD100	4/14	0.39 - 0.46	0.57	NA	470	N	NA	NA	No	BSL
120-12-7	Anthracene	0.066	J	0.86	J	mg/kg	2SD100	4/14	0.39 - 0.46	0.86	NA	2300	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	0.057	J	3.1	J	mg/kg	2SD100	9/14	0.39 - 0.46	3.1	NA	**0.87**	C	NA	NA	Yes	ASL
50-32-8	Benzo(a)pyrene	0.042	J	2.3	J	mg/kg	2SD100	10/14	0.41 - 0.46	2.3	NA	**0.087**	C	NA	NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.061	J	3.5	J	mg/kg	2SD100	13/14	0.41	3.5	NA	**0.87**	C	NA	NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.052	J	0.84	J	mg/kg	2SD100	6/14	0.39 - 0.46	0.84	NA	160	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.048	J	1.5	J	mg/kg	2SD100	8/14	0.39 - 0.46	1.5	NA	8.7	C	NA	NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.047	J	2.1	J	mg/kg	2SD100	4/14	0.39 - 0.6	2.1	NA	46	C	NA	NA	No	BSL
85-68-7	Butylbenzyl Phthalate	0.06	J	0.24	J	mg/kg	2SD100	2/14	0.39 - 0.6	0.24	NA	1600	N	NA	NA	No	BSL
86-74-8	Carbazole	0.052	J	0.59	J	mg/kg	2SD100	5/14	0.39 - 0.46	0.59	NA	32	C	NA	NA	No	BSL
218-01-9	Chrysene	0.046	J	4.2	J	mg/kg	2SD100	10/14	0.39 - 0.46	4.2	NA	87	C	NA	NA	No	BSL
84-74-2	Di-n-butyl phthalate	0.064	J	0.064	J	mg/kg	2SD101	1/14	0.39 - 1.7	0.064	NA	780	N	NA	NA	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.05	J	0.33	J	mg/kg	2SD100	5/14	0.39 - 0.46	0.33	NA	**0.087**	C	NA	NA	Yes	ASL
132-64-9	Dibenzofuran	0.2	J	0.32	J	mg/kg	2SD100	2/14	0.39 - 0.48	0.32	NA	31	N	NA	NA	No	BSL
206-44-0	Fluoranthene	0.1	J	9.1	J	mg/kg	2SD100	13/14	0.41	9.1	NA	310	N	NA	NA	No	BSL
86-73-7	Fluorene	0.046	J	0.67	J	mg/kg	2SD100	3/14	0.39 - 0.46	0.67	NA	310	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.05	J	1.3	J	mg/kg	2SD100	7/14	0.39 - 0.46	1.3	NA	**0.87**	C	NA	NA	Yes	ASL
78-59-1	Isophorone	0.37	J	0.37	J	mg/kg	2SD100	1/14	0.39 - 0.6	0.37	NA	670	C	NA	NA	No	BSL
85-01-8	Phenanthrene	0.042	J	6.8	J	mg/kg	2SD100	12/14	0.41 - 0.42	6.8	NA	160	N	NA	NA	No	BSL
129-00-0	Pyrene	0.06	J	5.9	J	mg/kg	2SD100	12/14	0.41 - 0.42	5.9	NA	230	N	NA	NA	No	BSL
72-55-9	4,4'-DDE	0.00067	J	0.0077	J	mg/kg	2SD103	3/10	0.0016 - 0.087	0.0077	NA	1.9	C	NA	NA	No	BSL
50-29-3	4,4'-DDT	0.018	J	0.018	J	mg/kg	2SD111	1/11	0.0042 - 0.0033	0.018	NA	1.9	C	NA	NA	No	BSL
5103-71-9	alpha-Chlordane	0.00042	J	0.0033		mg/kg	2SD101	6/13	0.0021 - 0.044	0.0033	NA	1.8 (7)	C	NA	NA	No	BSL
11096-82-5	Aroclor-1260	0.11	J	47.118	J	mg/kg	02-SD-19	21/23	0.622 - 143.103	47.118	NA	**0.32**	C	NA	NA	Yes	ASL
60-57-1	Dieldrin	0.0021	J	0.12	J	mg/kg	2SD102	10/12	0.0079 - 0.087	0.12	NA	**0.04**	C	NA	NA	Yes	ASL
72-20-8	Endrin	0.00072	J	0.019	J	mg/kg	2SD102	3/9	0.0079 - 0.087	0.019	NA	2.3	N	NA	NA	No	BSL
319-84-6	alpha-BHC	0.00017	J	0.00017		mg/kg	2SD111	1/14	0.00017 - 0.044	0.00017	NA	0.1	C	NA	NA	No	BSL
7429-90-5	Aluminum	1520		10100	L	mg/kg	2SD109	14/14		10100	NA	**7800**	N	NA	NA	Yes	ASL
7440-36-0	Antimony	1.5	L	1.5		mg/kg	2SD109-D	1/14	0.67 - 0.82	1.5	NA	3.1	N	NA	NA	No	BSL
7440-38-2	Arsenic	0.8		3.1		mg/kg	2SD102	12/14	0.62 - 0.72	3.1	NA	**0.43**	C	NA	NA	Yes	ASL
7440-39-3	Barium	16.1		53.2		mg/kg	2SD109	14/14		53.2	NA	550	N	NA	NA	No	BSL
7440-43-9	Cadmium	0.4		2.9		mg/kg	2SD100	6/14	0.05 - 0.31	2.9	NA	7.8	N	NA	NA	No	BSL
7440-70-2	Calcium	425		5040	J	mg/kg	2SD100	14/14		5040	NA	NA		NA	NA	No	NUT
7440-47-3	Chromium	9.2	J	66.7		mg/kg	2SD100	14/14		66.7	NA	**23 (8)**	N	NA	NA	No	BKG
7440-48-4	Cobalt	3.6		14.4		mg/kg	2SD109	14/14		14.4	NA	470	N	NA	NA	No	BSL
7440-50-8	Copper	12		56.9		mg/kg	2SD100	14/14		56.9	NA	310	N	NA	NA	No	BSL
7439-89-6	Iron	5490		23200	L	mg/kg	2SD109	14/14		23200	NA	**2300**	N	NA	NA	Yes	ASL
7439-92-1	Lead	7.6	L	246		mg/kg	2SD100	14/14		246	NA	400 (9)		NA	NA	No	BSL
7439-95-4	Magnesium	769		5280	J	mg/kg	2SD100	14/14		5280	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	169	J	1250		mg/kg	2SD109	14/14		1250	NA	**160 (10)**	N	NA	NA	Yes	ASL
7439-97-6	Mercury	0.07		5.4		mg/kg	2SD109-D	12/14	0.06 - 0.07	5.4	NA	**2.3 (11)**	N	NA	NA	Yes	ASL
7440-02-0	Nickel	12		65.8		mg/kg	2SD100	14/14		65.8	NA	160	N	NA	NA	No	BSL
7440-09-7	Potassium	203		1800	L	mg/kg	2SD113	14/14		1800	NA	NA		NA	NA	No	NUT

SITE 2 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7782-49-2	Selenium	0.72	L	1		mg/kg	2SD109	4/14	0.67 - 0.78	1	NA	39	N	NA	NA	No	BSL
7440-22-4	Silver	1.6		1.6		mg/kg	2SD102	1/14	0.45 - 0.53	1.6	NA	39	N	NA	NA	No	BSL
7440-23-5	Sodium	299		299		mg/kg	2SD106	1/14	65.6 - 242	299	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	6.6		29.6	J	mg/kg	2SD102	14/14		29.6	NA	55	N	NA	NA	No	BSL
7440-66-6	Zinc	38.6	J	347		mg/kg	2SD100	14/14		347	NA	2300	N	NA	NA	No	BSL
TTNUS22	Total Organic Carbon	230		20100		mg/kg	02-SD-20	18/18		20100	NA	NA		NA	NA	Yes	NTX

Associated Samples:
2SD1000001 02-SD-02
2SD1010001 02-SD-05
2SD1020001 02-SD-06
2SD1030001 02-SD-07
2SD1040001 02-SD-10
2SD1050001 02-SD-11
2SD1060001 02-SD-15
2SD1070001 02-SD-19
2SD1080001 02-SD-20
2SD1090001 02-SD-21
2SD1090001-02-SD-23
2SD1100001 02-SD-28
2SD1110001
2SD1120001
2SD1130001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 2 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	7.40E-01	NA	8.36E+00		mg/kg	3.78E+00	95% UCL-T	W - Test (2)	3.78E+00	95% UCL-T	W - Test (2)
Aroclor-1254	mg/kg	4.59E-02	NA	2.40E-01		mg/kg	5.82E-02	95% UCL-T	W - Test (3)	5.82E-02	95% UCL-T	W - Test (3)
Aroclor-1260	mg/kg	3.18E-01	NA	3.50E+00	J	mg/kg	6.41E-01	95% UCL-T	W - Test (3)	6.41E-01	95% UCL-T	W - Test (3)
Chromium	mg/kg	3.58E+01	NA	1.18E+02	J	mg/kg	5.40E+01	95% UCL-T	W - Test (2)	5.40E+01	95% UCL-T	W - Test (2)
Iron	mg/kg	1.64E+04	1.89E+04	2.96E+04	J	mg/kg	1.89E+04	95% UCL-N	W - Test (1)	1.89E+04	95% UCL-N	W - Test (1)
Manganese	mg/kg	2.92E+02	NA	7.77E+02	J	mg/kg	4.32E+02	95% UCL-T	W - Test (2)	4.32E+02	95% UCL-T	W - Test (2)
Nickel	mg/kg	3.46E+01	NA	2.43E+02		mg/kg	5.78E+01	95% UCL-T	W - Test (2)	5.78E+01	95% UCL-T	W - Test (2)
Vanadium	mg/kg	2.97E+01	3.36E+01	5.59E+01		mg/kg	3.36E+01	95% UCL-N	W - Test (1)	3.36E+01	95% UCL-N	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 2 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / SubsurfaceSoil
Exposure Point: Surface / Subsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	5.49E-01	NA	8.36E+00		mg/kg	1.36E+00	95% UCL-T	W - Test (3)	1.36E+00	95% UCL-T	W - Test (3)
Aroclor-1254	mg/kg	3.89E-02	NA	2.40E-01		mg/kg	4.39E-02	95% UCL-T	W - Test (3)	4.39E-02	95% UCL-T	W - Test (3)
Aroclor-1260	mg/kg	2.45E-01	NA	3.50E+00	J	mg/kg	3.58E-01	95% UCL-T	W - Test (2)	3.58E-01	95% UCL-T	W - Test (2)
Mangnese	mg/kg	3.47E+02	NA	1.92E+03		mg/kg	5.17E+02	95% UCL-T	W - Test (2)	5.17E+02	95% UCL-T	W - Test (2)
Nickel	mg/kg	3.06E+01	NA	2.43E+02		mg/kg	4.47E+01	95% UCL-T	W - Test (2)	4.47E+01	95% UCL-T	W - Test (2)
Thallium	mg/kg	8.82E-01	NA	3.40E+00	K	mg/kg	1.00E+00	95% UCL-T	W - Test (3)	1.00E+00	95% UCL-T	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 2 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,2-Dichloropropane	mg/L	5.82E-04	NA	1.40E-03		mg/L	6.99E-04	95% UCL-T	W - Test (3)	6.99E-04	95% UCL-T	W - Test (3)
Benzene	mg/L	5.55E-04	NA	1.10E-03		mg/L	6.37E-04	95% UCL-T	W - Test (3)	6.37E-04	95% UCL-T	W - Test (3)
Chloroform	mg/L	5.38E-04	NA	9.60E-04	J	mg/L	6.09E-04	95% UCL-T	W - Test (3)	6.09E-04	95% UCL-T	W - Test (3)
Trichloroethene	mg/L	6.40E-03	NA	3.50E-02	J	mg/L	3.18E-02	95% UCL-T	W - Test (2)	3.18E-02	95% UCL-T	W - Test (2)
cis-1,2-Dichloroethene	mg/L	1.24E-03	NA	7.10E-03		mg/L	2.47E-03	95% UCL-T	W - Test (3)	2.47E-03	95% UCL-T	W - Test (3)
Arsenic	mg/L	2.92E-03	NA	1.52E-02		mg/L	7.86E-03	95% UCL-T	W - Test (3)	7.86E-03	95% UCL-T	W - Test (3)
Barium	mg/L	2.47E-01	NA	7.30E-01		mg/L	6.44E-01	95% UCL-T	W - Test (2)	6.44E-01	95% UCL-T	W - Test (2)
Chromium	mg/L	1.13E-02	NA	3.91E-02		mg/L	3.91E-02	Maximum	W - Test (4)	3.91E-02	Maximum	W - Test (4)
Manganese	mg/L	3.00E+00	NA	2.47E+01		mg/L	8.68E+00	95% UCL-T	W - Test (3)	8.68E+00	95% UCL-T	W - Test (3)
Mercury	mg/L	3.84E-04	NA	2.40E-03		mg/L	9.47E-04	95% UCL-T	W - Test (3)	9.47E-04	95% UCL-T	W - Test (3)
RDX	mg/L	4.75E-04	NA	8.70E-04		mg/L	7.63E-04	95% UCL-T	W - Test (3)	7.63E-04	95% UCL-T	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 2 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	mg/L	4.72E-04	NA	5.40E-04	J	mg/L	5.31E-04	95% UCL-T	W - Test (3)	5.31E-04	95% UCL-T	W - Test (3)
Trichloroethene	mg/L	6.83E-04	NA	1.60E-03		mg/L	9.23E-04	95% UCL-T	W - Test (2)	9.23E-04	95% UCL-T	W - Test (2)
Bis(2-Ethylhexyl)phthalate	mg/L	2.67E-03	NA	6.50E-03		mg/L	3.12E-03	95% UCL-T	W - Test (3)	3.12E-03	95% UCL-T	W - Test (3)
Cadmium	mg/L	1.74E-03	NA	5.60E-03		mg/L	2.13E-03	95% UCL-T	W - Test (3)	2.13E-03	95% UCL-T	W - Test (3)
Iron	mg/L	3.94E-01	NA	1.11E+00	J	mg/L	5.78E-01	95% UCL-T	W - Test (3)	5.78E-01	95% UCL-T	W - Test (3)
Manganese	mg/L	2.71E-01	3.88E-01	7.35E-01		mg/L	3.88E-01	95% UCL-T	W - Test (1)	3.88E-01	95% UCL-T	W - Test (1)
Thallium	mg/L	1.57E-03	NA	3.10E-03		mg/L	1.73E-03	95% UCL-T	W - Test (3)	1.73E-03	95% UCL-T	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	5.60E-01	NA	3.44E+00	J	mg/kg	3.44E+00	95% UCL-T	W - Test (4)	3.44E+00	95% UCL-T	W - Test (4)
Aroclor-1260	mg/kg	9.41E+00	NA	1.43E+02		mg/kg	1.47E+01	95% UCL-T	W - Test (3)	1.47E+01	95% UCL-T	W - Test (3)
Dieldrin	mg/kg	2.17E-02	NA	1.20E-01	J	mg/kg	6.30E-02	95% UCL-T	W - Test (2)	6.30E-02	95% UCL-T	W - Test (2)
Aluminum	mg/kg	5.26E+03	6.32E+03	9.00E+03	L	mg/kg	6.32E+03	95% UCL-N	W - Test (1)	6.32E+03	95% UCL-N	W - Test (1)
Arsenic	mg/kg	1.34E+00	NA	3.10E+00		mg/kg	2.11E+00	95% UCL-T	W - Test (2)	2.11E+00	95% UCL-T	W - Test (2)
Iron	mg/kg	1.28E+04	1.44E+04	1.89E+04		mg/kg	1.44E+04	95% UCL-N	W - Test (1)	1.44E+04	95% UCL-N	W - Test (1)
Manganese	mg/kg	5.84E+02	7.16E+02	9.38E+02		mg/kg	7.16E+02	95% UCL-N	W - Test (1)	7.16E+02	95% UCL-N	W - Test (1)
Mercury	mg/kg	2.89E-01	NA	2.72E+00		mg/kg	5.01E-01	95% UCL-T	W - Test (3)	5.01E-01	95% UCL-T	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(4) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E 05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 2 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.49E-07	Cancer Ingestion Intake - CTE	5.51E-08
Noncancer Ingestion Intake - RME	9.78E-07	Noncancer Ingestion Intake - CTE	4.29E-07
Cancer Dermal Intake - RME	1.10E-05	Cancer Dermal Intake - CTE	6.96E-07
Noncancer Dermal Intake - RME	3.09E-05	Noncancer Dermal Intake - CTE	5.42E-06

SITE 2 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	3.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.7E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	6.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	5.3E-05	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	3.5E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.9E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.2E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	4.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	5.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	3.3E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	4.7E-03
	(total)												9.3E-02
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.1E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.4E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.7E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	4.5E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.7E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.8E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.2E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.0E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.7E-02
	(total)												2.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.3E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	(total)										1.0E-05
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-07
	(total)										9.3E-07
										Total Risk Across All Exposure Routes/Pathways	**1.1E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.5E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.2E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	2.3E-05	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.5E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	8.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.3E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	2.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.4E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.1E-03
	(total)												4.1E-02
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.9E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.5E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	2.9E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	7.8E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E-03
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	3.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.9E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.8E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.0E-02
	(total)												4.8E-02

Total Hazard Index Across All Exposure Routes/Pathways **8.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.1E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	3.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-08
	(total)										1.6E-06
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	3.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-08
	(total)										5.8E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 2 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.6E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.8E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	3.4E-06	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	2.3E-06
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-03
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	3.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-04
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	2.1E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	3.0E-04
	(total)												6.0E-03
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.0E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.8E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	3.0E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	8.1E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-03
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.0E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	3.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.1E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.9E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.0E-02
	(total)												5.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.4E-07
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	(total)										7.8E-07
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	8.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	9.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	(total)										2.0E-07
										Total Risk Across All Exposure Routes/Pathways	**9.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	9.1E-10	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	4.6E-05
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	8.5E-07	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	5.6E-07
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	3.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.9E-04
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	6.8E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.4E-04
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	9.1E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.5E-05
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	5.3E-07	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	7.5E-05
	(total)												1.5E-03
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.0E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.8E-05
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	3.0E-07	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	8.1E-06
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-04
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.4E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.0E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	3.3E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.1E-04
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.9E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.0E-03
	(total)												5.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**6.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	7.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.2E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-10
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.3E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	(total)										5.8E-08
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	3.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-10
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	(total)										6.1E-09
										Total Risk Across All Exposure Routes/Pathways	**6.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	*Soil to Skin Adherence Factor*	*(mg/cm^2)*	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 2 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.9E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.6E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.8E-05	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.2E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	6.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.2E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.6E-04
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.1E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.6E-03
	(total)												3.2E-02
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.8E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.9E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	5.8E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.6E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	2.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.8E-03
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	4.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.8E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	6.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.8E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	3.6E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.0E-02
	(total)												9.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.8E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	3.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-08
	(total)										1.4E-06
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	7.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	5.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	3.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	4.8E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.4E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	5.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	4.5E-06	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	3.0E-06
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	1.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E-03
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	3.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	4.8E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E-04
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	2.8E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	4.0E-04
	(total)												7.9E-03
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.8E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.9E-04
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	5.8E-07	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.6E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	2.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.8E-04
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	4.7E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.8E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	6.3E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.8E-04
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	3.6E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.0E-03
	(total)												9.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	4.5E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	6.9E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	7.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	(total)										3.4E-07
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	7.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.4E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	5.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	**3.6E-07**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	BW x AT x CF
	Fi	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.91E-07	Cancer Ingestion Intake - CTE	8.57E-08
Noncancer Ingestion Intake - RME	4.57E-06	Noncancer Ingestion Intake - CTE	2.00E-06
Cancer Dermal Intake - RME	1.37E-05	Cancer Dermal Intake - CTE	1.20E-06
Noncancer Dermal Intake - RME	1.60E-04	Noncancer Dermal Intake - CTE	2.80E-05

SITE 2 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.7E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.3E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	2.5E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.6E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	8.6E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.9E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	2.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.5E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.2E-02
	(total)												4.4E-01
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	7.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.6E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	6.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	8.6E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.3E-03
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	3.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	6.9E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.6E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	9.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-01
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	5.4E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.0E-01
	(total)												1.4E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.5E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	(total)										1.1E-05
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	6.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	4.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	5.3E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	(total)										1.2E-06
										Total Risk Across All Exposure Routes/Pathways	**1.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	7.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.2E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.8E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.1E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	7.2E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	3.8E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	8.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.3E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.8E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	6.7E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	9.6E-03
	(total)												1.9E-01
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	9.8E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	4.9E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.5E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	4.0E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	5.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.5E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	9.4E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.2E-02
	(total)												2.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	3.2E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	5.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										2.5E-06
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	4.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.2E-08
	(total)										1.0E-07
										Total Risk Across All Exposure Routes/Pathways	**2.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.56E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 2 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	5.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	8.0E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	4.0E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	8.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	7.4E-05	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	4.9E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	2.6E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	5.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	7.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.0E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	4.6E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	6.6E-03
	(total)												1.3E-01
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	6.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	4.3E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.2E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	4.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	6.7E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.8E-03
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	2.3E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.8E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	5.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.7E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	7.1E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.9E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	4.1E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.3E-01
	(total)												1.1E+00

Total Hazard Index Across All Exposure Routes/Pathways **1.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.8E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	3.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	(total)										1.4E-05
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.6E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	(total)										3.5E-06
										Total Risk Across All Exposure Routes/Pathways	**1.7E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.7E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.3E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	2.5E-05	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.6E-05
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	8.7E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.9E-03
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	2.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-03
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.5E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.2E-03
	(total)												4.4E-02
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	8.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.8E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.9E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	6.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	8.9E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.4E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	3.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	7.1E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.9E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	9.5E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	5.5E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.0E-02
	(total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.7E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	(total)										1.3E-06
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	8.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	5.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	6.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 2 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	4.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	7.4E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.7E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	8.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	6.9E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	4.6E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	2.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.1E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	5.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	7.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.7E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	4.3E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	6.1E-02
	(total)												1.2E+00
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	7.8E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.9E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	8.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.2E-04	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	3.2E-03
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	4.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	9.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E+00
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.6E-01
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	7.5E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	4.1E-01
	(total)												2.0E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	4.1E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-05
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	6.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	7.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	(total)										3.2E-05
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	9.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	6.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	7.4E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	(total)										1.6E-06
										Total Risk Across All Exposure Routes/Pathways	**3.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	2.5E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.2E-02
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	2.3E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.5E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	8.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-01
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.8E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.2E-02
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	2.5E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.4E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.1E-02
	(total)												4.1E-01
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	1.0E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.2E-03
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chromium	5.40E+01	mg/kg	5.40E+01	mg/kg	M	1.6E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	4.3E-04
	Iron	1.89E+04	mg/kg	1.89E+04	mg/kg	M	5.7E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	Manganese	4.32E+02	mg/kg	4.32E+02	mg/kg	M	1.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.6E-01
	Nickel	5.78E+01	mg/kg	5.78E+01	mg/kg	M	1.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.2E-02
	Vanadium	3.36E+01	mg/kg	3.36E+01	mg/kg	M	1.0E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.5E-02
	(total)												2.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	4.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-06
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	7.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	7.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	(total)										3.5E-06
Dermal	BAP EQUIVALENT	3.78E+00	mg/kg	3.78E+00	mg/kg	M	4.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	5.82E-02	mg/kg	5.82E-02	mg/kg	M	3.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	Aroclor-1260	6.41E-01	mg/kg	6.41E-01	mg/kg	M	3.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	(total)										7.2E-08
										Total Risk Across All Exposure Routes/Pathways	**3.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 2 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	6.2E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.1E-04
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	7.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.6E-03
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	6.3E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.1E-04
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.0E-03
	(total)												6.3E-03
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	7.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.2E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.9E-04
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	9.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	2.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-02
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	2.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.5E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.4E-04
	(total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	6.8E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	2.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	(total)										5.4E-07
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	2.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	4.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	3.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.8E-08
	(total)										7.7E-08
										Total Risk Across All Exposure Routes/Pathways	**6.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	4.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.5E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	7.7E-05
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	1.8E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.1E-04
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	1.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.9E-05
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.5E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.0E-04
	(total)												1.6E-03
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	7.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.2E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.9E-05
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	9.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	2.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-03
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	2.0E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-04
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.5E-09	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.4E-05
	(total)												3.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	6.1E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-08
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	2.0E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	(total)										4.8E-08
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	(total)										2.8E-09
										Total Risk Across All Exposure Routes/Pathways	**5.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 2 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	4.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.5E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	7.4E-03
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	1.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.7E-02
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	1.5E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.6E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	3.4E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.8E-02
	(total)												1.5E-01
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	3.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	5.9E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.9E-03
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	1.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.4E-01
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	9.9E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-02
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	2.2E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.2E-03
	(total)												1.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAHs - 0.13
PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	6.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	2.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	(total)										5.2E-07
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	5.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	8.4E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	6.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	(total)										1.5E-08
										Total Risk Across All Exposure Routes/Pathways	**5.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	7.4E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.7E-03
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	6.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	8.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.4E-02
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	7.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.8E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	1.7E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.4E-02
	(total)												7.5E-02
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	7.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.2E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.9E-04
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	9.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Mangnese	5.17E+02	mg/kg	5.17E+02	mg/kg	M	2.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-02
	Nickel	4.47E+01	mg/kg	4.47E+01	mg/kg	M	2.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-03
	Thallium	1.00E+00	mg/kg	1.00E+00	mg/kg	M	4.5E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.4E-04
	(total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAHs - 0.13
PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.8a. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	3.3E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	8.7E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	(total)										2.6E-07
Dermal	BAP EQUIVALENT	1.36E+00	mg/kg	1.36E+00	mg/kg	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1254	4.39E-02	mg/kg	4.39E-02	mg/kg	M	1.7E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-10
	Aroclor-1260	3.58E-01	mg/kg	3.58E-01	mg/kg	M	1.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	(total)										3.1E-09
										Total Risk Across All Exposure Routes/Pathways	**2.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 2 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	1.00E+00	4.30E-01		1.00E-02		1.00E-02	1.30E-08
Benzene	6.37E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.03E-08
Chloroform	6.09E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.03E-08
Trichloroethene	3.18E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.04E-06
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.15E-08
Arsenic	7.86E-03		i			1.00E+00			1.00E-03			7.86E-09
Barium	6.44E-01		i			1.00E+00			1.00E-03			6.44E-07
Chromium	3.91E-02		i			1.00E+00			2.00E-03			7.82E-08
Manganese	8.68E+00		i			1.00E+00			1.00E-03			8.68E-06
Mercury	9.47E-04		i			1.00E+00			1.00E-03			9.47E-10
RDX	7.63E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.64E-08

SITE 2 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.7E-10	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.5E-07
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	2.7E-10	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.6E-07
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	2.2E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.5E-06
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	8.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.9E-06
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	2.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.6E-05
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	1.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-05
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	1.3E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.2E-03
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	5.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.3E-05
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	1.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.3E-04
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	8.2E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.7E-03
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	9.9E-07	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.6E-05
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	1.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.4E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	1.2E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.7E-04
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	7.1E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-04
	(total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-01**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

SITE 2 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	6.2E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	9.5E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-12
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	7.8E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.3E-12
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	6.6E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.9E-11
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.9E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.9E-11
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	5.9E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	9.2E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	4.7E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.8E-10
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	4.7E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	3.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	2.6E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	1.00E+00	4.30E-01		1.00E-02		1.00E-02	1.30E-08
Benzene	6.37E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.03E-08
Chloroform	6.09E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.03E-08
Trichloroethene	3.18E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.04E-06
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.15E-08
Arsenic	7.86E-03		i			1.00E+00			1.00E-03			7.86E-09
Barium	6.44E-01		i			1.00E+00			1.00E-03			6.44E-07
Chromium	3.91E-02		i			1.00E+00			2.00E-03			7.82E-08
Manganese	8.68E+00		i			1.00E+00			1.00E-03			8.68E-06
Mercury	9.47E-04		i			1.00E+00			1.00E-03			9.47E-10
RDX	7.63E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.64E-08

SITE 2 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	4.4E-11	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	3.8E-08
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	6.6E-11	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	3.9E-08
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	5.5E-11	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.4E-07
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	4.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.1E-07
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	8.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.3E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.3E-05
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	6.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.5E-06
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	6.6E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-03
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	2.6E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.6E-05
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	5.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-04
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	4.1E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	8.3E-04
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	5.0E-07	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.3E-05
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	5.5E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.9E-02
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	6.0E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.9E-04
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	3.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-04
	(total)												7.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**7.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	5.6E-12	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	8.5E-12	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-13
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	7.0E-12	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-13
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	5.9E-10	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-12
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.6E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.4E-12
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.1E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-10
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.7E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-10
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	8.4E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	5.1E-11
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	8.5E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-09
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	6.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-09
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	4.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	(total)										2.5E-08
										Total Risk Across All Exposure Routes/Pathways	**2.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	1.00E+00	4.30E-01		1.00E-02		1.00E-02	1.30E-08
Benzene	6.37E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.03E-08
Chloroform	6.09E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.03E-08
Trichloroethene	3.18E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.04E-06
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.15E-08
Arsenic	7.86E-03		i			1.00E+00			1.00E-03			7.86E-09
Barium	6.44E-01		i			1.00E+00			1.00E-03			6.44E-07
Chromium	3.91E-02		i			1.00E+00			2.00E-03			7.82E-08
Manganese	8.68E+00		i			1.00E+00			1.00E-03			8.68E-06
Mercury	9.47E-04		i			1.00E+00			1.00E-03			9.47E-10
RDX	7.63E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.64E-08

SITE 2 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.7E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.5E-06
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	2.5E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.5E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	2.1E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.4E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	7.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.7E-05
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	8.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.3E-04
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	6.5E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.5E-05
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	6.6E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	2.6E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.6E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	5.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-03
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	4.1E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	8.3E-03
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	5.0E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.3E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	5.5E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.9E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	6.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.9E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	3.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-03
	(total)												7.1E-01

Total Hazard Index Across All Exposure Routes/Pathways **7.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	2.4E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	3.6E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	3.0E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-12
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	2.5E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	1.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.9E-11
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.2E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.8E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-10
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	9.3E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	9.4E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	7.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	5.1E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	(total)										2.8E-08
										Total Risk Across All Exposure Routes/Pathways	**2.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	1.00E+00	4.30E-01		1.00E-02		1.00E-02	1.30E-08
Benzene	6.37E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.03E-08
Chloroform	6.09E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.03E-08
Trichloroethene	3.18E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.04E-06
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.15E-08
Arsenic	7.86E-03		i			1.00E+00			1.00E-03			7.86E-09
Barium	6.44E-01		i			1.00E+00			1.00E-03			6.44E-07
Chromium	3.91E-02		i			1.00E+00			2.00E-03			7.82E-08
Manganese	8.68E+00		i			1.00E+00			1.00E-03			8.68E-06
Mercury	9.47E-04		i			1.00E+00			1.00E-03			9.47E-10
RDX	7.63E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.64E-08

SITE 2 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	8.4E-10	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	7.3E-07
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.3E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	7.5E-07
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.1E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	8.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	3.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E-05
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	8.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.3E-04
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	6.5E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.5E-05
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	6.6E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	2.6E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.6E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	5.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-03
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	4.1E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	8.3E-03
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	5.0E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.3E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	5.5E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.9E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	6.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.9E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	3.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-03
	(total)												7.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**7.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.2E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.8E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-13
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.5E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-12
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.3E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.6E-12
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	5.6E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.3E-12
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.2E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.8E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-10
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	9.3E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	9.4E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	7.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	5.1E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	(total)										2.8E-08
										Total Risk Across All Exposure Routes/Pathways	**2.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 -TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - (exp(Ra) x (Ds-Dt))/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	2.50E-01	4.30E-01		1.00E-02		1.00E-02	6.33E-09
Benzene	6.37E-04		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	9.43E-09
Chloroform	6.09E-04		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	5.14E-09
Trichloroethene	3.18E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	5.21E-07
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	1.99E-08
Arsenic	7.86E-03		i			2.50E-01			1.00E-03			1.96E-09
Barium	6.44E-01		i			2.50E-01			1.00E-03			1.61E-07
Chromium	3.91E-02		i			2.50E-01			2.00E-03			1.96E-08
Manganese	8.68E+00		i			2.50E-01			1.00E-03			2.17E-06
Mercury	9.47E-04		i			2.50E-01			1.00E-03			2.37E-10
RDX	7.63E-04		o		4.75	2.50E-01	1.98		1.90E-02		7.41E-04	2.82E-08

SITE 2 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.8E-03
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	1.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E-03
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	8.7E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.5E-01
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	6.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E-03
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	2.2E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.2E-01
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	1.8E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.5E-01
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	1.1E-03	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	7.1E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	2.4E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E+01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	2.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.6E-02
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	2.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.0E-03
	(total)												1.3E+01
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	3.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.9E-04
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	1.6E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-04
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	1.6E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.7E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	6.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.3E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	6.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-03
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	5.1E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.0E-02
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	6.2E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.6E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	6.8E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.5E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	7.5E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.6E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	8.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.0E-03
	(total)												9.0E-01

SITE 2 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	(mg/m^3- min)	R	5.0E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	4.4E-03
	Benzene	6.37E-04	mg/L	2.48E-04	(mg/m^3- min)	R	5.4E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	3.2E-03
	Chloroform	6.09E-04	mg/L	1.99E-04	(mg/m^3- min)	R	4.3E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.0E-02
	Trichloroethene	3.18E-02	mg/L	1.04E-02	(mg/m^3- min)	R	2.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	(mg/m^3- min)	R	1.9E-05	mg/kg-day		mg/kg-day	NA	NA	
													5.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	6.6E-06	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	6.0E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	5.7E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	3.0E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-06
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	7.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-04
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	7.2E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.9E-07
	(total)										1.2E-04
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	6.8E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-08
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.0E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	5.5E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	5.6E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-07
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	2.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	3.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	(total)										1.4E-06
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	$(mg/m^3\text{- min})$	R	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	2.48E-04	$(mg/m^3\text{- min})$	R	1.8E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-08
	Chloroform	6.09E-04	mg/L	1.99E-04	$(mg/m^3\text{- min})$	R	1.5E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Trichloroethene	3.18E-02	mg/L	1.04E-02	$(mg/m^3\text{- min})$	R	7.7E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	$(mg/m^3\text{- min})$	R	6.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											6.4E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.2E-04**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	1.67E-01	4.30E-01		1.00E-02		1.00E-02	5.17E-09
Benzene	6.37E-04		o		6.30E-01	1.67E-01	2.60E-01		2.10E-02		1.30E-02	7.71E-09
Chloroform	6.09E-04		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	4.20E-09
Trichloroethene	3.18E-02		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	4.26E-07
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	1.67E-01	3.40E-01		1.00E-02		7.20E-03	1.62E-08
Arsenic	7.86E-03		i			1.67E-01			1.00E-03			1.31E-09
Barium	6.44E-01		i			1.67E-01			1.00E-03			1.08E-07
Chromium	3.91E-02		i			1.67E-01			2.00E-03			1.31E-08
Manganese	8.68E+00		i			1.67E-01			1.00E-03			1.45E-06
Mercury	9.47E-04		i			1.67E-01			1.00E-03			1.58E-10
RDX	7.63E-04		o		4.75	1.67E-01	1.98		1.90E-02		7.41E-04	2.30E-08

SITE 2 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	9.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	8.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.7E-03
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	7.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.8E-04
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	4.1E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	6.8E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	3.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.2E-03
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	1.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-01
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	8.3E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.2E-01
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	5.0E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	3.3E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	1.1E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.6E+00
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	1.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.0E-02
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	9.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.3E-03
	(total)												6.1E+00
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	9.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.7E-04
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	7.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.7E-05
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	7.8E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.3E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	3.0E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.0E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	2.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.0E-04
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	2.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	4.0E-03
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	2.4E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	6.4E-05
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	2.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.3E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	2.9E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.4E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	4.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-03
	(total)												3.5E-01

SITE 2 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	(mg/m^3- min)	R	1.8E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.6E-03
	Benzene	6.37E-04	mg/L	2.48E-04	(mg/m^3- min)	R	2.0E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.2E-03
	Chloroform	6.09E-04	mg/L	1.99E-04	(mg/m^3- min)	R	1.6E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.9E-02
	Trichloroethene	3.18E-02	mg/L	1.04E-02	(mg/m^3- min)	R	8.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	(mg/m^3- min)	R	7.0E-06	mg/kg-day		mg/kg-day	NA	NA	
													2.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.5E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	9.0E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	6.1E-08
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	8.2E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	7.8E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	4.1E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	1.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	9.8E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										1.6E-05
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	9.5E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	1.4E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	7.7E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.7E-10
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	7.8E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	8.6E-08
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	2.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	4.2E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	(total)										1.8E-07
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	$(mg/m^3\text{- min})$	R	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	2.48E-04	$(mg/m^3\text{- min})$	R	2.0E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	Chloroform	6.09E-04	mg/L	1.99E-04	$(mg/m^3\text{- min})$	R	1.6E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Trichloroethene	3.18E-02	mg/L	1.04E-02	$(mg/m^3\text{- min})$	R	8.3E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	$(mg/m^3\text{- min})$	R	7.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											6.9E-08

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.6E-05**

SITE 2 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Mass Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,2-Dichloropropane	6.99E-04		o		1.00E+00	2.50E-01	4.30E-01		1.00E-02		1.00E-02	6.33E-09
Benzene	6.37E-04		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	9.43E-09
Chloroform	6.09E-04		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	5.14E-09
Trichloroethene	3.18E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	5.21E-07
cis-1,2-Dichloroethene	2.47E-03		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	1.99E-08
Arsenic	7.86E-03		i			2.50E-01			1.00E-03			1.96E-09
Barium	6.44E-01		i			2.50E-01			1.00E-03			1.61E-07
Chromium	3.91E-02		i			2.50E-01			2.00E-03			1.96E-08
Manganese	8.68E+00		i			2.50E-01			1.00E-03			2.17E-06
Mercury	9.47E-04		i			2.50E-01			1.00E-03			2.37E-10
RDX	7.63E-04		o		4.75	2.50E-01	1.98		1.90E-02		7.41E-04	2.82E-08

SITE 2 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	4.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	4.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-02
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	3.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.9E-03
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	2.0E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.4E-01
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	1.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-02
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	5.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E+00
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	4.1E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.9E-01
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	2.5E-03	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.7E-03
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	5.5E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E+01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	6.1E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-01
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	4.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-02
	(total)												3.1E+01
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	2.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	4.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-03
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	2.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.3E-04
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	2.3E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.9E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	8.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.9E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	8.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-03
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	7.2E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.5E-02
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	8.7E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.3E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	9.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E+00
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	1.1E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.0E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	1.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.2E-03
	(total)												1.3E+00

SITE 2 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	(mg/m^3- min)	R	2.3E-05	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	2.0E-02
	Benzene	6.37E-04	mg/L	2.48E-04	(mg/m^3- min)	R	2.5E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.5E-02
	Chloroform	6.09E-04	mg/L	1.99E-04	(mg/m^3- min)	R	2.0E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.3E-01
	Trichloroethene	3.18E-02	mg/L	1.04E-02	(mg/m^3- min)	R	1.0E-03	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	(mg/m^3- min)	R	8.9E-05	mg/kg-day		mg/kg-day	NA	NA	
													2.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	3.8E-06	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	3.5E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	3.3E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	1.7E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	4.3E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-05
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	4.2E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	(total)										6.7E-05
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	2.4E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	3.6E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	2.0E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	2.0E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	7.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	1.1E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										4.8E-07
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	$(mg/m^3\text{- min})$	R	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	2.48E-04	$(mg/m^3\text{- min})$	R	2.2E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.3E-08
	Chloroform	6.09E-04	mg/L	1.99E-04	$(mg/m^3\text{- min})$	R	1.7E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Trichloroethene	3.18E-02	mg/L	1.04E-02	$(mg/m^3\text{- min})$	R	9.0E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	$(mg/m^3\text{- min})$	R	7.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											7.4E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **6.9E-05**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,2-Dichloropropane	6.99E-04	o	1.00E+00	1.67E-01	4.30E-01	1.00E-02	1.00E-02	5.17E-09
Benzene	6.37E-04	o	6.30E-01	1.67E-01	2.60E-01	2.10E-02	1.30E-02	7.71E-09
Chloroform	6.09E-04	o	1.10E+00	1.67E-01	4.70E-01	8.90E-03	9.30E-03	4.20E-09
Trichloroethene	3.18E-02	o	1.30E+00	1.67E-01	5.50E-01	1.60E-02	2.60E-02	4.26E-07
cis-1,2-Dichloroethene	2.47E-03	o	8.20E-01	1.67E-01	3.40E-01	1.00E-02	7.20E-03	1.62E-08
Arsenic	7.86E-03	i		1.67E-01		1.00E-03		1.31E-09
Barium	6.44E-01	i		1.67E-01		1.00E-03		1.08E-07
Chromium	3.91E-02	i		1.67E-01		2.00E-03		1.31E-08
Manganese	8.68E+00	i		1.67E-01		1.00E-03		1.45E-06
Mercury	9.47E-04	i		1.67E-01		1.00E-03		1.58E-10
RDX	7.63E-04	o	4.75	1.67E-01	1.98	1.90E-02	7.41E-04	2.30E-08

SITE 2 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	3.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	2.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.1E-03
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	2.6E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.6E-03
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	1.4E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.3E-01
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	1.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-02
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	3.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E+00
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	2.8E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.9E-01
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	1.7E-03	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.1E-03
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	3.7E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E+01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	4.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-01
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	3.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-02
	(total)												2.0E+01
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	2.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.7E-04
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	1.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-04
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	1.3E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.1E-02
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.47E-03	mg/L	M	4.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.8E-04
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	3.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	Barium	6.44E-01	mg/L	6.44E-01	mg/L	M	3.2E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	6.5E-03
	Chromium	3.91E-02	mg/L	3.91E-02	mg/L	M	3.9E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.0E-04
	Manganese	8.68E+00	mg/L	8.68E+00	mg/L	M	4.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.4E-01
	Mercury	9.47E-04	mg/L	9.47E-04	mg/L	M	4.7E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.2E-03
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	6.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-03
	(total)												5.7E-01

SITE 2 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	(mg/m^3- min)	R	8.6E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	7.6E-03
	Benzene	6.37E-04	mg/L	2.48E-04	(mg/m^3- min)	R	9.3E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.5E-03
	Chloroform	6.09E-04	mg/L	1.99E-04	(mg/m^3- min)	R	7.5E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	8.7E-02
	Trichloroethene	3.18E-02	mg/L	1.04E-02	(mg/m^3- min)	R	3.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	(mg/m^3- min)	R	3.3E-05	mg/kg-day		mg/kg-day	NA	NA	
													1.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	8.5E-07	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-08
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	7.8E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	7.4E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	3.9E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	9.6E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-05
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	9.3E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	(total)										1.5E-05
Dermal	1,2-Dichloropropane	6.99E-04	mg/L	6.99E-04	mg/L	M	4.4E-08	mg/kg-day	6.80E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Benzene	6.37E-04	mg/L	6.37E-04	mg/L	M	6.6E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Chloroform	6.09E-04	mg/L	6.09E-04	mg/L	M	3.6E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-10
	Trichloroethene	3.18E-02	mg/L	3.18E-02	mg/L	M	3.6E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Arsenic	7.86E-03	mg/L	7.86E-03	mg/L	M	1.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	RDX	7.63E-04	mg/L	7.63E-04	mg/L	M	2.0E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	(total)										8.3E-08
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.30E-04	$(mg/m^3\text{- min})$	R	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	2.48E-04	$(mg/m^3\text{- min})$	R	2.7E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	7.7E-09
	Chloroform	6.09E-04	mg/L	1.99E-04	$(mg/m^3\text{- min})$	R	2.1E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Trichloroethene	3.18E-02	mg/L	1.04E-02	$(mg/m^3\text{- min})$	R	1.1E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.7E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	8.77E-04	$(mg/m^3\text{- min})$	R	9.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											9.2E-08

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.5E-05**

SITE 2 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 2 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	8.9E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.8E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	8.9E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.9E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.9E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.8E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.0E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	7.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-04
	(total)												1.4E-02
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.8E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.6E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.8E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.8E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.4E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.2E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.2E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.1E-03
	(total)												4.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	7.4E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.2E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	7.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.4E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.0E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	8.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.1E-06
										Total Risk Across All Exposure Routes/Pathways	**6.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2- TABLE 7.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.2E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	4.4E-05
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.2E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	5.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	2.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-05
	(total)												3.5E-03
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.8E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.6E-05
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.8E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.8E-05
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.4E-05
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.4E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-04
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.2E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.1E-04
	(total)												4.5E-03

Total Hazard Index Across All Exposure Routes/Pathways **8.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.9E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.7E-07
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	5.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.6E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	8.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	4.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.9E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.1E-07
										Total Risk Across All Exposure Routes/Pathways	**3.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.63E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 2 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	5.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.1E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	4.3E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.1E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.1E-02
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	4.9E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-01
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	2.4E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.7E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.7E-03
	(total)												3.4E-01
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.4E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.8E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.4E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.7E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	3.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.6E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.1E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.3E-03
	(total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**5.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	7.1E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.0E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	7.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.8E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.0E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	4.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	2.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.2E-07
										Total Risk Across All Exposure Routes/Pathways	**3.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	5.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.1E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.1E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.1E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.1E-02
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.4E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.1E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.2E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.1E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	8.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-03
	(total)												1.7E-01
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.8E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.6E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.8E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.8E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.4E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.2E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.2E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.1E-03
	(total)												4.5E-02

Total Hazard Index Across All Exposure Routes/Pathways **2.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	8.3E-08	mg/kg-day	7.30E+00	(mg/kg-day)$^{-1}$	6.1E-07
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.6E-07	mg/kg-day	2.00E+00	(mg/kg-day)$^{-1}$	7.1E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.5E-09	mg/kg-day	1.60E+01	(mg/kg-day)$^{-1}$	2.4E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	5.1E-08	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	7.6E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	3.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.7E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.2E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.4E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	5.6E-08	mg/kg-day	2.00E+00	(mg/kg-day)$^{-1}$	1.1E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	4.0E-10	mg/kg-day	1.60E+01	(mg/kg-day)$^{-1}$	6.4E-09
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	4.0E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	4.0E-09	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	6.0E-09
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	9.2E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	4.6E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	3.2E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 2 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	9.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.9E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	7.9E-05
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	4.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.0E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.4E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	9.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	4.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.2E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	3.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-04
	(total)												6.3E-03
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	5.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.6E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	7.1E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	8.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	4.0E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.0E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.8E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-03
	(total)												5.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 -TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	9.2E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-07
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	4.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.9E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.7E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	5.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	3.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.1E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.5E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	3.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.7E-06
										Total Risk Across All Exposure Routes/Pathways	**6.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	5.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	9.9E-10	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.0E-05
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	9.9E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.9E-05
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.3E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.3E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.5E-04
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.6E-04
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	7.8E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-05
	(total)												1.6E-03
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.6E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	7.1E-05
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.6E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-05
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-04
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	4.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.0E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.8E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-04
	(total)												5.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**7.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	6.9E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.3E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	4.2E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.2E-07
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	4.6E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	7.3E-09
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	4.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	4.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-09
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	5.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	3.6E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**2.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 2 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	4.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.1E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	4.2E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.1E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.1E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	4.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	2.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.5E-04
	(total)												3.3E-02
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	9.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	6.8E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.4E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	6.8E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.8E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	6.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	7.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.7E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	5.4E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.6E-03
	(total)												1.1E-01

Total Hazard Index Across All Exposure Routes/Pathways **1.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	7.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.0E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.8E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	6.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.4E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	9.7E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	9.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.8E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	7.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-06
										Total Risk Across All Exposure Routes/Pathways	**5.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	5.2E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.0E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	5.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.2E-04
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.8E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.0E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	5.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	4.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-04
	(total)												8.3E-03
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	9.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	6.8E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.4E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	6.8E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.8E-05
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	6.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-04
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E-04
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	7.7E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.7E-03
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	5.4E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.6E-04
	(total)												1.1E-02

Total Hazard Index Across All Exposure Routes/Pathways **1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.7E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	7.5E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	7.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	8.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	5.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.0E-07
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	6.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.4E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	9.7E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	9.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	7.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-07
										Total Risk Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 2 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	8.6E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.7E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	8.7E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.7E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.6E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.6E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	9.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.9E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	6.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-03
	(total)												1.4E-01
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	5.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	7.8E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.6E-02
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	7.8E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.8E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	7.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.8E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.9E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	8.8E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.1E+00
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	6.2E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.9E-02
	(total)												1.2E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.6E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-05
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.9E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-05
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	3.0E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.7E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	3.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.9E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.8E-05
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	3.7E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-05
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.7E-07	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.3E-06
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.7E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-06
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.3E-05
										Total Risk Across All Exposure Routes/Pathways	**1.1E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 7.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.9E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.8E-04
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.9E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.9E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.2E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E-02
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.7E-04
	(total)												4.6E-02
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	7.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.0E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.1E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.0E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.9E-03
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.5E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	8.3E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.9E-03
	(total)												1.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.7E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.9E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.7E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	7.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.5E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.0E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	8.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-06
										Total Risk Across All Exposure Routes/Pathways	**5.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 2 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	8.1E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.6E-02
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	8.1E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.1E-02
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.0E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.8E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.2E-01
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	9.2E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.6E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	6.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-02
	(total)												1.3E+00
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.4E-06	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.8E-02
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.4E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-02
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.4E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.7E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	3.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-01
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.6E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E+00
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.1E-06	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.4E-02
	(total)												2.3E+00

Total Hazard Index Across All Exposure Routes/Pathways **3.5E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	3.8E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-05
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.6E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-05
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	6.9E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	6.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-06
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.6E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	7.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	5.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.4E-05
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	8.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.7E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-05
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.2E-07	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	2.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	1.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	9.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.8E-05
										Total Risk Across All Exposure Routes/Pathways	**1.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	6.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	2.7E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.4E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	2.7E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.7E-02
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	9.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E-02
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	6.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-01
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	3.1E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	2.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.1E-03
	(total)												4.3E-01
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	2.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	1.9E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	3.8E-03
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	1.9E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.9E-03
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.3E-03
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	4.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	2.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-01
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	1.5E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	7.2E-03
	(total)												3.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	4.2E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-06
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	1.8E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	7.7E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	7.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	2.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-07
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	8.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	6.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.2E-06
Dermal	BAP EQUIVALENT	3.44E+00	mg/kg	3.44E+00	mg/kg	M	3.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.47E+01	mg/kg	1.47E+01	mg/kg	M	7.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Dieldrin	6.30E-02	mg/kg	6.30E-02	mg/kg	M	5.4E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	8.6E-08
	Aluminum	6.32E+03	mg/kg	6.32E+03	mg/kg	M	5.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.11E+00	mg/kg	2.11E+00	mg/kg	M	5.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-08
	Iron	1.44E+04	mg/kg	1.44E+04	mg/kg	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.16E+02	mg/kg	7.16E+02	mg/kg	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.01E-01	mg/kg	5.01E-01	mg/kg	M	4.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.7E-06
										Total Risk Across All Exposure Routes/Pathways	**8.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Dieldrin - 0.1
Arsenic - 0.03
Other Metals - 0.01

SITE 2 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.1E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	3.8E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	6.4E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.7E-05		2.00E-02	mg/kg-day	NA	NA	8.3E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	2.7E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.2E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	7.3E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	4.9E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.2E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	2.2E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.1E-04
	(total)												9.6E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	4.1E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.4E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	5.9E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	(total)										8.4E-08
										Total Risk Across All Exposure Routes/Pathways	**8.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER**

SITE NAME: **SITE 2 - APPLE ORCHARD LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/11/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.19a CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.7E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.7E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.9E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.2E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	8.3E-06		2.00E-02	mg/kg-day	NA	NA	4.1E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.4E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.1E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.7E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.5E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.1E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.1E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-04
	(total)												4.8E-03

Total Hazard Index Across All Exposure Routes/Pathways **4.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	7.3E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.5E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.1E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	(total)										1.5E-08
										Total Risk Across All Exposure Routes/Pathways	**1.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4-20

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.7E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.9E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.2E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	8.3E-05		2.00E-02	mg/kg-day	NA	NA	4.1E-03
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.4E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.1E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.5E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.1E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-03
	(total)												4.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	8.1E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.9E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.7E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.2E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	(total)										1.7E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.7E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.9E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.2E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	8.3E-05		2.00E-02	mg/kg-day	NA	NA	4.1E-03
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.4E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.1E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.5E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.1E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-03
	(total)												4.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	8.1E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.9E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.7E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.2E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	(total)										1.7E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.21

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.34E-05
Noncancer Ingestion Intake(RME) = 3.13E-05

Cancer Ingestion Intake(CTE) = 4.03E-06
Noncancer Ingestion Intake(CTE) = 3.13E-05

Cancer Dermal Intake(RME) = 2.42E+00
Noncancer Dermal Intake(RME) = 5.64E+00

Cancer Dermal Intake(CTE) = 7.25E-01
Noncancer Dermal Intake(CTE) = 5.64E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.7E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.9E-08	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.8E-06
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	9.8E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.9E-06
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	6.7E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	1.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.1E-04
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	5.4E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	7.7E-04
	(total)												1.6E-03
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.0E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.0E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.7E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.8E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	7.3E-06		2.00E-02	mg/kg-day	NA	NA	3.7E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.2E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	9.6E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.3E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	9.8E-09	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.4E-04
	(total)												4.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	7.1E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.2E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	4.2E-08	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-10
	(total)										7.7E-10
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	2.2E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	7.3E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	3.1E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	4.4E-08
	(total)										4.5E-08
										Total Risk Across All Exposure Routes/Pathways	**4.6E-08**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.7E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.9E-08	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.8E-06
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	9.8E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.9E-06
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	6.7E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	1.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.1E-04
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	5.4E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	7.7E-04
	(total)												1.6E-03
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.0E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.0E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.7E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.8E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	7.3E-06		2.00E-02	mg/kg-day	NA	NA	3.7E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.2E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	9.6E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.3E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	9.8E-09	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.4E-04
	(total)												4.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	2.1E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	3.7E-09	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-11
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.3E-08	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	(total)										2.3E-10
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	6.5E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.2E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	9.4E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	**1.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.22

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3,260	EPA 1997a	3,260	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.37E-05
Noncancer Ingestion Intake(RME) = 1.66E-04

Cancer Ingestion Intake(CTE) = 1.18E-05
Noncancer Ingestion Intake(CTE) = 8.28E-05

Cancer Dermal Intake(RME) = 1.54E+00
Noncancer Dermal Intake(RME) = 1.08E+01

Cancer Dermal Intake(CTE) = 7.71E-01
Noncancer Dermal Intake(CTE) = 5.40E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	8.8E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.8E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.5E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.5E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	5.2E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-05
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	3.5E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.1E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	9.6E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.2E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	6.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.2E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	2.9E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.1E-03
	(total)												8.4E-03
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	9.7E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.7E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	3.3E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.5E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.4E-05		2.00E-02	mg/kg-day	NA	NA	7.0E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	2.3E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.8E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	6.2E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	4.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.2E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.9E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.7E-04
	(total)												8.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.3E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	7.7E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.2E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	7.4E-08	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	(total)										1.3E-09
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.4E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.4E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	4.7E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.0E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	(total)										2.9E-08
										Total Risk Across All Exposure Routes/Pathways	**3.0E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	4.4E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.4E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	7.6E-08	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.3E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.6E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-05
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	4.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	3.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.0E-03
	(total)												4.2E-03
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	4.8E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.8E-06
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.6E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.7E-05
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	7.0E-06		2.00E-02	mg/kg-day	NA	NA	3.5E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.2E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	9.2E-04
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.1E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-05
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.6E-03
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	9.4E-09	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.3E-04
	(total)												4.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**8.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	6.3E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.8E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.1E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	3.7E-08	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-10
	(total)										6.7E-10
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	6.9E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.2E-11
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.3E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.0E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	(total)										1.4E-08
										Total Risk Across All Exposure Routes/Pathways	**1.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.23

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	Professional judgement	7	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.70E-04
Noncancer Ingestion Intake(RME) = 1.37E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.23E+01
Noncancer Dermal Intake(RME) = 1.23E+02

Cancer Dermal Intake(CTE) = 8.24E+00
Noncancer Dermal Intake(CTE) = 8.24E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: *09/11/00*

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	2.00E+00	4.70E-01		8.90E-03		9.30E-03	1.39E-08
Trichloroethene	9.23E-04		o		1.30E+00	2.00E+00	5.50E-01		1.60E-02		2.60E-02	4.59E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	2.00E+00	2.10E+01		3.30E-02		1.30E+01	1.84E-06
Cadmium	2.13E-03		I			2.00E+00			1.00E-03			4.27E-09
Iron	5.78E-01		I			2.00E+00			1.00E-03			1.16E-06
Manganese	3.88E-01		I			2.00E+00			1.00E-03			7.76E-07
Thallium	1.73E-03		I			2.00E+00			1.00E-03			3.46E-09

SITE 2 - TABLE 7.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	7.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.3E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.3E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.1E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	4.3E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	2.9E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.8E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	7.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.6E-03
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	5.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	2.4E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.4E-02
	(total)												6.9E-02
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.7E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E-04
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	5.7E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	9.4E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.3E-04		2.00E-02	mg/kg-day	NA	NA	1.1E-02
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	5.3E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	4.2E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	1.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.8E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	9.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-01
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	4.3E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.1E-03
	(total)												1.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	2.5E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	4.3E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.5E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	(total)										2.7E-08
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	5.9E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.9E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	7.8E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	(total)										1.1E-06
										Total Risk Across All Exposure Routes/Pathways	**1.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	4.9E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.9E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	8.5E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.9E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	2.0E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.9E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	5.3E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-03
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	3.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.6E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.3E-02
	(total)												4.6E-02
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	7.4E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.4E-05
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.5E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.2E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.1E-04		2.00E-02	mg/kg-day	NA	NA	5.4E-03
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.8E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.4E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	4.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	3.2E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.0E-03
	(total)												6.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	4.9E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	8.5E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.9E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	(total)										5.2E-09
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	7.4E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.5E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.1E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.24

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-04
Noncancer Ingestion Intake(RME) = 6.39E-03

Cancer Ingestion Intake(CTE) = 6.11E-05
Noncancer Ingestion Intake(CTE) = 2.14E-03

Cancer Dermal Intake(RME) = 1.92E+01
Noncancer Dermal Intake(RME) = 2.24E+02

Cancer Dermal Intake(CTE) = 4.28E+00
Noncancer Dermal Intake(CTE) = 1.50E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: **SITE 2 - APPLE ORCHARD LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/11/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	2.00E+00	4.70E-01		8.90E-03		9.30E-03	1.39E-08
Trichloroethene	9.23E-04		o		1.30E+00	2.00E+00	5.50E-01		1.60E-02		2.60E-02	4.59E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	2.00E+00	2.10E+01		3.30E-02		1.30E+01	1.84E-06
Cadmium	2.13E-03		I			2.00E+00			1.00E-03			4.27E-09
Iron	5.78E-01		I			2.00E+00			1.00E-03			1.16E-06
Manganese	3.88E-01		I			2.00E+00			1.00E-03			7.76E-07
Thallium	1.73E-03		I			2.00E+00			1.00E-03			3.46E-09

SITE 2 - TABLE 7.24. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	3.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.4E-04
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	5.9E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	9.8E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-03
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	1.4E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	3.7E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-02
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	2.5E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-01
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	1.1E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-01
	(total)												3.2E-01
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	3.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.1E-04
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.0E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.7E-03
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	4.1E-04		2.00E-02	mg/kg-day	NA	NA	2.1E-02
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	9.6E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.6E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	2.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	1.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.2E-01
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	7.8E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.1E-02
	(total)												3.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.24. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	2.9E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	5.1E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.7E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	(total)										3.1E-08
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	2.7E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	8.8E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	9.7E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	3.5E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	(total)										5.1E-07
										Total Risk Across All Exposure Routes/Pathways	**5.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Chloroform	5.31E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	8.95E-09
Trichloroethene	9.23E-04		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.03E-08
Bis(2-Ethylhexyl)phthalate	3.12E-03		o		1.00E+02	1.00E+00	2.10E+01		3.30E-02		1.30E+01	1.30E-06
Cadmium	2.13E-03		I			1.00E+00			1.00E-03			2.13E-09
Iron	5.78E-01		I			1.00E+00			1.00E-03			5.78E-07
Manganese	3.88E-01		I			1.00E+00			1.00E-03			3.88E-07
Thallium	1.73E-03		I			1.00E+00			1.00E-03			1.73E-09

SITE 2 - TABLE 7.24a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-04
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	2.0E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.3E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	6.7E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.3E-04
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	4.6E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	9.1E-03
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	1.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.1E-03
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	8.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.1E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	3.7E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.3E-02
	(total)												1.1E-01
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	1.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-04
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	4.5E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	7.6E-04
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	2.0E-04		2.00E-02	mg/kg-day	NA	NA	9.8E-03
	Cadmium	2.13E-03	mg/L	2.13E-03	mg/L	M	3.2E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.6E-02
	Iron	5.78E-01	mg/L	5.78E-01	mg/L	M	8.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-04
	Manganese	3.88E-01	mg/L	3.88E-01	mg/L	M	5.8E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.3E-02
	Thallium	1.73E-03	mg/L	1.73E-03	mg/L	M	2.6E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.7E-03
	(total)												1.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.24a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	3.2E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	5.6E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-10
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	1.9E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	(total)										3.5E-09
Dermal	Chloroform	5.31E-04	mg/L	5.31E-04	mg/L	M	3.8E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-10
	Trichloroethene	9.23E-04	mg/L	9.23E-04	mg/L	M	1.3E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Bis(2-Ethylhexyl)phthalate	3.12E-03	mg/L	3.12E-03	mg/L	M	5.6E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-08
	(total)										8.0E-08
										Total Risk Across All Exposure Routes/Pathways	**8.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.25

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 2 - TABLE 7.25. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	4.6E-07	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	4.0E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	8.0E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.7E-04
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	6.3E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.3E-03
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	6.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**8.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.25. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	2.9E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	8.3E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	2.3E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.1E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	7.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.25a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard *Calculation (1)*	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	2.0E-07	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.8E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	3.5E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.1E-04
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	2.8E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.2E-03
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	9.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.6E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.25a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	4.5E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	3.6E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	3.4E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.4E-08
										Total Risk Across All Exposure Routes/Pathways	**2.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.26

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 2 - TABLE 7.26. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.2E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.1E-06
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.8E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.1E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.5E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.8E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	5.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.0E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.26. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	4.3E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	6.6E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	5.4E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.4E-11
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	4.6E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-10
										Total Risk Across All Exposure Routes/Pathways	**3.4E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.26a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	5.3E-10	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	4.7E-07
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	8.1E-10	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.8E-07
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	6.7E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.8E-06
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	5.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.7E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**8.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.26a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	6.8E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.0E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-12
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	8.6E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-12
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	7.2E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-11
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	3.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.3E-11
										Total Risk Across All Exposure Routes/Pathways	**5.3E-11**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.27

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.76E-02
Noncancer Inhalation Intake(RME) = 4.38E-01

Cancer Inhalation Intake(CTE) = 8.23E-03
Noncancer Inhalation Intake(CTE) = 1.92E-01

SITE 2 - TABLE 7.27. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.0E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	9.0E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	1.8E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.1E-03
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	1.4E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.6E-02
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	1.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	4.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.27. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	8.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	1.5E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	1.2E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.8E-09
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	1.1E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	4.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.3E-08
										Total Risk Across All Exposure Routes/Pathways	**8.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.27a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	4.5E-07	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	4.0E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	7.9E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.6E-04
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	6.2E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.2E-03
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	5.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**8.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.27a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	3.4E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	9.8E-10
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	2.7E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	9.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.8E-08

Total Risk Across All Exposure Routes/Pathways **1.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.28

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 2 - TABLE 7.28. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	6.4E-07	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	5.6E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	1.1E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	6.6E-04
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	8.8E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.0E-02
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	8.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	3.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.28. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	3.8E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	3.0E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.9E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.1E-07
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.28a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	4.3E-07	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	3.8E-04
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	7.5E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.4E-04
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	5.9E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.9E-03
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	5.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**7.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.28a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	4.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	7.5E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	5.9E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	5.6E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.0E-08
										Total Risk Across All Exposure Routes/Pathways	**4.0E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.29

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 2 - TABLE 7.29. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard *Calculation (1)*	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.7E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.5E-06
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	2.6E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.5E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	2.1E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.5E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	8.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.8E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.29. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	5.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	8.8E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-11
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	7.3E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-11
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	6.1E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.5E-10
										Total Risk Across All Exposure Routes/Pathways	**4.5E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.29a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.1E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	9.9E-07
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.7E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.0E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.4E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.7E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	5.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.9E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.29a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	1.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.7E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-12
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.4E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-11
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	1.2E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.2E-11
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	5.3E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.8E-11
										Total Risk Across All Exposure Routes/Pathways	**8.8E-11**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.30

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 2 - TABLE 7.30. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.8E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.6E-03
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	3.1E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.8E-03
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	2.5E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.9E-02
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	8.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.30. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	2.7E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	2.1E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	2.0E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	7.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.30a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	1.2E-06	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	1.1E-03
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	2.1E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.2E-03
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	1.7E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.9E-02
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	1.6E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	5.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.30a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	2.35E-06	mg/m^3	R	3.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	4.09E-06	mg/m^3	R	6.0E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Chloroform	6.09E-04	mg/L	3.22E-06	mg/m^3	R	4.7E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Trichloroethene	3.18E-02	mg/L	3.05E-04	mg/m^3	R	4.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	cis-1,2-Dichloroethene	2.47E-03	mg/L	1.12E-05	mg/m^3	R	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-08
										Total Risk Across All Exposure Routes/Pathways	**3.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 4.31

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 2 - TABLE 7.31. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	4.8E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	4.2E-06
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	7.2E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.3E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	6.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.9E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.8E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**7.8E-05**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

SITE 2 - TABLE 8.31. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	4.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	6.2E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-11
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	5.1E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-11
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	4.3E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-10

Total Risk Across All Exposure Routes/Pathways **3.2E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 7.31a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	3.2E-09	mg/kg-day	1.14E-03	mg/kg-day	NA	NA	2.8E-06
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	4.8E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.8E-06
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	4.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.6E-05
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	3.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.2E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**5.2E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 2 - TABLE 8.31a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloropropane	6.99E-04	mg/L	6.19E-09	mg/m^3	R	9.1E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Benzene	6.37E-04	mg/L	9.42E-09	mg/m^3	R	1.4E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-12
	Chloroform	6.09E-04	mg/L	7.78E-09	mg/m^3	R	1.1E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.2E-12
	Trichloroethene	3.18E-02	mg/L	6.53E-07	mg/m^3	R	9.6E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	cis-1,2-Dichloroethene	2.47E-03	mg/L	2.91E-08	mg/m^3	R	4.3E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.1E-11

Total Risk Across All Exposure Routes/Pathways **7.1E-11**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 2 - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.6E-06			9.6E-06	BAP EQUIVALENT					
			Aroclor-1254	4.1E-08		7.7E-08	1.2E-07	Aroclor-1254	Immunological, Nails	2.8E-03		5.4E-03	8.2E-03
			Aroclor-1260	4.5E-07		8.5E-07	1.3E-06	Aroclor-1260					
			Chromium					Chromium	NOAEL	3.5E-05		4.5E-04	4.8E-04
			Iron					Iron	liver/blood/GI tract	6.2E-02		1.9E-02	8.1E-02
			Manganese					Manganese	CNS	2.1E-02		1.7E-01	1.9E-01
			Nickel					Nickel	Decreased body / organ weights	2.8E-03		2.2E-02	2.5E-02
			Vanadium					Vanadium	NOEL	4.7E-03		5.7E-02	6.2E-02
Groundwater	Air	Onsite Indoor and Outdoor Air	1,2-Dichloropropane					1,2-Dichloropropane			4.0E-04		4.0E-04
			Benzene		8.3E-09		8.3E-09	Benzene			4.7E-04		4.7E-04
			Chloroform		1.8E-08		1.8E-08	Chloroform	Liver		7.4E-03		7.4E-03
			Trichloroethene		1.3E-07		1.3E-07	Trichloroethene	CNS				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil	1.1E-05
Total Risk Across Groundwater/Air	1.5E-07
Total Risk Across All Media and All Exposure Routes	1.1E-05

Total Hazard Index Across All Media and All Exposure Routes	3.7E-01
Total Liver HI =	8.9E-02
Total CNS HI =	1.9E-01
Total Immume HI =	8.2E-03
Total Blood HI =	8.1E-02
Total GI Tract HI =	8.1E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air. The total risks from inhalation of indoor air and outdoor air are presented separately in Table 4-13.

SITE 2 - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.5E-06			1.5E-06	BAP EQUIVALENT					
			Aroclor-1254	6.4E-09		4.9E-09	1.1E-08	Aroclor-1254	Immunological, Nails	1.2E-03		9.5E-04	2.2E-03
			Aroclor-1260	7.1E-08		5.4E-08	1.2E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	1.5E-05		7.8E-05	9.3E-05
			Iron					Iron	liver/blood/GI tract	2.7E-02		3.4E-03	3.0E-02
			Manganese					Manganese	CNS	9.3E-03		2.9E-02	3.9E-02
			Nickel					Nickel	Decreased body / organ weights	1.2E-03		3.9E-03	5.2E-03
			Vanadium					Vanadium	NOEL	2.1E-03		1.0E-02	1.2E-02
Groundwater	Air	Onsite	1,2-Dichloropropane					1,2-Dichloropropane			1.8E-04		1.8E-04
		Indoor and	Benzene		1.3E-09		1.3E-09	Benzene			2.1E-04		2.1E-04
		Outdoor Air	Chloroform		2.9E-09		2.9E-09	Chloroform	Liver		3.2E-03		3.2E-03
			Trichloroethene		2.0E-08		2.0E-08	Trichloroethene	CNS				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 1.7E-06
Total Risk Across Groundwater/Air: 2.4E-08

Total Risk Across All Media and All Exposure Routes: 1.7E-06

Total Hazard Index Across All Media and All Exposure Routes: 9.2E-02

Total Liver HI = 3.4E-02
Total CNS HI = 3.9E-02
Total Immune HI = 2.2E-03
Total Blood HI = 3.0E-02
Total GI Tract HI = 3.0E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 4-22.

SITE 2 - TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsurface Soil	BAP EQUIVALENT	5.0E-07			5.0E-07	BAP EQUIVALENT					
			Aroclor-1254	4.4E-09		8.4E-09	1.3E-08	Aroclor-1254	Immunological, Nails	3.1E-04		5.9E-04	9.0E-04
			Aroclor-1260	3.6E-08		6.8E-08	1.0E-07	Aroclor-1260					
			Mangnese					Mangnese	CNS	3.6E-03		2.9E-02	3.2E-02
			Nickel					Nickel	Decreased body / organ weights	3.1E-04		2.5E-03	2.8E-03
			Thallium					Thallium	Liver	2.0E-03		6.4E-04	2.7E-03
Surface Water	Surface Water	Onsite Ditches	Chloroform			2.5E-10	2.5E-10	Chloroform	Liver			1.1E-05	1.1E-05
			Trichloroethene			1.5E-09	1.5E-09	Trichloroethene	CNS			6.4E-05	6.4E-05
			Bis(2-Ethylhexyl)phthalate			8.3E-08	8.3E-08	Bis(2-Ethylhexyl)phthalate	Liver			8.3E-04	8.3E-04
			Cadmium					Cadmium	Kidney			2.2E-03	2.2E-03
			Iron					Iron	liver/blood/GI tract			2.4E-05	2.4E-05
			Manganese					Manganese	CNS			6.2E-03	6.2E-03
			Thallium					Thallium	Liver			3.1E-04	3.1E-04
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1260	1.5E-06		2.8E-06	4.3E-06	Aroclor-1260					
			Dieldrin	5.1E-08		1.6E-07	2.1E-07	Dieldrin	Liver	1.8E-04		5.6E-04	7.4E-04
			Aluminum					Aluminum	Immunological, Nails	8.9E-04		2.8E-04	1.2E-03
			Arsenic	1.6E-07		1.5E-07	3.1E-07	Arsenic	Skin, Vascular	9.9E-04		9.4E-04	1.9E-03
			Iron					Iron	liver/blood/GI tract	6.8E-03		2.1E-03	8.9E-03
			Manganese					Manganese	CNS	5.0E-03		4.0E-02	4.5E-02
			Mercury					Mercury	CNS	2.4E-04		1.1E-03	1.3E-03
Groundwater	Water	Onsite	1,2-Dichloropropane			4.0E-09	4.0E-09	1,2-Dichloropropane			1.5E-07		1.5E-07
			Benzene		2.8E-12	2.7E-09	2.7E-09	Benzene			1.6E-07	8.6E-05	8.6E-05
			Chloroform		6.3E-12	2.8E-10	2.9E-10	Chloroform	Liver		2.5E-06	1.3E-05	1.6E-05
			Trichloroethene		3.9E-11	5.2E-08	5.2E-08	Trichloroethene	CNS			2.2E-03	2.2E-03
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			5.3E-05	5.3E-05
			Arsenic			5.3E-08	5.3E-08	Arsenic	Skin, Vascular			3.3E-04	3.3E-04
			Barium					Barium	Kidney			1.7E-03	1.7E-03
			Chromium					Chromium	NOAEL			2.6E-05	2.6E-05
			Manganese					Manganese	CNS			1.4E-01	1.4E-01
			Mercury					Mercury	CNS			5.7E-04	5.7E-04
			RDX			2.8E-08	2.8E-08	RDX	Prostate			2.4E-04	2.4E-04

Total Risk Across Surface Soil	6.2E-07
Total Risk Across Surface Water	8.4E-08
Total Risk Across Sediment	6.1E-06
Total Risk Across Groundwater	1.4E-07
Total Risk Across All Media and All Exposure Routes	6.9E-06

Total Hazard Index Across All Media and All Exposure Routes	2.5E-01
Total Liver HI =	1.4E-02
Total CNS HI =	2.3E-01
Total Kidney HI =	3.8E-03
Total Blood HI =	9.0E-03
Total Immune HI =	2.1E-03
Total Prostate HI =	2.4E-04
Total Lifetime HI =	2.8E-03
Total Skin HI =	2.3E-03
Total Vascular HI =	2.3E-03

SITE 2 - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsurface Soil	BAP EQUIVALENT	4.5E-08			4.5E-08	BAP EQUIVALENT					
			Aroclor-1254	4.0E-10		3.0E-10	7.0E-10	Aroclor-1254	Immunological, Nails	7.7E-05		5.9E-05	1.4E-04
			Aroclor-1260	3.2E-09		2.5E-09	5.7E-09	Aroclor-1260					
			Mangnese					Mangnese	CNS	9.1E-04		2.9E-03	3.8E-03
			Nickel					Nickel	Decreased body / organ weights	7.9E-05		2.5E-04	3.3E-04
			Thallium					Thallium	Liver	5.0E-04		6.4E-05	5.7E-04
Surface Water	Surface Water	Onsite Ditches	Chloroform			4.5E-11	4.5E-11	Chloroform	Liver			5.7E-06	5.7E-06
			Trichloroethene			2.7E-10	2.7E-10	Trichloroethene	CNS			3.2E-05	3.2E-05
			Bis(2-Ethylhexyl)phthalate			1.5E-08	1.5E-08	Bis(2-Ethylhexyl)phthalate	Liver			4.1E-04	4.1E-04
			Cadmium					Cadmium	Kidney			1.1E-03	1.1E-03
			Iron					Iron	liver/blood/GI tract			1.2E-05	1.2E-05
			Manganese					Manganese	CNS			3.1E-03	3.1E-03
			Thallium					Thallium	Liver			1.6E-04	1.6E-04
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.1E-07			1.1E-07	BAP EQUIVALENT					
			Aroclor-1260	1.3E-07		1.0E-07	2.3E-07	Aroclor-1260					
			Dieldrin	4.6E-09		5.8E-09	1.0E-08	Dieldrin	Liver	4.4E-05		5.6E-05	1.0E-04
			Aluminum					Aluminum	Immunological, Nails	2.2E-04		2.8E-05	2.5E-04
			Arsenic	1.4E-08		5.4E-09	2.0E-08	Arsenic	Skin, Vascular	2.5E-04		9.4E-05	3.4E-04
			Iron					Iron	liver/blood/GI tract	1.7E-03		2.1E-04	1.9E-03
			Manganese					Manganese	CNS	1.3E-03		4.0E-03	5.2E-03
			Mercury					Mercury	CNS	5.9E-05		1.1E-04	1.7E-04
Groundwater	Water	Onsite	1,2-Dichloropropane			7.2E-10	7.2E-10	1,2-Dichloropropane			3.8E-08		3.8E-08
			Benzene		2.5E-13	4.8E-10	4.8E-10	Benzene			3.9E-08	4.3E-05	4.3E-05
			Chloroform		5.7E-13	5.1E-11	5.2E-11	Chloroform	Liver		6.4E-07	6.5E-06	7.2E-06
			Trichloroethene		3.5E-12	9.3E-09	9.4E-09	Trichloroethene	CNS			1.1E-03	1.1E-03
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			2.6E-05	2.6E-05
			Arsenic			9.6E-09	9.6E-09	Arsenic	Skin, Vascular			1.7E-04	1.7E-04
			Barium					Barium	Kidney			8.3E-04	8.3E-04
			Chromium					Chromium	NOAEL			1.3E-05	1.3E-05
			Manganese					Manganese	CNS			6.9E-02	6.9E-02
			Mercury					Mercury	CNS			2.9E-04	2.9E-04
			RDX			5.1E-09	5.1E-09	RDX	Prostate			1.2E-04	1.2E-04

Total Risk Across Surface Soil	5.1E-08
Total Risk Across Surface Water	1.5E-08
Total Risk Across Sediment	3.8E-07
Total Risk Across Groundwater	2.5E-08
Total Risk Across All Media and All Exposure Routes	4.7E-07

Total Hazard Index Across All Media and All Exposure Routes	8.9E-02
Total Liver HI =	3.2E-03
Total CNS HI =	8.2E-02
Total Kidney HI =	1.9E-03
Total Blood HI =	1.9E-03
Total Immune HI =	3.9E-04
Total Prostate HI =	1.2E-04
Total Lifetime HI =	3.3E-04
Total Skin HI =	5.1E-04
Total Vascular HI =	5.1E-04

SITE 2 - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsurface Soil	BAP EQUIVALENT	4.8E-07			4.8E-07	BAP EQUIVALENT					
			Aroclor-1254	4.2E-09		1.7E-09	5.9E-09	Aroclor-1254	Immunological, Nails	7.4E-03		2.9E-03	1.0E-02
			Aroclor-1260	3.5E-08		1.4E-08	4.8E-08	Aroclor-1260					
			Mangnese					Mangnese	CNS	8.7E-02		1.4E-01	2.3E-01
			Nickel					Nickel	Decreased body / organ weights	7.6E-03		1.2E-02	2.0E-02
			Thallium					Thallium	Liver	4.8E-02		3.2E-03	5.2E-02
Surface Water	Surface Water	Onsite Ditches	Chloroform			4.9E-11	4.9E-11	Chloroform	Liver			5.7E-05	5.7E-05
			Trichloroethene			3.0E-10	3.0E-10	Trichloroethene	CNS			3.2E-04	3.2E-04
			Bis(2-Ethylhexyl)phthalate			1.7E-08	1.7E-08	Bis(2-Ethylhexyl)phthalate	Liver			4.1E-03	4.1E-03
			Cadmium					Cadmium	Kidney			1.1E-02	1.1E-02
			Iron					Iron	liver/blood/GI tract			1.2E-04	1.2E-04
			Manganese					Manganese	CNS			3.1E-02	3.1E-02
			Thallium					Thallium	Liver			1.6E-03	1.6E-03
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.2E-06			1.2E-06	BAP EQUIVALENT					
			Aroclor-1260	1.4E-06		5.6E-07	2.0E-06	Aroclor-1260					
			Dieldrin	4.9E-08		3.2E-08	8.1E-08	Dieldrin	Liver	4.3E-03		2.8E-03	7.1E-03
			Aluminum					Aluminum	Immunological, Nails	2.1E-02		1.4E-03	2.3E-02
			Arsenic	1.5E-07		3.0E-08	1.8E-07	Arsenic	Skin, Vascular	2.4E-02		4.7E-03	2.8E-02
			Iron					Iron	liver/blood/GI tract	1.6E-01		1.1E-02	1.7E-01
			Manganese					Manganese	CNS	1.2E-01		2.0E-01	3.2E-01
			Mercury					Mercury	CNS	5.7E-03		5.3E-03	1.1E-02
Groundwater	Water	Onsite	1,2-Dichloropropane			8.0E-10	8.0E-10	1,2-Dichloropropane			1.5E-06		1.5E-06
			Benzene		1.1E-12	5.3E-10	5.4E-10	Benzene			1.5E-06	4.3E-04	4.3E-04
			Chloroform		2.4E-12	5.7E-11	5.9E-11	Chloroform	Liver		2.4E-05	6.5E-05	9.0E-05
			Trichloroethene		1.5E-11	1.0E-08	1.0E-08	Trichloroethene	CNS			1.1E-02	1.1E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			2.6E-04	2.6E-04
			Arsenic			1.1E-08	1.1E-08	Arsenic	Skin, Vascular			1.7E-03	1.7E-03
			Barium					Barium	Kidney			8.3E-03	8.3E-03
			Chromium					Chromium	NOAEL			1.3E-04	1.3E-04
			Manganese					Manganese	CNS			6.9E-01	6.9E-01
			Mercury					Mercury	CNS			2.9E-03	2.9E-03
			RDX			5.6E-09	5.6E-09	RDX	Prostate			1.2E-03	1.2E-03

Total Risk Across Surface Soil	5.3E-07
Total Risk Across Surface Water	1.7E-08
Total Risk Across Sediment	3.5E-06
Total Risk Across Groundwater	2.8E-08
Total Risk Across All Media and All Exposure Routes	4.0E-06

Total Hazard Index Across All Media and All Exposure Routes	1.6E+00
Total Liver HI =	2.4E-01
Total CNS HI =	1.3E+00
Total Kidney HI =	1.9E-02
Total Blood HI =	1.7E-01
Total Immune HI =	3.3E-02
Total Prostate HI =	1.2E-03
Total Lifetime HI =	2.0E-02
Total Skin HI =	3.0E-02
Total Vascular HI =	3.0E-02

SITE 2 - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsurface Soil	BAP EQUIVALENT	2.4E-07			2.4E-07	BAP EQUIVALENT					
			Aroclor-1254	2.1E-09		3.4E-10	2.5E-09	Aroclor-1254	Immunological, Nails	3.7E-03		5.9E-04	4.3E-03
			Aroclor-1260	1.7E-08		2.7E-09	2.0E-08	Aroclor-1260					
			Mangnese					Mangnese	CNS	4.4E-02		2.9E-02	7.2E-02
			Nickel					Nickel	Decreased body / organ weights	3.8E-03		2.5E-03	6.3E-03
			Thallium					Thallium	Liver	2.4E-02		6.4E-04	2.5E-02
Surface Water	Surface Water	Onsite Ditches	Chloroform			4.9E-11	4.9E-11	Chloroform	Liver			5.7E-05	5.7E-05
			Trichloroethene			3.0E-10	3.0E-10	Trichloroethene	CNS			3.2E-04	3.2E-04
			Bis(2-Ethylhexyl)phthalate			1.7E-08	1.7E-08	Bis(2-Ethylhexyl)phthalate	Liver			4.1E-03	4.1E-03
			Cadmium					Cadmium	Kidney			1.1E-02	1.1E-02
			Iron					Iron	liver/blood/GI tract			1.2E-04	1.2E-04
			Manganese					Manganese	CNS			3.1E-02	3.1E-02
			Thallium					Thallium	Liver			1.6E-03	1.6E-03
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	6.1E-07			6.1E-07	BAP EQUIVALENT					
			Aroclor-1260	7.1E-07		1.1E-07	8.2E-07	Aroclor-1260					
			Dieldrin	2.4E-08		6.4E-09	3.1E-08	Dieldrin	Liver	2.1E-03		5.6E-04	2.7E-03
			Aluminum					Aluminum	Immunological, Nails	1.1E-02		2.8E-04	1.1E-02
			Arsenic	7.6E-08		6.0E-09	8.2E-08	Arsenic	Skin, Vascular	1.2E-02		9.4E-04	1.3E-02
			Iron					Iron	liver/blood/GI tract	8.1E-02		2.1E-03	8.4E-02
			Manganese					Manganese	CNS	6.1E-02		4.0E-02	1.0E-01
			Mercury					Mercury	CNS	2.8E-03		1.1E-03	3.9E-03
Groundwater	Water	Onsite	1,2-Dichloropropane			8.0E-10	8.0E-10	1,2-Dichloropropane			7.3E-07		7.3E-07
			Benzene		5.3E-13	5.3E-10	5.3E-10	Benzene			7.5E-07	4.3E-04	4.3E-04
			Chloroform		1.2E-12	5.7E-11	5.8E-11	Chloroform	Liver		1.2E-05	6.5E-05	7.7E-05
			Trichloroethene		7.6E-12	1.0E-08	1.0E-08	Trichloroethene	CNS			1.1E-02	1.1E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			2.6E-04	2.6E-04
			Arsenic			1.1E-08	1.1E-08	Arsenic	Skin, Vascular			1.7E-03	1.7E-03
			Barium					Barium	Kidney			8.3E-03	8.3E-03
			Chromium					Chromium	NOAEL			1.3E-04	1.3E-04
			Manganese					Manganese	CNS			6.9E-01	6.9E-01
			Mercury					Mercury	CNS			2.9E-03	2.9E-03
			RDX			5.6E-09	5.6E-09	RDX	Prostate			1.2E-03	1.2E-03

Total Risk Across Surface Soil	2.6E-07
Total Risk Across Surface Water	1.7E-08
Total Risk Across Sediment	1.5E-06
Total Risk Across Groundwater	2.8E-08
Total Risk Across All Media and All Exposure Routes	1.9E-06

Total Hazard Index Across All Media and All Exposure Routes	1.1E+00
Total Liver HI =	1.2E-01
Total CNS HI =	9.1E-01
Total Kidney HI =	1.9E-02
Total Blood HI =	8.4E-02
Total Immune HI =	1.5E-02
Total Prostate HI =	1.2E-03
Total Lifetime HI =	6.3E-03
Total Skin HI =	1.4E-02
Total Vascular HI =	1.4E-02

SITE 2 - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER

SITE 2 - APPLE ORCHARD LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	7.4E-07			7.4E-07	BAP EQUIVALENT					
			Aroclor-1254	3.1E-09		1.7E-08	2.0E-08	Aroclor-1254	Immunological, Nails	1.8E-04		9.8E-04	1.2E-03
			Aroclor-1260	3.4E-08		1.9E-07	2.2E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	2.3E-06		8.1E-05	8.3E-05
			Iron					Iron	liver/blood/GI tract	3.9E-03		3.6E-03	7.5E-03
			Manganese					Manganese	CNS	1.4E-03		3.0E-02	3.2E-02
			Nickel					Nickel	Decreased body / organ weights	1.8E-04		4.1E-03	4.3E-03
			Vanadium					Vanadium	NOEL	3.0E-04		1.0E-02	1.1E-02
Surface Water	Surface Water	Onsite Diitches	Chloroform	4.3E-11		1.3E-10	1.8E-10	Chloroform	Liver	1.7E-06		5.0E-06	6.7E-06
			Trichloroethene	1.4E-10		8.0E-10	9.4E-10	Trichloroethene	CNS	4.8E-06		2.8E-05	3.3E-05
			Bis(2-Ethylhexyl)phthalate	5.9E-10		4.4E-08	4.5E-08	Bis(2-Ethylhexyl)phthalate	Liver	4.9E-06		3.7E-04	3.7E-04
			Cadmium					Cadmium	Kidney	1.3E-04		9.6E-04	1.1E-03
			Iron					Iron	liver/blood/GI tract	6.0E-05		1.1E-05	7.1E-05
			Manganese					Manganese	CNS	6.1E-04		2.7E-03	3.3E-03
			Thallium					Thallium	Liver	7.7E-04		1.4E-04	9.1E-04
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	6.7E-07			6.7E-07	BAP EQUIVALENT					
			Aroclor-1260	7.9E-07		4.3E-06	5.1E-06	Aroclor-1260					
			Dieldrin	2.7E-08		2.4E-07	2.7E-07	Dieldrin	Liver	7.9E-05		7.1E-04	7.9E-04
			Aluminum					Aluminum	Immunological, Nails	4.0E-04		3.6E-04	7.5E-04
			Arsenic	8.5E-08		2.3E-07	3.1E-07	Arsenic	Skin, Vascular	4.4E-04		1.2E-03	1.6E-03
			Iron					Iron	liver/blood/GI tract	3.0E-03		2.7E-03	5.7E-03
			Manganese					Manganese	CNS	2.2E-03		5.0E-02	5.3E-02
			Mercury					Mercury	CNS	1.0E-04		1.3E-03	1.5E-03

Total Risk Across Surface Soil	9.8E-07
Total Risk Across Surface Water	4.6E-08
Total Risk Across Sediment	6.3E-06
Total Risk Across All Media and All Exposure Routes	7.3E-06

Total Hazard Index Across All Media and All Exposure Routes	1.2E-01
Total Liver HI =	1.4E-02
Total CNS HI =	8.9E-02
Total Kidney HI =	1.1E-03
Total Immume HI =	1.9E-03
Total Lifetime HI =	4.3E-03
Total Skin HI =	1.6E-03
Total Vascular HI =	1.6E-03
Total Blood HI =	1.3E-02
Total GI Tract HI =	1.3E-02

SITE 2 - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 2 - APPLE ORCHARD LANDFILL .
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.6E-08			5.6E-08	BAP EQUIVALENT					
			Aroclor-1254	2.3E-10		5.1E-10	7.4E-10	Aroclor-1254	Immunological, Nails	4.6E-05		9.8E-05	1.4E-04
			Aroclor-1260	2.6E-09		5.6E-09	8.1E-09	Aroclor-1260					
			Chromium					Chromium	NOAEL	5.6E-07		8.1E-06	8.7E-06
			Iron					Iron	liver/blood/GI tract	9.9E-04		3.6E-04	1.3E-03
			Manganese					Manganese	CNS	3.4E-04		3.0E-03	3.4E-03
			Nickel					Nickel	Decreased body / organ weights	4.5E-05		4.1E-04	4.5E-04
			Vanadium					Vanadium	NOEL	7.5E-05		1.0E-03	1.1E-03
Surface Water	Surface Water	Onsite Diitches	Chloroform	1.3E-11		4.0E-11	5.3E-11	Chloroform	Liver	1.7E-06		5.0E-06	6.7E-06
			Trichloroethene	4.1E-11		2.4E-10	2.8E-10	Trichloroethene	CNS	4.8E-06		2.8E-05	3.3E-05
			Bis(2-Ethylhexyl)phthalate	1.8E-10		1.3E-08	1.3E-08	Bis(2-Ethylhexyl)phthalate	Liver	4.9E-06		3.7E-04	3.7E-04
			Cadmium					Cadmium	Kidney	1.3E-04		9.6E-04	1.1E-03
			Iron					Iron	liver/blood/GI tract	6.0E-05		1.1E-05	7.1E-05
			Manganese					Manganese	CNS	6.1E-04		2.7E-03	3.3E-03
			Thallium					Thallium	Liver	7.7E-04		1.4E-04	9.1E-04
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	5.1E-08			5.1E-08	BAP EQUIVALENT					
			Aroclor-1260	5.9E-08		1.3E-07	1.9E-07	Aroclor-1260					
			Dieldrin	2.0E-09		7.3E-09	9.3E-09	Dieldrin	Liver	2.0E-05		7.1E-05	9.1E-05
			Aluminum					Aluminum	Immunological, Nails	9.9E-05		3.6E-05	1.3E-04
			Arsenic	6.4E-09		6.9E-09	1.3E-08	Arsenic	Skin, Vascular	1.1E-04		1.2E-04	2.3E-04
			Iron					Iron	liver/blood/GI tract	7.5E-04		2.7E-04	1.0E-03
			Manganese					Manganese	CNS	5.6E-04		5.0E-03	5.6E-03
			Mercury					Mercury	CNS	2.6E-05		1.3E-04	1.6E-04

Total Risk Across Surface Soil	6.4E-08
Total Risk Across Surface Water	1.4E-08
Total Risk Across Sediment	2.6E-07
Total Risk Across All Media and All Exposure Routes	3.4E-07

Total Hazard Index Across All Media and All Exposure Routes	2.0E-02
Total Liver HI =	2.9E-03
Total CNS HI =	1.3E-02
Total Kidney HI =	1.1E-03
Total Immune HI =	2.8E-04
Total Lifetime HI =	4.5E-04
Total Skin HI =	2.3E-04
Total Vascular HI =	2.3E-04
Total Blood HI =	2.4E-03
Total GI Tract HI =	2.4E-03

SITE 2 - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1254	5.5E-09		1.1E-08	1.6E-08	Aroclor-1254	Immunological, Nails	9.6E-04		1.9E-03	2.9E-03
			Aroclor-1260	6.1E-08		1.2E-07	1.8E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	1.2E-05		1.6E-04	1.7E-04
			Iron					Iron	liver/blood/GI tract	2.1E-02		6.8E-03	2.8E-02
			Manganese					Manganese	CNS	7.2E-03		5.8E-02	6.6E-02
			Nickel					Nickel	Decreased body / organ weights	9.6E-04		7.8E-03	8.8E-03
			Vanadium					Vanadium	NOEL	1.6E-03		2.0E-02	2.2E-02
Surface Water	Surface Water	Onsite Diitches	Chloroform	7.7E-11		8.4E-11	1.6E-10	Chloroform	Liver	8.8E-06		9.7E-06	1.8E-05
			Trichloroethene	2.4E-10		5.1E-10	7.5E-10	Trichloroethene	CNS	2.5E-05		5.5E-05	8.0E-05
			Bis(2-Ethylhexyl)phthalate	1.0E-09		2.8E-08	2.9E-08	Bis(2-Ethylhexyl)phthalate	Liver	2.6E-05		7.0E-04	7.3E-04
			Cadmium					Cadmium	Kidney	7.1E-04		1.8E-03	2.5E-03
			Iron					Iron	liver/blood/GI tract	3.2E-04		2.1E-05	3.4E-04
			Manganese					Manganese	CNS	3.2E-03		5.2E-03	8.5E-03
			Thallium					Thallium	Liver	4.1E-03		2.7E-04	4.4E-03
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	1.2E-06			1.2E-06	BAP EQUIVALENT					
			Aroclor-1260	1.4E-06		2.7E-06	4.1E-06	Aroclor-1260					
			Dieldrin	4.8E-08		1.6E-07	2.0E-07	Dieldrin	Liver	4.2E-04		1.4E-03	1.8E-03
			Aluminum					Aluminum	Immunological, Nails	2.1E-03		6.8E-04	2.8E-03
			Arsenic	1.5E-07		1.5E-07	3.0E-07	Arsenic	Skin, Vascular	2.3E-03		2.3E-03	4.6E-03
			Iron					Iron	liver/blood/GI tract	1.6E-02		5.2E-03	2.1E-02
			Manganese					Manganese	CNS	1.2E-02		9.7E-02	1.1E-01
			Mercury					Mercury	CNS	5.5E-04		2.6E-03	3.1E-03

Total Risk Across Surface Soil	1.5E-06
Total Risk Across Surface Water	3.0E-08
Total Risk Across Sediment	5.8E-06
Total Risk Across All Media and All Exposure Routes	7.3E-06

Total Hazard Index Across All Media and All Exposure Routes	2.9E-01
Total Liver HI =	5.6E-02
Total CNS HI =	1.9E-01
Total Kidney HI =	2.5E-03
Total Immume HI =	5.6E-03
Total Lifetime HI =	8.8E-03
Total Skin HI =	4.6E-03
Total Blood HI =	4.9E-02
Total GI Tract HI =	4.9E-02

SITE 2 - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.3E-07			3.3E-07	BAP EQUIVALENT					
			Aroclor-1254	1.4E-09		1.1E-09	2.5E-09	Aroclor-1254	Immunological, Nails	2.4E-04		1.9E-04	4.3E-04
			Aroclor-1260	1.5E-08		1.2E-08	2.7E-08	Aroclor-1260					
			Chromium					Chromium	NOAEL	3.0E-06		1.6E-05	1.9E-05
			Iron					Iron	liver/blood/GI tract	5.2E-03		6.8E-04	5.9E-03
			Manganese					Manganese	CNS	1.8E-03		5.8E-03	7.6E-03
			Nickel					Nickel	Decreased body / organ weights	2.4E-04		7.8E-04	1.0E-03
			Vanadium					Vanadium	NOEL	4.0E-04		2.0E-03	2.4E-03
Surface Water	Surface Water	Onsite Diitches	Chloroform	3.8E-11		4.2E-11	8.0E-11	Chloroform	Liver	4.4E-06		4.8E-06	9.2E-06
			Trichloroethene	1.2E-10		2.6E-10	3.8E-10	Trichloroethene	CNS	1.3E-05		2.7E-05	4.0E-05
			Bis(2-Ethylhexyl)phthalate	5.2E-10		1.4E-08	1.5E-08	Bis(2-Ethylhexyl)phthalate	Liver	1.3E-05		3.5E-04	3.6E-04
			Cadmium					Cadmium	Kidney	3.5E-04		9.2E-04	1.3E-03
			Iron					Iron	liver/blood/GI tract	1.6E-04		1.0E-05	1.7E-04
			Manganese					Manganese	CNS	1.6E-03		2.6E-03	4.2E-03
			Thallium					Thallium	Liver	2.0E-03		1.3E-04	2.2E-03
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	3.0E-07			3.0E-07	BAP EQUIVALENT					
			Aroclor-1260	3.5E-07		2.7E-07	6.2E-07	Aroclor-1260					
			Dieldrin	1.2E-08		1.6E-08	2.8E-08	Dieldrin	Liver	1.0E-04		1.4E-04	2.4E-04
			Aluminum					Aluminum	Immunological, Nails	5.2E-04		6.8E-05	5.9E-04
			Arsenic	3.7E-08		1.5E-08	5.2E-08	Arsenic	Skin, Vascular	5.8E-04		2.3E-04	8.1E-04
			Iron					Iron	liver/blood/GI tract	4.0E-03		5.2E-04	4.5E-03
			Manganese					Manganese	CNS	3.0E-03		9.7E-03	1.3E-02
			Mercury					Mercury	CNS	1.4E-04		2.6E-04	4.0E-04

Total Risk Across Surface Soil	3.6E-07
Total Risk Across Surface Water	1.5E-08
Total Risk Across Sediment	1.0E-06
Total Risk Across All Media and All Exposure Routes	1.4E-06

Total Hazard Index Across All Media and All Exposure Routes	4.5E-02
Total Liver HI =	1.3E-02
Total CNS HI =	2.5E-02
Total Kidney HI =	1.3E-03
Total Immune HI =	1.0E-03
Total Lifetime HI =	1.0E-03
Total Skin HI =	8.1E-04
Total Blood HI =	1.1E-02
Total GI Tract HI =	1.1E-02

SITE 2 - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.1E-05			1.1E-05	BAP EQUIVALENT					
			Aroclor-1254	4.6E-08		9.6E-08	1.4E-07	Aroclor-1254	Immunological, Nails	1.3E-02		2.8E-02	4.1E-02
			Aroclor-1260	5.0E-07		1.1E-06	1.6E-06	Aroclor-1260					
			Chromium					Chromium	NOAEL	1.6E-04		2.3E-03	2.5E-03
			Iron					Iron	liver/blood/GI tract	2.9E-01		1.0E-01	3.9E-01
			Manganese					Manganese	CNS	9.9E-02		8.6E-01	9.6E-01
			Nickel					Nickel	Decreased body / organ weights	1.3E-02		1.2E-01	1.3E-01
			Vanadium					Vanadium	NOEL	2.2E-02		3.0E-01	3.2E-01
Groundwater	Air	Onsite Indoor and Outdoor Air	1,2-Dichloropropane					1,2-Dichloropropane			9.0E-04		9.0E-04
			Benzene		4.5E-09		4.5E-09	Benzene			1.1E-03		1.1E-03
			Chloroform		9.8E-09		9.8E-09	Chloroform	Liver		1.6E-02		1.6E-02
			Trichloroethene		6.9E-08		6.9E-08	Trichloroethene	CNS				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 1.3E-05
Total Risk Across Groundwater/Air: 8.3E-08

Total Risk Across All Media and All Exposure Routes: 1.3E-05

Total Hazard Index Across All Media and All Exposure Routes: 1.9E+00

Total Liver HI = 4.1E-01
Total CNS HI = 9.6E-01
Total Immune HI = 4.1E-02
Total Lifetime HI = 1.3E-01
Total Blood HI = 3.9E-01
Total GI Tract HI = 3.9E-01

SITE 2 - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.4E-06			2.4E-06	BAP EQUIVALENT					
			Aroclor-1254	1.0E-08		8.4E-09	1.8E-08	Aroclor-1254	Immunological, Nails	5.8E-03		4.9E-03	1.1E-02
			Aroclor-1260	1.1E-07		9.2E-08	2.0E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	7.2E-05		4.0E-04	4.8E-04
			Iron					Iron	liver/blood/GI tract	1.3E-01		1.8E-02	1.4E-01
			Manganese					Manganese	CNS	4.3E-02		1.5E-01	1.9E-01
			Nickel					Nickel	Decreased body / organ weights	5.8E-03		2.0E-02	2.6E-02
			Vanadium					Vanadium	NOEL	9.6E-03		5.2E-02	6.1E-02
Groundwater	Air	Onsite Indoor and Outdoor Air	1,2-Dichloropropane					1,2-Dichloropropane			4.0E-04		4.0E-04
			Benzene		9.8E-10		9.8E-10	Benzene			4.6E-04		4.6E-04
			Chloroform		2.1E-09		2.1E-09	Chloroform	Liver		7.2E-03		7.2E-03
			Trichloroethene		1.5E-08		1.5E-08	Trichloroethene	CNS				
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 2.6E-06
Total Risk Across Groundwater/Air: 1.8E-08

Total Risk Across All Media and All Exposure Routes: 2.6E-06

Total Hazard Index Across All Media and All Exposure Routes: 4.5E-01

Total Liver HI = 1.5E-01
Total CNS HI = 1.9E-01
Total Immume HI = 1.1E-02
Total Lifetime HI = 2.6E-02
Total Blood HI = 1.4E-01
Total GI Tract HI = 1.4E-01

SITE 2 - TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-05			1.3E-05	BAP EQUIVALENT					
			Aroclor-1254	5.5E-08		3.0E-07	3.5E-07	Aroclor-1254	Immunological, Nails	4.0E-03		2.2E-02	2.6E-02
			Aroclor-1260	6.0E-07		3.2E-06	3.9E-06	Aroclor-1260					
			Chromium					Chromium	NOAEL	4.9E-05		1.8E-03	1.8E-03
			Iron					Iron	liver/blood/GI tract	8.6E-02		7.8E-02	1.6E-01
			Manganese					Manganese	CNS	3.0E-02		6.7E-01	7.0E-01
			Nickel					Nickel	Decreased body / organ weights	4.0E-03		8.9E-02	9.3E-02
			Vanadium					Vanadium	NOEL	6.6E-03		2.3E-01	2.3E-01
Surface Water	Surface Water	Onsite Ditches	Chloroform	1.5E-09		3.6E-09	5.1E-09	Chloroform	Liver	7.3E-05		1.7E-04	2.4E-04
			Trichloroethene	4.8E-09		2.1E-08	2.6E-08	Trichloroethene	CNS	2.1E-04		9.4E-04	1.2E-03
			Bis(2-Ethylhexyl)phthalate	2.0E-08		1.1E-06	1.1E-06	Bis(2-Ethylhexyl)phthalate	Liver	2.1E-04		1.1E-02	1.2E-02
			Cadmium					Cadmium	Kidney	5.8E-03		4.2E-02	4.8E-02
			Iron					Iron	liver/blood/GI tract	2.6E-03		4.8E-04	3.1E-03
			Manganese					Manganese	CNS	2.7E-02		1.2E-01	1.5E-01
			Thallium					Thallium	Liver	3.4E-02		6.1E-03	4.0E-02
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.2E-05			1.2E-05	BAP EQUIVALENT					
			Aroclor-1260	1.4E-05		7.5E-05	8.9E-05	Aroclor-1260					
			Dieldrin	4.7E-07		4.3E-06	4.7E-06	Dieldrin	Liver	1.7E-03		1.6E-02	1.7E-02
			Aluminum					Aluminum	Immunological, Nails	8.7E-03		7.8E-03	1.6E-02
			Arsenic	1.5E-06		4.0E-06	5.5E-06	Arsenic	Skin, Vascular	9.6E-03		2.6E-02	3.6E-02
			Iron					Iron	liver/blood/GI tract	6.6E-02		5.9E-02	1.3E-01
			Manganese					Manganese	CNS	4.9E-02		1.1E+00	1.2E+00
			Mercury					Mercury	CNS	2.3E-03		2.9E-02	3.2E-02
Groundwater	Water	Onsite	1,2-Dichloropropane	4.5E-07		4.7E-08	4.9E-07	1,2-Dichloropropane			4.9E-03		4.9E-03
			Benzene	1.7E-07	6.5E-08	3.0E-08	2.7E-07	Benzene		5.8E-03	3.8E-03	9.9E-04	1.1E-02
			Chloroform	3.5E-08	1.4E-07	3.4E-09	1.8E-07	Chloroform	Liver	1.7E-03	6.1E-02	1.6E-04	6.2E-02
			Trichloroethene	3.3E-06	6.3E-07	6.2E-07	4.5E-06	Trichloroethene	CNS	1.5E-01		2.7E-02	1.7E-01
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	6.8E-03		6.3E-04	7.4E-03
			Arsenic	1.1E-04		3.2E-07	1.1E-04	Arsenic	Skin, Vascular	7.2E-01		2.1E-03	7.2E-01
			Barium					Barium	Kidney	2.5E-01		1.0E-02	2.6E-01
			Chromium					Chromium	NOAEL	7.1E-04		1.6E-04	8.8E-04
			Manganese					Manganese	CNS	1.2E+01		8.5E-01	1.3E+01
			Mercury					Mercury	CNS	8.6E-02		3.6E-03	9.0E-02
			RDX	7.9E-07		3.3E-07	1.1E-06	RDX	Prostate	7.0E-03		3.0E-03	9.9E-03

Total Risk Across Surface Soil	1.7E-05
Total Risk Across Surface Water	1.1E-06
Total Risk Across Sediment	1.1E-04
Total Risk Across Groundwater	1.2E-04
Total Risk Across All Media and All Exposure Routes	2.5E-04

Total Hazard Index Across All Media and All Exposure Routes	1.7E+01
Total Liver HI =	4.2E-01
Total CNS HI =	1.5E+01
Total Kidney HI =	3.1E-01
Total Blood HI =	3.0E-01
Total Immune HI =	4.2E-02
Total Prostate HI =	9.9E-03
Total Lifetime HI =	9.3E-02
Total Skin HI =	7.6E-01
Total GI Tract HI =	2.9E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 4-13.

SITE 2 - TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1254	5.3E-09		1.2E-08	1.7E-08	Aroclor-1254	Immunological, Nails	1.3E-03		2.9E-03	4.2E-03
			Aroclor-1260	5.9E-08		1.3E-07	1.9E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	1.6E-05		2.4E-04	2.5E-04
			Iron					Iron	liver/blood/GI tract	2.9E-02		1.0E-02	3.9E-02
			Manganese					Manganese	CNS	9.9E-03		8.9E-02	9.9E-02
			Nickel					Nickel	Decreased body / organ weights	1.3E-03		1.2E-02	1.3E-02
			Vanadium					Vanadium	NOEL	2.2E-03		3.0E-02	3.3E-02
Surface Water	Surface Water	Onsite Ditches	Chloroform	3.0E-10		4.5E-10	7.5E-10	Chloroform	Liver	4.9E-05		7.4E-05	1.2E-04
			Trichloroethene	9.3E-10		2.7E-09	3.7E-09	Trichloroethene	CNS	1.4E-04		4.2E-04	5.6E-04
			Bis(2-Ethylhexyl)phthalate	4.0E-09		1.5E-07	1.5E-07	Bis(2-Ethylhexyl)phthalate	Liver	1.4E-04		5.4E-03	5.5E-03
			Cadmium					Cadmium	Kidney	3.9E-03		1.4E-02	1.8E-02
			Iron					Iron	liver/blood/GI tract	1.8E-03		1.6E-04	1.9E-03
			Manganese					Manganese	CNS	1.8E-02		4.0E-02	5.8E-02
			Thallium					Thallium	Liver	2.3E-02		2.0E-03	2.5E-02
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.1E-06			1.1E-06	BAP EQUIVALENT					
			Aroclor-1260	1.3E-06		2.9E-06	4.3E-06	Aroclor-1260					
			Dieldrin	4.6E-08		1.7E-07	2.1E-07	Dieldrin	Liver	5.8E-04		2.1E-03	2.7E-03
			Aluminum					Aluminum	Immunological, Nails	2.9E-03		1.0E-03	3.9E-03
			Arsenic	1.4E-07		1.6E-07	3.0E-07	Arsenic	Skin, Vascular	3.2E-03		3.5E-03	6.7E-03
			Iron					Iron	liver/blood/GI tract	2.2E-02		7.9E-03	3.0E-02
			Manganese					Manganese	CNS	1.6E-02		1.5E-01	1.6E-01
			Mercury					Mercury	CNS	7.7E-04		3.9E-03	4.7E-03
Groundwater	Water	Onsite	1,2-Dichloropropane	6.1E-08		6.4E-09	6.7E-08	1,2-Dichloropropane			2.0E-03		2.0E-03
			Benzene	2.4E-08	8.0E-09	4.1E-09	3.6E-08	Benzene		2.7E-03	1.6E-03	4.7E-04	4.8E-03
			Chloroform	4.8E-09	1.8E-08	4.7E-10	2.3E-08	Chloroform	Liver	7.6E-04	2.6E-02	7.7E-05	2.6E-02
			Trichloroethene	4.5E-07	8.3E-08	8.6E-08	6.2E-07	Trichloroethene	CNS	6.8E-02		1.3E-02	8.1E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	3.2E-03		3.0E-04	3.5E-03
			Arsenic	1.5E-05		3.6E-08	1.5E-05	Arsenic	Skin, Vascular	3.4E-01		8.0E-04	3.4E-01
			Barium					Barium	Kidney	1.2E-01		4.0E-03	1.2E-01
			Chromium					Chromium	NOAEL	3.3E-04		6.4E-05	4.0E-04
			Manganese					Manganese	CNS	5.6E+00		3.3E-01	5.9E+00
			Mercury					Mercury	CNS	4.0E-02		1.4E-03	4.2E-02
			RDX	1.1E-07		4.6E-08	1.5E-07	RDX	Prostate	3.3E-03		1.4E-03	4.7E-03

Total Risk Across Surface Soil	1.5E-06
Total Risk Across Surface Water	1.6E-07
Total Risk Across Sediment	5.9E-06
Total Risk Across Groundwater	1.6E-05
Total Risk Across All Media and All Exposure Routes	2.4E-05

Total Hazard Index Across All Media and All Exposure Routes	7.0E+00
Total Liver HI =	1.3E-01
Total CNS HI =	6.3E+00
Total Kidney HI =	1.4E-01
Total Blood HI =	7.5E-02
Total Immune HI =	8.1E-03
Total Prostate HI =	4.7E-03
Total Lifetime HI =	1.3E-02
Total Skin HI =	3.4E-01
Total GI Tract HI =	7.1E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 4-22.

SITE 2 - TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.0E-05			3.0E-05	BAP EQUIVALENT					
			Aroclor-1254	1.3E-07		1.3E-07	2.6E-07	Aroclor-1254	Immunological, Nails	3.7E-02		3.9E-02	7.6E-02
			Aroclor-1260	1.4E-06		1.5E-06	2.9E-06	Aroclor-1260					
			Chromium					Chromium	NOAEL	4.6E-04		3.2E-03	3.7E-03
			Iron					Iron	liver/blood/GI tract	8.1E-01		1.4E-01	9.5E-01
			Manganese					Manganese	CNS	2.8E-01		1.2E+00	1.5E+00
			Nickel					Nickel	Decreased body / organ weights	3.7E-02		1.6E-01	2.0E-01
			Vanadium					Vanadium	NOEL	6.1E-02		4.1E-01	4.8E-01
Surface Water	Surface Water	Onsite Ditches	Chloroform	1.8E-09		1.6E-09	3.4E-09	Chloroform	Liver	3.4E-04		3.1E-04	6.5E-04
			Trichloroethene	5.6E-09		9.7E-09	1.5E-08	Trichloroethene	CNS	9.8E-04		1.7E-03	2.7E-03
			Bis(2-Ethylhexyl)phthalate	2.4E-08		5.0E-07	5.2E-07	Bis(2-Ethylhexyl)phthalate	Liver	1.0E-03		2.1E-02	2.2E-02
			Cadmium					Cadmium	Kidney	2.7E-02		7.6E-02	1.0E-01
			Iron					Iron	liver/blood/GI tract	1.2E-02		8.6E-04	1.3E-02
			Manganese					Manganese	CNS	1.2E-01		2.2E-01	3.4E-01
			Thallium					Thallium	Liver	1.6E-01		1.1E-02	1.7E-01
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	2.8E-05			2.8E-05	BAP EQUIVALENT					
			Aroclor-1260	3.2E-05		3.4E-05	6.6E-05	Aroclor-1260					
			Dieldrin	1.1E-06		1.9E-06	3.0E-06	Dieldrin	Liver	1.6E-02		2.8E-02	4.4E-02
			Aluminum					Aluminum	Immunological, Nails	8.1E-02		1.4E-02	9.5E-02
			Arsenic	3.5E-06		1.8E-06	5.3E-06	Arsenic	Skin, Vascular	9.0E-02		4.7E-02	1.4E-01
			Iron					Iron	liver/blood/GI tract	6.2E-01		1.1E-01	7.2E-01
			Manganese					Manganese	CNS	4.6E-01		2.0E+00	2.5E+00
			Mercury					Mercury	CNS	2.1E-02		5.4E-02	7.5E-02
Groundwater	Water	Onsite	1,2-Dichloropropane	2.6E-07		1.6E-08	2.8E-07	1,2-Dichloropropane			2.2E-02		2.2E-02
			Benzene	1.0E-07	7.0E-08	1.0E-08	1.8E-07	Benzene		1.4E-02	1.7E-02	1.4E-03	3.2E-02
			Chloroform	2.0E-08	1.6E-07	1.2E-09	1.8E-07	Chloroform	Liver	3.9E-03	2.6E-01	2.3E-04	2.7E-01
			Trichloroethene	1.9E-06	6.6E-07	2.2E-07	2.8E-06	Trichloroethene	CNS	3.4E-01		3.9E-02	3.8E-01
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.6E-02		8.9E-04	1.7E-02
			Arsenic	6.5E-05		1.1E-07	6.5E-05	Arsenic	Skin, Vascular	1.7E+00		2.9E-03	1.7E+00
			Barium					Barium	Kidney	5.9E-01		1.5E-02	6.0E-01
			Chromium					Chromium	NOAEL	1.7E-03		2.3E-04	1.9E-03
			Manganese					Manganese	CNS	2.8E+01		1.2E+00	2.9E+01
			Mercury					Mercury	CNS	2.0E-01		5.0E-03	2.1E-01
			RDX	4.6E-07		1.2E-07	5.8E-07	RDX	Prostate	1.6E-02		4.2E-03	2.0E-02

Total Risk Across Surface Soil	3.3E-05
Total Risk Across Surface Water	5.4E-07
Total Risk Across Sediment	1.0E-04
Total Risk Across Groundwater	6.9E-05
Total Risk Across All Media and All Exposure Routes	2.0E-04

Total Hazard Index Across All Media and All Exposure Routes	4.0E+01
Total Liver HI =	2.2E+00
Total CNS HI =	3.4E+01
Total Kidney HI =	7.1E-01
Total Blood HI =	1.7E+00
Total Immune HI =	1.7E-01
Total Prostate HI =	2.0E-02
Total Lifetime HI =	2.0E-01
Total Skin HI =	1.8E+00
Total GI Tract HI =	1.7E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 4-13.

SITE 2 - TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.4E-06			3.4E-06	BAP EQUIVALENT					
			Aroclor-1254	1.4E-08		6.0E-09	2.0E-08	Aroclor-1254	Immunological, Nails	1.2E-02		5.2E-03	1.8E-02
			Aroclor-1260	1.6E-07		6.6E-08	2.2E-07	Aroclor-1260					
			Chromium					Chromium	NOAEL	1.5E-04		4.3E-04	5.9E-04
			Iron					Iron	liver/blood/GI tract	2.7E-01		1.9E-02	2.9E-01
			Manganese					Manganese	CNS	9.2E-02		1.6E-01	2.5E-01
			Nickel					Nickel	Decreased body / organ weights	1.2E-02		2.2E-02	3.4E-02
			Vanadium					Vanadium	NOEL	2.1E-02		5.5E-02	7.6E-02
Surface Water	Surface Water	Onsite Ditches	Chloroform	2.0E-10		2.3E-10	4.3E-10	Chloroform	Liver	1.1E-04		1.3E-04	2.5E-04
			Trichloroethene	6.2E-10		1.4E-09	2.0E-09	Trichloroethene	CNS	3.3E-04		7.6E-04	1.1E-03
			Bis(2-Ethylhexyl)phthalate	2.7E-09		7.8E-08	8.1E-08	Bis(2-Ethylhexyl)phthalate	Liver	3.3E-04		9.8E-03	1.0E-02
			Cadmium					Cadmium	Kidney	9.1E-03		2.6E-02	3.5E-02
			Iron					Iron	liver/blood/GI tract	4.1E-03		2.9E-04	4.4E-03
			Manganese					Manganese	CNS	4.1E-02		7.3E-02	1.1E-01
			Thallium					Thallium	Liver	5.3E-02		3.7E-03	5.7E-02
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	3.1E-06			3.1E-06	BAP EQUIVALENT					
			Aroclor-1260	3.6E-06		1.5E-06	5.1E-06	Aroclor-1260					
			Dieldrin	1.2E-07		8.6E-08	2.1E-07	Dieldrin	Liver	5.4E-03		3.8E-03	9.2E-03
			Aluminum					Aluminum	Immunological, Nails	2.7E-02		1.9E-03	2.9E-02
			Arsenic	3.9E-07		8.1E-08	4.7E-07	Arsenic	Skin, Vascular	3.0E-02		6.3E-03	3.6E-02
			Iron					Iron	liver/blood/GI tract	2.1E-01		1.4E-02	2.2E-01
			Manganese					Manganese	CNS	1.5E-01		2.7E-01	4.2E-01
			Mercury					Mercury	CNS	7.1E-03		7.2E-03	1.4E-02
Groundwater	Water	Onsite	1,2-Dichloropropane	5.8E-08		3.0E-09	6.1E-08	1,2-Dichloropropane			8.6E-03		8.6E-03
			Benzene	2.3E-08	9.4E-09	1.9E-09	3.4E-08	Benzene		9.1E-03	6.7E-03	7.7E-04	1.7E-02
			Chloroform	4.5E-09	2.1E-08	2.2E-10	2.6E-08	Chloroform	Liver	2.6E-03	1.1E-01	1.3E-04	1.1E-01
			Trichloroethene	4.3E-07	9.3E-08	4.0E-08	5.6E-07	Trichloroethene	CNS	2.3E-01		2.1E-02	2.5E-01
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.1E-02		4.8E-04	1.1E-02
			Arsenic	1.4E-05		1.7E-08	1.4E-05	Arsenic	Skin, Vascular	1.1E+00		1.3E-03	1.1E+00
			Barium					Barium	Kidney	3.9E-01		6.5E-03	4.0E-01
			Chromium					Chromium	NOAEL	1.1E-03		1.0E-04	1.2E-03
			Manganese					Manganese	CNS	1.9E+01		5.4E-01	1.9E+01
			Mercury					Mercury	CNS	1.3E-01		2.2E-03	1.4E-01
			RDX	1.0E-07		2.2E-08	1.2E-07	RDX	Prostate	1.1E-02		2.3E-03	1.3E-02

Total Risk Across Surface Soil	3.6E-06
Total Risk Across Surface Water	8.3E-08
Total Risk Across Sediment	8.9E-06
Total Risk Across Groundwater	1.5E-05
Total Risk Across All Media and All Exposure Routes	2.8E-05

Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
Total Liver HI =	7.0E-01
Total CNS HI =	2.0E+01
Total Kidney HI =	4.3E-01
Total Blood HI =	5.2E-01
Total Immune HI =	4.7E-02
Total Prostate HI =	1.3E-02
Total Lifetime HI =	3.4E-02
Total Skin HI =	1.2E+00
Total GI Tract HI =	5.1E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 4-22.

TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FULL TIME WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.6E-06			9.6E-06	BAP EQUIVALENT					
			Aroclor-1260	4.5E-07		8.5E-07	1.3E-06	Aroclor-1260					
						Total Risk Across Surface Soil	1.1E-05					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air							

Total Risk Across All Media and All Exposure Routes 1.1E-05

TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface /	BAP EQUIVALENT	5.0E-07			5.0E-07	BAP EQUIVALENT					
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1260	1.5E-06		2.8E-06	4.3E-06	Aroclor-1260					

Total Risk Across Surface Soil	5.0E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	5.6E-06
Total Risk Across Groundwater	
Total Risk Across All Media and All Exposure Routes	6.1E-06

Total Hazard Index Across All Media and All Exposure Routes	

SITE 2 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)

RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER

SITE - APPLE ORCHARD LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: *Construction Worker*
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Onsite Ditches	BAP EQUIVALENT	1.2E-06			1.2E-06	BAP EQUIVALENT					
			Aroclor-1260	1.4E-06		5.6E-07	2.0E-06	Aroclor-1260					

Total Risk Across Surface Soil	
Total Risk Across Surface Water	
Total Risk Across Sediment	3.2E-06
Total Risk Across Groundwater	
Total Risk Across All Media and All Exposure Routes	3.2E-06

Total Hazard Index Across All Media and All Exposure Routes	

SITE 2 - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADULT RECREATIONAL USER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	7.4E-07			7.4E-07	BAP EQUIVALENT					
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	6.7E-07			6.7E-07	BAP EQUIVALENT					
			Aroclor-1260	7.9E-07		4.3E-06	5.1E-06	Aroclor-1260					
						Total Risk Across Surface Soil	7.4E-07					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Surface Water							
						Total Risk Across Sediment	5.7E-06						
						Total Risk Across All Media and All Exposure Routes	6.5E-06						

SITE 2 - TABLE 10.5. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	1.2E-06			1.2E-06	BAP EQUIVALENT					
			Aroclor-1260	1.4E-06		2.7E-06	4.1E-06	Aroclor-1260					

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	5.3E-06
Total Risk Across All Media and All Exposure Routes	6.6E-06

Total Hazard Index Across All Media and All Exposure Routes	

SITE 2 - TABLE 10.6. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.1E-05			1.1E-05	BAP EQUIVALENT					
			Aroclor-1260	5.0E-07		1.1E-06	1.6E-06	Aroclor-1260					
						Total Risk Across Surface Soil	1.2E-05					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air							

Total Risk Across All Media and All Exposure Routes 1.2E-05

SITE 2 - TABLE 10.6a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.4E-06			2.4E-06	BAP EQUIVALENT					
						Total Risk Across Surface Soil	2.4E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air							

Total Risk Across All Media and All Exposure Routes 2.4E-06

SITE 2 - TABLE 10.7. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-05			1.3E-05	BAP EQUIVALENT					
			Aroclor-1260	6.0E-07		3.2E-06	3.9E-06	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	Bis(2-Ethylhexyl)phthalate	2.0E-08		1.1E-06	1.1E-06	Bis(2-Ethylhexyl)phthalate	Liver	2.1E-04		1.1E-02	1.2E-02
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	1.2E-05			1.2E-05	BAP EQUIVALENT					
			Aroclor-1260	1.4E-05		7.5E-05	8.9E-05	Aroclor-1260					
			Dieldrin	4.7E-07		4.3E-06	4.7E-06	Dieldrin	Liver	1.7E-03		1.6E-02	1.7E-02
			Arsenic	1.5E-06		4.0E-06	5.5E-06	Arsenic	Skin, Vascular	9.6E-03		2.6E-02	3.6E-02
Groundwater	Water	Onsite	Trichloroethene	3.3E-06	6.3E-07	6.2E-07	4.5E-06	Trichloroethene	CNS	1.5E-01		2.7E-02	1.7E-01
			Arsenic	1.1E-04		3.2E-07	1.1E-04	Arsenic	Skin, Vascular	7.2E-01		2.1E-03	7.2E-01
			Manganese					Manganese	CNS	1.2E+01		8.5E-01	1.3E+01
			RDX	7.9E-07		3.3E-07	1.1E-06	RDX	Prostate	7.0E-03		3.0E-03	9.9E-03

Total Risk Across Surface Soil	1.7E-05
Total Risk Across Surface Water	1.1E-06
Total Risk Across Sediment	1.1E-04
Total Risk Across Groundwater	1.2E-04
Total Risk Across All Media and All Exposure Routes	2.5E-04

Total Hazard Index Across All Media and All Exposure Routes	1.4E+01
Total Liver HI =	2.9E-02
Total CNS HI =	1.3E+01
Total Prostate HI =	9.9E-03
Total Vascular HI =	7.6E-01

SITE 2 - TABLE 10.7a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	1.1E-06			1.1E-06	BAP EQUIVALENT					
			Aroclor-1260	1.3E-06		2.9E-06	4.3E-06	Aroclor-1260					
Groundwater	Water	Onsite	Arsenic	1.5E-05		3.6E-08	1.5E-05	Arsenic	Skin, Vascular	3.4E-01		8.0E-04	3.4E-01
			Manganese					Manganese	CNS	5.6E+00		3.3E-01	5.9E+00

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	5.4E-06
Total Risk Across Groundwater	1.5E-05
Total Risk Across All Media and All Exposure Routes	2.2E-05

Total Hazard Index Across All Media and All Exposure Routes	6.2E+00
Total CNS HI =	5.9E+00
Total Skin HI =	3.4E-01
Total Vascular HI =	3.4E-01

SITE 2 - TABLE 10.8. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.0E-05			3.0E-05	BAP EQUIVALENT					
			Aroclor-1260	1.4E-06		1.5E-06	2.9E-06	Aroclor-1260					
			Manganese					Manganese	CNS	2.8E-01		1.2E+00	1.5E+00
Surface Water	Surface Water	Onsite Diitches	Bis(2-Ethylhexyl)phthalate	2.4E-08		5.0E-07	5.2E-07	Bis(2-Ethylhexyl)phthalate	Liver	1.0E-03		2.1E-02	2.2E-02
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	2.8E-05			2.8E-05	BAP EQUIVALENT					
			Aroclor-1260	3.2E-05		3.4E-05	6.6E-05	Aroclor-1260					
			Dieldrin	1.1E-06		1.9E-06	3.0E-06	Dieldrin	Liver	1.6E-02		2.8E-02	4.4E-02
			Arsenic	3.5E-06		1.8E-06	5.3E-06	Arsenic	Skin, Vascular	9.0E-02		4.7E-02	1.4E-01
			Manganese					Manganese	CNS	4.6E-01		2.0E+00	2.5E+00
Groundwater	Water	Onsite	Trichloroethene	1.9E-06	6.6E-07	2.2E-07	2.8E-06	Trichloroethene	CNS	3.4E-01		3.9E-02	3.8E-01
			Arsenic	6.5E-05		1.1E-07	6.5E-05	Arsenic	Skin, Vascular	1.7E+00		2.9E-03	1.7E+00
			Manganese					Manganese	CNS	2.8E+01		1.2E+00	2.9E+01

Total Risk Across Surface Soil	3.3E-05
Total Risk Across Surface Water	5.2E-07
Total Risk Across Sediment	1.0E-04
Total Risk Across Groundwater	6.7E-05
Total Risk Across All Media and All Exposure Routes	2.0E-04

Total Hazard Index Across All Media and All Exposure Routes	3.5E+01
Total Liver HI =	6.6E-02
Total CNS HI =	3.3E+01
Total Skin HI =	1.8E+00
Total Vascular HI =	1.8E+00

SITE 2 - TABLE 10.8a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 2 - APPLE ORCHARD LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.4E-06			3.4E-06	BAP EQUIVALENT					
Sediment	Sediment	Onsite Diitches	BAP EQUIVALENT	3.1E-06			3.1E-06	BAP EQUIVALENT					
			Aroclor-1260	3.6E-06		1.5E-06	5.1E-06	Aroclor-1260					
Groundwater	Water	Onsite	Arsenic	1.4E-05		1.7E-08	1.4E-05	Arsenic	Skin, Vascular	1.1E+00		1.3E-03	1.1E+00
			Manganese					Manganese	CNS	1.9E+01		5.4E-01	1.9E+01

Total Risk Across Surface Soil	3.4E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	8.2E-06
Total Risk Across Groundwater	1.4E-05
Total Risk Across All Media and All Exposure Routes	2.6E-05

Total Hazard Index Across All Media and All Exposure Routes	2.0E+01
Total CNS HI =	1.9E+01
Total Skin HI =	1.1E+00
Total Vascular HI =	1.1E+00

Vapor Intrusion from Groundwater - SITE 2 - RME
Source: ASTM E 1739-95

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,2-Dichloropropane	6.99E-04	7.82E-02	8.73E-06	2.80E+03	1.15E-01	6.10E-03	2.49E-05	1.20E-03	6.10E-03	5.81E-05	3.37E-03	2.35E-06
Benzene	6.37E-04	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	4.09E-06
Chloroform	6.09E-04	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	3.22E-06
Trichloroethene	3.18E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.05E-04
cis-1,2-Dichloroethene	2.47E-03	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.12E-05

Volatilization from Groundwater to Outdoor Air - SITE 2 - RME
Source: ASTM E 1739-95

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
Uair	390	Wind speed above ground in mixing zone (cm/sec)
dair	200	ambient air mixing zone height, (cm)
W	1500	width of source parallel to groundwater flow direction, (cm)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)

RME

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	VF mg/m^3)/(mg/l	Cair (mg/m^3)
1,2-Dichloropropane	6.99E-04	7.82E-02	8.73E-06	2.80E+03	1.15E-01	6.10E-03	2.49E-05	1.20E-03	8.86E-06	6.19E-09
Benzene	6.37E-04	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	1.48E-05	9.42E-09
Chloroform	6.09E-04	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	1.28E-05	7.78E-09
Trichloroethene	3.18E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	2.05E-05	6.53E-07
cis-1,2-Dichloroethene	2.47E-03	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	1.18E-05	2.91E-08

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloropropane	2.30E-04	1.7E-06	5.0E-06		1.14E-03	NA	NA	4.4E-03	7.6%
Benzene	2.48E-04	1.8E-06	5.4E-06	2.90E-02	1.70E-03	5.4E-08	8.4%	3.2E-03	5.5%
Chloroform	1.99E-04	1.5E-06	4.3E-06	8.10E-02	8.60E-05	1.2E-07	18.9%	5.0E-02	87.0%
Trichloroethene	1.04E-02	7.7E-05	2.2E-04	6.00E-03		4.6E-07	72.7%	NA	NA
cis-1,2-Dichloroethene	8.77E-04	6.5E-06	1.9E-05			NA	NA	NA	NA
					Total	**6.4E-07**	**100.0%**	**5.8E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	6	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloropropane	2.30E-04	2.0E-06	2.3E-05		1.14E-03	NA	NA	2.0E-02	7.6%
Benzene	2.48E-04	2.2E-06	2.5E-05	2.90E-02	1.70E-03	6.3E-08	8.4%	1.5E-02	5.5%
Chloroform	1.99E-04	1.7E-06	2.0E-05	8.10E-02	8.60E-05	1.4E-07	18.9%	2.3E-01	87.0%
Trichloroethene	1.04E-02	9.0E-05	1.0E-03	6.00E-03		5.4E-07	72.7%	NA	NA
cis-1,2-Dichloroethene	8.77E-04	7.6E-06	8.9E-05			NA	NA	NA	NA
					Total	**7.4E-07**	**100.0%**	**2.7E-01**	**100.0%**

Volatilization From Showering - SITE 2 - CTE
Source: Foster & Chrostowski, 1987.

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,2-Dichloropropane	6.99E-04	1.13E+02	2.80E-03	1.25E+01	1.20E+03	1.15E+01	1.51E+01	2.76E-04	2.30E-04	2.88E-02
Benzene	6.37E-04	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	2.98E-04	2.48E-04	3.42E-02
Chloroform	6.09E-04	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	2.39E-04	1.99E-04	2.87E-02
Trichloroethene	3.18E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.24E-02	1.04E-02	2.86E-02
cis-1,2-Dichloroethene	2.47E-03	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.05E-03	8.77E-04	3.12E-02

Vapor Intrusion from Groundwater - SITE 2 - CTE
Source: ASTM E 1739-95

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,2-Dichloropropane	6.99E-04	7.82E-02	8.73E-06	2.80E+03	1.15E-01	6.10E-03	2.49E-05	1.20E-03	6.10E-03	5.81E-05	3.37E-03	2.35E-06
Benzene	6.37E-04	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	4.09E-06
Chloroform	6.09E-04	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	3.22E-06
Trichloroethene	3.18E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.05E-04
cis-1,2-Dichloroethene	2.47E-03	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.12E-05

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloropropane	2.30E-04	1.8E-07	1.8E-06		1.14E-03	NA	NA	1.6E-03	7.6%
Benzene	2.48E-04	2.0E-07	2.0E-06	2.90E-02	1.70E-03	5.8E-09	8.4%	1.2E-03	5.5%
Chloroform	1.99E-04	1.6E-07	1.6E-06	8.10E-02	8.60E-05	1.3E-08	18.9%	1.9E-02	87.0%
Trichloroethene	1.04E-02	8.3E-06	8.3E-05	6.00E-03		5.0E-08	72.7%	NA	NA
cis-1,2-Dichloroethene	8.77E-04	7.0E-07	7.0E-06			NA	NA	NA	NA
					Total	**6.9E-08**	**100.0%**	**2.1E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	2	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	730	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 2 - APPLE ORCHARD LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloropropane	2.30E-04	2.5E-07	8.6E-06		1.14E-03	NA	NA	7.6E-03	7.6%
Benzene	2.48E-04	2.7E-07	9.3E-06	2.90E-02	1.70E-03	7.7E-09	8.4%	5.5E-03	5.5%
Chloroform	1.99E-04	2.1E-07	7.5E-06	8.10E-02	8.60E-05	1.7E-08	18.9%	8.7E-02	87.0%
Trichloroethene	1.04E-02	1.1E-05	3.9E-04	6.00E-03		6.7E-08	72.7%	NA	NA
cis-1,2-Dichloroethene	8.77E-04	9.4E-07	3.3E-05			NA	NA	NA	NA
					Total	**9.2E-08**	**100.0%**	**1.0E-01**	**100.0%**

CALCULATION OF t*, T, AND B FOR RDX
ACCORDING TO USEPA DERMAL GUIDANCE (USEPA, 1992)

Step 1
Calculation of Kp (if none provided)
log Kp = -2.72 + 0.71log(Kow) - 0.0061 MW

Compound	log (Kow)	MW	log (Kp)	Kp
RDX	0.87	222.1	-3.46	1.90E-02

Kow and Kp from Risk Assessment Information System (RAIS)
(http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_9801)

Step 2
Calculation of B
B = Kow/1.0E-4

Compound	Kow	B
RDX	7.41E+00	**7.41E-04**

Step 3
Calculation of log Dsc/lsc and Dsc
Log Dsc/lsc = -2.72 - 0.0061 MW
Dcs = diffusivity of a substance within the membrane (cm^2/hr)
lsc = thickness of the stratum corneum (= 1.0E-03 cm)

Compound	MW	log (Dsc/lsc)	Dsc (cm^2/hr)
RDX	222.12	-4.07	8.42E-08

Step 4
Calculation of T
T = lsc^2/6Dsc

Compound	lsc	Dsc	T
RDX	1.00E-03	8.42E-08	**1.98**

Step 4
Calculation of t*

If B<0.1, t* = 2.4 T (case 1)

If 0.1 < B < 1.17, t* = (8.4 + 6 log B)T (case 2)

If B > 1.17, t* = 6(b-(b2-c2)^.5)T (case 3)

Case 1

Compound	t* (hour)
RDX	**4.75**

SITE 3

RISK ASSESSMENT CALCULATIONS

SITE 3 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 3 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors from Water in On-site Ditches	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 3 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
120-12-7	Anthracene	0.067	J	0.067	J	mg/kg	3SS1110100	1/12	0.36 - 0.42	0.067	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.068	J	0.31	J	mg/kg	3SS1110100	2/12	0.36 - 0.42	0.31	NA	0.87	C	**0.08**	SSL_MIGR NA	No	BSL
50-32-8	Benzo(a)pyrene	0.055	J	0.23	J	mg/kg	3SS1110100	3/12	0.36 - 0.42	0.23	NA	**0.087**	C	0.4	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.048	J	0.3	J	mg/kg	3SS1110100	3/12	0.36 - 0.42	0.3	NA	0.87	C	**0.2**	SSL_MIGR NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.085	J	0.085	J	mg/kg	3SS1110100	1/12	0.36 - 0.42	0.085	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.049	J	0.11	J	mg/kg	3SS1110100	2/12	0.36 - 0.42	0.11	NA	8.7	C	2	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.044	J	0.31	J	mg/kg	3SS1110100	3/12	0.36 - 0.42	0.31	NA	87	C	8	SSL_MIGR NA	No	BSL
206-44-0	Fluoranthene	0.11	J	0.73		mg/kg	3SS1110100	2/12	0.36 - 0.42	0.73	NA	310	N	210	SSL_MIGR NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	J	0.11	J	mg/kg	3SS1110100	1/12	0.36 - 0.42	0.11	NA	0.87	C	0.7	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.11	J	0.49		mg/kg	3SS1110100	2/12	0.36 - 0.42	0.49	NA	160	N		NA NA	No	BSL
108-95-2	Phenol	0.046	J	0.046	J	mg/kg	3SS1060100	1/12	0.36 - 0.43	0.046	NA	4700	N	5	SSL_MIGR NA	No	BSL
129-00-0	Pyrene	0.059	J	0.6		mg/kg	3SS1110100	3/12	0.36 - 0.42	0.6	NA	230	N	210	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.0041	J	0.0041	J	mg/kg	3SS1150100	1/13	0.0036 - 0.0045	0.0041	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.011	J	0.011	J	mg/kg	3SS1150100	1/12	0.0036 - 0.0045	0.011	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0025	J	0.012	J	mg/kg	3SS1110100	7/13	0.0019 - 0.0021	0.012	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11097-69-1	Aroclor-1254	0.058	J	0.061	J	mg/kg	3SS1020100	2/13	0.036 - 0.045	0.061	NA	0.32	C		NA NA	No	BSL
11096-82-5	Aroclor-1260	0.05	J	0.43		mg/kg	3SS1120100	8/13	0.036 - 0.041	0.43	NA	**0.32**	C		NA NA	Yes	ASL
1031-07-8	Endosulfan Sulfate	0.0028	J	0.0028	J	mg/kg	3SS1150100	1/13	0.0036 - 0.0045	0.0028	NA	47 (8)	N		NA NA	No	BSL
7421-93-4	Endrin Aldehyde	0.0084		0.016		mg/kg	3SS1120100	5/12	0.0036 - 0.0041	0.016	NA	2.3 (9)	N		NA NA	No	BSL
5103-74-2	gamma-Chlordane	0.0057	J	0.0063	J	mg/kg	3SS1110100	3/13	0.0019 - 0.0023	0.0063	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0018	J	0.0019	J	mg/kg	3SS1120100	1/13	0.0019 - 0.0023	0.0019	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
7429-90-5	Aluminum	4360		13700		mg/kg	3SS1140100	13/13		13700	NA	**7800**	N		NA NA	No	BKG

SITE 3 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-36-0	Antimony	1.3	L	1.3	L	mg/kg	3SS1110100	1/13	0.62 - 0.76	1.3	NA	3.1	N	**0.3**	SSL_MIGR NA	No	BSL
7440-38-2	Arsenic	2	K	7.1		mg/kg	3SS1150100	13/13		7.1	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	22.9		60.1		mg/kg	3SS1040100	13/13		60.1	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-43-9	Cadmium	0.3		0.3		mg/kg	3SS1150100	1/13	0.04 - 0.05	0.3	NA	7.8	N	0.4 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	530		3700		mg/kg	3SS1140100	13/13		3700	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	8.4		22.5		mg/kg	3SS1140100	13/13		22.5	NA	23 (10)	N	**2** 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	2.3		13.2		mg/kg	3SS1070100	13/13		13.2	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	8.3	J	31.1	J	mg/kg	3SS1120100	13/13		31.1	NA	310	N		NA NA	No	BSL
7439-89-6	Iron	7510		22900		mg/kg	3SS1070100	13/13		22900	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	7.9		308		mg/kg	3SS1110100	13/13		308	NA	400 (11)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	433		2620		mg/kg	3SS1070100	13/13		2620	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	34.8		644		mg/kg	3SS1070100	13/13		644	NA	**160 (12)**	N		NA NA	No	BKG
7439-97-6	Mercury	0.14		0.14		mg/kg	3SS1090100	1/13	0.06 - 0.24	0.14	NA	2.3 (13)	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL, BKG
7440-02-0	Nickel	4.6		18		mg/kg	3SS1070100	12/13	8.5	18	NA	160	N	**7** 13000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-09-7	Potassium	296	J	1510	J	mg/kg	3SS1070100	13/13		1510	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	0.73	J	1.6	J	mg/kg	3SS1140100	9/13	0.62 - 0.76	1.6	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL
7440-22-4	Silver	0.23		0.69		mg/kg	3SS1140100	2/13	0.15 - 0.19	0.69	NA	39	N	2	SSL_MIGR NA	No	BSL, BKG
7440-23-5	Sodium	21.9		44.1		mg/kg	3SS1140100	10/13	19.7 - 21.4	44.1	NA	NA			NA NA	No	NUT
7440-62-2	Vanadium	13.6		43.9		mg/kg	3SS1140100	13/13		43.9	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	19.4	J	121	J	mg/kg	3SS1150100	13/13		121	NA	2300	N	620	SSL_MIGR NA	No	BSL

SITE 3 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
	BOD-5day (total)	77		100		mg/kg	3SS1020100	2/2		100	NA	NA			NA	No	NTX
	Chemical Oxygen Demand	47000		77000		ug/L	3SS1110100	4/4		77000	NA	NA			NA	No	NTX
TTNUS17	pH	2.3		5.6			3SS1110100	4/4		5.6	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	5700		15000		mg/kg	3SS1110100	4/4		15000	NA	NA			NA	No	NTX

Associated Samples:

3SS1020100
3SS1040100
3SS1050100
3SS1060100
3SS1070100
3SS1080100
3SS1090100
3SS1100100
3SS1110100
3SS1120100
3SS1120100-D
3SS1130100
3SS1140100
3SS1150100

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan Sulfate as Endosulfan.
9 Endrin Aldehyde as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 3 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
78-93-3	2-Butanone	0.01	J	0.01	J	mg/kg	3SU1050300	1/18	0.011 - 0.014	0.01	NA	4700	N		NA NA	No	BSL
67-64-1	Acetone	0.055	J	0.055	J	mg/kg	3SU1050300	1/18	0.011 - 0.014	0.055	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
108-88-3	Toluene	0.001	J	0.001	J	mg/kg	3SU1050300	1/18	0.011 - 0.014	0.001	NA	1600	N	0.6 650	SSL_MIGR SSL_INH	No	BSL
120-12-7	Anthracene	0.067	J	0.067	J	mg/kg	3SS1110100	1/17	0.36 - 0.44	0.067	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.068	J	0.31	J	mg/kg	3SS1110100	2/17	0.36 - 0.44	0.31	NA	0.87	C	**0.08**	SSL_MIGR NA	No	BSL
50-32-8	Benzo(a)pyrene	0.055	J	0.23	J	mg/kg	3SS1110100	3/17	0.36 - 0.44	0.23	NA	**0.087**	C	0.4	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.048	J	0.3	J	mg/kg	3SS1110100	3/17	0.36 - 0.44	0.3	NA	0.87	C	**0.2**	SSL_MIGR NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.085	J	0.085	J	mg/kg	3SS1110100	1/17	0.36 - 0.44	0.085	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.049	J	0.11	J	mg/kg	3SS1110100	2/17	0.36 - 0.44	0.11	NA	8.7	C	2	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.044	J	0.31	J	mg/kg	3SS1110100	3/17	0.36 - 0.44	0.31	NA	87	C	8	SSL_MIGR NA	No	BSL
206-44-0	Fluoranthene	0.11	J	0.73		mg/kg	3SS1110100	2/17	0.36 - 0.44	0.73	NA	310	N	210	SSL_MIGR NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.11	J	0.11	J	mg/kg	3SS1110100	1/17	0.36 - 0.44	0.11	NA	0.87	C	0.7	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.11	J	0.49		mg/kg	3SS1110100	2/17	0.36 - 0.44	0.49	NA	160	N		NA NA	No	BSL
108-95-2	Phenol	0.046	J	0.089	J	mg/kg	3SU1050300	2/17	0.36 - 0.43	0.089	NA	4700	N	5	SSL_MIGR NA	No	BSL
129-00-0	Pyrene	0.059	J	0.6		mg/kg	3SS1110100	3/17	0.36 - 0.44	0.6	NA	230	N	210	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.0024	J	0.0041	J	mg/kg	3SS1150100	2/18	0.0036 - 0.0045	0.0041	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.011	J	0.011	J	mg/kg	3SS1150100	1/17	0.0036 - 0.0045	0.011	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0025	J	0.013	J	mg/kg	3SU1050300	8/18	0.0019 - 0.0021	0.013	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11097-69-1	Aroclor-1254	0.058	J	0.061	J	mg/kg	3SS1020100	2/18	0.036 - 0.045	0.061	NA	0.32	C		NA NA	No	BSL
11096-82-5	Aroclor-1260	0.05	J	0.43		mg/kg	3SS1120100	8/18	0.036 - 0.045	0.43	NA	**0.32**	C		NA NA	Yes	ASL
1031-07-8	Endosulfan Sulfate	0.0028	J	0.0028	J	mg/kg	3SS1150100	1/18	0.0036 - 0.0045	0.0028	NA	47 (8)	N		NA NA	No	BSL
7421-93-4	Endrin Aldehyde	0.0084		0.016		mg/kg	3SS1120100	5/17	0.0036 - 0.0045	0.016	NA	2.3 (9)	N		NA NA	No	BSL

SITE 3 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
5103-74-2	gamma-Chlordane	0.0057	J	0.015		mg/kg	3SU1050300	4/18	0.0019 - 0.0023	0.015	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0018	J	0.0019	J	mg/kg	3SS1120100	1/18	0.0019 - 0.0023	0.0019	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
7429-90-5	Aluminum	3160		13700		mg/kg	3SS1140100	18/18		13700	NA	**7800**	N		NA NA	No	BKG
7440-36-0	Antimony	1.3	L	1.3	L	mg/kg	3SS1110100	1/18	0.62 - 0.76	1.3	NA	3.1	N	**0.3**	SSL_MIGR NA	No	BSL
7440-38-2	Arsenic	1.7	K	7.1		mg/kg	3SS1150100	17/18	0.58	7.1	NA	**0.43**	C	**1** 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	12		82.9		mg/kg	3SU1050300	18/18		82.9	NA	550	N	**82** 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-43-9	Cadmium	0.3		0.3		mg/kg	3SS1150100	1/18	0.04 - 0.05	0.3	NA	7.8	N	0.4 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	284		3700		mg/kg	3SS1140100	15/18	185 - 188	3700	NA	NA	N		NA NA	No	NUT
7440-47-3	Chromium	6.1		22.5		mg/kg	3SS1140100	18/18		22.5	NA	23 (10)	N	**2** 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	2.3		13.2		mg/kg	3SS1070100	18/18		13.2	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	3	J	31.1	J	mg/kg	3SS1120100	18/18		31.1	NA	310	N		NA NA	No	BSL
7439-89-6	Iron	4100		22900		mg/kg	3SS1070100	18/18		22900	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	5.5		308		mg/kg	3SS1110100	18/18		308	NA	400 (11)	N		NA NA	No	BSL, BKG
7439-95-4	Magnesium	274		2620		mg/kg	3SS1070100	18/18		2620	NA	NA	N		NA NA	No	NUT
7439-96-5	Manganese	31.2		644		mg/kg	3SS1070100	18/18		644	NA	**160 (12)**	N		NA NA	Yes	ASL
7439-97-6	Mercury	0.14		0.14		mg/kg	3SS1090100	1/18	0.06 - 0.24	0.14	NA	2.3 (13)	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL, BKG
7440-02-0	Nickel	2.3		18		mg/kg	3SS1070100	17/18	8.5	18	NA	160	N	**7** 13000	SSL_MIGR SSL_INH	No	BSL
7440-09-7	Potassium	174	J	1510	J	mg/kg	3SS1070100	18/18		1510	NA	NA	N		NA NA	No	NUT, BKG
7782-49-2	Selenium	0.73	J	1.6	J	mg/kg	3SS1140100	10/18	0.62 - 0.76	1.6	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL
7440-22-4	Silver	0.23		0.69		mg/kg	3SS1140100	2/18	0.15 - 0.19	0.69	NA	39	N	2	SSL_MIGR NA	No	BSL, BKG
7440-23-5	Sodium	21.9		49.4		mg/kg	3SU1060300	14/18	19.5 - 21.4	49.4	NA	NA	N		NA NA	No	NUT

SITE 3 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-62-2	Vanadium	7.6		43.9		mg/kg	3SS1140100	18/18		43.9	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	19.4	J	121	J	mg/kg	3SS1150100	18/18		121	NA	2300	N	620	SSL_MIGR NA	No	BSL
121-82-4	RDX	0.04	J	0.04	J	mg/kg	3SU1040300	1/18	0.5	0.04	NA	5.8	C		NA NA	No	BSL
	BOD-5day (total)	77		100		mg/L	3SS1020100	2/2		100	NA	NA			NA	No	NTX
	Chemical Oxygen Demand	47000		77000		mg/kg	3SS1110100	4/4		77000	NA	NA			NA	No	NTX
TTNUS17	pH	2.3		5.6			3SS1110100	4/4		5.6	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	5700		15000		mg/kg	3SS1110100	4/4		15000	NA	NA			NA	No	NTX

Associated Samples:
3SS1020100
3SS1040100
3SS1050100
3SS1060100
3SS1070100
3SS1080100
3SS1090100
3SS1100100
3SS1110100
3SS1120100
3SS1120100-AVG
3SS1120100-D
3SS1130100
3SS1140100
3SS1150100
3SU1020200
3SU1040300
3SU1050300
3SU1060300
3SU1070300

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III; April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan Sulfate as Endosulfan.
9 Endrin Aldehyde as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 3 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
541-73-1	1,3-Dichlorobenzene	1.1		1.1		µg/L	3GW190001	1/10	1	1.1	NA	**0.55**	N	NA	NA	Yes	ASL
106-46-7	1,4-Dichlorobenzene	2.6		2.6		µg/L	3GW190001	1/10	1	2.6	NA	**0.47**	C	75	FED-MCL	Yes	ASL
67-64-1	Acetone	1.4	L	3.1	L	µg/L	3GW190001	8/9	1.4	3.1	NA	61	N	NA	NA	No	BSL
71-43-2	Benzene	1.8		1.8		µg/L	3GW190001	1/10	1	1.8	NA	**0.36**	C	5	FED-MCL	Yes	ASL
108-90-7	Chlorobenzene	0.65	J	29		µg/L	3GW190001	2/10	1	29	NA	**11**	N	100	FED-MCL	Yes	ASL
127-18-4	Tetrachloroethene	0.2	J	0.62	J	µg/L	3GW1070001	2/10	1	0.62	NA	1.1	C	5	FED-MCL	No	BSL
156-60-5	Trans-1,2-dichloroethene	0.49	J	5.3		µg/L	3GW190001	2/10	1	5.3	NA	12	N	100	FED-MCL	No	BSL
79-01-6	Trichloroethene	0.26	J	21	J	µg/L	3GW1020001	5/10	1	21	NA	**1.6**	C	**5**	FED-MCL	Yes	ASL
75-01-4	Vinyl Chloride	0.25	J	3.3		µg/L	3GW190001	3/10	1	3.3	NA	**0.019**	C	**2**	FED-MCL	Yes	ASL
156-59-2	cis-1,2-dichloroethene	0.71	J	35		µg/L	3GW1020001	6/10	1	35	NA	**6.1**	N	70	FED-MCL	Yes	ASL
84-74-2	Di-n-butyl phthalate	5.5		5.5		µg/L	3GW470001	1/10	5	5.5	NA	370	N	NA	NA	No	BSL
7429-90-5	Aluminum	971		39700		µg/L	3GW470001	4/10	13.6 - 164	39700	NA	**3700**	N	**50-200 (7)**	FED-MCL	No	BKG
7440-38-2	Arsenic	2.6		7.3		µg/L	3GW470001	2/10	1.5	7.3	NA	**0.045**	C	50	FED-MCL	Yes	ASL
7440-39-3	Barium	46.6		688		µg/L	3GW470001	10/10	0	688	NA	**260**	N	2000	FED-MCL	Yes	ASL
7440-41-7	Beryllium	6.2		6.2		µg/L	3GW470001	1/10	0.1 - 1.1	6.2	NA	7.3	N	**4**	FED-MCL	No	BSL, BKG
7440-70-2	Calcium	6400		41700		µg/L	3GW470001	10/10	0	41700	NA	NA		NA	NA	No	NUT
7440-47-3	Chromium	25.3		73.2		µg/L	3GW470001	3/10	2.3 - 9.8	73.2	NA	**11 (8)**	N	100	FED-MCL	No	BKG
7440-48-4	Cobalt	7.2		37.4		µg/L	3GW470001	7/10	3.3	37.4	NA	220	N	NA	NA	No	BSL
7440-50-8	Copper	2.8		115		µg/L	3GW470001	5/10	2.4	115	NA	150	N	1300	FED-MCL	No	BSL, BKG
7439-89-6	Iron	655	J	91500		µg/L	3GW470001	9/10	314	91500	NA	**1100**	N	**300 (7)**	FED-MCL	Yes	ASL
7439-92-1	Lead	2.6		32.2		µg/L	3GW470001	3/10	1	32.2	NA	**15**		**15**	FED-AL	No	BKG
7439-95-4	Magnesium	4070		21100		µg/L	3GW470001	10/10	0	21100	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	81.8		3460		µg/L	3GW1070001	10/10	0	3460	NA	**73 (9)**	N	**50 (7)**	FED-MCL	Yes	ASL
7439-97-6	Mercury	0.26		0.39		µg/L	3GW470001	2/10	0.2	0.39	NA	1.1 (10)	N	2	FED-MCL	No	BSL
7440-02-0	Nickel	12.9		55.4		µg/L	3GW470001	7/10	7.5	55.4	NA	73	N	100	FED-MCL	No	BSL, BKG
7440-09-7	Potassium	1110		9700		µg/L	3GW470001	10/10	0	9700	NA	NA		NA	NA	No	NUT
7440-23-5	Sodium	9120		30500		µg/L	3GW770001	10/10	0	30500	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	3.9		83.3		µg/L	3GW470001	3/10	2.1	83.3	NA	**26**	N	NA	NA	No	BKG
7440-66-6	Zinc	226		226		µg/L	3GW470001	1/10	2 - 58.7	226	NA	1100	N	5000 (7)	FED-MCL	No	BSL, BKG
121-14-2	2,4 Dinitrotoluene	0.2		0.23		µg/L	3GW180001	4/10	0.2	0.23	NA	7.3	N	NA	NA	No	BSL
2691-41-0	HMX	0.75		0.75		µg/L	3GW1070001	1/10	0.5	0.75	NA	180	N	NA	NA	No	BSL
121-82-4	RDX	0.81		0.81		µg/L	3GW1070001	1/10	0.5 - 4	0.81	NA	**0.61**	C	NA	NA	Yes	ASL

SITE 3 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
3GW1020001																
3GW1040001																
3GW1070001																
3GW170001																
3GW180001																
3GW180001-D																
3GW190001																
3GW470001																
3GW770001																
3GW78D0001																
3GW78S0001																

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
8 Hexavalent Chromium
9 Manganese-Nonfood
10 Mercury as Mercuric Chloride
11 Health based action level (California Department of Health Services, January, 1999)

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Nocarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:

For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 3 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
106-46-7	1,4 Dichlorobenzene	0.14	J	0.14	J	µg/L	3SW1000001	1/5	1	0.14	NA	0.47	C	400	NRWQC	No	BSL
127-18-4	Tetrachloroethene	0.1	J	0.1	J	µg/L	3SW1000001	1/5	1	0.1	NA	1.1	C	0.8	NRWQC	No	BSL
79-01-6	Trichloroethene	0.17	J	0.21	J	µg/L	3SW1000001	3/5	1	0.21	NA	1.6	C	2.7	NRWQC	No	BSL
108-60-1	2,2'-Oxybis(1-chloropropane)	5		5		µg/L	3SW1000001	1/5	5	5	NA	**0.26**	C	1400	NRWQC	Yes	ASL
95-95-4	2,4,5-Trichlorophenol	20		20		µg/L	3SW1000001	1/5	20	20	NA	370	N	**1**	NRWQC	No	BSL
88-06-2	2,4,6-Trichlorophenol	5		5		µg/L	3SW1000001	1/5	5	5	NA	6.1	C	**2**	NRWQC	No	BSL
7429-90-5	Aluminum	55.6		55.6		µg/L	3SW1000001	1/5	26.8 - 40.2	55.6	NA	3700	N		NA	No	BSL, BKG
7440-39-3	Barium	46.2		51.5		µg/L	3SW1010001	5/5		51.5	NA	260	N	1000	NRWQC	No	BSL
7440-43-9	Cadmium	0.22	K	0.24	K	µg/L	3SW1040001	2/5	0.2	0.24	NA	1.8	N		NA	No	BSL, BKG
7440-70-2	Calcium	26400		29700		µg/L	3SW1020001	5/5		29700	NA	NA			NA	No	NUT
7440-50-8	Copper	1.5	K	2.1	K	µg/L	3SW1030001	2/5	0.8	2.1	NA	150	N	1000	NRWQC	No	BSL, BKG
7439-89-6	Iron	360		607		µg/L	3SW1010001	5/5		607	NA	1100	N	**300**	NRWQC	No	BSL
7439-95-4	Magnesium	9620		10900		µg/L	3SW1040001	5/5		10900	NA	NA			NA	No	NUT
7439-96-5	Manganese	305		429		µg/L	3SW1010001	5/5		429	NA	**73 (7)**	N	**50**	NRWQC	Yes	ASL
7440-02-0	Nickel	1.6	K	5.7	K	µg/L	3SW1010001	4/5	1.2	5.7	NA	73	N	610	NRWQC	No	BSL, BKG
7440-09-7	Potassium	4860		5460		µg/L	3SW1040001	5/5		5460	NA	NA			NA	No	NUT
7440-23-5	Sodium	20500		22300		µg/L	3SW1010001	5/5		22300	NA	NA			NA	No	NUT
7440-66-6	Zinc	30.1	K	30.1	K	µg/L	3SW1020001	1/5	9 - 22.8	30.1	NA	1100	N	5000	NRWQC	No	BSL
TTNUS21	Total Dissolved Solids	180		200		µg/L	3SW1020001	5/5		200	NA	NA		250000	NRWQC	No	NTX

Associated Samples:
3SW10000(
3SW10100(
3SW1020001
3SW1030001
3SW1040001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Manganese-Nonfood

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
NRWQC = National Recommended Water Quality Criteria (USEPA, April 1999)

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 3 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
56-55-3	Benzo(a)anthracene	0.044	J	0.048	J	mg/kg	3SD1040001	2/5	0.36 - 0.42	0.048	NA	0.87	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	0.054	J	0.054	J	mg/kg	3SD1040001	1/4	0.36 - 0.42	0.054	NA	0.087	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	0.082	J	0.082	J	mg/kg	3SD1040001	1/4	0.36 - 0.42	0.082	NA	0.87	C	NA	NA	No	BSL
218-01-9	Chrysene	0.042	J	0.053	J	mg/kg	3SD1040001	2/5	0.36 - 0.42	0.053	NA	87	C	NA	NA	No	BSL
206-44-0	Fluoranthene	0.062	J	0.07	J	mg/kg	3SD1040001	2/5	0.36 - 0.42	0.07	NA	310	N	NA	NA	No	BSL
129-00-0	Pyrene	0.048	J	0.071	J	mg/kg	3SD1000001	2/5	0.36 - 0.42	0.071	NA	230	N	NA	NA	No	BSL
72-55-9	4,4'-DDE	0.00024	J	0.00024	J	mg/kg	3SD1040001	1/5	0.0035 - 0.0042	0.00024	NA	1.9	C	NA	NA	No	BSL
5103-71-9	alpha-Chlordane	0.00074	J	0.0024		mg/kg	3SD1030001	4/5	0.0018	0.0024	NA	1.8 (7)	C	NA	NA	No	BSL
11097-69-1	Aroclor-1254	0.017	J	0.077	J	mg/kg	3SD1030001	4/5	0.035	0.077	NA	0.32	C	NA	NA	No	BSL
11096-82-5	Aroclor-1260	0.02	J	0.02	J	mg/kg	3SD1040001	1/5	0.035 - 0.042	0.02	NA	0.32	C	NA	NA	No	BSL
60-57-1	Dieldrin	0.00067	J	0.0025	J	mg/kg	3SD1010001	3/4	0.0035	0.0025	NA	0.04	C	NA	NA	No	BSL
959-98-8	Endosulfan I	0.0000062	J	0.00047	J	mg/kg	3SD1020001	2/5	0.0018 - 0.002	0.00047	NA	47	N	NA	NA	No	BSL
5103-74-2	gamma-Chlordane	0.00011	J	0.00046	J	mg/kg	3SD1020001	3/5	0.0018	0.00046	NA	1.8 (7)	C	NA	NA	No	BSL
7429-90-5	Aluminum	323	J	3500	J	mg/kg	3SD1010001	5/5		3500	NA	7800	N	NA	NA	No	BSL, BKG
7440-38-2	Arsenic	0.63		2		mg/kg	3SD1000001	5/5		2	NA	**0.43**	C	NA	NA	Yes	ASL
7440-39-3	Barium	8.9		46.4		mg/kg	3SD1010001	5/5		46.4	NA	550	N	NA	NA	No	BSL, BKG
7440-70-2	Calcium	455.0		455.0		mg/kg	3SD1040001	1/5	134 - 301	455.0	NA	NA		NA	NA	No	NUT, BKG
7440-47-3	Chromium	1.4	J	6.8	J	mg/kg	3SD1040001	5/5		6.8	NA	23 (8)	N	NA	NA	No	BSL, BKG
7440-48-4	Cobalt	1.4		6.4		mg/kg	3SD1000001	5/5		6.4	NA	470	N	NA	NA	No	BSL, BKG
7440-50-8	Copper	1.3	J	105	J	mg/kg	3SD1000001	5/5		105	NA	310	N	NA	NA	No	BSL, BKG
57-12-5	Cyanide	0.33		0.33		mg/kg	3SD1000001	1/5	0.15 - 0.17	0.33	NA	160	N	NA	NA	No	BSL, BKG
7439-89-6	Iron	1570	J	10700	J	mg/kg	3SD1000001	5/5		10700	NA	**2300**	N	NA	NA	No	BKG
7439-92-1	Lead	3.6	J	10.2	J	mg/kg	3SD1000001	4/5	1.1	10.2	NA	400 (9)		NA	NA	No	BSL, BKG
7439-95-4	Magnesium	122		4250		mg/kg	3SD1000001	5/5		4250	NA	NA		NA	NA	No	NUT, BKG
7439-96-5	Manganese	243	L	1430	L	mg/kg	3SD1020001	5/5		1430	NA	**160 (10)**	N	NA	NA	Yes	ASL
7439-97-6	Mercury	0.08		0.08		mg/kg	3SD1030001	1/5	0.05 - 0.06	0.08	NA	2.3 (11)	N	NA	NA	No	BSL, BKG
7440-02-0	Nickel	2.9	J	52.8	J	mg/kg	3SD1000001	5/5		52.8	NA	160	N	NA	NA	No	BSL, BKG
7440-09-7	Potassium	87.3		222		mg/kg	3SD1010001	4/5	70.5	222	NA	NA		NA	NA	No	NUT, BKG
7440-62-2	Vanadium	1.7		5.9		mg/kg	3SD1010001	5/5		5.9	NA	55	N	NA	NA	No	BSL, BKG
7440-66-6	Zinc	30.1	J	62.9	J	mg/kg	3SD1000001	3/5	16 - 16.6	62.9	NA	2300	N	NA	NA	No	BSL, BKG
TTNUS22	Total Organic Carbon	580		3300		mg/kg	3SD1010001	5/5		3300	NA	**3.1**	N	NA	NA	No	NTX

SITE 3 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:
3SD1000001
3SD1010001
3SD1020001
3SD1030001
3SD1040001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 *Values presented are sample-specific quantitation limits.*
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 *alpha-Chordane and gamma-chlordane as Chlordane.*
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 3 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	1.82E-01	NA	3.03E-01	J	mg/kg	2.47E-01	95% UCL-T	W - Test (1)	2.47E-01	95% UCL-T	W - Test (1)
Aroclor-1260	mg/kg	1.50E-01	NA	4.30E-01		mg/kg	4.30E-01	Maximum	W - Test (2)	4.30E-01	Maximum	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 3 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Surface / Surbsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	1.86E-01	NA	3.03E-01	J	mg/kg	2.28E-01	95% UCL-T	W - Test (1)	2.28E-01	95% UCL-T	W - Test (1)
Aroclor-1260	mg/kg	1.14E-01	NA	4.30E-01	.	mg/kg	2.86E-01	95% UCL-T	W - Test (1)	2.86E-01	95% UCL-T	W - Test (1)
Manganese	mg/kg	2.16E+02	NA	6.44E+02		mg/kg	3.52E+02	95% UCL-T	W - Test (2)	3.52E+02	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.

SITE 3 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,3-Dichlorobenzene	mg/L	5.60E-04	NA	1.10E-03		mg/L	6.55E-04	95% UCL-T	W - Test (1)	6.55E-04	95% UCL-T	W - Test (1)
1,4-Dichlorobenzene	mg/L	7.10E-04	NA	2.60E-03		mg/L	9.99E-04	95% UCL-T	W - Test (1)	9.99E-04	95% UCL-T	W - Test (1)
Benzene	mg/L	6.30E-04	NA	1.80E-03		mg/L	8.19E-04	95% UCL-T	W - Test (1)	8.19E-04	95% UCL-T	W - Test (1)
Chlorobenzene	mg/L	3.37E-03	NA	2.90E-02		mg/L	8.43E-03	95% UCL-T	W - Test (1)	8.43E-03	95% UCL-T	W - Test (1)
Trichloroethene	mg/L	3.19E-03	NA	2.10E-02	J	mg/L	1.54E-02	95% UCL-T	W - Test (1)	1.54E-02	95% UCL-T	W - Test (1)
Vinyl Chloride	mg/L	8.55E-04	NA	3.30E-03		mg/L	1.52E-03	95% UCL-T	W - Test (1)	1.52E-03	95% UCL-T	W - Test (1)
cis-1,2-Dichloroethene	mg/L	6.87E-03	NA	3.50E-02		mg/L	3.50E-02	Maximum	W - Test (2)	3.50E-02	Maximum	W - Test (2)
Arsenic	mg/L	1.59E-03	NA	7.30E-03		mg/L	2.80E-03	95% UCL-T	W - Test (1)	2.80E-03	95% UCL-T	W - Test (1)
Barium	mg/L	1.62E-01	NA	6.88E-01		mg/L	3.20E-01	95% UCL-T	W - Test (3)	3.20E-01	95% UCL-T	W - Test (3)
Iron	mg/L	1.78E+01	NA	9.15E+01		mg/L	9.15E+01	Maximum	W - Test (2)	9.15E+01	Maximum	W - Test (2)
Manganese	mg/L	1.07E+00	NA	3.46E+00		mg/L	3.46E+00	Maximum	W - Test (2)	3.46E+00	Maximum	W - Test (2)
RDX	mg/L	6.54E-04	NA	8.10E-04		mg/L	8.10E-04	Maximum	W - Test (2)	8.10E-04	Maximum	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

SITE 3 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2,2'-Oxybis(1-chloropropane)	mg/L	3.00E-03	NA	5.00E-03		mg/L	5.00E-03	Maximum	N<10(1)	3.00E-03	Mean-N	N<10(1)
Manganese	mg/L	3.61E-01	NA	4.29E-01		mg/L	4.29E-01	Maximum	N<10(1)	3.61E-01	Mean-N	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

SITE 3 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	mg/kg	1.19E+00	NA	2.00E+00		mg/kg	2.00E+00	Maximum	N<10(1)	1.19E+00	Mean-N	N<10(1)
Manganese	mg/kg	6.71E+02	NA	1.43E+03	L	mg/kg	1.43E+03	Maximum	N<10(1)	6.71E+02	Mean-N	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 sediment samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA – ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 3 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	Fi	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.49E-07	Cancer Ingestion Intake - CTE	5.51E-08
Noncancer Ingestion Intake - RME	9.78E-07	Noncancer Ingestion Intake - CTE	4.29E-07
Cancer Dermal Intake - RME	1.10E-05	Cancer Dermal Intake - CTE	6.96E-07
Noncancer Dermal Intake - RME	3.09E-05	Noncancer Dermal Intake - CTE	5.42E-06

SITE 3 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	9.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	8.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	8.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-07
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	(total)										9.3E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-07
	(total)										5.7E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	9.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	8.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.9E-08
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-08
	(total)										1.5E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	(total)										3.6E-08
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 3 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	6.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	(total)										7.2E-08
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	7.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	6.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**2.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												

Total Hazard Index Across All Exposure Routes/Pathways

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.0E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	8.7E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	(total)										5.4E-09
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	(total)										3.7E-09
										Total Risk Across All Exposure Routes/Pathways	**9.1E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 3 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	8.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.2E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	(total)										1.3E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	(total)										8.0E-08
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	8.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.9E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	(total)										3.2E-08
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-09
	(total)										8.0E-09
										Total Risk Across All Exposure Routes/Pathways	**4.0E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.91E-07	Cancer Ingestion Intake - CTE	8.57E-08
Noncancer Ingestion Intake - RME	4.57E-06	Noncancer Ingestion Intake - CTE	2.00E-06
Cancer Dermal Intake - RME	1.37E-05	Cancer Dermal Intake - CTE	1.20E-06
Noncancer Dermal Intake - RME	1.60E-04	Noncancer Dermal Intake - CTE	2.80E-05

SITE 3 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	9.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.7E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	(total)										1.0E-06
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	4.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	(total)										7.1E-07
										Total Risk Across All Exposure Routes/Pathways	**1.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.4E-08
	(total)										2.3E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-08
	(total)										6.2E-08
										Total Risk Across All Exposure Routes/Pathways	**2.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 3 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	4.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.2E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-07
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	(total)										1.3E-06
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.1E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	(total)										2.2E-06
										Total Risk Across All Exposure Routes/Pathways	**3.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	4.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	(total)										1.2E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	5.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	(total)										8.5E-08
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 3 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	7.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-06
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.7E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.4E-07
	(total)										2.9E-06
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	6.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.9E-07
	(total)										9.9E-07
										Total Risk Across All Exposure Routes/Pathways	**3.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	7.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 3 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	3.0E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										3.3E-07
Dermal	BAP EQUIVALENT	2.47E-01	mg/kg	2.47E-01	mg/kg	M	2.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-08
	(total)										4.4E-08
										Total Risk Across All Exposure Routes/Pathways	**3.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14

SITE 3 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 3 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	4.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	5.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.5E-03
	(total)												2.5E-03
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	1.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-02
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03

SITE 3 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-08
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	1.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	(total)										1.1E-07
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	4.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	2.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-08
	(total)										5.5E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	8.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.2E-04
	(total)												6.2E-04
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	7.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	1.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-03
	(total)												2.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.0E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	1.3E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	(total)										1.0E-08
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	9.8E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	(total)										2.0E-09
										Total Risk Across All Exposure Routes/Pathways	**1.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14
Arsenic - 0.03

SITE 3 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 3 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	7.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	9.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	1.2E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.0E-02
	(total)												6.0E-02
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	6.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	7.8E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.8E-02
	(total)												9.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	1.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	(total)										1.1E-07
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	9.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	5.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	(total)										1.1E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	6.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-02
	(total)												3.0E-02
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	3.52E+02	mg/kg	3.52E+02	mg/kg	M	1.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.0E-02
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	5.5E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	6.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	(total)										5.4E-08
Dermal	BAP EQUIVALENT	2.28E-01	mg/kg	2.28E-01	mg/kg	M	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.86E-01	mg/kg	2.86E-01	mg/kg	M	1.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	(total)										2.2E-09
										Total Risk Across All Exposure Routes/Pathways	**5.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14
Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	1.00E+00	6.90E-01		8.70E-02		4.00E-01	1.31E-07
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	1.00E+00	6.90E-01		6.20E-02		2.50E-01	1.42E-07
Benzene	8.19E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.60E-08
Chlorobenzene	8.43E-03		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	6.41E-07
Trichloroethene	1.54E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	5.05E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.58E-08
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	5.87E-07
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Barium	3.20E-01		i			1.00E+00			1.00E-03			3.20E-07
Iron	9.15E+01		i			1.00E+00			1.00E-03			9.15E-05
Manganese	3.46E+00		i			1.00E+00			1.00E-03			3.46E-06
RDX	8.10E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.99E-08

SITE 3 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	1.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	2.1E-10	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	9.0E-10
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	3.4E-10	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.0E-07
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	2.4E-09	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.4E-07
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	8.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	2.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.4E-07
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	1.7E-06	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	1.8E-03
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.8E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.0E-05
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	3.3E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-04
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	8.1E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.1E-04
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	6.4E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-03
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	7.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.4E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	4.1E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	8.3E-04
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	1.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-03
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	4.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.5E-02
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	7.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.5E-04
	(total)												6.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	7.4E-11	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-12
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.2E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-12
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	3.2E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	8.3E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	(total)										2.7E-10
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	6.4E-07	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.2E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	2.3E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	7.1E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	2.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	(total)										2.3E-07
										Total Risk Across All Exposure Routes/Pathways	**2.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	1.00E+00	6.90E-01		8.70E-02		4.00E-01	1.31E-07
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	1.00E+00	6.90E-01		6.20E-02		2.50E-01	1.42E-07
Benzene	8.19E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.60E-08
Chlorobenzene	8.43E-03		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	6.41E-07
Trichloroethene	1.54E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	5.05E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.58E-08
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	5.87E-07
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Barium	3.20E-01		i			1.00E+00			1.00E-03			3.20E-07
Iron	9.15E+01		i			1.00E+00			1.00E-03			9.15E-05
Manganese	3.46E+00		i			1.00E+00			1.00E-03			3.46E-06
RDX	8.10E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.99E-08

SITE 3 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	3.4E-11	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	5.2E-11	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.3E-10
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	8.5E-11	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.0E-08
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	5.9E-10	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.5E-08
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	5.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	2.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.5E-08
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	8.3E-07	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	9.2E-04
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	9.0E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-05
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.7E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-05
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	4.1E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-04
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	3.2E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.3E-04
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.7E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-05
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	2.0E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	4.1E-04
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	5.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-03
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	2.2E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-02
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	3.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-04
	(total)												3.2E-02

Total Hazard Index Across All Exposure Routes/Pathways **3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	6.7E-12	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-13
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.1E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.2E-13
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.9E-10	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-12
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	7.4E-11	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-11
	(total)										2.5E-11
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.2E-07	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	2.1E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-10
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	4.1E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.3E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	4.9E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	(total)										4.1E-08
										Total Risk Across All Exposure Routes/Pathways	**4.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	1.00E+00	6.90E-01		8.70E-02		4.00E-01	1.31E-07
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	1.00E+00	6.90E-01		6.20E-02		2.50E-01	1.42E-07
Benzene	8.19E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.60E-08
Chlorobenzene	8.43E-03		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	6.41E-07
Trichloroethene	1.54E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	5.05E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.58E-08
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	5.87E-07
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Barium	3.20E-01		i			1.00E+00			1.00E-03			3.20E-07
Iron	9.15E+01		i			1.00E+00			1.00E-03			9.15E-05
Manganese	3.46E+00		i			1.00E+00			1.00E-03			3.46E-06
RDX	8.10E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.99E-08

SITE 3 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	2.0E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	8.7E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	3.3E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.9E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	2.3E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.3E-06
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	8.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.3E-06
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	8.3E-06	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	9.2E-03
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	9.0E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-04
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	4.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	3.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.3E-03
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	2.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	4.1E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	2.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	3.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-03
	(total)												3.2E-01

Total Hazard Index Across All Exposure Routes/Pathways **3.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	2.8E-11	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	6.3E-13
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	4.7E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-12
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	1.2E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.3E-12
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	3.2E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	9.5E-11
	(total)										1.0E-10
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.3E-07	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	2.4E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-10
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	4.6E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.4E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	5.4E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	(total)										4.6E-08
										Total Risk Across All Exposure Routes/Pathways	**4.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	1.00E+00	6.90E-01		8.70E-02		4.00E-01	1.31E-07
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	1.00E+00	6.90E-01		6.20E-02		2.50E-01	1.42E-07
Benzene	8.19E-04		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	2.60E-08
Chlorobenzene	8.43E-03		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	6.41E-07
Trichloroethene	1.54E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	5.05E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.58E-08
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	5.87E-07
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Barium	3.20E-01		i			1.00E+00			1.00E-03			3.20E-07
Iron	9.15E+01		i			1.00E+00			1.00E-03			9.15E-05
Manganese	3.46E+00		i			1.00E+00			1.00E-03			3.46E-06
RDX	8.10E-04		o		4.75	1.00E+00	1.98		1.90E-02		7.41E-04	5.99E-08

SITE 3 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	6.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	9.9E-10	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	4.3E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.6E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	9.6E-07
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	1.1E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	6.6E-07
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	4.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	5.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.6E-06
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	8.3E-06	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	9.2E-03
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	9.0E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-04
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	4.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	3.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.3E-03
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	3.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	2.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	4.1E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	2.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	3.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-03
	(total)												3.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	1.4E-11	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-13
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	2.3E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-13
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	6.1E-10	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-12
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.6E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-11
	(total)										5.2E-11
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.3E-07	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	2.4E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-10
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	4.6E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.4E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	5.4E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	(total)										4.6E-08
										Total Risk Across All Exposure Routes/Pathways	**4.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Massa Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	*Shower Duration*	*(min)*	15	*EPA 1992d*	10	*EPA 1992d*	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	2.50E-01	6.90E-01		8.70E-02		4.00E-01	6.54E-08
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	2.50E-01	6.90E-01		6.20E-02		2.50E-01	7.11E-08
Benzene	8.19E-04		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	1.21E-08
Chlorobenzene	8.43E-03		o		1.00E+00	2.50E-01	4.30E-01		4.10E-02		6.90E-02	3.13E-07
Trichloroethene	1.54E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	2.53E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	7.04E-09
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	2.82E-07
Arsenic	2.80E-03		i			2.50E-01			1.00E-03			7.00E-10
Barium	3.20E-01		i			2.50E-01			1.00E-03			7.99E-08
Iron	9.15E+01		i			2.50E-01			1.00E-03			2.29E-05
Manganese	3.46E+00		i			2.50E-01			1.00E-03			8.65E-07
RDX	8.10E-04		o		4.75	2.50E-01	1.98		1.90E-02		7.41E-04	2.99E-08

SITE 3 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	1.8E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	2.0E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	2.7E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	9.1E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	2.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.5E-03
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	2.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-02
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	4.2E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	7.0E-02
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	4.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	9.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.6E-02
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	7.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-01
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	8.8E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-01
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	2.5E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.4E+00
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	9.5E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.7E+00
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	2.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.4E-03
	(total)												1.4E+01
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	2.1E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	2.3E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	2.2E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	7.5E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	3.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-03
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	9.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.9E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	8.0E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.3E-02
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	8.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.9E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.4E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	2.5E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	5.1E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	7.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-02
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	2.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.4E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	9.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.1E-03
	(total)												4.3E-01

SITE 3 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	(mg/m^3- min)	R	4.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	(mg/m^3- min)	R	6.4E-06	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.8E-05
	Benzene	8.19E-04	mg/L	3.19E-04	(mg/m^3- min)	R	6.9E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	4.1E-03
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	(mg/m^3- min)	R	6.1E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.6E-03
	Trichloroethene	1.54E-02	mg/L	5.02E-03	(mg/m^3- min)	R	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	(mg/m^3- min)	R	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	(mg/m^3- min)	R	2.7E-04	mg/kg-day		mg/kg-day	NA	NA	
													7.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	9.4E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	7.7E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	1.4E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.4E-05	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-05
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.6E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-05
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	7.6E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-07
	(total)										7.0E-05
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	7.7E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.3E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	2.7E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	7.6E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	7.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	3.2E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-07
	(total)										2.4E-06
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	$(mg/m^3\text{- min})$	R	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	$(mg/m^3\text{- min})$	R	2.2E-06	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Benzene	8.19E-04	mg/L	3.19E-04	$(mg/m^3\text{- min})$	R	2.4E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	$(mg/m^3\text{- min})$	R	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.54E-02	mg/L	5.02E-03	$(mg/m^3\text{- min})$	R	3.7E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	$(mg/m^3\text{- min})$	R	4.9E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	$(mg/m^3\text{- min})$	R	9.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											1.8E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **7.4E-05**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: **SITE 3 - PISTOL RANGE LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/14/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	1.67E-01	6.90E-01		8.70E-02		4.00E-01	5.35E-08
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	1.67E-01	6.90E-01		6.20E-02		2.50E-01	5.81E-08
Benzene	8.19E-04		o		6.30E-01	1.67E-01	2.60E-01		2.10E-02		1.30E-02	9.90E-09
Chlorobenzene	8.43E-03		o		1.00E+00	1.67E-01	4.30E-01		4.10E-02		6.90E-02	2.56E-07
Trichloroethene	1.54E-02		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	2.06E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	5.75E-09
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	1.67E-01	3.40E-01		1.00E-02		7.20E-03	2.31E-07
Arsenic	2.80E-03		i			1.67E-01			1.00E-03			4.68E-10
Barium	3.20E-01		i			1.67E-01			1.00E-03			5.34E-08
Iron	9.15E+01		i			1.67E-01			1.00E-03			1.53E-05
Manganese	3.46E+00		i			1.67E-01			1.00E-03			5.78E-07
RDX	8.10E-04		o		4.75	1.67E-01	1.98		1.90E-02		7.41E-04	2.45E-08

SITE 3 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	8.4E-06	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	9.3E-03
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.3E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.3E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.0E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.5E-03
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	1.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.4E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	2.0E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.3E-02
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	4.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.5E-02
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-01
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	4.1E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.9E-02
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	1.2E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E+00
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	4.4E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.2E+00
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	1.0E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.5E-03
	(total)												6.4E+00
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	9.8E-06	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	1.1E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.1E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.5E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.0E-04
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	4.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	3.8E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	6.3E-03
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	4.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.2E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	8.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	9.8E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.0E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	2.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.3E-03
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	1.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.3E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	4.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-03
	(total)												1.7E-01

SITE 3 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	(mg/m^3- min)	R	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	(mg/m^3- min)	R	2.4E-06	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	1.0E-05
	Benzene	8.19E-04	mg/L	3.19E-04	(mg/m^3- min)	R	2.6E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.5E-03
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	(mg/m^3- min)	R	2.3E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.3E-03
	Trichloroethene	1.54E-02	mg/L	5.02E-03	(mg/m^3- min)	R	4.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	(mg/m^3- min)	R	5.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	(mg/m^3- min)	R	1.0E-04	mg/kg-day		mg/kg-day	NA	NA	
													2.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.3E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.0E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	2.0E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	2.0E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-06
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-06
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	1.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										9.5E-06
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.1E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.8E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	3.8E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.1E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	8.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	4.5E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	(total)										3.3E-07
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	$(mg/m^3\text{- min})$	R	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	$(mg/m^3\text{- min})$	R	2.4E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	Benzene	8.19E-04	mg/L	3.19E-04	$(mg/m^3\text{- min})$	R	2.6E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	7.4E-09
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	$(mg/m^3\text{- min})$	R	2.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.54E-02	mg/L	5.02E-03	$(mg/m^3\text{- min})$	R	4.0E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	$(mg/m^3\text{- min})$	R	5.3E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	$(mg/m^3\text{- min})$	R	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											1.9E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.0E-05**

SITE 3 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: **SITE 3 - PISTOL RANGE LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/14/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,3-Dichlorobenzene	6.55E-04		o		4.10E+00	2.50E-01	6.90E-01		8.70E-02		4.00E-01	6.54E-08
1,4-Dichlorobenzene	9.99E-04		o		3.30E+00	2.50E-01	6.90E-01		6.20E-02		2.50E-01	7.11E-08
Benzene	8.19E-04		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	1.21E-08
Chlorobenzene	8.43E-03		o		1.00E+00	2.50E-01	4.30E-01		4.10E-02		6.90E-02	3.13E-07
Trichloroethene	1.54E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	2.53E-07
Vinyl Chloride	1.52E-03		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	7.04E-09
cis-1,2-Dichloroethene	3.50E-02		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	2.82E-07
Arsenic	2.80E-03		i			2.50E-01			1.00E-03			7.00E-10
Barium	3.20E-01		i			2.50E-01			1.00E-03			7.99E-08
Iron	9.15E+01		i			2.50E-01			1.00E-03			2.29E-05
Manganese	3.46E+00		i			2.50E-01			1.00E-03			8.65E-07
RDX	8.10E-04		o		4.75	2.50E-01	1.98		1.90E-02		7.41E-04	2.99E-08

SITE 3 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	4.2E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	4.7E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	6.4E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.1E-03
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	5.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-02
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	5.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-02
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	9.8E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.6E-01
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	9.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	2.2E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.2E-01
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-01
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	2.0E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.9E-01
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	5.8E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E+01
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	2.2E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.1E+01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	5.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-02
	(total)												3.2E+01
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	2.9E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	3.2E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	3.2E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.1E-03
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	5.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.8E-03
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	1.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.0E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	1.1E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.9E-02
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	3.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.3E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-02
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-03
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	3.6E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	7.3E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	1.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E-02
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	3.9E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.8E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	1.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.4E-03
	(total)												6.0E-01

SITE 3 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	(mg/m^3- min)	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	(mg/m^3- min)	R	3.0E-05	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	1.3E-04
	Benzene	8.19E-04	mg/L	3.19E-04	(mg/m^3- min)	R	3.2E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.9E-02
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	(mg/m^3- min)	R	2.9E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.7E-02
	Trichloroethene	1.54E-02	mg/L	5.02E-03	(mg/m^3- min)	R	5.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	(mg/m^3- min)	R	6.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	(mg/m^3- min)	R	1.3E-03	mg/kg-day		mg/kg-day	NA	NA	
													3.6E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	5.5E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	4.5E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	8.4E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-07
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	8.3E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.5E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	4.4E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-07
	(total)										4.1E-05
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	2.7E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	6.5E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	4.6E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	9.6E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	2.7E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	1.1E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	(total)										8.6E-07
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	$(mg/m^3\text{- min})$	R	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	$(mg/m^3\text{- min})$	R	2.5E-06	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Benzene	8.19E-04	mg/L	3.19E-04	$(mg/m^3\text{- min})$	R	2.8E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	$(mg/m^3\text{- min})$	R	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.54E-02	mg/L	5.02E-03	$(mg/m^3\text{- min})$	R	4.4E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	$(mg/m^3\text{- min})$	R	5.7E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	$(mg/m^3\text{- min})$	R	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											2.1E-06
										Total Risk Across All Exposure Routes/Pathways	**4.4E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,3-Dichlorobenzene	6.55E-04	o	4.10E+00	1.67E-01	6.90E-01	8.70E-02	4.00E-01	5.35E-08
1,4-Dichlorobenzene	9.99E-04	o	3.30E+00	1.67E-01	6.90E-01	6.20E-02	2.50E-01	5.81E-08
Benzene	8.19E-04	o	6.30E-01	1.67E-01	2.60E-01	2.10E-02	1.30E-02	9.90E-09
Chlorobenzene	8.43E-03	o	1.00E+00	1.67E-01	4.30E-01	4.10E-02	6.90E-02	2.56E-07
Trichloroethene	1.54E-02	o	1.30E+00	1.67E-01	5.50E-01	1.60E-02	2.60E-02	2.06E-07
Vinyl Chloride	1.52E-03	o	5.10E-01	1.67E-01	2.10E-01	7.30E-03	2.30E-03	5.75E-09
cis-1,2-Dichloroethene	3.50E-02	o	8.20E-01	1.67E-01	3.40E-01	1.00E-02	7.20E-03	2.31E-07
Arsenic	2.80E-03	i		1.67E-01		1.00E-03		4.68E-10
Barium	3.20E-01	i		1.67E-01		1.00E-03		5.34E-08
Iron	9.15E+01	i		1.67E-01		1.00E-03		1.53E-05
Manganese	3.46E+00	i		1.67E-01		1.00E-03		5.78E-07
RDX	8.10E-04	o	4.75	1.67E-01	1.98	1.90E-02	7.41E-04	2.45E-08

SITE 3 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	2.8E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	3.1E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	4.3E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.4E-03
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	3.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	3.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-02
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	6.6E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-01
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	6.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	1.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-01
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.2E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.0E-01
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	1.4E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.0E-01
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	3.9E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E+01
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	1.5E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.4E+00
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	3.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	(total)												2.1E+01
Dermal	1,3-Dichlorobenzene	6.55E-04	mg/L	6.55E-04	mg/L	M	1.6E-05	mg/kg-day	9.00E-04	mg/kg-day	NA	NA	1.8E-02
	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.7E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.8E-04
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	2.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.8E-04
	Chlorobenzene	8.43E-03	mg/L	8.43E-03	mg/L	M	7.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.8E-03
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	6.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.0E-02
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	3.50E-02	mg/L	M	6.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.9E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.6E-04
	Barium	3.20E-01	mg/L	3.20E-01	mg/L	M	1.6E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.2E-03
	Iron	9.15E+01	mg/L	9.15E+01	mg/L	M	4.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-02
	Manganese	3.46E+00	mg/L	3.46E+00	mg/L	M	1.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.2E-01
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	7.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-03
	(total)												2.8E-01

SITE 3 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	(mg/m^3- min)	R	7.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	(mg/m^3- min)	R	1.1E-05	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	4.8E-05
	Benzene	8.19E-04	mg/L	3.19E-04	(mg/m^3- min)	R	1.2E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	7.0E-03
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	(mg/m^3- min)	R	1.1E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	6.2E-03
	Trichloroethene	1.54E-02	mg/L	5.02E-03	(mg/m^3- min)	R	1.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	(mg/m^3- min)	R	2.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	(mg/m^3- min)	R	4.7E-04	mg/kg-day		mg/kg-day	NA	NA	
													1.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	1.2E-06	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	1.0E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	1.9E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	1.9E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-06
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	9.9E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										9.0E-06
Dermal	1,4-Dichlorobenzene	9.99E-04	mg/L	9.99E-04	mg/L	M	4.9E-07	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Benzene	8.19E-04	mg/L	8.19E-04	mg/L	M	8.4E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	Trichloroethene	1.54E-02	mg/L	1.54E-02	mg/L	M	1.8E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Vinyl Chloride	1.52E-03	mg/L	1.52E-03	mg/L	M	4.9E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	4.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	RDX	8.10E-04	mg/L	8.10E-04	mg/L	M	2.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	(total)										1.6E-07
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.93E-04	$(mg/m^3\text{- min})$	R	2.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.94E-04	$(mg/m^3\text{- min})$	R	3.1E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-09
	Benzene	8.19E-04	mg/L	3.19E-04	$(mg/m^3\text{- min})$	R	3.4E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	Chlorobenzene	8.43E-03	mg/L	2.82E-03	$(mg/m^3\text{- min})$	R	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.54E-02	mg/L	5.02E-03	$(mg/m^3\text{- min})$	R	5.4E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	Vinyl Chloride	1.52E-03	mg/L	6.55E-04	$(mg/m^3\text{- min})$	R	7.0E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.24E-02	$(mg/m^3\text{- min})$	R	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											2.6E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **9.5E-06**

SITE 3 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 3 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.4E-04
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-02
	(total)												1.1E-02
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.9E-04
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	6.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.0E-02
	(total)												8.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**9.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	7.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-07
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	9.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**2.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.13. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	4.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-04
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	2.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-03
	(total)												1.3E-03
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.3E-05
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.7E-03
	(total)												3.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.13. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.1E-09
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.1E-09
										Total Risk Across All Exposure Routes/Pathways	**1.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 3 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	6.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-02
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	4.8E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E-01
	(total)												2.6E-01
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.5E-03
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	3.2E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-01
	(total)												4.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	9.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	6.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.9E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.7E-03
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.1E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.7E-02
	(total)												6.3E-02
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.3E-04
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.0E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.7E-02
	(total)												3.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-08
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.6E-08
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	4.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-09
										Total Risk Across All Exposure Routes/Pathways	**8.9E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 3 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.2E-04
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	9.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.5E-03
	(total)												4.9E-03
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	3.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	8.1E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.0E-01
	(total)												1.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	5.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-08
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	3.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.1E-08
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	3.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.2E-07
										Total Risk Across All Exposure Routes/Pathways	**3.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.2E-05
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-04
	(total)												5.9E-04
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.7E-05
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.8E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.7E-03
	(total)												4.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.6E-09
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	2.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	4.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.9E-09
										Total Risk Across All Exposure Routes/Pathways	**7.4E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 3 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	6.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-03
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	4.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E-02
	(total)												2.6E-02
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	6.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-03
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	1.5E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.9E-01
	(total)												2.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	9.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	6.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	9.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**2.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	9.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.3E-04
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	5.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E-03
	(total)												3.1E-03
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	3.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-04
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	7.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.1E-03
	(total)												9.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	7.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.1E-08
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-09
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.2E-09
										Total Risk Across All Exposure Routes/Pathways	**2.9E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 3 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.7E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.1E-03
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	2.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.8E-02
	(total)												1.1E-01
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	7.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-02
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	1.8E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.2E+00
	(total)												2.2E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	9.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	6.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-06
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.5E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	6.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.8E-06
										Total Risk Across All Exposure Routes/Pathways	**5.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-03
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-02
	(total)												1.7E-02
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.4E-01
	(total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-08
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	3.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.1E-08
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.8E-08
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.8E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Sediment	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Sediment	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 3 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.5E-02
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	1.8E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.1E-01
	(total)												1.0E+00
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.3E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.5E-02
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	3.2E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E+00
	(total)												4.1E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**5.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	2.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-06
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	1.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.3E-06
Dermal	Arsenic	2.00E+00	mg/kg	2.00E+00	mg/kg	M	1.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Manganese	1.43E+03	mg/kg	1.43E+03	mg/kg	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.7E-06
										Total Risk Across All Exposure Routes/Pathways	**5.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	5.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-02
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	2.9E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-01
	(total)												1.6E-01
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.6E-03
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	2.0E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-01
	(total)												2.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03

Other Metals - 0.01

SITE 3 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Surface Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	8.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.2E-07
Dermal	Arsenic	1.19E+00	mg/kg	1.19E+00	mg/kg	M	3.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Manganese	6.71E+02	mg/kg	6.71E+02	mg/kg	M	5.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.6E-08
										Total Risk Across All Exposure Routes/Pathways	**2.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

Arsenic - 0.03
Other Metals - 0.01

SITE 3 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	7.20E-08
Manganese	4.29E-01		I			1.00E+00			1.00E-03			4.29E-07

SITE 3 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	9.1E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	2.3E-05
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	5.4E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.8E-03
	(total)												6.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**6.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	3.3E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.3E-08
										Total Risk Across All Exposure Routes/Pathways	**2.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.7E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	6.8E-06
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-03
	(total)												2.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-09
										Total Risk Across All Exposure Routes/Pathways	**2.5E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.20

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	7.20E-08
Manganese	4.29E-01		I			1.00E+00			1.00E-03			4.29E-07

SITE 3 - TABLE 7.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	4.6E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.1E-04
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	2.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.4E-02
	(total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	6.5E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.6E-09
										Total Risk Across All Exposure Routes/Pathways	**4.6E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: **SITE 3 - PISTOL RANGE LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/14/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.7E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	6.8E-05
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.9E-02
	(total)												2.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.9E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.7E-09
										Total Risk Across All Exposure Routes/Pathways	**2.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.21

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.34E-05
Noncancer Ingestion Intake(RME) = 3.13E-05

Cancer Ingestion Intake(CTE) = 4.03E-06
Noncancer Ingestion Intake(CTE) = 3.13E-05

Cancer Dermal Intake(RME) = 2.42E+00
Noncancer Dermal Intake(RME) = 5.64E+00

Cancer Dermal Intake(CTE) = 7.25E-01
Noncancer Dermal Intake(CTE) = 5.64E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	7.20E-08
Manganese	4.29E-01		I			1.00E+00			1.00E-03			4.29E-07

SITE 3 - TABLE 7.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	1.6E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	3.9E-06
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.7E-04
	(total)												6.8E-04
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	4.1E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.0E-05
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	2.4E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.0E-03
	(total)												3.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	6.7E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-09
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	5.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.7E-09
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	1.7E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.2E-08
										Total Risk Across All Exposure Routes/Pathways	**1.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	9.4E-08	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	2.3E-06
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	1.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.6E-04
	(total)												5.7E-04
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	6.1E-06
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-03
	(total)												2.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	1.2E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	8.5E-10
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.5E-10
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.1E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.2E-09
										Total Risk Across All Exposure Routes/Pathways	**3.0E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.22

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3,260	EPA 1997a	3,260	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.37E-05
Noncancer Ingestion Intake(RME) = 1.66E-04

Cancer Ingestion Intake(CTE) = 1.18E-05
Noncancer Ingestion Intake(CTE) = 8.28E-05

Cancer Dermal Intake(RME) = 1.54E+00
Noncancer Dermal Intake(RME) = 1.08E+01

Cancer Dermal Intake(CTE) = 7.71E-01
Noncancer Dermal Intake(CTE) = 5.40E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	7.20E-08
Manganese	4.29E-01		I			1.00E+00			1.00E-03			4.29E-07

SITE 3 - TABLE 7.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	8.3E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	2.1E-05
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	7.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.6E-03
	(total)												3.6E-03
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	7.8E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.9E-05
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	4.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.8E-03
	(total)												5.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 8.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	1.2E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	8.3E-09
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.3E-09
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-09
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	6.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.8E-09
										Total Risk Across All Exposure Routes/Pathways	**1.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER**

SITE NAME: **SITE 3 - PISTOL RANGE LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/14/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.5E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	6.2E-06
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-03
	(total)												1.5E-03
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.3E-07	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	5.8E-06
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	1.9E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.4E-03
	(total)												2.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	4.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-09
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.3E-08	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.3E-09
										Total Risk Across All Exposure Routes/Pathways	**4.8E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.23

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	Professional judgement	7	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.70E-04
Noncancer Ingestion Intake(RME) = 1.37E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.23E+01
Noncancer Dermal Intake(RME) = 1.23E+02

Cancer Dermal Intake(CTE) = 8.24E+00
Noncancer Dermal Intake(CTE) = 8.24E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	2.00E+00	9.67E-01		5.30E-03		3.80E-02	1.02E-07
Manganese	4.29E-01		I			2.00E+00			1.00E-03			8.58E-07

SITE 3 - TABLE 7.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	6.8E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.7E-04
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	5.9E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.9E-02
	(total)												3.0E-02
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	1.3E-05	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	3.1E-04
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												1.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	2.3E-06	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	2.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-07
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	4.3E-06	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	3.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-07
										Total Risk Across All Exposure Routes/Pathways	**4.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: **SITE 3 - PISTOL RANGE LANDFILL**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/14/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	2.7E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	6.9E-05
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-02
	(total)												1.7E-02
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	3.6E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	8.9E-05
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.0E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.7E-02
	(total)												3.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	2.7E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.9E-08
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	3.6E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-08
										Total Risk Across All Exposure Routes/Pathways	**4.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.24

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-04
Noncancer Ingestion Intake(RME) = 6.39E-03

Cancer Ingestion Intake(CTE) = 6.11E-05
Noncancer Ingestion Intake(CTE) = 2.14E-03

Cancer Dermal Intake(RME) = 1.92E+01
Noncancer Dermal Intake(RME) = 2.24E+02

Cancer Dermal Intake(CTE) = 4.28E+00
Noncancer Dermal Intake(CTE) = 1.50E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	5.00E-03		o		2.32E+00	2.00E+00	9.67E-01		5.30E-03		3.80E-02	1.02E-07
Manganese	4.29E-01		I			2.00E+00			1.00E-03			8.58E-07

SITE 3 - TABLE 7.24. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	3.2E-05	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	8.0E-04
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	2.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-01
	(total)												1.4E-01
Dermal	2,2'-Oxybis(1-chloropropan	5.00E-03	mg/L	5.00E-03	mg/L	M	2.3E-05	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	5.7E-04
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.9E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.4E-01
	(total)												2.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.24. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	2.7E-06	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	2.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.9E-07
Dermal	2,2'-Oxybis(1-chloropropane)	5.00E-03	mg/L	5.00E-03	mg/L	M	2.0E-06	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Manganese	4.29E-01	mg/L	4.29E-01	mg/L	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/14/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
2,2'-Oxybis(1-chloropropane)	3.00E-03		o		2.32E+00	1.00E+00	9.67E-01		5.30E-03		3.80E-02	4.32E-08
Manganese	3.61E-01		I			1.00E+00			1.00E-03			3.61E-07

SITE 3 - TABLE 7.24a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	6.4E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.6E-04
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	7.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.9E-02
	(total)												3.9E-02
Dermal	2,2'-Oxybis(1-chloropropan	3.00E-03	mg/L	3.00E-03	mg/L	M	6.5E-06	mg/kg-day	4.00E-02	mg/kg-day	NA	NA	1.6E-04
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	5.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.8E-02
	(total)												6.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.24a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	1.8E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-08
Dermal	2,2'-Oxybis(1-chloropropane)	3.00E-03	mg/L	3.00E-03	mg/L	M	1.9E-07	mg/kg-day	7.00E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Manganese	3.61E-01	mg/L	3.61E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	**2.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.25

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

SITE 3 - TABLE 7.25. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	5.2E-07	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.3E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	1.0E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	6.0E-04
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	6.5E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.8E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	2.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	8.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	3.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.9E-04

Total Hazard Index Across All Exposure Routes/Pathways **9.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.25. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	1.9E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	3.7E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.0E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.2E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	3.0E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.9E-07
	(total)										9.7E-07
										Total Risk Across All Exposure Routes/Pathways	**9.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.25a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	2.3E-07	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	1.0E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	4.5E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.6E-04
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	2.8E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.7E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	3.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.3E-04

Total Hazard Index Across All Exposure Routes/Pathways **4.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.25a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	2.9E-08	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	6.5E-10
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	5.8E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.6E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.8E-09
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	4.7E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	(total)										1.5E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.26

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 3 - TABLE 7.26. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	9.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	1.4E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	6.3E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	2.4E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.4E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	1.6E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.6E-07
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	6.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	8.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.4E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.26. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	5.1E-10	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	8.5E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-11
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.2E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	5.7E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	(total)										1.9E-09
										Total Risk Across All Exposure Routes/Pathways	**1.9E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.26a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	4.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	6.3E-10	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.8E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.0E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	6.1E-07
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	7.2E-09	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	4.2E-07
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	7.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.0E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.26a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	8.1E-11	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-12
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.3E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-12
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	3.5E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-11
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	9.1E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	(total)										3.0E-10
										Total Risk Across All Exposure Routes/Pathways	**3.0E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.27

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

SITE 3 - TABLE 7.27. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	7.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	1.2E-06	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	5.1E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	2.3E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.4E-03
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	1.5E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	8.6E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	6.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	1.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	7.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.2E-03

Total Hazard Index Across All Exposure Routes/Pathways **2.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.27. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	1.0E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	2.0E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-09
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	5.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	1.6E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	(total)										5.2E-07
										Total Risk Across All Exposure Routes/Pathways	**5.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.27a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	3.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	5.1E-07	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.2E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	1.0E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.9E-04
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	6.4E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.8E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	2.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	8.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	3.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.7E-04

Total Hazard Index Across All Exposure Routes/Pathways **9.7E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.27a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	2.2E-08	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-10
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	4.3E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.2E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.3E-09
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	3.5E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	(total)										1.1E-07
										Total Risk Across All Exposure Routes/Pathways	**1.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.28

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

SITE 3 - TABLE 7.28. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	7.3E-07	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	3.2E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	1.4E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.5E-04
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	9.1E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	5.4E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	4.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	4.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.28. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	2.5E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	4.9E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.4E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	4.0E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	(total)										1.3E-06
										Total Risk Across All Exposure Routes/Pathways	**1.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.28a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	4.9E-07	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.1E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	9.6E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.7E-04
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	6.1E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.6E-04
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	2.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	7.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	2.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.3E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**9.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.28a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	4.9E-08	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	9.6E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	2.7E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	7.8E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	(total)										2.5E-07

Total Risk Across All Exposure Routes/Pathways **2.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.29

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 3 - TABLE 7.29. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	2.0E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	8.8E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	3.3E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.0E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	2.3E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.3E-06
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	8.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.3E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.29. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	6.9E-10	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.1E-09	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-11
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	3.0E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	7.7E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	(total)										2.5E-09
										Total Risk Across All Exposure Routes/Pathways	**2.5E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.29a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	8.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	1.3E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	5.9E-09
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	2.2E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.3E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	1.5E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.0E-07
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	5.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.2E-06

Total Hazard Index Across All Exposure Routes/Pathways **2.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.29a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	1.3E-10	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-12
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	2.2E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	6.4E-12
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	5.8E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-11
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.5E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	(total)										5.0E-10
										Total Risk Across All Exposure Routes/Pathways	**5.0E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.30

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

SITE 3 - TABLE 7.30. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	2.1E-06	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	9.0E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	4.0E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.4E-03
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	2.6E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.5E-03
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	3.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	1.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.30. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	1.8E-07	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	3.5E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	9.7E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.8E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	2.8E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-07
	(total)										9.1E-07
										Total Risk Across All Exposure Routes/Pathways	**9.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.30a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	1.75E-06	mg/m^3	R	9.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	1.4E-06	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	6.0E-06
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	2.7E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.6E-03
	Chlorobenzene	8.43E-03	mg/L	3.32E-05	mg/m^3	R	1.7E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.0E-03
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	7.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	2.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	1.59E-04	mg/m^3	R	8.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.6E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.30a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	2.68E-06	mg/m^3	R	3.9E-08	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	8.6E-10
	Benzene	8.19E-04	mg/L	5.25E-06	mg/m^3	R	7.7E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Trichloroethene	1.54E-02	mg/L	1.48E-04	mg/m^3	R	2.2E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Vinyl Chloride	1.52E-03	mg/L	4.25E-05	mg/m^3	R	6.2E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	(total)										2.0E-07
										Total Risk Across All Exposure Routes/Pathways	**2.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 4.31

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 3 - TABLE 7.31. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	3.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	5.6E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	2.5E-08
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	9.3E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.5E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	6.4E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.8E-06
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	6.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.3E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**9.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.31. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	4.8E-10	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	8.0E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-11
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	2.1E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	5.4E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	(total)										1.8E-09
										Total Risk Across All Exposure Routes/Pathways	**1.8E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 7.31a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,3-Dichlorobenzene	6.55E-04	mg/L	4.82E-09	mg/m^3	R	2.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	3.8E-09	mg/kg-day	2.29E-01	mg/kg-day	NA	NA	1.6E-08
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	6.2E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	3.7E-06
	Chlorobenzene	8.43E-03	mg/L	8.35E-08	mg/m^3	R	4.3E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.5E-06
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-Dichloroethene	3.50E-02	mg/L	4.13E-07	mg/m^3	R	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												6.2E-06
												Total Hazard Index Across All Exposure Routes/Pathways	**6.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 3 - TABLE 8.31a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,4-Dichlorobenzene	9.99E-04	mg/L	7.35E-09	mg/m^3	R	1.1E-10	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-12
	Benzene	8.19E-04	mg/L	1.21E-08	mg/m^3	R	1.8E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-12
	Trichloroethene	1.54E-02	mg/L	3.16E-07	mg/m^3	R	4.6E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.8E-11
	Vinyl Chloride	1.52E-03	mg/L	8.22E-08	mg/m^3	R	1.2E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-10
	(total)										4.0E-10
										Total Risk Across All Exposure Routes/Pathways	**4.0E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 3 - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	6.3E-07			6.3E-07	BAP EQUIVALENT					
			Aroclor-1260	3.0E-07		5.7E-07	8.7E-07	Aroclor-1260					
Groundwater	Air	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene					
		Indoor and	1,4-Dichlorobenzene		4.1E-09		4.1E-09	1,4-Dichlorobenzene	Liver		2.3E-06		2.3E-06
		Outdoor Air	Benzene		1.1E-08		1.1E-08	Benzene			6.1E-04		6.1E-04
			Chlorobenzene					Chlorobenzene	Liver		3.8E-04		3.8E-04
			Trichloroethene		6.2E-08		6.2E-08	Trichloroethene	CNS				
			Vinyl Chloride		8.9E-07		8.9E-07	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 1.5E-06
Total Risk Across Groundwater/Air: 9.7E-07
Total Risk Across All Media and All Exposure Routes: 2.5E-06

Total Hazard Index Across All Media and All Exposure Routes: 9.9E-04
Total Liver HI = 3.9E-04
Total CNS HI =
Total Blood HI =

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 5-13.

SITE 3 - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.9E-08			9.9E-08	BAP EQUIVALENT					
			Aroclor-1260	4.7E-08		3.6E-08	8.3E-08	Aroclor-1260					
Groundwater	Air	Onsite Indoor and Outdoor Air	1,3-Dichlorobenzene					1,3-Dichlorobenzene					
			1,4-Dichlorobenzene		6.5E-10		6.5E-10	1,4-Dichlorobenzene	Liver		1.0E-06		1.0E-06
			Benzene		1.7E-09		1.7E-09	Benzene			2.7E-04		2.7E-04
			Chlorobenzene					Chlorobenzene	Liver		1.7E-04		1.7E-04
			Trichloroethene		9.8E-09		9.8E-09	Trichloroethene	CNS				
			Vinyl Chloride		1.4E-07		1.4E-07	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 1.8E-07
Total Risk Across Groundwater/Air: 1.5E-07
Total Risk Across All Media and All Exposure Routes: 3.4E-07

Total Hazard Index Across All Media and All Exposure Routes: 4.3E-04
Total Liver HI = 1.7E-04
Total CNS HI =
Total Blood HI =

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 5-22.

SITE 3 - TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsuface Soil	BAP EQUIVALENT	8.4E-08			8.4E-08	BAP EQUIVALENT					
			Aroclor-1260	2.9E-08		5.5E-08	8.3E-08	Aroclor-1260					
			Manganese					Manganese	CNS	2.5E-03		2.0E-02	2.2E-02
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)			2.3E-08	2.3E-08	2,2'-Oxybis(1-chloropropane)	Blood			2.3E-05	2.3E-05
			Manganese					Manganese	CNS			6.8E-03	6.8E-03
Sediment	Sediment	Onsite Diitches	Arsenic	1.5E-07		1.4E-07	2.9E-07	Arsenic	Skin, Vascular	9.4E-04		8.9E-04	1.8E-03
			Manganese					Manganese	CNS	1.0E-02		8.0E-02	9.0E-02
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene				1.8E-03	1.8E-03
			1,4-Dichlorobenzene		1.6E-12	1.5E-08	1.5E-08	1,4-Dichlorobenzene	Liver		9.0E-10	6.0E-05	6.0E-05
			Benzene		3.5E-12	3.4E-09	3.4E-09	Benzene			2.0E-07	1.1E-04	1.1E-04
			Chlorobenzene					Chlorobenzene	Liver		1.4E-07	4.1E-04	4.1E-04
			Trichloroethene		1.9E-11	2.5E-08	2.5E-08	Trichloroethene	CNS			1.1E-03	1.1E-03
			Vinyl Chloride		2.5E-10	1.4E-07	1.4E-07	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			7.4E-04	7.4E-04
			Arsenic			1.9E-08	1.9E-08	Arsenic	Skin, Vascular			1.2E-04	1.2E-04
			Barium					Barium	Kidney			8.3E-04	8.3E-04
			Iron					Iron	Liver/blood/GI Tract			3.9E-03	3.9E-03
			Manganese					Manganese	CNS			5.5E-02	5.5E-02
			RDX			3.0E-08	3.0E-08	RDX	Prostate			2.5E-04	2.5E-04

Total Risk Across Surface / Subsurface Soil	1.7E-07
Total Risk Across Surface Water	2.3E-08
Total Risk Across Sediment	2.9E-07
Total Risk Across Groundwater	2.3E-07
Total Risk Across All Media and All Exposure Routes	7.1E-07

Total Hazard Index Across All Media and All Exposure Routes	1.8E-01
Total Liver HI =	2.6E-02
Total CNS HI =	1.5E-01
Total Blood HI =	4.6E-03
Total Prostate HI =	2.5E-04
Total Skin HI =	1.9E-03
Total Kidney HI =	8.3E-04
Total Vascular HI =	1.9E-03
Total GI Tract HI =	3.9E-03

SITE 3 - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsuface Soil	BAP EQUIVALENT	7.5E-09			7.5E-09	BAP EQUIVALENT					
			Aroclor-1260	2.6E-09		2.0E-09	4.6E-09	Aroclor-1260					
			Manganese					Manganese	CNS	6.2E-04		2.0E-03	2.6E-03
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)			2.5E-09	2.5E-09	2,2'-Oxybis(1-chloropropane)	Blood			6.8E-06	6.8E-06
			Manganese					Manganese	CNS			2.9E-03	2.9E-03
Sediment	Sediment	Onsite Diitches	Arsenic	8.1E-09		3.1E-09	1.1E-08	Arsenic	Skin, Vascular	1.4E-04		5.3E-05	1.9E-04
			Manganese					Manganese	CNS	1.2E-03		3.7E-03	4.9E-03
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene				9.2E-04	9.2E-04
			1,4-Dichlorobenzene		1.5E-13	2.8E-09	2.8E-09	1,4-Dichlorobenzene	Liver		2.3E-10	3.0E-05	3.0E-05
			Benzene		3.2E-13	6.2E-10	6.2E-10	Benzene			5.0E-08	5.5E-05	5.5E-05
			Chlorobenzene					Chlorobenzene	Liver		3.5E-08	2.0E-04	2.0E-04
			Trichloroethene		1.7E-12	4.5E-09	4.5E-09	Trichloroethene	CNS			5.3E-04	5.3E-04
			Vinyl Chloride		2.2E-11	2.4E-08	2.4E-08	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			3.7E-04	3.7E-04
			Arsenic			3.4E-09	3.4E-09	Arsenic	Skin, Vascular			5.9E-05	5.9E-05
			Barium					Barium	Kidney			4.1E-04	4.1E-04
			Iron					Iron	Liver/blood/GI Tract			1.9E-03	1.9E-03
			Manganese					Manganese	CNS			2.7E-02	2.7E-02
			RDX			5.4E-09	5.4E-09	RDX	Prostate			1.3E-04	1.3E-04

Total Risk Across Surface / Subsurface Soil	1.2E-08
Total Risk Across Surface Water	2.5E-09
Total Risk Across Sediment	1.1E-08
Total Risk Across Groundwater	4.1E-08
Total Risk Across All Media and All Exposure Routes	6.7E-08

Total Hazard Index Across All Media and All Exposure Routes	4.3E-02
Total Liver HI =	4.7E-03
Total CNS HI =	3.6E-02
Total Blood HI =	2.3E-03
Total Prostate HI =	1.3E-04
Total Skin HI =	2.5E-04
Total Kidney HI =	4.1E-04
Total Vascular HI =	2.5E-04
Total GI Tract HI =	1.9E-03

SITE 3 - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsuface Soil	BAP EQUIVALENT	8.0E-08			8.0E-08	BAP EQUIVALENT					
			Aroclor-1260	2.8E-08		1.1E-08	3.9E-08	Aroclor-1260					
			Manganese					Manganese	CNS	6.0E-02		9.8E-02	1.6E-01
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)			4.6E-09	4.6E-09	2,2'-Oxybis(1-chloropropane)	Blood			1.1E-04	1.1E-04
			Manganese					Manganese	CNS			3.4E-02	3.4E-02
Sediment	Sediment	Onsite Diitches	Arsenic	1.4E-07		2.9E-08	1.7E-07	Arsenic	Skin, Vascular	2.3E-02		4.5E-03	2.7E-02
			Manganese					Manganese	CNS	2.4E-01		4.0E-01	6.4E-01
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene				9.2E-03	9.2E-03
			1,4-Dichlorobenzene		6.3E-13	3.1E-09	3.1E-09	1,4-Dichlorobenzene	Liver		8.7E-09	3.0E-04	3.0E-04
			Benzene		1.4E-12	6.8E-10	6.9E-10	Benzene			1.9E-06	5.5E-04	5.5E-04
			Chlorobenzene					Chlorobenzene	Liver		1.3E-06	2.0E-03	2.0E-03
			Trichloroethene		7.3E-12	5.0E-09	5.0E-09	Trichloroethene	CNS			5.3E-03	5.3E-03
			Vinyl Chloride		9.5E-11	2.7E-08	2.7E-08	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			3.7E-03	3.7E-03
			Arsenic			3.8E-09	3.8E-09	Arsenic	Skin, Vascular			5.9E-04	5.9E-04
			Barium					Barium	Kidney			4.1E-03	4.1E-03
			Iron					Iron	Liver/blood/GI Tract			1.9E-02	1.9E-02
			Manganese					Manganese	CNS			2.7E-01	2.7E-01
			RDX			6.0E-09	6.0E-09	RDX	Prostate			1.3E-03	1.3E-03

Total Risk Across Surface / Subsurface Soil	1.2E-07
Total Risk Across Surface Water	4.6E-09
Total Risk Across Sediment	1.7E-07
Total Risk Across Groundwater	4.6E-08
Total Risk Across All Media and All Exposure Routes	3.4E-07

Total Hazard Index Across All Media and All Exposure Routes	1.2E+00
Total Liver HI =	1.8E-01
Total CNS HI =	9.5E-01
Total Blood HI =	2.3E-02
Total Prostate HI =	1.3E-03
Total Skin HI =	2.8E-02
Total Kidney HI =	4.1E-03
Total Vascular HI =	2.8E-02
Total GI Tract HI =	1.9E-02

SITE 3 - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface / Subsuface Soil	BAP EQUIVALENT	4.0E-08			4.0E-08	BAP EQUIVALENT					
			Aroclor-1260	1.4E-08		2.2E-09	1.6E-08	Aroclor-1260					
			Manganese					Manganese	CNS	3.0E-02		2.0E-02	4.9E-02
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)			2.7E-09	2.7E-09	2,2'-Oxybis(1-chloropropane)	Blood			6.8E-05	6.8E-05
			Manganese					Manganese	CNS			2.9E-02	2.9E-02
Sediment	Sediment	Onsite Diitches	Arsenic	8.6E-08		3.4E-09	8.9E-08	Arsenic	Skin, Vascular	6.7E-03		5.3E-04	7.2E-03
			Manganese					Manganese	CNS	5.7E-02		3.7E-02	9.4E-02
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene				9.2E-03	9.2E-03
			1,4-Dichlorobenzene		3.1E-13	3.1E-09	3.1E-09	1,4-Dichlorobenzene	Liver		4.3E-09	3.0E-04	3.0E-04
			Benzene		6.8E-13	6.8E-10	6.8E-10	Benzene			9.6E-07	5.5E-04	5.5E-04
			Chlorobenzene					Chlorobenzene	Liver		6.6E-07	2.0E-03	2.0E-03
			Trichloroethene		3.7E-12	5.0E-09	5.0E-09	Trichloroethene	CNS			5.3E-03	5.3E-03
			Vinyl Chloride		4.8E-11	2.7E-08	2.7E-08	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			3.7E-03	3.7E-03
			Arsenic			3.8E-09	3.8E-09	Arsenic	Skin, Vascular			5.9E-04	5.9E-04
			Barium					Barium	Kidney			4.1E-03	4.1E-03
			Iron					Iron	Liver/blood/GI Tract			1.9E-02	1.9E-02
			Manganese					Manganese	CNS			2.7E-01	2.7E-01
			RDX			6.0E-09	6.0E-09	RDX	Prostate			1.3E-03	1.3E-03

Total Risk Across Surface / Subsurface Soil	5.6E-08
Total Risk Across Surface Water	2.7E-09
Total Risk Across Sediment	8.9E-08
Total Risk Across Groundwater	4.6E-08
Total Risk Across All Media and All Exposure Routes	1.9E-07

Total Hazard Index Across All Media and All Exposure Routes	5.0E-01
Total Liver HI =	7.1E-02
Total CNS HI =	4.0E-01
Total Blood HI =	2.3E-02
Total Prostate HI =	1.3E-03
Total Skin HI =	7.8E-03
Total Kidney HI =	4.1E-03
Total Vascular HI =	7.8E-03
Total GI Tract HI =	1.9E-02

SITE 3 - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.8E-08			4.8E-08	BAP EQUIVALENT					
			Aroclor-1260	2.3E-08		1.2E-07	1.5E-07	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	4.7E-09		1.2E-08	1.7E-08	2,2'-Oxybis(1-chloropropane)	Blood	3.9E-06		1.0E-05	1.4E-05
			Manganese					Manganese	CNS	6.7E-04		3.0E-03	3.7E-03
Sediment	Sediment	Onsite Diitches	Arsenic	8.1E-08		2.2E-07	3.0E-07	Arsenic	Skin, Vascular	4.2E-04		1.1E-03	1.5E-03
			Manganese					Manganese	CNS	4.5E-03		1.0E-01	1.1E-01

Total Risk Across Surface Soil	2.0E-07
Total Risk Across Surface Water	1.7E-08
Total Risk Across Sediment	3.0E-07
Total Risk Across All Media and All Exposure Routes	5.1E-07

Total Hazard Index Across All Media and All Exposure Routes	1.1E-01
Total CNS HI =	1.1E-01
Total Blood HI =	1.4E-05
Total Skin HI =	1.5E-03
Total Vascular HI =	1.5E-03

SITE 3 - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER

SITE 3 - PISTOL RANGE LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.6E-09			3.6E-09	BAP EQUIVALENT					
			Aroclor-1260	1.7E-09		3.7E-09	5.5E-09	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	8.5E-10		2.2E-09	3.0E-09	2,2'-Oxybis(1-chloropropane)	Blood	2.3E-06		6.1E-06	8.4E-06
			Manganese					Manganese	CNS	5.6E-04		2.5E-03	3.1E-03
Sediment	Sediment	Onsite Diitches	Arsenic	3.6E-09		3.9E-09	7.4E-09	Arsenic	Skin, Vascular	6.2E-05		6.7E-05	1.3E-04
			Manganese					Manganese	CNS	5.3E-04		4.7E-03	5.3E-03

Total Risk Across Surface Soil	9.1E-09
Total Risk Across Surface Water	3.0E-09
Total Risk Across Sediment	7.4E-09
Total Risk Across All Media and All Exposure Routes	2.0E-08

Total Hazard Index Across All Media and All Exposure Routes	8.5E-03
Total CNS HI =	8.4E-03
Total Blood HI =	8.4E-06
Total Skin HI =	1.3E-04
Total Vascular HI =	1.3E-04

SITE 3 - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER

SITE 3 - PISTOL RANGE LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.5E-08			8.5E-08	BAP EQUIVALENT					
			Aroclor-1260	4.1E-08		8.0E-08	1.2E-07	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	8.3E-09		7.8E-09	1.6E-08	2,2'-Oxybis(1-chloropropane)	Blood	2.1E-05		1.9E-05	4.0E-05
			Manganese					Manganese	CNS	3.6E-03		5.8E-03	9.3E-03
Sediment	Sediment	Onsite Diitches	Arsenic	1.4E-07		1.4E-07	2.8E-07	Arsenic	Skin, Vascular	2.2E-03		2.2E-03	4.4E-03
			Manganese					Manganese	CNS	2.4E-02		1.9E-01	2.2E-01

Total Risk Across Surface Soil	2.1E-07
Total Risk Across Surface Water	1.6E-08
Total Risk Across Sediment	2.8E-07
Total Risk Across All Media and All Exposure Routes	5.0E-07

Total Hazard Index Across All Media and All Exposure Routes	2.3E-01
Total CNS HI =	2.3E-01
Total Blood HI =	4.0E-05
Total Skin HI =	4.4E-03
Total Vascular HI =	4.4E-03

SITE 3 - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.1E-08			2.1E-08	BAP EQUIVALENT					
			Aroclor-1260	1.0E-08		8.0E-09	1.8E-08	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	2.5E-09		2.3E-09	4.8E-09	2,2'-Oxybis(1-chloropropane)	Blood	6.2E-06		5.8E-06	1.2E-05
			Manganese					Manganese	CNS	1.5E-03		2.4E-03	3.9E-03
Sediment	Sediment	Onsite Diitches	Arsenic	2.1E-08		8.2E-09	2.9E-08	Arsenic	Skin, Vascular	3.3E-04		1.3E-04	4.6E-04
			Manganese					Manganese	CNS	2.8E-03		9.1E-03	1.2E-02

Total Risk Across Surface Soil	4.0E-08
Total Risk Across Surface Water	4.8E-09
Total Risk Across Sediment	2.9E-08
Total Risk Across All Media and All Exposure Routes	7.4E-08

Total Hazard Index Across All Media and All Exposure Routes	1.6E-02
Total CNS HI =	1.6E-02
Total Blood HI =	1.2E-05
Total Skin HI =	4.6E-04
Total Vascular HI =	4.6E-04

SITE 3 - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD

SITE 3 - PISTOL RANGE LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	7.1E-07			7.1E-07	BAP EQUIVALENT					
			Aroclor-1260	3.4E-07		7.1E-07	1.0E-06	Aroclor-1260					
Groundwater -	Air	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene					
		Indoor and	1,4-Dichlorobenzene		2.2E-09		2.2E-09	1,4-Dichlorobenzene	Liver		5.1E-06		5.1E-06
		Outdoor Air	Benzene		5.7E-09		5.7E-09	Benzene			1.4E-03		1.4E-03
			Chlorobenzene					Chlorobenzene	Liver		8.6E-04		8.6E-04
			Trichloroethene		3.3E-08		3.3E-08	Trichloroethene	CNS				
			Vinyl Chloride		4.8E-07		4.8E-07	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 1.8E-06

Total Risk Across Groundwater/Air: 5.2E-07

Total Risk Across All Media and All Exposure Routes: 2.3E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.2E-03

Total Liver HI = 8.6E-04

Total CNS HI =

Total Blood HI =

SITE 3 - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD

SITE 3 - PISTOL RANGE LANDFILL

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.5E-07			1.5E-07	BAP EQUIVALENT					
			Aroclor-1260	7.4E-08		6.2E-08	1.4E-07	Aroclor-1260					
Groundwater	Air	Onsite Indoor and Outdoor Air	1,3-Dichlorobenzene					1,3-Dichlorobenzene					
			1,4-Dichlorobenzene		4.8E-10		4.8E-10	1,4-Dichlorobenzene	Liver		2.2E-06		2.2E-06
			Benzene		1.3E-09		1.3E-09	Benzene			5.9E-04		5.9E-04
			Chlorobenzene					Chlorobenzene	Liver		3.8E-04		3.8E-04
			Trichloroethene		7.3E-09		7.3E-09	Trichloroethene	CNS				
			Vinyl Chloride		1.0E-07		1.0E-07	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood				

Total Risk Across Surface Soil: 2.9E-07

Total Risk Across Groundwater/Air: 1.1E-07

Total Risk Across All Media and All Exposure Routes: 4.0E-07

Total Hazard Index Across All Media and All Exposure Routes: 9.7E-04

Total Liver HI = 3.8E-04

Total CNS HI =

Total Blood HI =

SITE 3 - TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.5E-07			8.5E-07	BAP EQUIVALENT					
			Aroclor-1260	4.0E-07		2.2E-06	2.6E-06	Aroclor-1260					
Surface Water	Surface Water	Onsite Ditches	2,2'-Oxybis(1-chloropropane)	1.6E-07		3.0E-07	4.7E-07	2,2'-Oxybis(1-chloropropane)	Blood	1.7E-04		3.1E-04	4.9E-04
			Manganese					Manganese	CNS	2.9E-02		1.3E-01	1.6E-01
Sediment	Sediment	Onsite Ditches	Arsenic	1.4E-06		3.8E-06	5.2E-06	Arsenic	Skin, Vascular	9.1E-03		2.5E-02	3.4E-02
			Manganese					Manganese	CNS	9.8E-02		2.2E+00	2.3E+00
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene		2.0E-02		2.3E-02	4.3E-02
			1,4-Dichlorobenzene	2.3E-07	5.4E-08	1.8E-07	4.6E-07	1,4-Dichlorobenzene	Liver	9.1E-04	3.1E-05	7.5E-04	1.7E-03
			Benzene	2.2E-07	8.3E-08	3.8E-08	3.4E-07	Benzene		7.5E-03	4.9E-03	1.3E-03	1.4E-02
			Chlorobenzene					Chlorobenzene	Liver	1.2E-02	4.1E-03	4.9E-03	2.1E-02
			Trichloroethene	1.6E-06	3.1E-07	3.0E-07	2.2E-06	Trichloroethene	CNS	7.0E-02		1.3E-02	8.4E-02
			Vinyl Chloride	2.7E-05	2.7E-06	1.4E-06	3.1E-05	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	9.6E-02		8.9E-03	1.0E-01
			Arsenic	3.9E-05		1.1E-07	4.0E-05	Arsenic	Skin, Vascular	2.6E-01		7.4E-04	2.6E-01
			Barium					Barium	Kidney	1.3E-01		5.1E-03	1.3E-01
			Iron					Iron	Liver/blood/GI Tract	8.4E+00		2.4E-02	8.4E+00
			Manganese					Manganese	CNS	4.7E+00		3.4E-01	5.1E+00
			RDX	8.4E-07		3.6E-07	1.2E-06	RDX	Prostate	7.4E-03		3.1E-03	1.1E-02

Total Risk Across Surface Soil	3.4E-06
Total Risk Across Surface Water	4.7E-07
Total Risk Across Sediment	5.2E-06
Total Risk Across Groundwater	7.5E-05
Total Risk Across All Media and All Exposure Routes	8.4E-05

Total Hazard Index Across All Media and All Exposure Routes	1.7E+01
Total Liver HI =	8.4E+00
Total CNS HI =	7.6E+00
Total Blood HI =	8.5E+00
Total Prostate HI =	1.1E-02
Total Skin HI =	2.9E-01
Total Kidney HI =	1.3E-01
Total Vascular HI =	2.9E-01
Total GI Tract HI =	8.4E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 5-13.

SITE 3 - TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.3E-08			8.3E-08	BAP EQUIVALENT					
			Aroclor-1260	3.9E-08		8.5E-08	1.2E-07	Aroclor-1260					
Surface Water	Surface Water	Onsite Ditches	2,2'-Oxybis(1-chloropropane)	1.9E-08		2.5E-08	4.4E-08	2,2'-Oxybis(1-chloropropane)	Blood	6.9E-05		8.9E-05	1.6E-04
			Manganese					Manganese	CNS	1.7E-02		3.7E-02	5.4E-02
Sediment	Sediment	Onsite Ditches	Arsenic	8.1E-08		8.8E-08	1.7E-07	Arsenic	Skin, Vascular	1.8E-03		2.0E-03	3.8E-03
			Manganese					Manganese	CNS	1.5E-02		1.4E-01	1.5E-01
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene		9.3E-03		1.1E-02	2.0E-02
			1,4-Dichlorobenzene	3.1E-08	6.3E-09	2.6E-08	6.3E-08	1,4-Dichlorobenzene	Liver	4.3E-04	1.2E-05	3.5E-04	7.9E-04
			Benzene	3.0E-08	1.0E-08	5.3E-09	4.6E-08	Benzene		3.5E-03	2.1E-03	6.0E-04	6.2E-03
			Chlorobenzene					Chlorobenzene	Liver	5.4E-03	1.7E-03	2.3E-03	9.4E-03
			Trichloroethene	2.2E-07	4.0E-08	4.2E-08	3.0E-07	Trichloroethene	CNS	3.3E-02		6.3E-03	3.9E-02
			Vinyl Chloride	3.7E-06	3.9E-07	2.0E-07	4.3E-06	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	4.5E-02		4.2E-03	4.9E-02
			Arsenic	5.4E-06		1.3E-08	5.4E-06	Arsenic	Skin, Vascular	1.2E-01		2.9E-04	1.2E-01
			Barium					Barium	Kidney	5.9E-02		2.0E-03	6.1E-02
			Iron					Iron	Liver/blood/GI Tract	3.9E+00		9.3E-03	3.9E+00
			Manganese					Manganese	CNS	2.2E+00		1.3E-01	2.4E+00
			RDX	1.1E-07		4.9E-08	1.6E-07	RDX	Prostate	3.5E-03		1.5E-03	5.0E-03

Total Risk Across Surface Soil	2.1E-07
Total Risk Across Surface Water	4.4E-08
Total Risk Across Sediment	1.7E-07
Total Risk Across Groundwater	1.0E-05
Total Risk Across All Media and All Exposure Routes	1.1E-05

Total Hazard Index Across All Media and All Exposure Routes	6.8E+00
Total Liver HI =	3.9E+00
Total CNS HI =	2.6E+00
Total Blood HI =	4.0E+00
Total Prostate HI =	5.0E-03
Total Skin HI =	1.2E-01
Total Kidney HI =	6.1E-02
Total Vascular HI=	1.2E-01
Total GI Tract HI=	3.9E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 5-22.

SITE 3 - TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.0E-06			2.0E-06	BAP EQUIVALENT					
			Aroclor-1260	9.4E-07		9.9E-07	1.9E-06	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	1.9E-07		1.4E-07	3.3E-07	2,2'-Oxybis(1-chloropropane)	Blood	8.0E-04		5.7E-04	1.4E-03
			Manganese					Manganese	CNS	1.4E-01		2.4E-01	3.8E-01
Sediment	Sediment	Onsite Diitches	Arsenic	3.3E-06		1.7E-06	5.0E-06	Arsenic	Skin, Vascular	8.5E-02		4.5E-02	1.3E-01
			Manganese					Manganese	CNS	9.1E-01		4.0E+00	4.9E+00
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene		4.7E-02		3.2E-02	7.9E-02
			1,4-Dichlorobenzene	1.3E-07	6.0E-08	6.5E-08	2.6E-07	1,4-Dichlorobenzene	Liver	2.1E-03	1.4E-04	1.1E-03	3.3E-03
			Benzene	1.3E-07	9.0E-08	1.3E-08	2.3E-07	Benzene		1.7E-02	2.1E-02	1.8E-03	4.1E-02
			Chlorobenzene					Chlorobenzene	Liver	2.7E-02	1.8E-02	7.0E-03	5.2E-02
			Trichloroethene	9.3E-07	3.2E-07	1.1E-07	1.4E-06	Trichloroethene	CNS	1.6E-01		1.9E-02	1.8E-01
			Vinyl Chloride	1.6E-05	2.5E-06	5.1E-07	1.9E-05	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.2E-01		1.3E-02	2.4E-01
			Arsenic	2.3E-05		4.0E-08	2.3E-05	Arsenic	Skin, Vascular	6.0E-01		1.0E-03	6.0E-01
			Barium					Barium	Kidney	2.9E-01		7.3E-03	3.0E-01
			Iron					Iron	Liver/blood/GI Tract	1.9E+01		3.4E-02	2.0E+01
			Manganese					Manganese	CNS	1.1E+01		4.8E-01	1.2E+01
			RDX	4.9E-07		1.3E-07	6.1E-07	RDX	Prostate	1.7E-02		4.4E-03	2.2E-02

Total Risk Across Surface Soil	3.9E-06
Total Risk Across Surface Water	3.3E-07
Total Risk Across Sediment	5.0E-06
Total Risk Across Groundwater	4.4E-05
Total Risk Across All Media and All Exposure Routes	5.4E-05

Total Hazard Index Across All Media and All Exposure Routes	3.8E+01
Total Liver HI =	2.0E+01
Total CNS HI =	1.7E+01
Total Blood HI =	2.0E+01
Total Prostate HI =	2.2E-02
Total Skin HI =	7.3E-01
Total Kidney HI =	3.0E-01
Total Vascular HI =	7.3E-01
Total GI Tract HI =	2.0E+01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 5-13.

SITE 3 - TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.2E-07			2.2E-07	BAP EQUIVALENT					
			Aroclor-1260	1.1E-07		4.4E-08	1.5E-07	Aroclor-1260					
Surface Water	Surface Water	Onsite Diitches	2,2'-Oxybis(1-chloropropane)	1.3E-08		1.3E-08	2.6E-08	2,2'-Oxybis(1-chloropropane)	Blood	1.6E-04		1.6E-04	3.2E-04
			Manganese					Manganese	CNS	3.9E-02		6.8E-02	1.1E-01
Sediment	Sediment	Onsite Diitches	Arsenic	2.2E-07		4.6E-08	2.6E-07	Arsenic	Skin, Vascular	1.7E-02		3.6E-03	2.0E-02
			Manganese					Manganese	CNS	1.4E-01		2.5E-01	3.9E-01
Groundwater	Water	Onsite	1,3-Dichlorobenzene					1,3-Dichlorobenzene		3.1E-02		1.8E-02	4.9E-02
			1,4-Dichlorobenzene	2.9E-08	7.8E-09	1.2E-08	4.9E-08	1,4-Dichlorobenzene	Liver	1.4E-03	5.4E-05	5.8E-04	2.1E-03
			Benzene	2.9E-08	1.2E-08	2.4E-09	4.4E-08	Benzene		1.2E-02	8.6E-03	9.8E-04	2.1E-02
			Chlorobenzene					Chlorobenzene	Liver	1.8E-02	7.2E-03	3.8E-03	2.9E-02
			Trichloroethene	2.1E-07	4.5E-08	1.9E-08	2.7E-07	Trichloroethene	CNS	1.1E-01		1.0E-02	1.2E-01
			Vinyl Chloride	3.5E-06	4.0E-07	9.3E-08	4.0E-06	Vinyl Chloride					
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.5E-01		6.9E-03	1.6E-01
			Arsenic	5.1E-06		6.0E-09	5.1E-06	Arsenic	Skin, Vascular	4.0E-01		4.6E-04	4.0E-01
			Barium					Barium	Kidney	2.0E-01		3.2E-03	2.0E-01
			Iron					Iron	Liver/blood/GI Tract	1.3E+01		1.5E-02	1.3E+01
			Manganese					Manganese	CNS	7.4E+00		2.2E-01	7.6E+00
			RDX	1.1E-07		2.3E-08	1.3E-07	RDX	Prostate	1.2E-02		2.4E-03	1.4E-02

Total Risk Across Surface Soil	3.7E-07
Total Risk Across Surface Water	2.6E-08
Total Risk Across Sediment	2.6E-07
Total Risk Across Groundwater	9.7E-06
Total Risk Across All Media and All Exposure Routes	1.0E-05

Total Hazard Index Across All Media and All Exposure Routes	2.2E+01
Total Liver HI =	1.3E+01
Total CNS HI =	8.2E+00
Total Blood HI =	1.3E+01
Total Prostate HI =	1.4E-02
Total Skin HI =	4.2E-01
Total Kidney HI =	1.3E+01
Total Vascular HI =	4.2E-01
Total GI Tract HI =	1.3E+01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 5-22.

SITE 3 - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FULL TIME WORKER
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	6.3E-07			6.3E-07	BAP EQUIVALENT					
			Aroclor-1260	3.0E-07		5.7E-07	8.7E-07	Aroclor-1260					
						Total Risk Across Surface Soil	1.5E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air							

Total Risk Across All Media and All Exposure Routes 1.5E-06

SITE 3 - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	7.1E-07			7.1E-07	BAP EQUIVALENT					
			Aroclor-1260	3.4E-07		7.1E-07	1.0E-06	Aroclor-1260					
						Total Risk Across Surface Soil	1.8E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air							

Total Risk Across All Media and All Exposure Routes 1.8E-06

SITE 3 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.5E-07			8.5E-07	BAP EQUIVALENT					
			Aroclor-1260	4.0E-07		2.2E-06	2.6E-06	Aroclor-1260					
Sediment	Sediment	Onsite Diitches	Arsenic	1.4E-06		3.8E-06	5.2E-06	Arsenic	Skin, Vascular	9.1E-03		2.5E-02	3.4E-02
			Manganese					Manganese	CNS	9.8E-02		2.2E+00	2.3E+00
Groundwater	Water	Onsite	Trichloroethene	1.6E-06	3.1E-07	3.0E-07	2.2E-06	Trichloroethene	CNS	7.0E-02		1.3E-02	8.4E-02
			Vinyl Chloride	2.7E-05	2.7E-06	1.4E-06	3.1E-05	Vinyl Chloride					
			Arsenic	3.9E-05		1.1E-07	4.0E-05	Arsenic	Skin, Vascular	2.6E-01		7.4E-04	2.6E-01
			Iron					Iron	Liver/blood/GI Tract	8.4E+00		2.4E-02	8.4E+00
			Manganese					Manganese	CNS	4.7E+00		3.4E-01	5.1E+00
			RDX	8.4E-07		3.6E-07	1.2E-06	RDX	Prostate	7.4E-03		3.1E-03	1.1E-02

Total Risk Across Surface Soil	3.4E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	5.2E-06
Total Risk Across Groundwater	7.4E-05
Total Risk Across All Media and All Exposure Routes	8.3E-05

Total Hazard Index Across All Media and All Exposure Routes	1.6E+01
Total Liver HI =	8.4E+00
Total CNS HI =	7.5E+00
Total Blood HI =	8.4E+00
Total Prostate HI =	1.1E-02
Total Skin HI =	2.9E-01
Total Vascular HI =	2.9E-01
Total GI Tract HI =	8.4E+00

SITE 3 - TABLE 10.3a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENTSUMMARY - FUTURE ADULT RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	Vinyl Chloride	3.7E-06	3.9E-07	2.0E-07	4.3E-06	Vinyl Chloride					
			Arsenic	5.4E-06		1.3E-08	5.4E-06	Arsenic	Skin, Vascular	1.2E-01		2.9E-04	1.2E-01
			Iron					Iron	Liver/blood/GI Tract	3.9E+00		9.3E-03	3.9E+00
			Manganese					Manganese	CNS	2.2E+00		1.3E-01	2.4E+00

Total Risk Across Surface Soil	
Total Risk Across Surface Water	
Total Risk Across Sediment	
Total Risk Across Groundwater	9.7E-06
Total Risk Across All Media and All Exposure Routes	9.7E-06

Total Hazard Index Across All Media and All Exposure Routes	6.4E+00
Total Liver HI =	3.9E+00
Total CNS HI =	2.4E+00
Total Blood HI =	3.9E+00
Total Skin HI =	1.2E-01
Total Vascular HI=	1.2E-01
Total GI Tract HI=	3.9E+00

SITE 3 - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.0E-06			2.0E-06	BAP EQUIVALENT					
			Aroclor-1260	9.4E-07		9.9E-07	1.9E-06	Aroclor-1260					
Sediment	Sediment	Onsite Diitches	Arsenic	3.3E-06		1.7E-06	5.0E-06	Arsenic	Skin, Vascular	8.5E-02		4.5E-02	1.3E-01
			Manganese					Manganese	CNS	9.1E-01		4.0E+00	4.9E+00
Groundwater	Water	Onsite	Trichloroethene	9.3E-07	3.2E-07	1.1E-07	1.4E-06	Trichloroethene	CNS	1.6E-01		1.9E-02	1.8E-01
			Vinyl Chloride	1.6E-05	2.5E-06	5.1E-07	1.9E-05	Vinyl Chloride					
			Arsenic	2.3E-05		4.0E-08	2.3E-05	Arsenic	Skin, Vascular	6.0E-01		1.0E-03	6.0E-01
			Iron					Iron	Liver/blood/GI Tract	1.9E+01		3.4E-02	2.0E+01
			Manganese					Manganese	CNS	1.1E+01		4.8E-01	1.2E+01

Total Risk Across Surface Soil	3.9E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	5.0E-06
Total Risk Across Groundwater	4.3E-05
Total Risk Across All Media and All Exposure Routes	5.2E-05

Total Hazard Index Across All Media and All Exposure Routes	3.7E+01
Total Liver HI =	2.0E+01
Total CNS HI =	1.7E+01
Total Blood HI =	2.0E+01
Total Skin HI =	7.3E-01
Total Vascular HI =	7.3E-01
Total GI Tract HI =	2.0E+01

SITE 3 - TABLE 10.4a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 3 - PISTOL RANGE LANDFILL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	Vinyl Chloride	3.5E-06	4.0E-07	9.3E-08	4.0E-06	Vinyl Chloride					
			Arsenic	5.1E-06		6.0E-09	5.1E-06	Arsenic	Skin, Vascular	4.0E-01		4.6E-04	4.0E-01
			Iron					Iron	Liver/blood/GI Tract	1.3E+01		1.5E-02	1.3E+01
			Manganese					Manganese	CNS	7.4E+00		2.2E-01	7.6E+00
			RDX	1.1E-07		2.3E-08	1.3E-07	RDX	Prostate	1.2E-02		2.4E-03	1.4E-02

Total Risk Across Surface Soil	
Total Risk Across Surface Water	
Total Risk Across Sediment	
Total Risk Across Groundwater	9.3E-06
Total Risk Across All Media and All Exposure Routes	9.3E-06

Total Hazard Index Across All Media and All Exposure Routes	2.1E+01
Total Liver HI =	1.3E+01
Total CNS HI =	7.6E+00
Total Blood HI =	1.3E+01
Total Prostate HI =	1.4E-02
Total Skin HI =	4.0E-01
Total GI Tract HI =	1.3E+01
Total Vascular HI =	4.0E-01

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SITE 3 - PISTOL RANGE LANDFILL

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,3-Dichlorobenzene	6.55E-04	1.47E+02	2.43E-03	1.09E+01	1.05E+03	9.92E+00	1.30E+01	2.31E-04	1.93E-04	4.66E-02
1,4-Dichlorobenzene	9.99E-04	1.47E+02	2.43E-03	1.09E+01	1.05E+03	9.92E+00	1.30E+01	3.52E-04	2.94E-04	4.66E-02
Benzene	8.19E-04	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	3.83E-04	3.19E-04	6.17E-02
Chlorobenzene	8.43E-03	1.13E+02	3.71E-03	1.25E+01	1.20E+03	1.17E+01	1.54E+01	3.38E-03	2.82E-03	5.30E-02
Trichloroethene	1.54E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	6.03E-03	5.02E-03	5.16E-02
Vinyl Chloride	1.52E-03	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	7.86E-04	6.55E-04	6.82E-02
cis-1,2-Dichloroethene	3.50E-02	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.49E-02	1.24E-02	5.63E-02

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SITE 3 - PISTOL RANGE LANDFILL

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,3-Dichlorobenzene	6.55E-04	6.90E-02	7.90E-06	7.38E+01	9.96E-02	5.38E-03	2.43E-05	1.15E-03	5.38E-03	5.57E-05	2.68E-03	1.75E-06
1,4-Dichlorobenzene	9.99E-04	6.90E-02	7.90E-06	7.38E+01	9.96E-02	5.38E-03	2.43E-05	1.15E-03	5.38E-03	5.57E-05	2.68E-03	2.68E-06
Benzene	8.19E-04	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	5.25E-06
Chlorobenzene	8.43E-03	7.30E-02	8.70E-06	4.72E+02	1.52E-01	5.70E-03	2.06E-05	1.02E-03	5.70E-03	4.91E-05	3.95E-03	3.32E-05
Trichloroethene	1.54E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	1.48E-04
Vinyl Chloride	1.52E-03	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	4.25E-05
cis-1,2-Dichloroethene	3.50E-02	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.59E-04

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,3-Dichlorobenzene	1.93E-04	1.4E-06	4.2E-06			NA	NA	NA	NA
1,4-Dichlorobenzene	2.94E-04	2.2E-06	6.4E-06	2.20E-02	2.29E-01	4.8E-08	2.7%	2.8E-05	0.4%
Benzene	3.19E-04	2.4E-06	6.9E-06	2.90E-02	1.70E-03	6.9E-08	3.8%	4.1E-03	52.9%
Chlorobenzene	2.82E-03	2.1E-05	6.1E-05		1.70E-02	NA	NA	3.6E-03	46.7%
Trichloroethene	5.02E-03	3.7E-05	1.1E-04	6.00E-03		2.2E-07	12.4%	NA	NA
Vinyl Chloride	6.55E-04	4.9E-06	1.4E-05	3.00E-01		1.5E-06	81.1%	NA	NA
cis-1,2-Dichloroethene	1.24E-02	9.3E-05	2.7E-04			NA	NA	NA	NA
					Total	**1.8E-06**	**18.9%**	**7.7E-03**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	6	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,3-Dichlorobenzene	1.93E-04	1.7E-06	2.0E-05			NA	NA	NA	NA
1,4-Dichlorobenzene	2.94E-04	2.5E-06	3.0E-05	2.20E-02	2.29E-01	5.6E-08	2.7%	1.3E-04	0.4%
Benzene	3.19E-04	2.8E-06	3.2E-05	2.90E-02	1.70E-03	8.0E-08	3.8%	1.9E-02	52.9%
Chlorobenzene	2.82E-03	2.4E-05	2.9E-04		1.70E-02	NA	NA	1.7E-02	46.7%
Trichloroethene	5.02E-03	4.4E-05	5.1E-04	6.00E-03		2.6E-07	12.4%	NA	NA
Vinyl Chloride	6.55E-04	5.7E-06	6.6E-05	3.00E-01		1.7E-06	81.1%	NA	NA
cis-1,2-Dichloroethene	1.24E-02	1.1E-04	1.3E-03			NA	NA	NA	NA
					Total	**2.1E-06**	**18.9%**	**3.6E-02**	**100.0%**

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SITE 3 - PISTOL RANGE LANDFILL

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K Ra x CF
1,3-Dichlorobenzene	6.55E-04	1.47E+02	2.43E-03	1.09E+01	1.05E+03	9.92E+00	1.30E+01	2.31E-04	1.93E-04	2.58E-02
1,4-Dichlorobenzene	9.99E-04	1.47E+02	2.43E-03	1.09E+01	1.05E+03	9.92E+00	1.30E+01	3.52E-04	2.94E-04	2.58E-02
Benzene	8.19E-04	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	3.83E-04	3.19E-04	3.42E-02
Chlorobenzene	8.43E-03	1.13E+02	3.71E-03	1.25E+01	1.20E+03	1.17E+01	1.54E+01	3.38E-03	2.82E-03	2.93E-02
Trichloroethene	1.54E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	6.03E-03	5.02E-03	2.86E-02
Vinyl Chloride	1.52E-03	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	7.86E-04	6.55E-04	3.77E-02
cis-1,2-Dichloroethene	3.50E-02	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.49E-02	1.24E-02	3.12E-02

Vapor Intrusion from Groundwater - CTE
Source: ASTM E 1739-95
SITE 3 - PISTOL RANGE LANDFILL

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,3-Dichlorobenzene	6.55E-04	6.90E-02	7.90E-06	7.38E+01	9.96E-02	5.38E-03	2.43E-05	1.15E-03	5.38E-03	5.57E-05	2.68E-03	1.75E-06
1,4-Dichlorobenzene	9.99E-04	6.90E-02	7.90E-06	7.38E+01	9.96E-02	5.38E-03	2.43E-05	1.15E-03	5.38E-03	5.57E-05	2.68E-03	2.68E-06
Benzene	8.19E-04	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	5.25E-06
Chlorobenzene	8.43E-03	7.30E-02	8.70E-06	4.72E+02	1.52E-01	5.70E-03	2.06E-05	1.02E-03	5.70E-03	4.91E-05	3.95E-03	3.32E-05
Trichloroethene	1.54E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	1.48E-04
Vinyl Chloride	1.52E-03	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	4.25E-05
cis-1,2-Dichloroethene	3.50E-02	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.59E-04

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,3-Dichlorobenzene	1.93E-04	1.5E-07	1.5E-06			NA	NA	NA	NA
1,4-Dichlorobenzene	2.94E-04	2.4E-07	2.4E-06	2.20E-02	2.29E-01	5.2E-09	2.7%	1.0E-05	0.4%
Benzene	3.19E-04	2.6E-07	2.6E-06	2.90E-02	1.70E-03	7.4E-09	3.8%	1.5E-03	52.9%
Chlorobenzene	2.82E-03	2.3E-06	2.3E-05		1.70E-02	NA	NA	1.3E-03	46.7%
Trichloroethene	5.02E-03	4.0E-06	4.0E-05	6.00E-03		2.4E-08	12.4%	NA	NA
Vinyl Chloride	6.55E-04	5.3E-07	5.3E-06	3.00E-01		1.6E-07	81.1%	NA	NA
cis-1,2-Dichloroethene	1.24E-02	1.0E-05	1.0E-04			NA	NA	NA	NA
					Total	**1.9E-07**	**18.9%**	**2.8E-03**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	2	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	730	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 3 - PISTOL RANGE LANDFILL
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,3-Dichlorobenzene	1.93E-04	2.1E-07	7.2E-06			NA	NA	NA	NA
1,4-Dichlorobenzene	2.94E-04	3.1E-07	1.1E-05	2.20E-02	2.29E-01	6.9E-09	2.7%	4.8E-05	0.4%
Benzene	3.19E-04	3.4E-07	1.2E-05	2.90E-02	1.70E-03	9.9E-09	3.8%	7.0E-03	52.9%
Chlorobenzene	2.82E-03	3.0E-06	1.1E-04		1.70E-02	NA	NA	6.2E-03	46.7%
Trichloroethene	5.02E-03	5.4E-06	1.9E-04	6.00E-03		3.2E-08	12.4%	NA	NA
Vinyl Chloride	6.55E-04	7.0E-07	2.5E-05	3.00E-01		2.1E-07	81.1%	NA	NA
cis-1,2-Dichloroethene	1.24E-02	1.3E-05	4.7E-04			NA	NA	NA	NA
					Total	**2.6E-07**	**18.9%**	**1.3E-02**	**100.0%**

CALCULATION OF t*, T, AND B FOR 2,2-OXYBIS(1-CHLOROPROPANE)
ACCORDING TO USEPA DERMAL GUIDANCE (USEPA, 1992)

Step 1
Calculation of Kp (if none provided)
log Kp = -2.72 + 0.71log(Kow) - 0.0061 MW

Compound	log (Kow)	MW	log (Kp)	Kp
2,2'-Oxybis(1-chloropropane)	2.58	171.1	-1.93	5.30E-03

Kow and Kp from Risk Assessment Information System (RAIS)
(http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_9801)

Step 2
Calculation of B
B = Kow/1.0E-4

Compound	Kow	B
2,2'-Oxybis(1-chloropropane)	3.80E+02	3.80E-02

Step 3
Calculation of log Dsc/lsc and Dsc
Log Dsc/lsc = -2.72 - 0.0061 MW
Dcs = diffusivity of a substance within the membrane (cm^2/hr)
lsc = thickness of the stratum corneum (= 1.0E-03 cm)

Compound	MW	log (Dsc/lsc)	Dsc (cm^2/hr)
2,2'-Oxybis(1-chloropropane)	171.07	-3.76	1.72E-07

Step 4
Calculation of T
T = lsc^2/6Dsc

Compound	lsc	Dsc	T
2,2'-Oxybis(1-chloropropane)	1.00E-03	1.72E-07	0.97

Step 4
Calculation of t*

If B<0.1, t* = 2.4 T (case 1)

If 0.1 < B < 1.17, t* = (8.4 + 6 log B)T (case 2)

If B > 1.17, t* = 6(b-(b2-c2)^.5)T (case 3)

Case 1

Compound	t* (hour)
2,2'-Oxybis(1-chloropropane)	2.32

SITE 4

RISK ASSESSMENT CALCULATIONS

SITE 4 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND
PAGE 1 OF 2

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 4 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND
PAGE 2 OF 2

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	Surface Water	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water is not present at this site.
						Dermal	On-site	None	Surface water is not present at this site.
		Air	Vapors from Surface Water	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	Sediment	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water / sediment is not present at this site.
						Dermal	On-site	None	Surface water / sediment is not present at this site.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
75-09-2	Methylene Chloride	0.002	J	0.002	J	mg/kg	4SS1010100-D	1/10	0.01 - 0.012	0.002	NA	85	C	**0.001** 13	SSL_MIGR SSL_INH	No	BSL
83-32-9	Acenaphthene	0.056	J	0.27	J	mg/kg	4SS1030100	2/10	0.34 - 3.7	0.27	NA	470	N	29	SSL_MIGR NA	No	BSL
208-96-8	Acenaphthylene	0.28	J	0.28	J	mg/kg	4SS1020100	1/10	0.34 - 3.7	0.28	NA	470	N		NA NA	No	BSL
120-12-7	Anthracene	0.066	J	0.28	J	mg/kg	4SS1030100	2/10	0.34 - 3.7	0.28	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.042	J	1.1	J	mg/kg	4SS1020100	6/10	0.34 - 3.7	1.1	NA	**0.87**	C	**0.08**	SSL_MIGR NA	Yes	ASL
50-32-8	Benzo(a)pyrene	0.063	J	1.3	J	mg/kg	4SS1020100	5/10	0.34 - 3.7	1.3	NA	**0.087**	C	**0.4**	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.11	J	1.6	J	mg/kg	4SS1020100	6/10	0.34 - 3.7	1.6	NA	**0.87**	C	**0.2**	SSL_MIGR NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.061	J	0.59	J	mg/kg	4SS1020100	4/10	0.34 - 3.7	0.59	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.042	J	0.41		mg/kg	4SS1030100	6/10	0.34 - 3.7	0.41	NA	8.7	C	2	SSL_MIGR NA	No	BSL
86-74-8	Carbazole	0.16	J	0.16	J	mg/kg	4SS1030100	1/10	0.34 - 3.7	0.16	NA	32	C	**0.03**	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.092	J	1.1	J	mg/kg	4SS1020100	6/10	0.34 - 3.7	1.1	NA	87	C	8	SSL_MIGR NA	No	BSL
84-74-2	Di-n-butyl phthalate	0.059	J	0.075	J	mg/kg	4SS1000100	2/10	0.34 - 3.7	0.075	NA	780	N	270 2300	SSL_MIGR SSL_INH	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.056	J	0.056	J	mg/kg	4SS1030100	1/10	0.34 - 3.7	0.056	NA	0.087	C	0.08	SSL_MIGR NA	No	BSL
132-64-9	Dibenzofuran	0.091	J	0.091	J	mg/kg	4SS1030100	1/10	0.34 - 3.7	0.091	NA	31	N		NA NA	No	BSL
206-44-0	Fluoranthene	0.2	J	1.9		mg/kg	4SS1030100	6/10	0.34 - 3.7	1.9	NA	310	N	210	SSL_MIGR NA	No	BSL
86-73-7	Fluorene	0.14	J	0.14	J	mg/kg	4SS1030100	1/10	0.34 - 3.7	0.14	NA	310	N	28	SSL_MIGR NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.082	J	0.47	J	mg/kg	4SS1020100	4/10	0.34 - 3.7	0.47	NA	0.87	C	0.7	SSL_MIGR NA	No	BSL
91-20-3	Naphthalene	0.088	J	0.088	J	mg/kg	4SS1030100	1/10	0.34 - 3.7	0.088	NA	160	N	4	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.088	J	1.6		mg/kg	4SS1030100	6/10	0.34 - 3.7	1.6	NA	160	N		NA NA	No	BSL

SITE 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
129-00-0	Pyrene	0.13	J	1.6	J	mg/kg	4SS1020100	6/10	0.34 - 3.7	1.6	NA	230	N	210 NA	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.025		0.025		mg/kg	4SS1080100	1/10	0.0034 - 0.037	0.025	NA	1.9	C	3 NA	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.00027	J	0.016	J	mg/kg	4SS1010100-D	5/8	0.0017 - 0.018	0.016	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11096-82-5	Aroclor-1260	0.018	J	1.8		mg/kg	4SS1010100-D	9/10	0.035	1.8	NA	**0.32**	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.0014	J	0.012	J	mg/kg	4SS1050100	4/8	0.0034 - 0.036	0.012	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
5103-74-2	gamma-Chlordane	0.00027	J	0.013	J	mg/kg	4SS1010100-D	3/9	0.0017 - 0.018	0.013	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0072	J	0.0072	J	mg/kg	4SS1080100	1/10	0.0017 - 0.019	0.0072	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
72-43-5	Methoxychlor	0.012	J	0.012	J	mg/kg	4SS1080100	1/9	0.0007 - 0.047	0.012	NA	39	N	8	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	3300	J	10700	J	mg/kg	4SS1030100	10/10		10700	NA	**7800**	N		NA NA	No	BKG
7440-38-2	Arsenic	1.8		5.8		mg/kg	4SS1030100	10/10		5.8	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	8.6		68.7		mg/kg	4SS1030100	10/10		68.7	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-43-9	Cadmium	0.72		0.72		mg/kg	4SS1030100	1/10	0.04 - 0.2	0.72	NA	7.8	N	**0.4** 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	125		5230		mg/kg	4SS1030100	10/10		5230	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	7.8		25.7	J	mg/kg	4SS1010100	10/10		25.7	NA	**23 (8)**	N	**2** 270	SSL_MIGR SSL_INH	No	BKG
7440-48-4	Cobalt	1.3		14.2		mg/kg	4SS1010100-D	8/10	0.99 - 1.3	14.2	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	3.8	J	136	J	mg/kg	4SS1030100	10/10		136	NA	310	N		NA NA	No	BSL
57-12-5	Cyanide	0.18		0.18		mg/kg	4SS1060100	2/10	0.14 - 0.16	0.18	NA	160	N		NA NA	No	BSL
7439-89-6	Iron	5490		19300	J	mg/kg	4SS1030100	10/10		19300	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	2.9	J	68.5	J	mg/kg	4SS1030100	10/10		68.5	NA	400 (9)			NA NA	No	BSL, BKG

SITE 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7439-95-4	Magnesium	223		13200		mg/kg	4SS1010100-D	10/10		13200	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	20.5		346	L	mg/kg	4SS1030100	10/10		346	NA	**160 (10)**	N		NA NA	No	BKG
7439-97-6	Mercury	0.06		2.3		mg/kg	4SS1070100	7/10	0.05	2.3	NA	**2.3 (11)**	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL
7440-02-0	Nickel	2.5		191	J	mg/kg	4SS1010100-D	10/10		191	NA	**160**	N	**7** 13000	SSL_MIGR SSL_INH	Yes	ASL
7440-09-7	Potassium	102		822		mg/kg	4SS1030100	10/10		822	NA	NA			NA NA	No	NUT, BKG
7440-22-4	Silver	1.1		1.4		mg/kg	4SS1050100	2/10	0.15 - 0.53	1.4	NA	39	N	2	SSL_MIGR NA	No	BSL, BKG
7440-62-2	Vanadium	10.3		55		mg/kg	4SS1010100	10/10		55	NA	**55**	N	300	SSL_MIGR NA	Yes	ASL
7440-66-6	Zinc	9.9	J	354	J	mg/kg	4SS1030100	9/10	5.1	354	NA	2300	N	620	SSL_MIGR NA	No	BSL
99-35-4	1,3,5-Trinitrobenzene	0.11	J	0.11	J	mg/kg	4SS1070100	1/10	0.25	0.11	NA	230	N	NA	NA NA	No	BSL
118-96-7	2,4,6-Trinitrotoluene	0.11	J	0.46		mg/kg	4SS1000100	2/10	0.25	0.46	NA	21	C	NA	NA NA	No	BSL
19406-51-0	4-Amino-2,6-dinitrotoluene	0.1	J	0.1	J	mg/kg	4SS1090100	1/10	0.25	0.1	NA	0.47	N	NA	NA NA	No	BSL
	Acid-Insoluble Sulfide	53	L	69	L	mg/kg	4SS1030100	2/2		69	NA	NA		NA	NA	No	NTX
	Chemical Oxygen Demand	19000		22000		ug/l	4SS1080100	2/2		22000	NA	NA		NA	NA	No	NTX
TTNUS17	pH	5.5		7.5			4SS1030100	2/2		7.5	NA	NA		NA	NA	No	NTX
TTNUS22	Total Organic Carbon	6600		28000		mg/kg	4SS1030100	2/2		28000	NA	NA		NA	NA	No	NTX

Associated Samples:

4SS1000100
4SS1010100
4SS1010100-D
4SS1020100
4SS1030100
4SS1040100 4SS1070100
4SS1050100 4SS1080100
4SS1060100 4SS1090100

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

SITE 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation Factor (DAF) of 1

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level
For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MAYRLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil/Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
71-55-6	1,1,1-Trichloroethane	0.02	J	0.02	J	mg/kg	04-SB17-1214	1/37	0.01 - 0.06	0.02	NA	160	N	0.1 1200	SSL-MIGR SSL-INH	No	BSL, FREQ
79-34-5	1,1,2,2-Tetrachloroethane	0.006	J	13		mg/kg	04-SB17-1214	4/37	0.01 - 0.06	13	NA	**3.2**	C	**0.0002** 0.6	SSL-MIGR SSL-INH	Yes	ASL
79-00-5	1,1,2-Trichloroethane	0.006	J	0.02	J	mg/kg	04-SB17-1214	2/37	0.01 - 0.06	0.02	NA	11	C	**0.0009** 1	SSL-MIGR SSL-INH	No	BSL
107-06-2	1,2-Dichloroethane	0.13		0.13		mg/kg	04-SB17-1214	1/37	0.01 - 0.06	0.13	NA	7	C	**0.001** 0.4	SSL-MIGR SSL-INH	No	BSL, FREQ
540-59-0	1,2-Dichloroethene (total)	0.042	J	0.042	J	mg/kg	04-SB17-1214	1/37	0.01 - 0.06	0.042	NA	70	N		NA NA	No	BSL, FREQ
67-64-1	Acetone	0.007	J	0.007	J	mg/kg	04-SB06-0408	1/37	0.01 - 0.06	0.007	NA	780	N	0.8 100000	SSL-MIGR SSL-INH	No	BSL, FREQ
71-43-2	Benzene	0.001	J	0.031	J	mg/kg	04-SB17-1214	4/37	0.01 - 0.058	0.031	NA	22	C	**0.002** 0.8	SSL-MIGR SSL-INH	No	BSL
108-90-7	Chlorobenzene	0.006	J	0.046	J	mg/kg	04-SB11-0809	3/37	0.01 - 0.058	0.046	NA	160	N	0.07 130	SSL-MIGR SSL-INH	No	BSL
108-90-7	Chlorobenzene	0.006	J	0.046	J	mg/kg	04-SB17-1214	3/37	0.01 - 0.058	0.046	NA	160	N	0.07 130	SSL-MIGR SSL-INH	No	BSL
67-66-3	Chloroform	0.026	J	0.031	J	mg/kg	04-SB20-0607	1/37	0.01 - 0.06	0.031	NA	100	C	**0.03** 0.3	SSL-MIGR SSL-INH	No	BSL, FREQ
100-41-4	Ethylbenzene	0.002	J	0.093		mg/kg	04-SB17-1214	3/37	0.01 - 0.06	0.093	NA	780	N	0.7 400	SSL-MIGR SSL-INH	No	BSL
75-09-2	Methylene Chloride	0.002	J	0.002	J	mg/kg	4SS1010100-D	1/37	0.002 - 0.04	0.002	NA	85	C	**0.001** 13	SSL-MIGR SSL-INH	No	BSL, FREQ
127-18-4	Tetrachloroethene	0.006	J	0.13		mg/kg	04-SB17-1214	2/37	0.01 - 0.06	0.13	NA	12	C	**0.003** 11	SSL-MIGR SSL-INH	No	BSL
108-88-3	Toluene	0.009	J	0.53		mg/kg	04-SB17-1214	2/37	0.01 - 0.06	0.53	NA	1600	N	0.6 650	SSL-MIGR SSL-INH	No	BSL
79-01-6	Trichloroethene	0.001	J	4.4		mg/kg	04-SB20-0607	9/42	0.003 - 0.06	4.4	NA	58	C	**0.003** 5	SSL-MIGR SSL-INH	No	BSL
1330-20-7	Xylenes, Total	0.003	J	0.8		mg/kg	04-SB17-1214	5/37	0.01 - 0.06	0.8	NA	16000	N	9 410	SSL-MIGR SSL-INH	No	BSL
106-46-7	1,4-Dichlorobenzene	0.04	J	0.04	J	mg/kg	04-SB-22-D	1/41	0.34 - 7.1	0.04	NA	27	C	0.1	SSL-MIGR NA	No	BSL, FREQ
91-57-6	2-Methylnaphthalene	0.14	J	18		mg/kg	04-SB11-0809	6/41	0.34 - 7.1	18	NA	160	N		NA NA	No	BSL
83-32-9	Acenaphthene	0.056	J	0.27	J	mg/kg	4SS1030100	2/41	0.34 - 7.1	0.27	NA	470	N	29	SSL-MIGR NA	No	BSL
208-96-8	Acenaphthylene	0.095	J	0.28	J	mg/kg	4SS1020100	2/41	0.34 - 7.1	0.28	NA	470	N		NA NA	No	BSL

SITE 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MAYRLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil/Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
120-12-7	Anthracene	0.055	J	0.84	J	mg/kg	04-SB11-0809	4/41	0.34 - 7.1	0.84	NA	2300	N	590	SSL-MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.042	J	1.1	J	mg/kg	4SS1020100	11/41	0.34 - 7.1	1.1	NA	**0.87**	C	0.08	SSL-MIGR NA	Yes	ASL
50-32-8	Benzo(a)pyrene	0.053	J	1.3	J	mg/kg	4SS1020100	10/41	0.34 - 7.1	1.3	NA	**0.087**	C	0.4	SSL-MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.037	J	1.6	J	mg/kg	4SS1020100	12/41	0.34 - 7.1	1.6	NA	**0.87**	C	0.2	SSL-MIGR NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.06	J	0.59	J	mg/kg	4SS1020100	8/41	0.34 - 7.1	0.59	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.042	J	0.55		mg/kg	04-SB11-0809	10/41	0.34 - 7.1	0.55	NA	8.7	C	2	SSL-MIGR NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.038	J	2.7	J	mg/kg	4SU1070200	4/41	0.34 - 3.7	2.7	NA	46	C	180 31000	SSL-MIGR SSL-INH	No	BSL
86-74-8	Carbazole	0.16	J	0.18	J	mg/kg	04-SB11-0809	2/41	0.34 - 7.1	0.18	NA	32	C	**0.03**	SSL-MIGR NA	No	BSL
218-01-9	Chrysene	0.066	J	2.1	J	mg/kg	4SU1070200	12/41	0.34 - 3.7	2.1	NA	87	C	8	SSL-MIGR NA	No	BSL
84-74-2	Di-n-butyl phthalate	0.036	J	0.4		mg/kg	4SU1040200	7/41	0.036 - 7.1	0.4	NA	780	N	270 2300	SSL-MIGR SSL-INH	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.056	J	0.056	J	mg/kg	4SS1030100	1/41	0.34 - 7.1	0.056	NA	0.087	C	0.08	SSL-MIGR NA	No	BSL, FREQ
132-64-9	Dibenzofuran	0.091	J	0.091	J	mg/kg	4SS1030100	1/41	0.34 - 7.1	0.091	NA	31	N		NA NA	No	BSL, FREQ
84-66-2	Diethyl Phthalate	3.8		3.8		mg/kg	04-SB15-0812	1/41	0.34 - 7.1	3.8	NA	6300	N	23 2000	SSL-MIGR SSL-INH	No	BSL, FREQ
206-44-0	Fluoranthene	0.065	J	1.9		mg/kg	4SS1030100	12/41	0.34 - 7.1	1.9	NA	310	N	210	SSL-MIGR NA	No	BSL
86-73-7	Fluorene	0.14	J	1.3	J	mg/kg	04-SB11-0809	2/41	0.34 - 7.1	1.3	NA	310	N	28	SSL-MIGR NA	No	BSL, FREQ
193-39-5	Indeno(1,2,3-cd)pyrene	0.053	J	0.47	J	mg/kg	4SS1020100	8/41	0.34 - 7.1	0.47	NA	0.87	C	0.7	SSL-MIGR NA	No	BSL
91-20-3	Naphthalene	0.04	J	3.2		mg/kg	04-SB11-0809	5/41	0.34 - 7.1	3.2	NA	160	N	4	SSL-MIGR NA	No	BSL
85-01-8	Phenanthrene	0.041	J	6	J	mg/kg	04-SB11-0809	13/41	0.34 - 7.1	6	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.052	J	1.6	J	mg/kg	4SS1020100	12/41	0.34 - 7.1	1.6	NA	230	N	210	SSL-MIGR NA	No	BSL
72-54-8	4,4'-DDD	0.023	J	0.023	J	mg/kg	4SU1010200	1/18	0.0034 - 0.072	0.023	NA	2.7	C	0.8	SSL-MIGR NA	No	BSL

SITE 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MAYRLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil/Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
72-55-9	4,4'-DDE	0.00065	J	0.059		mg/kg	4SU1010200	3/19	0.0034 - 0.072	0.059	NA	1.9	C	3	SSL-MIGR NA	No	BSL
5103-71-9	Alpha-Chlordane	0.00027	J	0.016	J	mg/kg	4SS1010100-D	8/17	0.0017 - 0.036	0.016	NA	1.8 (7)	C	0.5 20	SSL-MIGR SSL-INH	No	BSL
11096-82-5	Aroclor-1260	0.0086	J	1.8		mg/kg	4SS1010100-D	17/21	0.034 - 0.035	1.8	NA	**0.32**	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.00037	J	0.012	J	mg/kg	4SS1050100	6/16	0.0034 - 0.072	0.012	NA	0.04	C	**0.0002** 1	SSL-MIGR NA	No	BSL
959-98-8	Endosulfan I	0.00035	J	0.00035	J	mg/kg	4SU1040200	1/16	0.0017 - 0.036	0.00035	NA	47	N	0.9	SSL-MIGR NA	No	BSL
33213-65-9	Endosulfan II	0.025	J	0.025	J	mg/kg	4SU1070200	1/15	0.0034 - 0.037	0.025	NA	47 (8)	N	0.9	SSL-MIGR NA	No	BSL
7421-93-4	Endrin Aldehyde	0.0026	J	0.0026	J	mg/kg	4SU1070200	1/19	0.0034 - 0.037	0.0026	NA	2.3 (9)	N		NA NA	No	BSL
53494-70-5	Endrin Ketone	0.011	J	0.011	J	mg/kg	4SU1070200	1/20	0.0034 - 0.037	0.011	NA	2.3 (9)	N		NA NA	No	BSL
5103-74-2	Gamma-Chlordane	0.00027	J	0.013	J	mg/kg	4SS1010100-D	3/18	0.0017 - 0.036	0.013	NA	1.8 (7)	C	0.5 20	SSL-MIGR SSL-INH	No	BSL
76-44-8	Heptachlor	0.00051	J	0.00051	J	mg/kg	4SU1000200	1/18	0.0017 - 0.036	0.00051	NA	0.14	C	1 0.1	SSL-MIGR SSL-INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.0072	J	0.0072	J	mg/kg	4SS1080100	1/20	0.0017 - 0.036	0.0072	NA	0.07	C	0.03 5	SSL-MIGR SSL-INH	No	BSL
72-43-5	Methoxychlor	0.012	J	0.012	J	mg/kg	4SS1080100	1/19	0.0004 - 0.36	0.012	NA	39	N	8	SSL-MIGR NA	No	BSL
7429-90-5	Aluminum	506	J	13600	J	mg/kg	04-SB08-0809	40/40		13600	NA	**7800**	N		NA NA	No	BKG
7440-36-0	Antimony	0.29		3.4		mg/kg	04-SB11-0809	4/40	0.18 - 3.9	3.4	NA	**3.1**	N	**0.3**	SSL-MIGR NA	Yes	ASL
7440-38-2	Arsenic	0.34		5.8		mg/kg	4SS1030100	32/40	0.19 - 3.2	5.8	NA	**0.43**	C	**1** 750	SSL-MIGR SSL-INH	No	BKG
7440-39-3	Barium	3.1		175		mg/kg	04-SB18-1012	33/40	1 - 9.6	175	NA	550	N	**82** 690000	SSL-MIGR SSL-INH	No	BSL, BKG
7440-41-7	Beryllium	0.42		0.44		mg/kg	04-SB10-0708	2/40	0.01 - 0.96	0.44	NA	16	N	3 1300	SSL-MIGR SSL-INH	No	BSL, BKG
7440-43-9	Cadmium	0.29	J	2.1		mg/kg	4SU1030200	9/40	0.04 - 2.4	2.1	NA	7.8	N	**0.4** 1800	SSL-MIGR SSL-INH	No	BSL
7440-70-2	Calcium	53.8	L	51200	J	mg/kg	04-SB11-0809	25/37	15.8 - 278	51200	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	2.5		31.2		mg/kg	04-SB17-1214	40/40		31.2	NA	**23 (10)**	N	**2** 270	SSL-MIGR SSL-INH	No	BKG

SITE 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MAYRLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil/Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-48-4	Cobalt	1.3		14.2		mg/kg	4SS1010100-D	23/40	0.59 - 6.1	14.2	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	2.2		743		mg/kg	04-SB13-0506	31/40	1.6 - 11.2	743	NA	**310**	N		NA NA	No	BKG
57-12-5	Cyanide	0.18		2.3		mg/kg	04-SB07-1822	4/36	0.14 - 1.3	2.3	NA	160	N	**2**	SSL-MIGR NA	No	BSL
7439-89-6	Iron	588	J	23300	J	mg/kg	04-SB13-0506	40/40		23300	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	0.55		242	J	mg/kg	04-SB13-0506	38/40	1.4 - 1.9	242	NA	400 (11)	N		NA NA	No	BSL, BKG
7439-95-4	Magnesium	33.7	K	13200		mg/kg	4SS1010100-D	38/40	4.2 - 52.8	13200	NA	NA			NA NA	No	NUT
7439-96-5	Manganese	1.4	L	444		mg/kg	04-SB13-0506	40/40		444	NA	**160 (12)**	N		NA NA	No	BKG
7439-97-6	Mercury	0.06	K	6.1		mg/kg	04-SB13-0506	22/40	0.05 - 0.2	6.1	NA	**2.3 (13)**	N	**0.1** 10	SSL-MIGR NA	Yes	ASL
7440-02-0	Nickel	2.5		191	J	mg/kg	4SS1010100-D	26/40	0.94 - 4	191	NA	**160**	N	**7** 13000	SSL-MIGR NA	No	BKG
7440-09-7	Potassium	28		822		mg/kg	4SS1030100	35/40	56.4 - 160	822	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	0.44	J	1.1	L	mg/kg	04-SB08-0809	4/40	0.17 - 2.9	1.1	NA	39	N	**0.3**	SSL-MIGR NA	No	BSL, BKG
7440-22-4	Silver	0.17	J	108		mg/kg	4SU1020200	8/40	0.07 - 0.53	108	NA	**39**	N	**2**	SSL-MIGR NA	N	BKG
7440-23-5	Sodium	30.1		30.1		mg/kg	04-SB13-0506	1/40	16.7 - 90.9	30.1	NA	NA			NA NA	No	NUT, FREQ
7440-62-2	Vanadium	2.2		125		mg/kg	4SU1070200	39/40	3.3	125	NA	**55**	N	300	SSL-MIGR NA	Yes	ASL
7440-66-6	Zinc	2	L	517	J	mg/kg	04-SB13-0506	32/40	0.67 - 13.3	517	NA	2300	N	620	SSL-MIGR NA	No	BSL, BKG
99-35-4	1,3,5-Trinitrobenzene	0.11	J	0.11	J	mg/kg	4SS1070100	1/36	0.25 - 40.2	0.11	NA	230	N		NA NA	No	BSL, FREQ
118-96-7	2,4,6-Trinitrotoluene	0.11	J	0.46		mg/kg	4SS1000100	2/36	0.25 - 35.59	0.46	NA	21	C		NA NA	No	BSL
88-72-2	2-Nitrotoluene	0.088	J	0.088	J	mg/kg	4SU1070200	1/36	0.0814 - 0.25	0.088	NA	78	N		NA NA	No	BSL, FREQ
19406-51-0	4-Amino-2,6-dinitrotoluene	0.1	J	0.1	J	mg/kg	4SS1090100	1/36	0.25 - 40.85	0.1	NA	0.47	N		NA NA	No	BSL, FREQ
121-82-4	RDX	0.1	J	0.1	J	mg/kg	4SU1030200	1/36	0.0509 - 0.5	0.1	NA	5.8	C		NA NA	No	BSL, FREQ

SITE 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MAYRLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil/Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
	Acid-Insoluble Sulfide	53	L	69	L	mg/kg	4SS1030100	2/4	50	69	NA	NA			NA	No	NTX
	Chemical Oxygen Demand	19		22		mg/L	4SS1080100	2/4	10	22	NA	NA			NA	No	NTX
TTNUS17	pH	4.47		8.1			4SU1030200	25/25		8.1	NA	NA			NA	No	NTX
TTNUS92	Total Kjeldahl Nitrogen	8.6		399		mg/kg	04-SB10-0708	17/17		399	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	520		28000		mg/kg	4SS1030100	4/4		28000	NA	NA			NA	No	NTX

Associated Samples:

04-SB-21	4SS1030100
04-SB-22	4SS1040100
04-SB-22-AVG	4SS1050100
04-SB-22-D	4SS1060100
04-SB-23	4SS1070100
04-SB-24	4SS1080100
04-SB-25	4SS1090100
04-SB-26	4SU1000200
04-SB-26-AVG	4SU1010200
04-SB-26-D	4SU1020200
04-SB-27	4SU1030200
04-SB-28	4SU1040200
04-SB-29	4SU1050200
04-SB04-1214	4SU1060200
04-SB05-0406	4SU1070200
04-SB06-0408	4SU1080200
04-SB07-1822	4SU1090200
04-SB08-0809	
04-SB08-0809-AVG	
04-SB08-0809-D	
04-SB09-0809	
04-SB10-0708	
04-SB11-0809	
04-SB12-1012	
04-SB13-0506	
04-SB14-0506	
04-SB15-0812	
04-SB16-1012	
04-SB17-1214	
04-SB18-1012	
04-SB19-1012	
04-SB20-0607	
04-SB20-0607-AVG	
04-SB20-0607-D	
4SS1000100	
4SS1010100	
4SS1010100-AVG	
4SS1010100-D	
4SS1020100	

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan II as Endosulfan.
9 Endrin Aldehyde and Endrin Ketone as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation Factor (DAF) of 1

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
FREQ = Detected is less than 5 percent (1/20) of the samples.
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 4 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
71-55-6	1,1,1-Trichloroethane	0.25	J	0.32	J	µg/L	4GW79	2/26	1 - 1500	0.32	NA	54	N	200	FED-MCL	No	BSL
79-34-5	1,1,2,2-Tetrachloroethane	0.98	J	330		µg/L	4GW105	9/26	1 - 1500	330	NA	**0.053**	C	NA	NA	Yes	ASL
79-00-5	1,1,2-Trichloroethane	0.55	J	0.73	J	µg/L	4GW13	2/26	1 - 1500	0.73	NA	**0.19**	C	5	FED-MCL	Yes	ASL
75-34-3	1,1-Dichloroethane	0.25	J	1.3		µg/L	4GW49D	5/26	1 - 1500	1.3	NA	80	N	NA	NA	No	BSL
107-06-2	1,2-Dichloroethane	0.44	J	0.63	J	µg/L	4GW79-D	2/26	1 - 1500	0.63	NA	**0.12**	C	5	FED-MCL	Yes	ASL
71-43-2	Benzene	0.52	J	1.2		µg/L	4GW11	4/26	1 - 1500	1.2	NA	**0.36**	C	5	FED-MCL	Yes	ASL
108-90-7	Chlorobenzene	0.3	J	54	J	µg/L	4GW105-D	7/26	1 - 1500	54	NA	**11**	N	100	FED-MCL	Yes	ASL
75-00-3	Chloroethane	0.25	J	0.74	J	µg/L	4GW10	2/26	1 - 1500	0.74	NA	3.6	C	NA	NA	No	BSL
67-66-3	Chloroform	0.33	J	0.86	J	µg/L	4GW109	2/26	0.46 - 1500	0.86	NA	**0.15**	C	80	FED-MCL	Yes	ASL
100-41-4	Ethylbenzene	0.56	J	0.56	J	µg/L	4GW103	1/26	1 - 1500	0.56	NA	130	N	700	FED-MCL	No	BSL, FREQ
127-18-4	Tetrachloroethene	0.28	J	1.9		µg/L	4GW109	6/26	1 - 1500	1.9	NA	**1.1**	C	5	FED-MCL	Yes	ASL
156-60-5	Trans-1,2-dichloroethene	3		3.1		µg/L	4GW109	1/26	1 - 1500	3.1	NA	12	N	100	FED-MCL	No	BSL, FREQ
79-01-6	Trichloroethene	0.46	J	8500		µg/L	4GW102	18/26	1	8500	NA	**1.6**	C	**5**	FED-MCL	Yes	ASL
75-01-4	Vinyl Chloride	4.5		66	J	µg/L	4GW105-D	2/26	1 - 1500	66	NA	**0.019**	C	**2**	FED-MCL	Yes	ASL
1330-20-7	Xylenes, Total	1.6		1.6		µg/L	4GW103	1/26	1 - 1500	1.6	NA	1200	N	10000	FED-MCL	No	BSL, FREQ
156-59-2	cis-1,2-dichloroethene	0.31	J	8500		µg/L	4GW102	12/26	1 - 10	8500	NA	**6.1**	N	**70**	FED-MCL	Yes	ASL
91-57-6	2-Methylnaphthalene	2	J	2	J	µg/L	4GW103	1/26	5 - 5.8	2	NA	12	N	NA	NA	No	BSL, FREQ
83-32-9	Acenaphthene	1.1	J	1.1	J	µg/L	4GW11	1/26	5	1.1	NA	37	N	NA	NA	No	BSL, FREQ
117-81-7	Bis(2-Ethylhexyl)phthalate	1	J	2.1	J	µg/L	4GW82	10/26	5 - 5.8	2.1	NA	4.8	C	6	FED-MCL	No	BSL
91-20-3	Naphthalene	1.2	J	1.2	J	µg/L	4GW103	1/26	5 - 5.8	1.2	NA	**0.65**	N	NA	NA	No	FREQ
108-95-2	Phenol	1.5	J	1.5	J	µg/L	4GW102	1/26	5 - 5.8	1.5	NA	2200	N	NA	NA	No	BSL, FREQ
7429-90-5	Aluminum	241		223000		µg/L	4GW10	13/26	22.8 - 337	223000	NA	**3700**	N	**50-200 (7)**	FED-MCL	No	BKG
7440-36-0	Antimony	2.6	K	3	K	µg/L	4GW110	2/26	1.9 - 4.2	3	NA	**1.5**	N	6	FED-MCL	Yes	ASL
7440-38-2	Arsenic	2.3		110		µg/L	4GW10	7/26	1.5 - 3.7	110	NA	**0.045**	C	**50**	FED-MCL	Yes	ASL
7440-39-3	Barium	24		554		µg/L	4GW10	26/26	0	554	NA	**260**	N	2000	FED-MCL	Yes	ASL
7440-41-7	Beryllium	2.1		4.7		µg/L	4GW10	2/26	0.1 - 2.6	4.7	NA	7.3	N	**4**	FED-MCL	No	BSL, BKG
7440-43-9	Cadmium	6.7	L	7.3	L	µg/L	4GW48	2/26	2.7 - 3.6	7.3	NA	**3.7**	N	**5**	FED-MCL	Yes	ASL
7440-70-2	Calcium	2030		119000		µg/L	4GW10	26/26	0	119000	NA	NA		NA	NA	No	NUT
7440-47-3	Chromium	15.7	K	1260		µg/L	4GW10	11/26	2.3 - 15.7	1260	NA	**11 (8)**	N	**100**	FED-MCL	No	BKG
7440-48-4	Cobalt	5		102	K	µg/L	4GW10	25/26	3.3 - 21.1	102	NA	220	N	NA	NA	No	BSL
7440-50-8	Copper	2.6		265		µg/L	4GW10	23/26	2.4	265	NA	**150**	N	1300	FED-MCL	No	BKG
7439-89-6	Iron	1750		329000		µg/L	4GW10	21/26	43.5 - 280	329000	NA	**1100**	N	**300 (7)**	FED-MCL	Yes	ASL
7439-92-1	Lead	4.3		146		µg/L	4GW10	6/26	1 - 4.7	146	NA	**15**		**15**	FED-AL	No	BKG
7439-95-4	Magnesium	1860		23200		µg/L	4GW10	26/26	0	23200	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	77.7		15100		µg/L	4GW10	25/26	2.4	15100	NA	**73 (9)**	N	**50 (7)**	FED-MCL	Yes	ASL
7439-97-6	Mercury	0.31		7.2		µg/L	4GW100	18/26	0.2	7.2	NA	**0.11 (10)**	N	**2**	FED-MCL	Yes	ASL
7440-02-0	Nickel	8.9		591		µg/L	4GW10	20/26	7.5	591	NA	**73**	N	**100**	FED-MCL	No	BKG
7440-09-7	Potassium	2620		12500		µg/L	4GW110	16/26	1390 - 2430	12500	NA	NA		NA	NA	No	NUT, BKG
7782-49-2	Selenium	2.9		75	K	µg/L	4GW10	4/26	2.5 - 12.6	75	NA	**18**	N	**50**	FED-MCL	Yes	ASL
7440-23-5	Sodium	3950		152000		µg/L	4GW110	26/26	0	152000	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	2.8		707		µg/L	4GW10	9/26	2.1 - 10.7	707	NA	**26**	N	NA	NA	No	BKG
7440-66-6	Zinc	13.7		830		µg/L	4GW11	18/26	4.6 - 12.1	830	NA	1100	N	5000 (7)	FED-MCL	No	BSL, BKG
19406-51-0	4-Amino-2,6-dinitrotoluene	0.8		0.8		µg/L	4GW105	1/26	0.2 - 0.4	0.8	NA	**0.22**	N	NA	NA	No	FREQ
2691-41-0	HMX	1.3		2		µg/L	4GW81S	3/26	0.5 - 1	2	NA	180	N	NA	NA	No	BSL
121-82-4	RDX	0.64		2.6		µg/L	4GW80	4/26	0.5 - 1.7	2.6	NA	**0.61**	C	NA	NA	Yes	ASL
TTNUS99	Ammonium Perchlorate	9.29	K	12.4	K	µg/L	4GW15	2/26	5	12.4	NA	NA	N	18 (11)	NA	No	BSL

SITE 4 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:

4GW100	4GW12
4GW10	4GW13
4GW101	4GW15
4GW102	4GW48
4GW103	4GW49D
4GW104	4GW50
4GW105	4GW52
4GW105-D	4GW79
4GW106	4GW79-D
4GW107	4GW80
4GW108	4GW81D
4GW109	4GW81D-D
4GW109-D	4GW815
4GW110	4GW82
4GW11	4GW89

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
8 Hexavalent Chromium
9 Manganese-Nonfood
10 Mercury as Mercuric Chloride
11 Health based action level (California Department of Health Services, January, 1999)

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Nocarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:

For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 4 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	5.74E-01	NA	1.62E+00	J	mg/kg	1.62E+00	Maximum	W - Test (1)	1.62E+00	Maximum	W - Test (1)
Aroclor-1260	mg/kg	4.95E-01	NA	1.60E+00		mg/kg	1.60E+00	Maximum	W - Test (1)	1.60E+00	Maximum	W - Test (1)
Nickel	mg/kg	2.74E+01	NA	1.22E+02	J	mg/kg	1.21E+02	95% UCL-T	W - Test (2)	1.21E+02	95% UCL-T	W - Test (2)
Vanadium	mg/kg	2.87E+01	3.56E+01	4.86E+01		mg/kg	3.56E+01	95% UCL-N	W - Test (3)	3.56E+01	95% UCL-N	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.
(2) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(3) Shapiro-Wilk W Test indicates data are normally distributed.

SITE 4 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Surface / Surbsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	mg/kg	3.59E-01	NA	1.30E+01		mg/kg	3.60E-02	95% UCL-T	W - Test (1)	3.60E-02	95% UCL-T	W - Test (1)
BAP EQUIVALENT	mg/kg	2.95E-01	NA	1.62E+00	J	mg/kg	6.01E-01	95% UCL-T	W - Test (1)	6.01E-01	95% UCL-T	W - Test (1)
Aroclor-1260	mg/kg	3.00E-01	NA	1.60E+00		mg/kg	1.32E+00	95% UCL-T	W - Test (2)	1.32E+00	95% UCL-T	W - Test (2)
Antimony	mg/kg	3.91E-01	NA	3.40E+00		mg/kg	4.45E-01	95% UCL-T	W - Test (1)	4.45E-01	95% UCL-T	W - Test (1)
Mercury	mg/kg	3.42E-01	NA	6.10E+00		mg/kg	3.93E-01	95% UCL-T	W - Test (1)	3.93E-01	95% UCL-T	W - Test (1)
Vanadium	mg/kg	2.17E+01	NA	1.25E+02		mg/kg	3.04E+01	95% UCL-T	W - Test (2)	3.04E+01	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.

SITE 4 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	mg/L	4.50E-02	NA	3.30E-01		mg/L	9.62E-02	95% UCL-T	W - Test (1)	9.62E-02	95% UCL-T	W - Test (1)
1,1,2-Trichloroethane	mg/L	3.36E-02	NA	7.30E-04	J	mg/L	7.30E-04	Maximum	W - Test (2)	7.30E-04	Maximum	W - Test (2)
1,2-Dichloroethane	mg/L	3.36E-02	NA	6.25E-04	J	mg/L	6.25E-04	Maximum	W - Test (2)	6.25E-04	Maximum	W - Test (2)
Benzene	mg/L	3.37E-02	NA	1.20E-03		mg/L	1.20E-03	Maximum	W - Test (2)	1.20E-03	Maximum	W - Test (2)
Chlorobenzene	mg/L	3.29E-02	NA	5.40E-02	J	mg/L	2.20E-02	95% UCL-T	W - Test (1)	2.20E-02	95% UCL-T	W - Test (1)
Chloroform	mg/L	3.36E-02	NA	8.60E-04	J	mg/L	8.60E-04	Maximum	W - Test (2)	8.60E-04	Maximum	W - Test (2)
Tetrachloroethene	mg/L	3.37E-02	NA	1.90E-03		mg/L	1.90E-03	Maximum	W - Test (2)	1.90E-03	Maximum	W - Test (2)
Trichloroethene	mg/L	4.52E-01	NA	8.50E+00		mg/L	4.11E+00	95% UCL-T	W - Test (1)	4.11E+00	95% UCL-T	W - Test (1)
Vinyl Chloride	mg/L	3.24E-02	NA	6.60E-02	J	mg/L	1.95E-02	95% UCL-T	W - Test (1)	1.95E-02	95% UCL-T	W - Test (1)
cis-1,2-dichloroethene	mg/L	3.52E-01	NA	8.50E+00		mg/L	2.70E-01	95% UCL-T	W - Test (1)	2.70E-01	95% UCL-T	W - Test (1)
Antimony	mg/L	1.11E-03	NA	3.00E-03	K	mg/L	1.23E-03	95% UCL-T	W - Test (1)	1.23E-03	95% UCL-T	W - Test (1)
Arsenic	mg/L	9.18E-03	NA	1.10E-01		mg/L	1.63E-02	95% UCL-T	W - Test (1)	1.63E-02	95% UCL-T	W - Test (1)
Barium	mg/L	1.13E-01	NA	5.54E-01		mg/L	1.57E-01	95% UCL-T	W - Test (3)	1.57E-01	95% UCL-T	W - Test (3)
Cadmium	mg/L	1.81E-03	NA	7.30E-03	K	mg/L	2.04E-03	95% UCL-T	W - Test (1)	2.04E-03	95% UCL-T	W - Test (1)
Iron	mg/L	3.48E+01	NA	3.29E+02		mg/L	3.29E+02	Maximum	W - Test (2)	3.29E+02	Maximum	W - Test (2)
Manganese	mg/L	1.48E+00	NA	1.51E+01		mg/L	7.43E+00	95% UCL-T	W - Test (3)	7.43E+00	95% UCL-T	W - Test (3)
Mercury	mg/L	2.12E-03	NA	7.20E-03		mg/L	7.20E-03	Maximum	W - Test (2)	7.20E-03	Maximum	W - Test (2)
Selenium	mg/L	7.33E-03	NA	7.50E-02	K	mg/L	9.25E-03	95% UCL-T	W - Test (1)	9.25E-03	95% UCL-T	W - Test (1)
RDX	mg/L	4.44E-04	NA	2.60E-03		mg/L	5.31E-04	95% UCL-T	W - Test (1)	5.31E-04	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

TABLE 5.1

NON-CANCER TOXICITY DATA – ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/Gt Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 4 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.49E-07	Cancer Ingestion Intake - CTE	5.51E-08
Noncancer Ingestion Intake - RME	9.78E-07	Noncancer Ingestion Intake - CTE	4.29E-07
Cancer Dermal Intake - RME	1.10E-05	Cancer Dermal Intake - CTE	6.96E-07
Noncancer Dermal Intake - RME	3.09E-05	Noncancer Dermal Intake - CTE	5.42E-06

SITE 4 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.9E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.5E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	5.0E-03
	(total)												1.1E-02
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	6.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	3.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	3.8E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.7E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.1E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	6.0E-02
	(total)												1.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	5.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-06
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	5.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	4.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.3E-06
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.1E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.1E-06
										Total Risk Across All Exposure Routes/Pathways	**7.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	6.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.5E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.2E-03
	(total)												4.8E-03
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	6.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.2E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.9E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.1E-02
	(total)												1.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	8.9E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-07
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	8.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	6.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.3E-07
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	8.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	**9.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 4 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	7.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.8E-04
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.2E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	3.2E-04
	(total)												7.0E-04
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	6.8E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.6E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.0E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.1E-02
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	4.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	4.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-08
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	9.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.0E-07
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	5.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.3E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	8.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.6E-07
										Total Risk Across All Exposure Routes/Pathways	**8.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.9E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.5E-05
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.6E-07	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	8.0E-05
	(total)												1.7E-04
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	5.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	6.8E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.6E-04
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.0E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												2.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.3E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	3.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	7.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-08
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	7.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	8.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-08
										Total Risk Across All Exposure Routes/Pathways	**4.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 4 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	5.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	4.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.0E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.2E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.7E-03
	(total)												3.7E-03
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.6E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.8E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.1E-02
	(total)												3.8E-02

Total Hazard Index Across All Exposure Routes/Pathways **4.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	7.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	7.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.1E-07
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-07
										Total Risk Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.0E-04
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	2.9E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	4.2E-04
	(total)												9.2E-04
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.6E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.8E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.1E-03
	(total)												3.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.9E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.8E-07
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.0E-08
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	FI	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.91E-07	Cancer Ingestion Intake - CTE	8.57E-08
Noncancer Ingestion Intake - RME	4.57E-06	Noncancer Ingestion Intake - CTE	2.00E-06
Cancer Dermal Intake - RME	1.37E-05	Cancer Dermal Intake - CTE	1.20E-06
Noncancer Dermal Intake - RME	1.60E-04	Noncancer Dermal Intake - CTE	2.80E-05

SITE 4 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	7.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	7.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.5E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.6E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.3E-02
	(total)												5.1E-02
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.9E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.4E-01
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.7E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.1E-01
	(total)												5.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	6.3E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-06
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.3E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	4.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.9E-06
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.3E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.6E-06
										Total Risk Across All Exposure Routes/Pathways	**8.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	7.1E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.0E-02
	(total)												2.2E-02
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	5.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	3.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.3E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.0E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.5E-02
	(total)												9.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.4E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.4E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-06
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.3E-07
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 4 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.3E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.9E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	7.0E-03
	(total)												1.5E-02
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.5E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.9E-01
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.4E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.4E-01
	(total)												4.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	7.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-06
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	7.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.1E-06
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	8.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	4.1E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.1E-06
										Total Risk Across All Exposure Routes/Pathways	**1.5E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	7.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	*1.60E+00*	*mg/kg*	*1.60E+00*	*mg/kg*	M	7.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.8E-03
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.6E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.3E-03
	(total)												5.1E-03
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.0E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.9E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.2E-02
	(total)												5.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	7.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	7.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.9E-07
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	3.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	*Fraction Ingested*	*(unitless)*	1	*Professional Judgement*	1	*Professional Judgement*	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 4 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.6E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.8E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.6E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	6.5E-02
	(total)												1.4E-01
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	4.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.4E-01
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	8.0E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	4.4E-01
	(total)												7.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**9.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.14
Metals - 0.01

SITE 4 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.8E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.8E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-05
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	4.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	1.8E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-06
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	6.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.7E-06
										Total Risk Across All Exposure Routes/Pathways	**2.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	6.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	6.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	5.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.5E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.2E-02
	(total)												4.8E-02
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	6.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	3.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.6E-02
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	1.1E-05	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.9E-02
	(total)												1.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	2.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	2.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	4.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.8E-06
Dermal	BAP EQUIVALENT	1.62E+00	mg/kg	1.62E+00	mg/kg	M	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.60E+00	mg/kg	1.60E+00	mg/kg	M	8.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Nickel	1.21E+02	mg/kg	1.21E+02	mg/kg	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.56E+01	mg/kg	3.56E+01	mg/kg	M	3.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-07
										Total Risk Across All Exposure Routes/Pathways	**2.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 4 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 4 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	5.1E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.5E-08
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	8.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	6.3E-08	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.6E-04
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	5.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-04
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	4.3E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	6.1E-04
	(total)												9.5E-04
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	4.8E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.0E-08
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.0E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.3E-04
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.7E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	8.3E-04
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.4E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	7.4E-03
	(total)												8.6E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.8E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-10
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	3.0E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	6.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	2.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.5E-07
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.7E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-10
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	1.3E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	7.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	6.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	4.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-07
										Total Risk Across All Exposure Routes/Pathways	**6.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.3E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.1E-08
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	2.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	4.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	1.6E-08	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.9E-05
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.6E-05
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.1E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.5E-04
	(total)												2.4E-04
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	4.8E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.0E-09
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.0E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.3E-05
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.7E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	8.3E-05
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.4E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	7.4E-04
	(total)												8.6E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.6E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-11
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	2.7E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	6.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-08
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	6.2E-11	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-11
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	4.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	4.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.0E-09
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.5E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	2.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.0E-09
										Total Risk Across All Exposure Routes/Pathways	**4.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 4 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.2E-07	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.0E-06
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	4.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	1.5E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.8E-03
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.4E-03
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.0E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.5E-02
	(total)												2.3E-02
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	2.4E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.0E-07
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	9.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-03
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	8.7E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.2E-03
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	6.8E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.7E-02
	(total)												4.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	1.7E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-10
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	2.9E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	6.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-07
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	3.4E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-11
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	2.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	2.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	1.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	9.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.0E-08
										Total Risk Across All Exposure Routes/Pathways	**3.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	6.1E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.0E-06
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	7.5E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.9E-03
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	6.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-03
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	5.1E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	7.3E-03
	(total)												1.1E-02
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	4.8E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.0E-08
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.0E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.3E-04
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	1.7E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	8.3E-04
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.4E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	7.4E-03
	(total)												8.6E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	8.7E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	1.5E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	3.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-08
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	9.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	7.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.7E-07
Dermal	1,1,2,2-Tetrachloroethane	3.60E-02	mg/kg	3.60E-02	mg/kg	M	6.9E-11	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	BAP EQUIVALENT	6.01E-01	mg/kg	6.01E-01	mg/kg	M	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.32E+00	mg/kg	1.32E+00	mg/kg	M	5.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Antimony	4.45E-01	mg/kg	4.45E-01	mg/kg	M	2.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	3.93E-01	mg/kg	3.93E-01	mg/kg	M	2.5E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	3.04E+01	mg/kg	3.04E+01	mg/kg	M	1.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.0E-08
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

1,1,2,2-TCA - 0.03
PCBs - 0.06
Volatiles - 0.01
Metals - 0.01

SITE 4 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02	o	2.20E+00	1.00E+00	9.20E-01	9.00E-03	2.50E-02	2.30E-06
1,1,2-Trichloroethane	7.30E-04	o	1.40E+00	1.00E+00	5.70E-01	8.40E-03	1.10E-02	1.28E-08
1,2-Dichloroethane	6.25E-04	o	8.40E-01	1.00E+00	3.50E-01	5.30E-03	3.00E-03	5.63E-09
Benzene	1.20E-03	o	6.30E-01	1.00E+00	2.60E-01	2.10E-02	1.30E-02	3.82E-08
Chlorobenzene	2.20E-02	o	1.00E+00	1.00E+00	4.30E-01	4.10E-02	6.90E-02	1.67E-06
Chloroform	8.60E-04	o	1.10E+00	1.00E+00	4.70E-01	8.90E-03	9.30E-03	1.45E-08
Tetrachloroethene	1.90E-03	o	4.30E+00	1.00E+00	9.00E-01	4.80E-02	2.50E-01	2.39E-07
Trichloroethene	4.11E+00	o	1.30E+00	1.00E+00	5.50E-01	1.60E-02	2.60E-02	1.35E-04
Vinyl Chloride	1.95E-02	o	5.10E-01	1.00E+00	2.10E-01	7.30E-03	2.30E-03	2.01E-07
cis-1,2-dichloroethene	2.70E-01	o	8.20E-01	1.00E+00	3.40E-01	1.00E-02	7.20E-03	4.53E-06
Antimony	1.23E-03	i		1.00E+00		1.00E-03		1.23E-09
Arsenic	1.63E-02	i		1.00E+00		1.90E-02		3.10E-07
Barium	1.57E-01	i		1.00E+00		1.00E-03		1.57E-07
Cadmium	2.04E-03	i		1.00E+00		1.00E-03		2.04E-09
Iron	3.29E+02	i		1.00E+00		1.00E-03		3.29E-04
Manganese	7.43E+00	i		1.00E+00		1.00E-03		7.43E-06
Mercury	7.20E-03	i		1.00E+00		1.00E-03		7.20E-09
Selenium	9.25E-03	i		1.00E+00		1.00E-03		9.25E-09
RDX	5.31E-04	o	4.75E+00	1.00E+00	1.98E+00	1.90E-02	7.41E-04	3.92E-08

SITE 4 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	7.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	1.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	1.2E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	8.2E-08
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	5.0E-10	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.9E-07
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	6.1E-09	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.6E-07
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	3.1E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.6E-06
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.6E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.1E-08
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	2.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	3.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	9.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.3E-06
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	2.9E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.9E-04
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	1.6E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.1E-05
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	7.1E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.4E-06
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	4.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-04
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	2.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.1E-03
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.8E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.8E-05
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	3.0E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.0E-04
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.7E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.8E-01
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	5.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.7E-03
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.6E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.6E-04
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	3.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	2.0E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	4.1E-04
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	2.6E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.1E-03
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	4.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	9.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	9.1E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.3E-03
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	1.2E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.3E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	5.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-04
	(total)												4.4E-01

Total Hazard Index Across All Exposure Routes/Pathways **4.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	2.7E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.5E-10
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	3.8E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-12
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	4.1E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.7E-12
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.8E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-12
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	2.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.1E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.0E-12
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	5.7E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	8.5E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.1E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.8E-09
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.0E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	5.8E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	2.5E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.7E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	7.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	6.6E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.1E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	6.1E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-06
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	9.1E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	5.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	1.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	9.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	1.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	3.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	3.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	4.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	1.8E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	(total)										1.3E-05
										Total Risk Across All Exposure Routes/Pathways	**1.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	2.30E-06
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.28E-08
1,2-Dichloroethane	6.25E-04		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	5.63E-09
Benzene	1.20E-03		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	3.82E-08
Chlorobenzene	2.20E-02		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	1.67E-06
Chloroform	8.60E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.45E-08
Tetrachloroethene	1.90E-03		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	2.39E-07
Trichloroethene	4.11E+00		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.35E-04
Vinyl Chloride	1.95E-02		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	2.01E-07
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.53E-06
Antimony	1.23E-03		i			1.00E+00			1.00E-03			1.23E-09
Arsenic	1.63E-02		i			1.00E+00			1.90E-02			3.10E-07
Barium	1.57E-01		i			1.00E+00			1.00E-03			1.57E-07
Cadmium	2.04E-03		i			1.00E+00			1.00E-03			2.04E-09
Iron	3.29E+02		i			1.00E+00			1.00E-03			3.29E-04
Manganese	7.43E+00		i			1.00E+00			1.00E-03			7.43E-06
Mercury	7.20E-03		i			1.00E+00			1.00E-03			7.20E-09
Selenium	9.25E-03		i			1.00E+00			1.00E-03			9.25E-09
RDX	5.31E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	3.92E-08

SITE 4 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	1.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	2.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	2.9E-11	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.1E-08
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.3E-10	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	7.4E-08
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.5E-09	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.0E-08
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	7.7E-11	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	9.0E-07
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	4.0E-10	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	2.8E-09
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	5.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	7.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.1E-06
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.5E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.4E-04
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	8.1E-08	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.0E-05
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	3.6E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.2E-06
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	2.4E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.1E-05
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-04
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	9.2E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.2E-06
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.5E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-04
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	8.5E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E-01
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	2.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.9E-03
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	7.8E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-04
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-03
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.0E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.0E-04
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.3E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.0E-03
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-03
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	4.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.9E-02
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	4.6E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.2E-03
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	5.9E-08	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.2E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.5E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.3E-05
	(total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	2.5E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-11
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	3.4E-12	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-13
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	3.7E-12	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-13
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.6E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-13
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	2.0E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.0E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	8.1E-13
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	5.1E-11	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-13
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	7.6E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.6E-10
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	9.5E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-10
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.0E-10
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.9E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	1.0E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-10
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	4.6E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-10
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	3.1E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	9.0E-10
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.2E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	7.2E-11
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.9E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.1E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.6E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-07
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	3.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	5.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	7.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	3.2E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	(total)										2.3E-06
										Total Risk Across All Exposure Routes/Pathways	**2.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	2.30E-06
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.28E-08
1,2-Dichloroethane	6.25E-04		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	5.63E-09
Benzene	1.20E-03		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	3.82E-08
Chlorobenzene	2.20E-02		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	1.67E-06
Chloroform	8.60E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.45E-08
Tetrachloroethene	1.90E-03		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	2.39E-07
Trichloroethene	4.11E+00		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.35E-04
Vinyl Chloride	1.95E-02		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	2.01E-07
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.53E-06
Antimony	1.23E-03		i			1.00E+00			1.00E-03			1.23E-09
Arsenic	1.63E-02		i			1.00E+00			1.90E-02			3.10E-07
Barium	1.57E-01		i			1.00E+00			1.00E-03			1.57E-07
Cadmium	2.04E-03		i			1.00E+00			1.00E-03			2.04E-09
Iron	3.29E+02		i			1.00E+00			1.00E-03			3.29E-04
Manganese	7.43E+00		i			1.00E+00			1.00E-03			7.43E-06
Mercury	7.20E-03		i			1.00E+00			1.00E-03			7.20E-09
Selenium	9.25E-03		i			1.00E+00			1.00E-03			9.25E-09
RDX	5.31E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	3.92E-08

SITE 4 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	7.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	1.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	1.1E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	7.9E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	4.8E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.8E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	5.9E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.5E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	3.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.5E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.5E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.1E-07
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	2.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	8.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.2E-05
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.5E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.4E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	8.1E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.0E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	3.6E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.2E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	2.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.1E-04
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-03
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	9.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.2E-05
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	8.5E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	2.9E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.9E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	7.8E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-03
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.0E-03
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.3E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.0E-02
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	4.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.9E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	4.6E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.2E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	5.9E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.2E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.5E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.3E-04
	(total)												2.2E+00

Total Hazard Index Across All Exposure Routes/Pathways **2.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	1.1E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-10
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	1.5E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	8.2E-13
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	1.6E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-12
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	6.9E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-12
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	8.4E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	4.2E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-12
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	2.2E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-13
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	3.3E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	4.1E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-09
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	2.1E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	1.2E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	6.6E-10
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	5.1E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-10
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	3.5E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.3E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.0E-11
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.2E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.2E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.8E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-07
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	6.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	6.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	8.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	3.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	(total)										2.5E-06
										Total Risk Across All Exposure Routes/Pathways	**2.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	2.30E-06
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.28E-08
1,2-Dichloroethane	6.25E-04		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	5.63E-09
Benzene	1.20E-03		o		6.30E-01	1.00E+00	2.60E-01		2.10E-02		1.30E-02	3.82E-08
Chlorobenzene	2.20E-02		o		1.00E+00	1.00E+00	4.30E-01		4.10E-02		6.90E-02	1.67E-06
Chloroform	8.60E-04		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.45E-08
Tetrachloroethene	1.90E-03		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	2.39E-07
Trichloroethene	4.11E+00		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.35E-04
Vinyl Chloride	1.95E-02		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	2.01E-07
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	4.53E-06
Antimony	1.23E-03		i			1.00E+00			1.00E-03			1.23E-09
Arsenic	1.63E-02		i			1.00E+00			1.90E-02			3.10E-07
Barium	1.57E-01		i			1.00E+00			1.00E-03			1.57E-07
Cadmium	2.04E-03		i			1.00E+00			1.00E-03			2.04E-09
Iron	3.29E+02		i			1.00E+00			1.00E-03			3.29E-04
Manganese	7.43E+00		i			1.00E+00			1.00E-03			7.43E-06
Mercury	7.20E-03		i			1.00E+00			1.00E-03			7.20E-09
Selenium	9.25E-03		i			1.00E+00			1.00E-03			9.25E-09
RDX	5.31E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	3.92E-08

SITE 4 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	5.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	5.5E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	4.0E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	2.4E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.4E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	2.9E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.7E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.5E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.7E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	7.6E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	5.4E-08
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.1E-05
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.5E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.4E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	8.1E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.0E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	3.6E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.2E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	2.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.1E-04
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-03
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	9.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.2E-05
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	8.5E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	2.9E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.9E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	7.8E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-03
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.0E-03
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.3E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.0E-02
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	4.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.9E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	4.6E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.2E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	5.9E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.2E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.3E-04
	(total)												2.2E+00

Total Hazard Index Across All Exposure Routes/Pathways **2.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	5.3E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-10
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	7.4E-12	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-13
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	7.9E-12	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-13
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	3.4E-11	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	9.9E-13
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	4.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	2.1E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-12
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.1E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-13
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.6E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.8E-10
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	2.0E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	6.1E-10
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	6.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.7E-09
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	2.1E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	1.2E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	6.6E-10
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	5.1E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-10
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	3.5E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.3E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.0E-11
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.2E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.2E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.8E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-07
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	6.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	6.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	8.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	3.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	(total)										2.5E-06
										Total Risk Across All Exposure Routes/Pathways	**2.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - (exp(Ra) x (Ds-Dt)/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	2.50E-01	9.20E-01		9.00E-03		2.50E-02	1.15E-06
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	2.50E-01	5.70E-01		8.40E-03		1.10E-02	6.40E-09
1,2-Dichloroethane	6.25E-04		o		8.40E-01	2.50E-01	3.50E-01		5.30E-03		3.00E-03	2.71E-09
Benzene	1.20E-03		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	1.78E-08
Chlorobenzene	2.20E-02		o		1.00E+00	2.50E-01	4.30E-01		4.10E-02		6.90E-02	8.17E-07
Chloroform	8.60E-04		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	7.25E-09
Tetrachloroethene	1.90E-03		o		4.30E+00	2.50E-01	9.00E-01		4.80E-02		2.50E-01	1.20E-07
Trichloroethene	4.11E+00		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	6.74E-05
Vinyl Chloride	1.95E-02		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	8.99E-08
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	2.18E-06
Antimony	1.23E-03		i			2.50E-01			1.00E-03			3.07E-10
Arsenic	1.63E-02		i			2.50E-01			1.90E-02			7.75E-08
Barium	1.57E-01		i			2.50E-01			1.00E-03			3.93E-08
Cadmium	2.04E-03		i			2.50E-01			1.00E-03			5.10E-10
Iron	3.29E+02		i			2.50E-01			1.00E-03			8.23E-05
Manganese	7.43E+00		i			2.50E-01			1.00E-03			1.86E-06
Mercury	7.20E-03		i			2.50E-01			1.00E-03			1.80E-09
Selenium	9.25E-03		i			2.50E-01			1.00E-03			2.31E-09
RDX	5.31E-04		o		4.75E+00	2.50E-01	1.98E+00		1.90E-02		7.41E-04	1.96E-08

SITE 4 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	2.6E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.4E-02
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	2.0E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	5.0E-03
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	1.7E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.7E-04
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	3.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-02
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	6.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	2.4E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-03
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	5.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.2E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.1E-01	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.9E+01
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	5.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	7.4E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.4E-01
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	3.4E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	8.4E-02
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	4.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E+00
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	4.3E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	6.1E-02
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	5.6E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.1E-01
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	9.0E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E+01
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	2.0E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E+01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	2.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-01
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	2.5E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.1E-02
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	1.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.8E-03
	(total)												6.2E+01

SITE 4 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	3.6E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.0E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	2.0E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	5.0E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	8.5E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.8E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	5.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-03
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	2.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	2.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.3E-04
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	3.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.8E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	2.1E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.5E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	6.9E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.9E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	9.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-03
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.4E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.1E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.2E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.5E-03
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.6E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.3E-02
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.6E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	5.9E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.3E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	5.7E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.7E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	7.3E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.5E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	6.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-03
	(total)												4.6E+00

SITE 4 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	4.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	4.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	4.2E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	3.0E-03
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	1.0E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	6.0E-03
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	1.6E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.4E-03
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	6.1E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.1E-02
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	1.2E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	8.8E-05
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	2.9E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	1.8E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	2.1E-03	mg/kg-day		mg/kg-day	NA	NA	
													9.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.7E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	9.0E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-04
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	6.9E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-07
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	5.9E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.1E-05	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	8.1E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.8E-05	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	3.9E-02	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-04
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.8E-04	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-04
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	1.5E-04	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	5.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	(total)										1.2E-03
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.2E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-05
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	6.9E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	2.9E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.9E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	7.8E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.3E-05	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	7.3E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-05
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	9.7E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-05
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	8.4E-06	mg/kg-day	1.50E+00	(mg/kg-day)-1	1.3E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.1E-06	mg/kg-day	1.10E-01	(mg/kg-day)-1	2.3E-07
	(total)										1.4E-04

SITE 4 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	1.4E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.7E-05
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	1.5E-06	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	8.3E-08
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	1.4E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.3E-07
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	3.5E-06	mg/kg-day	2.90E-02	(mg/kg-day)$^{-1}$	1.0E-07
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	5.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	2.1E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	1.7E-07
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	4.2E-06	mg/kg-day	2.00E-03	(mg/kg-day)$^{-1}$	8.5E-09
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.0E-02	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	6.0E-05
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	6.2E-05	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	1.9E-05
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	7.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.1E-04
										Total Risk Across All Exposure Routes/Pathways	**1.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02	o	2.20E+00	1.67E-01	9.20E-01	9.00E-03	2.50E-02	9.38E-07
1,1,2-Trichloroethane	7.30E-04	o	1.40E+00	1.67E-01	5.70E-01	8.40E-03	1.10E-02	5.23E-09
1,2-Dichloroethane	6.25E-04	o	8.40E-01	1.67E-01	3.50E-01	5.30E-03	3.00E-03	2.21E-09
Benzene	1.20E-03	o	6.30E-01	1.67E-01	2.60E-01	2.10E-02	1.30E-02	1.45E-08
Chlorobenzene	2.20E-02	o	1.00E+00	1.67E-01	4.30E-01	4.10E-02	6.90E-02	6.68E-07
Chloroform	8.60E-04	o	1.10E+00	1.67E-01	4.70E-01	8.90E-03	9.30E-03	5.93E-09
Tetrachloroethene	1.90E-03	o	4.30E+00	1.67E-01	9.00E-01	4.80E-02	2.50E-01	9.77E-08
Trichloroethene	4.11E+00	o	1.30E+00	1.67E-01	5.50E-01	1.60E-02	2.60E-02	5.51E-05
Vinyl Chloride	1.95E-02	o	5.10E-01	1.67E-01	2.10E-01	7.30E-03	2.30E-03	7.35E-08
cis-1,2-dichloroethene	2.70E-01	o	8.20E-01	1.67E-01	3.40E-01	1.00E-02	7.20E-03	1.78E-06
Antimony	1.23E-03	i		1.67E-01		1.00E-03		2.05E-10
Arsenic	1.63E-02	i		1.67E-01		1.90E-02		5.18E-08
Barium	1.57E-01	i		1.67E-01		1.00E-03		2.62E-08
Cadmium	2.04E-03	i		1.67E-01		1.00E-03		3.40E-10
Iron	3.29E+02	i		1.67E-01		1.00E-03		5.49E-05
Manganese	7.43E+00	i		1.67E-01		1.00E-03		1.24E-06
Mercury	7.20E-03	i		1.67E-01		1.00E-03		1.20E-09
Selenium	9.25E-03	i		1.67E-01		1.00E-03		1.54E-09
RDX	5.31E-04	o	4.75E+00	1.67E-01	1.98E+00	1.90E-02	7.41E-04	1.60E-08

SITE 4 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.2E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.1E-02
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	9.4E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.3E-03
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	8.0E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.7E-04
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.1E-03
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	2.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-03
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.4E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	5.3E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	8.8E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	3.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-01
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.6E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.9E-02
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.0E-01
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	2.0E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.9E-02
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	2.6E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.2E-02
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	4.2E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E+01
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	9.5E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.8E+00
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	9.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E-01
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	1.2E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.4E-02
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	6.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-03
	(total)												2.9E+01

SITE 4 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.7E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.9E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	9.6E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.4E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	4.1E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.4E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	2.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.9E-04
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.1E-03
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-04
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.8E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.0E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.7E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	3.3E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.3E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	3.8E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.3E-04
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	9.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.2E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	4.8E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	9.8E-04
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	6.2E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	5.0E-03
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	1.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	2.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.8E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	2.2E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.0E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	2.8E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.7E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.8E-04
	(total)												2.1E+00

SITE 4 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	1.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	1.6E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.1E-03
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	3.8E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.2E-03
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	5.9E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.5E-03
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	2.3E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.6E-02
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	4.6E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.3E-05
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.1E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	6.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	7.7E-04	mg/kg-day		mg/kg-day	NA	NA	
													3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.2E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-05
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	9.4E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	8.0E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.3E-08
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-08
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.1E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	6.7E-09
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.4E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	5.3E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-05
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.5E-05	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-05
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.1E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	6.8E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	(total)										1.6E-04
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.7E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	9.6E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	4.1E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	2.7E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	7.7E-09
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.1E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	6.6E-10
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.8E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.0E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.3E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	9.5E-07	mg/kg-day	1.50E+00	(mg/kg-day)-1	1.4E-06
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.9E-07	mg/kg-day	1.10E-01	(mg/kg-day)-1	3.2E-08
	(total)										1.9E-05

SITE 4 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	1.5E-05	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.9E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	1.6E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	8.9E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	1.6E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.4E-08
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	3.8E-07	mg/kg-day	2.90E-02	(mg/kg-day)$^{-1}$	1.1E-08
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	5.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	2.3E-07	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	1.8E-08
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	4.6E-07	mg/kg-day	2.00E-03	(mg/kg-day)$^{-1}$	9.1E-10
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.1E-03	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	6.5E-06
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	6.7E-06	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	2.0E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	7.7E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.1E-05
										Total Risk Across All Exposure Routes/Pathways	**1.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constante x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	2.50E-01	9.20E-01		9.00E-03		2.50E-02	1.15E-06
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	2.50E-01	5.70E-01		8.40E-03		1.10E-02	6.40E-09
1,2-Dichloroethane	6.25E-04		o		8.40E-01	2.50E-01	3.50E-01		5.30E-03		3.00E-03	2.71E-09
Benzene	1.20E-03		o		6.30E-01	2.50E-01	2.60E-01		2.10E-02		1.30E-02	1.78E-08
Chlorobenzene	2.20E-02		o		1.00E+00	2.50E-01	4.30E-01		4.10E-02		6.90E-02	8.17E-07
Chloroform	8.60E-04		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	7.25E-09
Tetrachloroethene	1.90E-03		o		4.30E+00	2.50E-01	9.00E-01		4.80E-02		2.50E-01	1.20E-07
Trichloroethene	4.11E+00		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	6.74E-05
Vinyl Chloride	1.95E-02		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	8.99E-08
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	2.50E-01	3.40E-01		1.00E-02		7.20E-03	2.18E-06
Antimony	1.23E-03		i			2.50E-01			1.00E-03			3.07E-10
Arsenic	1.63E-02		i			2.50E-01			1.90E-02			7.75E-08
Barium	1.57E-01		i			2.50E-01			1.00E-03			3.93E-08
Cadmium	2.04E-03		i			2.50E-01			1.00E-03			5.10E-10
Iron	3.29E+02		i			2.50E-01			1.00E-03			8.23E-05
Manganese	7.43E+00		i			2.50E-01			1.00E-03			1.86E-06
Mercury	7.20E-03		i			2.50E-01			1.00E-03			1.80E-09
Selenium	9.25E-03		i			2.50E-01			1.00E-03			2.31E-09
RDX	5.31E-04		o		4.75E+00	2.50E-01	1.98E+00		1.90E-02		7.41E-04	1.96E-08

SITE 4 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	6.1E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.0E-01
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	4.7E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.2E-02
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	4.0E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-03
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	7.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.6E-02
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	1.4E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.0E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	5.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.5E-03
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.2E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-02
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	2.6E-01	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.4E+01
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.2E-03	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	1.7E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E+00
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	7.9E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.0E-01
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	1.0E-03	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E+00
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.0E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.4E-01
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.3E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.6E-01
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	2.1E+01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E+01
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	4.8E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E+01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	4.6E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E+00
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	5.9E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.2E-01
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	3.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-02
	(total)												1.5E+02

SITE 4 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	5.1E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.5E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	2.9E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.1E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	1.2E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.0E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	7.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.6E-03
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	3.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	3.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.2E-04
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	5.3E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.3E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	3.0E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.0E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	4.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	9.7E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.7E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	1.4E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.3E-03
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	3.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-01
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	1.7E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.6E-03
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	2.3E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.8E-02
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	3.7E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-01
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	8.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.0E+00
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	8.0E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.8E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	1.0E-06	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.1E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	8.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-03
	(total)												6.5E+00

SITE 4 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	1.9E-03	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	2.0E-05	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.4E-02
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	4.7E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.8E-02
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	7.4E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	4.4E-02
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	2.9E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.3E-01
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	5.8E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	4.1E-04
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.4E-01	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	8.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	9.7E-03	mg/kg-day		mg/kg-day	NA	NA	
													4.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E+02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	5.3E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-04
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	4.0E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	3.4E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-07
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	6.6E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	4.7E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	1.0E-05	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	2.3E-02	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-04
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	1.1E-04	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-04
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	8.9E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-04
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.9E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	(total)										6.9E-04
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	4.4E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.8E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	2.4E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	1.0E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	6.8E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	2.8E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	4.6E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	2.6E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-05
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	3.4E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-06
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	3.0E-06	mg/kg-day	1.50E+00	(mg/kg-day)-1	4.4E-06
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	7.5E-07	mg/kg-day	1.10E-01	(mg/kg-day)-1	8.2E-08
	(total)										4.8E-05

SITE 4 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	1.6E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	3.2E-05
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	1.7E-06	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	9.7E-08
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	1.7E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.5E-07
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	4.1E-06	mg/kg-day	2.90E-02	(mg/kg-day)$^{-1}$	1.2E-07
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	6.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	2.4E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	2.0E-07
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	4.9E-06	mg/kg-day	2.00E-03	(mg/kg-day)$^{-1}$	9.9E-09
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.2E-02	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	7.0E-05
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	7.3E-05	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	2.2E-05
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	8.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.2E-04
										Total Risk Across All Exposure Routes/Pathways	**8.6E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/15/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	9.62E-02		o		2.20E+00	1.67E-01	9.20E-01		9.00E-03		2.50E-02	9.38E-07
1,1,2-Trichloroethane	7.30E-04		o		1.40E+00	1.67E-01	5.70E-01		8.40E-03		1.10E-02	5.23E-09
1,2-Dichloroethane	6.25E-04		o		8.40E-01	1.67E-01	3.50E-01		5.30E-03		3.00E-03	2.21E-09
Benzene	1.20E-03		o		6.30E-01	1.67E-01	2.60E-01		2.10E-02		1.30E-02	1.45E-08
Chlorobenzene	2.20E-02		o		1.00E+00	1.67E-01	4.30E-01		4.10E-02		6.90E-02	6.68E-07
Chloroform	8.60E-04		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	5.93E-09
Tetrachloroethene	1.90E-03		o		4.30E+00	1.67E-01	9.00E-01		4.80E-02		2.50E-01	9.77E-08
Trichloroethene	4.11E+00		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	5.51E-05
Vinyl Chloride	1.95E-02		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	7.35E-08
cis-1,2-dichloroethene	2.70E-01		o		8.20E-01	1.67E-01	3.40E-01		1.00E-02		7.20E-03	1.78E-06
Antimony	1.23E-03		i			1.67E-01			1.00E-03			2.05E-10
Arsenic	1.63E-02		i			1.67E-01			1.90E-02			5.18E-08
Barium	1.57E-01		i			1.67E-01			1.00E-03			2.62E-08
Cadmium	2.04E-03		i			1.67E-01			1.00E-03			3.40E-10
Iron	3.29E+02		i			1.67E-01			1.00E-03			5.49E-05
Manganese	7.43E+00		i			1.67E-01			1.00E-03			1.24E-06
Mercury	7.20E-03		i			1.67E-01			1.00E-03			1.20E-09
Selenium	9.25E-03		i			1.67E-01			1.00E-03			1.54E-09
RDX	5.31E-04		o		4.75E+00	1.67E-01	1.98E+00		1.90E-02		7.41E-04	1.60E-08

SITE 4 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	4.1E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.9E-02
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	3.1E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.8E-03
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	2.7E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.9E-04
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	5.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-02
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	9.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.7E-02
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	3.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-03
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	8.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.1E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.8E-01	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.9E+01
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	8.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	1.2E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E+00
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	5.3E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.3E-01
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	7.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E+00
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	6.7E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	9.6E-02
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	8.7E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.7E-01
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	1.4E+01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E+01
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	3.2E-01	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E+01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	3.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E+00
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	4.0E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	7.9E-02
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	2.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.6E-03
	(total)												9.7E+01

SITE 4 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	2.8E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.7E-03
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	1.6E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.9E-04
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	6.6E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.2E-05
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	4.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-03
	Chlorobenzene	2.20E-02	mg/L	2.20E-02	mg/L	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.9E-03
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.8E-04
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.9E-03
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	1.6E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.7E+00
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	2.70E-01	mg/L	M	5.3E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.3E-02
	Antimony	1.23E-03	mg/L	1.23E-03	mg/L	M	6.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.0E-03
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	1.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.1E-02
	Barium	1.57E-01	mg/L	1.57E-01	mg/L	M	7.8E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.6E-03
	Cadmium	2.04E-03	mg/L	2.04E-03	mg/L	M	1.0E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	8.1E-03
	Iron	3.29E+02	mg/L	3.29E+02	mg/L	M	1.6E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.5E-02
	Manganese	7.43E+00	mg/L	7.43E+00	mg/L	M	3.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.6E-01
	Mercury	7.20E-03	mg/L	7.20E-03	mg/L	M	3.6E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.7E-02
	Selenium	9.25E-03	mg/L	9.25E-03	mg/L	M	4.6E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	9.2E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	4.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-03
	(total)												3.4E+00

SITE 4 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	6.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	7.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	8.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	7.3E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	5.2E-03
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	1.8E-05	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.0E-02
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	2.8E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.6E-02
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	1.1E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-01
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	2.1E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.5E-04
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	5.0E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	6.37E-03	(mg/m^3- min)	R	3.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	3.6E-03	mg/kg-day		mg/kg-day	NA	NA	
													1.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E+02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	1.2E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	8.9E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	7.6E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-06	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	1.1E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	2.3E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	5.0E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-05
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	2.4E-05	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-05
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	2.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-05
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	6.5E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.1E-08
	(total)										1.5E-04
Dermal	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	9.62E-02	mg/L	M	8.0E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	7.30E-04	mg/L	M	4.5E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	1,2-Dichloroethane	6.25E-04	mg/L	6.25E-04	mg/L	M	1.9E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Benzene	1.20E-03	mg/L	1.20E-03	mg/L	M	1.2E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Chloroform	8.60E-04	mg/L	8.60E-04	mg/L	M	5.0E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-10
	Tetrachloroethene	1.90E-03	mg/L	1.90E-03	mg/L	M	8.3E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	Trichloroethene	4.11E+00	mg/L	4.11E+00	mg/L	M	4.7E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-06
	Vinyl Chloride	1.95E-02	mg/L	1.95E-02	mg/L	M	6.3E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Arsenic	1.63E-02	mg/L	1.63E-02	mg/L	M	4.4E-07	mg/kg-day	1.50E+00	(mg/kg-day)-1	6.6E-07
	RDX	5.31E-04	mg/L	5.31E-04	mg/L	M	1.4E-07	mg/kg-day	1.10E-01	(mg/kg-day)-1	1.5E-08
	(total)										8.7E-06

SITE 4 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	1.83E-02	(mg/m^3- min)	R	2.0E-05	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	3.9E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.99E-04	(mg/m^3- min)	R	2.1E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.2E-08
	1,2-Dichloroethane	6.25E-04	mg/L	1.94E-04	(mg/m^3- min)	R	2.1E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.9E-08
	Benzene	1.20E-03	mg/L	4.68E-04	(mg/m^3- min)	R	5.0E-07	mg/kg-day	2.90E-02	(mg/kg-day)$^{-1}$	1.5E-08
	Chlorobenzene	2.20E-02	mg/L	7.35E-03	(mg/m^3- min)	R	7.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chloroform	8.60E-04	mg/L	2.82E-04	(mg/m^3- min)	R	3.0E-07	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	2.4E-08
	Tetrachloroethene	1.90E-03	mg/L	5.69E-04	(mg/m^3- min)	R	6.1E-07	mg/kg-day	2.00E-03	(mg/kg-day)$^{-1}$	1.2E-09
	Trichloroethene	4.11E+00	mg/L	1.34E+00	(mg/m^3- min)	R	1.4E-03	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	8.6E-06
	Vinyl Chloride	1.95E-02	mg/L	8.37E-03	(mg/m^3- min)	R	9.0E-06	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	2.7E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	9.60E-02	(mg/m^3- min)	R	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.5E-05
										Total Risk Across All Exposure Routes/Pathways	**1.8E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 4 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	2.3E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.7E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	1.5E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.9E-04
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	1.7E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.0E-03
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	8.9E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.0E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	5.4E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.8E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	7.7E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	2.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	3.8E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	7.5E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	7.2E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	8.4E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.6E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	5.4E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	3.2E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	1.9E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	2.8E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-05
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	3.8E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	8.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.9E-05
										Total Risk Across All Exposure Routes/Pathways	**2.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	4.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	8.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	1.0E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	7.4E-05
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	6.6E-07	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	3.9E-04
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	7.4E-06	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	4.4E-04
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	3.9E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.5E-03
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	2.3E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.7E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	3.4E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	4.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	1.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	5.9E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	1.1E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	6.4E-10
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	1.3E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	8.5E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	9.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	5.0E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	3.0E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-10
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	4.3E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	6.0E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.5E-06
										Total Risk Across All Exposure Routes/Pathways	**4.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 4 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	5.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	7.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	8.0E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	5.7E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	3.5E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.0E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	4.3E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.5E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	2.2E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.5E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.1E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	7.8E-08
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.0E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**3.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	1.9E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	2.7E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	2.9E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-11
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.2E-09	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.6E-11
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	7.7E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-11
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	3.9E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	7.8E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	5.9E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	7.3E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.1E-08
										Total Risk Across All Exposure Routes/Pathways	**6.1E-08**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

SITE 4 - TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	3.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	3.5E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.5E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.5E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.9E-07
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.9E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.1E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	9.4E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.1E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	4.8E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.4E-08
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	7.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	9.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.3E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	3.0E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	6.0E-10
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	4.2E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-12
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	4.5E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	2.0E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-12
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	2.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.2E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.8E-12
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	6.2E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	9.3E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.2E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	3.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.7E-09
										Total Risk Across All Exposure Routes/Pathways	**9.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.76E-02
Noncancer Inhalation Intake(RME) = 4.38E-01

Cancer Inhalation Intake(CTE) = 8.23E-03
Noncancer Inhalation Intake(CTE) = 1.92E-01

SITE 4 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	2.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	4.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	5.3E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	3.8E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	3.4E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.0E-03
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	3.8E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.2E-03
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	2.0E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.3E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	1.2E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	8.6E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	1.7E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	2.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	5.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.8E-02

Total Hazard Index Across All Exposure Routes/Pathways **2.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	2.0E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	3.9E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	4.5E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	2.9E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	1.7E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	1.0E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	1.5E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-06
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	2.0E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	6.1E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	4.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.5E-05
										Total Risk Across All Exposure Routes/Pathways	**1.5E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m³	R	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m³	R	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m³	R	2.3E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.6E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m³	R	1.5E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.7E-04
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m³	R	1.7E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.8E-04
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m³	R	8.7E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.0E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m³	R	5.3E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.8E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m³	R	7.6E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m³	R	1.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m³	R	2.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	4.4E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.8E-08
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	8.5E-09	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-10
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	9.9E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	9.0E-10
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	6.3E-08	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	3.7E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	2.3E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	3.2E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	4.5E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-06
										Total Risk Across All Exposure Routes/Pathways	**3.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 4 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	3.3E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.3E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	2.1E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.2E-03
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	2.4E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.4E-03
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	1.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.4E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	7.5E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	5.4E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	1.1E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	1.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	3.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	5.0E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	9.7E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	1.1E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	7.2E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	8.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	4.3E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	2.6E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	3.7E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-05
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	5.1E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.9E-05
										Total Risk Across All Exposure Routes/Pathways	**3.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	9.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	2.2E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.6E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	1.4E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.3E-04
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	1.6E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.3E-04
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	8.3E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	9.7E-03
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	5.0E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.6E-05
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	7.2E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	9.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	2.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	9.8E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	1.9E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	2.2E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	1.4E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	1.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	8.3E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-09
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	5.0E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	7.2E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-06
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	9.9E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.5E-06
										Total Risk Across All Exposure Routes/Pathways	**7.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 4 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	7.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	1.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	1.1E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	8.0E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	4.9E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.9E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	6.0E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.5E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	3.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.5E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.5E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.1E-07
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	2.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	8.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.2E-05

Total Hazard Index Across All Exposure Routes/Pathways **4.2E-05**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

SITE 4 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	2.6E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	3.6E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-11
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	3.8E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-11
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.7E-09	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-11
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	2.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.0E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	8.4E-11
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	5.3E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	7.9E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	9.9E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	3.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.2E-08
										Total Risk Across All Exposure Routes/Pathways	**8.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	7.0E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	7.5E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	5.4E-07
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	3.2E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	1.9E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	4.0E-08	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.3E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	2.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.3E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.0E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	7.3E-08
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	5.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.8E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	5.0E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	7.0E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-12
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	7.5E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-12
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	3.2E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-12
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	4.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	2.0E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	1.0E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.3E-09
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.9E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	5.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-08
										Total Risk Across All Exposure Routes/Pathways	**1.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 4 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	4.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	7.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	9.2E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	6.6E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	5.9E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	3.5E-03
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	6.7E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	3.9E-03
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	3.5E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.1E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	2.1E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.5E-04
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	3.0E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	4.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	9.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	3.5E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	6.8E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	7.9E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	5.1E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	5.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	3.0E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	1.8E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	2.6E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	3.6E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	8.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.7E-05
										Total Risk Across All Exposure Routes/Pathways	**2.7E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	2.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	5.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	6.2E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	4.4E-04
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	3.9E-06	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	2.3E-03
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	4.4E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.6E-03
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	2.3E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.7E-02
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	1.4E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.0E-04
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	2.0E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	2.8E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	6.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	5.37E-05	mg/m^3	R	7.9E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	1,1,2-Trichloroethane	7.30E-04	mg/L	1.03E-06	mg/m^3	R	1.5E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	8.4E-10
	1,2-Dichloroethane	6.25E-04	mg/L	1.20E-06	mg/m^3	R	1.8E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Benzene	1.20E-03	mg/L	7.70E-06	mg/m^3	R	1.1E-07	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Chlorobenzene	2.20E-02	mg/L	8.67E-05	mg/m^3	R	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	4.55E-06	mg/m^3	R	6.7E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Tetrachloroethene	1.90E-03	mg/L	2.74E-05	mg/m^3	R	4.0E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Trichloroethene	4.11E+00	mg/L	3.94E-02	mg/m^3	R	5.8E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-06
	Vinyl Chloride	1.95E-02	mg/L	5.43E-04	mg/m^3	R	8.0E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-06
	cis-1,2-dichloroethene	2.70E-01	mg/L	1.23E-03	mg/m^3	R	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.0E-06
										Total Risk Across All Exposure Routes/Pathways	**6.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 4 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	2.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	3.1E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.2E-06
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.4E-08	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	8.0E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.7E-07	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	9.8E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	8.4E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	9.8E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	4.3E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.1E-07
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	6.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	8.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	1.8E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	2.5E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	2.7E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-11
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	1.2E-09	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-11
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	7.2E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-11
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	3.7E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	7.4E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	5.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	6.9E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	2.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.8E-08
										Total Risk Across All Exposure Routes/Pathways	**5.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 7.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	2.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	2.1E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.5E-06
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	9.1E-09	mg/kg-day	1.70E-03	mg/kg-day	NA	NA	5.4E-06
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	1.1E-07	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	6.6E-06
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	5.6E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.6E-05
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	2.9E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	2.1E-07
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	4.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.9E-05

Total Hazard Index Across All Exposure Routes/Pathways **7.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 4 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	9.62E-02	mg/L	2.73E-07	mg/m^3	R	4.0E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	1,1,2-Trichloroethane	7.30E-04	mg/L	3.80E-09	mg/m^3	R	5.6E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-12
	1,2-Dichloroethane	6.25E-04	mg/L	4.09E-09	mg/m^3	R	6.0E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-12
	Benzene	1.20E-03	mg/L	1.77E-08	mg/m^3	R	2.6E-10	mg/kg-day	2.90E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-12
	Chlorobenzene	2.20E-02	mg/L	2.18E-07	mg/m^3	R	3.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chloroform	8.60E-04	mg/L	1.10E-08	mg/m^3	R	1.6E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-11
	Tetrachloroethene	1.90E-03	mg/L	5.62E-08	mg/m^3	R	8.2E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-12
	Trichloroethene	4.11E+00	mg/L	8.44E-05	mg/m^3	R	1.2E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.4E-09
	Vinyl Chloride	1.95E-02	mg/L	1.05E-06	mg/m^3	R	1.5E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	cis-1,2-dichloroethene	2.70E-01	mg/L	3.19E-06	mg/m^3	R	4.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	**1.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 4 - TABLE 9-1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.1E-06			4.1E-06	BAP EQUIVALENT					
			Aroclor-1260	1.1E-06		2.1E-06	3.2E-06	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	5.9E-03		4.7E-02	5.3E-02
			Vanadium					Vanadium	NOEL	5.0E-03		6.0E-02	6.5E-02
Groundwater	Water /Air	Onsite Air	1,1,2,2-Tetrachloroethane		7.5E-07		7.5E-07	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		4.0E-09		4.0E-09	1,1,2-Trichloroethane	Liver				
			1,2-Dichloroethane		7.7E-09		7.7E-09	1,2-Dichloroethane			1.7E-04		1.7E-04
			Benzene		1.6E-08		1.6E-08	Benzene			8.9E-04		8.9E-04
			Chlorobenzene					Chlorobenzene	Liver		1.0E-03		1.0E-03
			Chloroform		2.6E-08		2.6E-08	Chloroform	Liver		1.0E-02		1.0E-02
			Tetrachloroethene		3.8E-09		3.8E-09	Tetrachloroethene	Liver		3.8E-05		3.8E-05
			Trichloroethene		1.7E-05		1.7E-05	Trichloroethene	CNS				
			Vinyl Chloride		1.1E-05		1.1E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 7.4E-06
Total Risk Across Groundwater/Air: 2.9E-05
Total Risk Across All Media and All Exposure Routes: 3.6E-05

Total Hazard Index Across All Media and All Exposure Routes: 1.3E-01
Total Liver HI = 1.1E-02
Total Lifetime HI = 5.3E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 6-9.

SITE 4 - TABLE 9-1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	6.5E-07			6.5E-07	BAP EQUIVALENT					
			Aroclor-1260	1.8E-07		1.3E-07	3.1E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	2.6E-03		8.2E-03	1.1E-02
			Vanadium					Vanadium	NOEL	2.2E-03		1.1E-02	1.3E-02
Groundwater	Water /Air	Onsite Air	1,1,2,2-Tetrachloroethane		1.2E-07		1.2E-07	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		6.4E-10		6.4E-10	1,1,2-Trichloroethane	Liver				
			1,2-Dichloroethane		1.2E-09		1.2E-09	1,2-Dichloroethane			7.4E-05		7.4E-05
			Benzene		2.5E-09		2.5E-09	Benzene			3.9E-04		3.9E-04
			Chlorobenzene					Chlorobenzene	Liver		4.4E-04		4.4E-04
			Chloroform		4.1E-09		4.1E-09	Chloroform	Liver		4.5E-03		4.5E-03
			Tetrachloroethene		6.1E-10		6.1E-10	Tetrachloroethene	Liver		1.7E-05		1.7E-05
			Trichloroethene		2.6E-06		2.6E-06	Trichloroethene	CNS				
			Vinyl Chloride		1.8E-06		1.8E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 9.6E-07
Total Risk Across Groundwater/Air: 4.5E-06
Total Risk Across All Media and All Exposure Routes: 5.5E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.9E-02
Total Liver HI = 5.0E-03
Total Lifetime HI = 1.1E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 6-18.

SITE 4 - TABLE 9-2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface / Subsuface Soil	Surface / Subsuface Soil	1,1,2,2-Tetrachloroethane	3.6E-10		3.4E-10	7.1E-10	1,1,2,2-Tetrachloroethane		8.5E-08		8.0E-08	1.6E-07
			BAP EQUIVALENT	2.2E-07			2.2E-07	BAP EQUIVALENT					
			Aroclor-1260	1.3E-07		2.5E-07	3.8E-07	Aroclor-1260					
			Antimony					Antimony	Lifespan	1.6E-04		3.3E-04	4.9E-04
			Mercury					Mercury	CNS	1.8E-04		8.3E-04	1.0E-03
			Vanadium					Vanadium	NOEL	6.1E-04		7.4E-03	8.1E-03
Groundwater	Water / Air	Onsite	1,1,2,2-Tetrachloroethane		5.5E-10	2.1E-06	2.1E-06	1,1,2,2-Tetrachloroethane				4.9E-04	4.9E-04
			1,1,2-Trichloroethane		2.1E-12	3.3E-09	3.3E-09	1,1,2-Trichloroethane	Liver			4.1E-05	4.1E-05
			1,2-Dichloroethane		3.7E-12	2.3E-09	2.3E-09	1,2-Dichloroethane			8.2E-08	2.4E-06	2.5E-06
			Benzene		5.2E-12	5.0E-09	5.0E-09	Benzene			2.9E-07	1.6E-04	1.6E-04
			Chlorobenzene					Chlorobenzene	Liver		3.6E-07	1.1E-03	1.1E-03
			Chloroform		9.0E-12	4.0E-10	4.1E-10	Chloroform	Liver		3.6E-06	1.8E-05	2.2E-05
			Tetrachloroethene		1.1E-12	5.6E-08	5.6E-08	Tetrachloroethene	Liver		1.1E-08	3.0E-04	3.0E-04
			Trichloroethene		5.1E-09	6.7E-06	6.7E-06	Trichloroethene	CNS			2.8E-01	2.8E-01
			Vinyl Chloride		3.2E-09	1.7E-06	1.7E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			5.7E-03	5.7E-03
			Antimony					Antimony	Lifespan			2.6E-04	2.6E-04
			Arsenic			2.1E-06	2.1E-06	Arsenic	Skin, Vascular			1.3E-02	1.3E-02
			Barium					Barium	Kidney			4.1E-04	4.1E-04
			Cadmium					Cadmium	Kidney			2.1E-03	2.1E-03
			Iron					Iron	Liver/Blood/GI Tract			1.4E-02	1.4E-02
			Manganese					Manganese	CNS			1.2E-01	1.2E-01
			Mercury					Mercury	CNS			4.3E-03	4.3E-03
			Selenium					Selenium	Blood/Skin/CNS			2.3E-05	2.3E-05
			RDX			2.0E-08	2.0E-08	RDX	Prostate			1.7E-04	1.7E-04

Total Risk Across Surface / Subsurface Soil	6.0E-07
Total Risk Across Groundwater	1.3E-05
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	4.5E-01
Total Liver HI =	1.5E-02
Total CNS HI =	4.1E-01
Total Blood HI =	2.0E-02
Total Prostate HI =	1.7E-04
Total Skin HI =	1.3E-02
Total Vascular HI =	1.3E-02
Total Lifetime HI =	7.5E-04
Total GI Tract HI =	1.4E-02
Total Kidney HI =	2.5E-03

SITE 4 - TABLE 9-2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface / Subsuface Soil	Surface / Subsuface Soil	1,1,2,2-Tetrachloroethane	3.3E-11		1.2E-11	4.5E-11	1,1,2,2-Tetrachloroethane		2.1E-08		8.0E-09	2.9E-08
			BAP EQUIVALENT	2.0E-08			2.0E-08	BAP EQUIVALENT					
			Aroclor-1260	1.2E-08		9.0E-09	2.1E-08	Aroclor-1260					
			Antimony					Antimony	Lifespan	3.9E-05		3.3E-05	7.2E-05
			Mercury					Mercury	CNS	4.6E-05		8.3E-05	1.3E-04
			Vanadium					Vanadium	NOEL	1.5E-04		7.4E-04	9.0E-04
Groundwater	Water / Air	Onsite	1,1,2,2-Tetrachloroethane		4.9E-11	3.7E-07	3.7E-07	1,1,2,2-Tetrachloroethane				2.4E-04	2.4E-04
			1,1,2-Trichloroethane		1.9E-13	5.9E-10	5.9E-10	1,1,2-Trichloroethane	Liver			2.0E-05	2.0E-05
			1,2-Dichloroethane		3.4E-13	4.2E-10	4.2E-10	1,2-Dichloroethane			2.1E-08	1.2E-06	1.2E-06
			Benzene		4.7E-13	9.0E-10	9.0E-10	Benzene			7.4E-08	8.1E-05	8.1E-05
			Chlorobenzene					Chlorobenzene	Liver		9.0E-08	5.3E-04	5.3E-04
			Chloroform		8.1E-13	7.2E-11	7.3E-11	Chloroform	Liver		9.0E-07	9.2E-06	1.0E-05
			Tetrachloroethene		1.0E-13	1.0E-08	1.0E-08	Tetrachloroethene	Liver		2.8E-09	1.5E-04	1.5E-04
			Trichloroethene		4.6E-10	1.2E-06	1.2E-06	Trichloroethene	CNS			1.4E-01	1.4E-01
			Vinyl Chloride		2.9E-10	3.1E-07	3.1E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			2.9E-03	2.9E-03
			Antimony					Antimony	Lifespan			1.3E-04	1.3E-04
			Arsenic			3.8E-07	3.8E-07	Arsenic	Skin, Vascular			6.6E-03	6.6E-03
			Barium					Barium	Kidney			2.0E-04	2.0E-04
			Cadmium					Cadmium	Kidney			1.0E-03	1.0E-03
			Iron					Iron	Liver/Blood/GI Tract			7.0E-03	7.0E-03
			Manganese					Manganese	CNS			5.9E-02	5.9E-02
			Mercury					Mercury	CNS			2.2E-03	2.2E-03
			Selenium					Selenium	Blood/Skin/CNS			1.2E-05	1.2E-05
			RDX			3.5E-09	3.5E-09	RDX	Prostate			8.3E-05	8.3E-05

Total Risk Across Surface / Subsurface Soil: 4.1E-08
Total Risk Across Groundwater: 2.3E-06

Total Risk Across All Media and All Exposure Routes: 2.3E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.2E-01

Total Liver HI =	7.7E-03
Total CNS HI =	2.0E-01
Total Blood HI =	9.8E-03
Total Prostate HI =	8.3E-05
Total Skin HI =	6.6E-03
Total Vascular HI =	6.6E-03
Total Lifetime HI =	2.0E-04
Total GI Tract HI =	7.0E-03
Total Kidney HI =	1.2E-03

SITE 4 - TABLE 9-3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface / Subsuface Soil	Surface / Subsuface Soil	1,1,2,2-Tetrachloroethane	3.5E-10		6.9E-11	4.2E-10	1,1,2,2-Tetrachloroethane		2.0E-06		4.0E-07	2.4E-06
			BAP EQUIVALENT	2.1E-07			2.1E-07	BAP EQUIVALENT					
			Aroclor-1260	1.3E-07		5.0E-08	1.8E-07	Aroclor-1260					
			Antimony					Antimony	Lifespan	3.8E-03		1.7E-03	5.4E-03
			Mercury					Mercury	CNS	4.4E-03		4.2E-03	8.6E-03
			Vanadium					Vanadium	NOEL	1.5E-02		3.7E-02	5.2E-02
Groundwater	Water / Air	Onsite	1,1,2,2-Tetrachloroethane		2.1E-10	4.2E-07	4.2E-07	1,1,2,2-Tetrachloroethane				2.4E-03	2.4E-03
			1,1,2-Trichloroethane		8.2E-13	6.6E-10	6.6E-10	1,1,2-Trichloroethane	Liver			2.0E-04	2.0E-04
			1,2-Dichloroethane		1.4E-12	4.6E-10	4.7E-10	1,2-Dichloroethane			7.9E-07	1.2E-05	1.3E-05
			Benzene		2.0E-12	1.0E-09	1.0E-09	Benzene			2.8E-06	8.1E-04	8.1E-04
			Chlorobenzene					Chlorobenzene	Liver		3.5E-06	5.3E-03	5.3E-03
			Chloroform		3.4E-12	8.0E-11	8.4E-11	Chloroform	Liver		3.5E-05	9.2E-05	1.3E-04
			Tetrachloroethene		4.3E-13	1.1E-08	1.1E-08	Tetrachloroethene	Liver		1.1E-07	1.5E-03	1.5E-03
			Trichloroethene		2.0E-09	1.3E-06	1.3E-06	Trichloroethene	CNS			1.4E+00	1.4E+00
			Vinyl Chloride		1.2E-09	3.5E-07	3.5E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			2.9E-02	2.9E-02
			Antimony					Antimony	Lifespan			1.3E-03	1.3E-03
			Arsenic			4.2E-07	4.2E-07	Arsenic	Skin, Vascular			6.6E-02	6.6E-02
			Barium					Barium	Kidney			2.0E-03	2.0E-03
			Cadmium					Cadmium	Kidney			1.0E-02	1.0E-02
			Iron					Iron	Liver/Blood/GI Tract			7.0E-02	7.0E-02
			Manganese					Manganese	CNS			5.9E-01	5.9E-01
			Mercury					Mercury	CNS			2.2E-02	2.2E-02
			Selenium					Selenium	Blood/Skin/CNS			1.2E-04	1.2E-04
			RDX			3.9E-09	3.9E-09	RDX	Prostate			8.3E-04	8.3E-04

Total Risk Across Surface / Subsurface Soil: 3.9E-07
Total Risk Across Groundwater: 2.5E-06
Total Risk Across All Media and All Exposure Routes: 2.9E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.3E+00

Total Liver HI = 7.7E-02
Total CNS HI = 2.0E+00
Total Blood HI = 1.0E-01
Total Prostate HI = 8.3E-04
Total Skin HI = 6.6E-02
Total Vascular HI = 6.6E-02
Total Lifetime HI = 6.7E-03
Total GI Tract HI = 7.0E-02
Total Kidney HI = 1.2E-02

SITE 4 - TABLE 9-3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface / Subsuface Soil	Surface / Subsuface Soil	1,1,2,2-Tetrachloroethane	1.7E-10		1.4E-11	1.9E-10	1,1,2,2-Tetrachloroethane		1.0E-06		8.0E-08	1.1E-06
			BAP EQUIVALENT	1.1E-07			1.1E-07	BAP EQUIVALENT					
			Aroclor-1260	6.4E-08		1.0E-08	7.4E-08	Aroclor-1260					
			Antimony					Antimony	Lifespan	1.9E-03		3.3E-04	2.2E-03
			Mercury					Mercury	CNS	2.2E-03		8.3E-04	3.0E-03
			Vanadium					Vanadium	NOEL	7.3E-03		7.4E-03	1.5E-02
Groundwater	Water / Air	Onsite	1,1,2,2-Tetrachloroethane		1.1E-10	4.2E-07	4.2E-07	1,1,2,2-Tetrachloroethane				2.4E-03	2.4E-03
			1,1,2-Trichloroethane		4.1E-13	6.6E-10	6.6E-10	1,1,2-Trichloroethane	Liver			2.0E-04	2.0E-04
			1,2-Dichloroethane		7.2E-13	4.6E-10	4.6E-10	1,2-Dichloroethane.			4.0E-07	1.2E-05	1.2E-05
			Benzene		9.9E-13	1.0E-09	1.0E-09	Benzene			1.4E-06	8.1E-04	8.1E-04
			Chlorobenzene					Chlorobenzene	Liver		1.7E-06	5.3E-03	5.3E-03
			Chloroform		1.7E-12	8.0E-11	8.2E-11	Chloroform	Liver		1.7E-05	9.2E-05	1.1E-04
			Tetrachloroethene		2.2E-13	1.1E-08	1.1E-08	Tetrachloroethene	Liver		5.4E-08	1.5E-03	1.5E-03
			Trichloroethene		9.8E-10	1.3E-06	1.3E-06	Trichloroethene	CNS			1.4E+00	1.4E+00
			Vinyl Chloride		6.1E-10	3.5E-07	3.5E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			2.9E-02	2.9E-02
			Antimony					Antimony	Lifespan			1.3E-03	1.3E-03
			Arsenic			4.2E-07	4.2E-07	Arsenic	Skin, Vascular			6.6E-02	6.6E-02
			Barium					Barium	Kidney			2.0E-03	2.0E-03
			Cadmium					Cadmium	Kidney			1.0E-02	1.0E-02
			Iron					Iron	Liver/Blood/GI Tract			7.0E-02	7.0E-02
			Manganese					Manganese	CNS			5.9E-01	5.9E-01
			Mercury					Mercury	CNS			2.2E-02	2.2E-02
			Selenium					Selenium	Blood/Skin/CNS			1.2E-04	1.2E-04
			RDX			3.9E-09	3.9E-09	RDX	Prostate			8.3E-04	8.3E-04

Total Risk Across Surface / Subsurface Soil: 1.8E-07
Total Risk Across Groundwater: 2.5E-06
Total Risk Across All Media and All Exposure Routes: 2.7E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.2E+00

Total Liver HI =	7.7E-02
Total CNS HI =	2.0E+00
Total Blood HI =	1.0E-01
Total Prostate HI =	8.3E-04
Total Skin HI =	6.6E-02
Total Vascular HI =	6.6E-02
Total Lifetime HI =	3.5E-03
Total Immune System HI =	3.0E-03
Total Kidney HI =	1.2E-02

SITE 4 - TABLE 9-4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.2E-07			3.2E-07	BAP EQUIVALENT					
			Aroclor-1260	8.6E-08		4.6E-07	5.5E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	3.8E-04		8.6E-03	8.9E-03
			Vanadium					Vanadium	NOEL	3.2E-04		1.1E-02	1.1E-02
						Total Risk Across Surface Soil	8.7E-07					Total Hazard Index Across All Media and All Exposure Routes	2.0E-02

Risk Across All Media and All Exposure Routes: 8.7E-07

Total Lifetime HI = 8.9E-03

SITE 4 - TABLE 9-4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.4E-08			2.4E-08	BAP EQUIVALENT					
			Aroclor-1260	6.4E-09		1.4E-08	2.0E-08	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	9.5E-05		8.6E-04	9.5E-04
			Vanadium					Vanadium	NOEL	8.0E-05		1.1E-03	1.2E-03
						Total Risk Across Surface Soil	4.4E-08					Total Hazard Index Across All Media and All Exposure Routes	2.1E-03

Risk Across All Media and All Exposure Routes 4.4E-08

Total Lifetime HI = 9.5E-04

SITE 4 - TABLE 9-5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.6E-07			5.6E-07	BAP EQUIVALENT					
			Aroclor-1260	1.5E-07		3.0E-07	4.5E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	2.0E-03		1.6E-02	1.8E-02
			Vanadium					Vanadium	NOEL	1.7E-03		2.1E-02	2.3E-02
						Total Risk Across Surface Soil	1.0E-06					Total Hazard Index Across All Media and All Exposure Routes	4.1E-02

Risk Across All Media and All Exposure Routes 1.0E-06

Total Lifetime HI = 1.8E-02

SITE 4 - TABLE 9-5a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER

SITE 4 - CHEMICAL BURIAL AREA

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.4E-07			1.4E-07	BAP EQUIVALENT					
			Aroclor-1260	3.8E-08		3.0E-08	6.8E-08	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	5.0E-04		1.6E-03	2.1E-03
			Vanadium					Vanadium	NOEL	4.2E-04		2.1E-03	2.5E-03
						Total Risk Across Surface Soil	2.1E-07					Total Hazard Index Across All Media and All Exposure Routes	4.7E-03

Risk Across All Media and All Exposure Routes 2.1E-07

Total Lifetime HI = 2.1E-03

SITE 4 - TABLE 9-6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.6E-06			4.6E-06	BAP EQUIVALENT					
			Aroclor-1260	1.3E-06		2.6E-06	3.9E-06	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	2.8E-02		2.4E-01	2.7E-01
			Vanadium					Vanadium	NOEL	2.3E-02		3.1E-01	3.4E-01
Groundwater	Water /Air	Onsite Air	1,1,2,2-Tetrachloroethane		4.0E-07		4.0E-07	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		2.2E-09		2.2E-09	1,1,2-Trichloroethane	Liver				
			1,2-Dichloroethane		4.1E-09		4.1E-09	1,2-Dichloroethane			3.8E-04		3.8E-04
			Benzene		8.4E-09		8.4E-09	Benzene			2.0E-03		2.0E-03
			Chlorobenzene					Chlorobenzene	Liver		2.2E-03		2.2E-03
			Chloroform		1.4E-08		1.4E-08	Chloroform	Liver		2.3E-02		2.3E-02
			Tetrachloroethene		2.1E-09		2.1E-09	Tetrachloroethene	Liver		8.6E-05		8.6E-05
			Trichloroethene		8.9E-06		8.9E-06	Trichloroethene	CNS				
			Vinyl Chloride		6.1E-06		6.1E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 8.5E-06
Total Risk Across Groundwater/Air: 1.5E-05
Total Risk Across All Media and All Exposure Routes: 2.4E-05

Total Hazard Index Across All Media and All Exposure Routes: 6.4E-01
Total Liver HI = 2.6E-02
Total Lifetime HI = 2.7E-01

SITE 4 - TABLE 9-6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.0E-06			1.0E-06	BAP EQUIVALENT					
			Aroclor-1260	2.7E-07		2.3E-07	5.1E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	1.2E-02		4.3E-02	5.5E-02
			Vanadium					Vanadium	NOEL	1.0E-02		5.5E-02	6.5E-02
Groundwater	Water /Air	Onsite Air	1,1,2,2-Tetrachloroethane		8.8E-08		8.8E-08	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		4.7E-10		4.7E-10	1,1,2-Trichloroethane	Liver				
			1,2-Dichloroethane		9.0E-10		9.0E-10	1,2-Dichloroethane			1.6E-04		1.6E-04
			Benzene		1.8E-09		1.8E-09	Benzene			8.7E-04		8.7E-04
			Chlorobenzene					Chlorobenzene	Liver		9.8E-04		9.8E-04
			Chloroform		3.0E-09		3.0E-09	Chloroform	Liver		1.0E-02		1.0E-02
			Tetrachloroethene		4.5E-10		4.5E-10	Tetrachloroethene	Liver		3.8E-05		3.8E-05
			Trichloroethene		1.9E-06		1.9E-06	Trichloroethene	CNS				
			Vinyl Chloride		1.3E-06		1.3E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 1.5E-06
Total Risk Across Groundwater/Air: 3.4E-06
Total Risk Across All Media and All Exposure Routes: 4.9E-06

Total Hazard Index Across All Media and All Exposure Routes: 1.3E-01
Total Liver HI = 1.1E-02
Total Lifetime HI = 5.5E-02

SITE 4 - TABLE 9-7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.6E-06			5.6E-06	BAP EQUIVALENT					
			Aroclor-1260	1.5E-06		8.1E-06	9.6E-06	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	8.3E-03		1.9E-01	2.0E-01
			Vanadium					Vanadium	NOEL	7.0E-03		2.4E-01	2.5E-01
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	1.8E-04	2.8E-05	2.5E-05	2.3E-04	1,1,2,2-Tetrachloroethane		4.4E-02		6.0E-03	5.0E-02
			1,1,2-Trichloroethane	3.9E-07	8.8E-08	3.9E-08	5.2E-07	1,1,2-Trichloroethane	Liver	5.0E-03		5.0E-04	5.5E-03
			1,2-Dichloroethane	5.3E-07	1.4E-07	2.7E-08	7.0E-07	1,2-Dichloroethane		5.7E-04	3.2E-03	2.8E-05	3.8E-03
			Benzene	3.3E-07	1.2E-07	5.6E-08	5.0E-07	Benzene		1.1E-02	7.2E-03	1.9E-03	2.0E-02
			Chlorobenzene					Chlorobenzene	Liver	3.0E-02	1.1E-02	1.3E-02	5.4E-02
			Chloroform	4.9E-08	2.0E-07	4.8E-09	2.6E-07	Chloroform	Liver	2.4E-03	8.6E-02	2.3E-04	8.8E-02
			Tetrachloroethene	9.3E-07	1.4E-08	6.7E-07	1.6E-06	Tetrachloroethene	Liver	5.2E-03	1.4E-04	3.8E-03	9.1E-03
			Trichloroethene	4.2E-04	8.2E-05	8.0E-05	5.9E-04	Trichloroethene	CNS	1.9E+01		3.5E+00	2.2E+01
			Vinyl Chloride	3.5E-04	3.4E-05	1.8E-05	4.0E-04	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	7.4E-01		6.9E-02	8.1E-01
			Antimony					Antimony	Lifespan	8.4E-02		1.6E-03	8.6E-02
			Arsenic	2.3E-04		1.3E-05	2.4E-04	Arsenic	Skin, Vascular	1.5E+00		8.1E-02	1.6E+00
			Barium					Barium	Kidney	6.1E-02		2.5E-03	6.4E-02
			Cadmium					Cadmium	Kidney	1.1E-01		1.3E-02	1.2E-01
			Iron					Iron	Liver/Blood/GI Tract	3.0E+01		8.6E-02	3.0E+01
			Manganese					Manganese	CNS	1.0E+01		7.3E-01	1.1E+01
			Mercury					Mercury	CNS	6.6E-01		2.7E-02	6.8E-01
			Selenium					Selenium	Blood/Skin/CNS	5.1E-02		1.5E-04	5.1E-02
			RDX	5.5E-07		2.3E-07		RDX	Prostate	4.8E-03		2.1E-03	6.9E-03

Total Risk Across Surface Soil: 1.5E-05
Total Risk Across Groundwater: 1.5E-03

Total Risk Across All Media and All Exposure Routes: 1.5E-03

Total Hazard Index Across All Media and All Exposure Routes: 6.7E+01

Total Liver HI =	3.0E+01
Total CNS HI =	3.4E+01
Total Blood HI =	3.1E+01
Total Prostate HI =	6.9E-03
Total Skin HI =	1.6E+00
Total Vascular HI =	1.6E+00
Total Lifetime HI =	2.8E-01
Total GI Tract HI =	3.0E+01
Total Kidney HI =	1.9E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 6-9.

SITE 4 - TABLE 9-7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.4E-07			5.4E-07	BAP EQUIVALENT					
			Aroclor-1260	1.5E-07		3.2E-07	4.6E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	2.8E-03		2.5E-02	2.8E-02
			Vanadium					Vanadium	NOEL	2.3E-03		3.2E-02	3.5E-02
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	2.5E-05	3.1E-06	3.4E-06	3.1E-05	1,1,2,2-Tetrachloroethane		2.1E-02		2.9E-03	2.3E-02
			1,1,2-Trichloroethane	5.3E-08	1.0E-08	5.5E-09	6.9E-08	1,1,2-Trichloroethane	Liver	2.3E-03		2.4E-04	2.6E-03
			1,2-Dichloroethane	7.3E-08	1.6E-08	3.7E-09	9.3E-08	1,2-Dichloroethane		2.7E-04	1.3E-03	1.4E-05	1.5E-03
			Benzene	4.5E-08	1.5E-08	7.7E-09	6.7E-08	Benzene		5.1E-03	3.0E-03	8.9E-04	9.1E-03
			Chlorobenzene					Chlorobenzene	Liver	1.4E-02	4.4E-03	6.1E-03	2.5E-02
			Chloroform	6.7E-09	2.5E-08	6.6E-10	3.2E-08	Chloroform	Liver	1.1E-03	3.6E-02	1.1E-04	3.7E-02
			Tetrachloroethene	1.3E-07	1.9E-09	9.3E-08	2.2E-07	Tetrachloroethene	Liver	2.4E-03	6.9E-05	1.8E-03	4.3E-03
			Trichloroethane	5.8E-05	1.1E-05	1.1E-05	8.0E-05	Trichloroethene	CNS	8.8E+00		1.7E+00	1.0E+01
			Vinyl Chloride	4.7E-05	5.0E-06	2.6E-06	5.5E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	3.5E-01		3.3E-02	3.8E-01
			Antimony					Antimony	Lifespan	3.9E-02		6.3E-04	4.0E-02
			Arsenic	3.1E-05		1.4E-06	3.3E-05	Arsenic	Skin, Vascular	7.0E-01		3.2E-02	7.3E-01
			Barium					Barium	Kidney	2.9E-02		9.8E-04	3.0E-02
			Cadmium					Cadmium	Kidney	5.2E-02		5.0E-03	5.7E-02
			Iron					Iron	Liver/Blood/GI Tract	1.4E+01		3.4E-02	1.4E+01
			Manganese					Manganese	CNS	4.8E+00		2.8E-01	5.1E+00
			Mercury					Mercury	CNS	3.1E-01		1.0E-02	3.2E-01
			Selenium					Selenium	Blood/Skin/CNS	2.4E-02		5.7E-05	2.4E-02
			RDX	7.5E-08		3.2E-08		RDX	Prostate	2.3E-03		9.8E-04	3.2E-03

Total Risk Across Surface Soil: 1.0E-06
Total Risk Across Groundwater: 2.0E-04
Total Risk Across All Media and All Exposure Routes: 2.0E-04

Total Hazard Index Across All Media and All Exposure Routes: 3.1E+01

Total Liver HI =	1.4E+01
Total CNS HI =	1.6E+01
Total Blood HI =	1.4E+01
Total Prostate HI =	3.2E-03
Total Skin HI =	7.5E-01
Total Vascular HI =	7.3E-01
Total Lifetime HI =	6.8E-02
Total GI Tract HI =	1.4E+01
Total Kidney HI =	8.7E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 6-18.

SITE 4 - TABLE 9-8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-05			1.3E-05	BAP EQUIVALENT					
			Aroclor-1260	3.5E-06		3.7E-06	7.2E-06	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	7.8E-02		3.4E-01	4.2E-01
			Vanadium					Vanadium	NOEL	6.5E-02		4.4E-01	5.0E-01
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	1.1E-04	3.3E-05	8.8E-06	1.5E-04	1,1,2,2-Tetrachloroethane		1.0E-01		8.5E-03	1.1E-01
			1,1,2-Trichloroethane	2.3E-07	1.0E-07	1.4E-08	3.4E-07	1,1,2-Trichloroethane	Liver	1.2E-02		7.1E-04	1.2E-02
			1,2-Dichloroethane	3.1E-07	1.6E-07	9.4E-09	4.8E-07	1,2-Dichloroethane		1.3E-03	1.5E-02	4.0E-05	1.6E-02
			Benzene	1.9E-07	1.3E-07	2.0E-08	3.4E-07	Benzene		2.6E-02	3.1E-02	2.6E-03	6.0E-02
			Chlorobenzene					Chlorobenzene	Liver	7.0E-02	4.8E-02	1.8E-02	1.4E-01
			Chloroform	2.9E-08	2.2E-07	1.7E-09	2.5E-07	Chloroform	Liver	5.5E-03	3.7E-01	3.2E-04	3.8E-01
			Tetrachloroethene	5.4E-07	1.3E-08	2.4E-07	7.9E-07	Tetrachloroethene	Liver	1.2E-02	5.6E-04	5.3E-03	1.8E-02
			Trichloroethene	2.5E-04	8.5E-05	2.8E-05	3.6E-04	Trichloroethene	CNS	4.4E+01		5.0E+00	4.9E+01
			Vinyl Chloride	2.0E-04	3.3E-05	6.5E-06	2.4E-04	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.7E+00		9.7E-02	1.8E+00
			Antimony					Antimony	Lifespan	2.0E-01		2.3E-03	2.0E-01
			Arsenic	1.3E-04		4.4E-06	1.4E-04	Arsenic	Skin, Vascular	3.5E+00		1.2E-01	3.6E+00
			Barium					Barium	Kidney	1.4E-01		3.6E-03	1.5E-01
			Cadmium					Cadmium	Kidney	2.6E-01		1.8E-02	2.8E-01
			Iron					Iron	Liver/Blood/GI Tract	7.0E+01		1.2E-01	7.0E+01
			Manganese					Manganese	CNS	2.4E+01		1.0E+00	2.5E+01
			Mercury					Mercury	CNS	1.5E+00		3.8E-02	1.6E+00
			Selenium					Selenium	Blood/Skin/CNS	1.2E-01		2.1E-04	1.2E-01
			RDX	3.2E-07		8.2E-08	4.0E-07	RDX	Prostate	1.1E-02		2.9E-03	1.4E-02

Total Risk Across Surface Soil	2.0E-05
Total Risk Across Groundwater	8.9E-04
Total Risk Across All Media and All Exposure Routes	9.1E-04

Total Hazard Index Across All Media and All Exposure Routes	1.5E+02
Total Liver HI =	7.1E+01
Total CNS HI =	7.5E+01
Total Blood HI =	7.2E+01
Total Prostate HI =	1.4E-02
Total Skin HI =	3.7E+00
Total GI Tract HI=	7.0E+01
Total Lifetime HI =	6.2E-01
Total Kidney HI =	4.3E-01
Total Vascular HI =	3.6E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 6-9.

SITE 4 - TABLE 9-8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.4E-06			1.4E-06	BAP EQUIVALENT					
			Aroclor-1260	3.9E-07		1.6E-07	5.6E-07	Aroclor-1260					
			Nickel					Nickel	Decreased body / organ weights	2.6E-02		4.6E-02	7.1E-02
			Vanadium					Vanadium	NOEL	2.2E-02		5.9E-02	8.0E-02
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	2.3E-05	4.1E-06	1.6E-06	2.9E-05	1,1,2,2-Tetrachloroethane		6.9E-02		4.7E-03	7.3E-02
			1,1,2-Trichloroethane	5.1E-08	1.3E-08	2.5E-09	6.6E-08	1,1,2-Trichloroethane	Liver	7.8E-03		3.9E-04	8.2E-03
			1,2-Dichloroethane	6.9E-08	2.0E-08	1.7E-09	9.2E-08	1,2-Dichloroethane		8.9E-04	5.6E-03	2.2E-05	6.5E-03
			Benzene	4.2E-08	1.8E-08	3.6E-09	6.4E-08	Benzene		1.7E-02	1.3E-02	1.4E-03	3.1E-02
			Chlorobenzene					Chlorobenzene	Liver	4.7E-02	1.9E-02	9.9E-03	7.6E-02
			Chloroform	6.4E-09	3.0E-08	3.1E-10	3.7E-08	Chloroform	Liver	3.7E-03	1.5E-01	1.8E-04	1.5E-01
			Tetrachloroethene	1.2E-07	2.0E-09	4.3E-08	1.7E-07	Tetrachloroethene	Liver	8.1E-03	2.5E-04	2.9E-03	1.1E-02
			Trichloroethene	5.5E-05	1.2E-05	5.2E-06	7.2E-05	Trichloroethene	CNS	2.9E+01		2.7E+00	3.2E+01
			Vinyl Chloride	4.5E-05	5.1E-06	1.2E-06	5.1E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.2E+00		5.3E-02	1.2E+00
			Antimony					Antimony	Lifespan	1.3E-01		1.0E-03	1.3E-01
			Arsenic	3.0E-05		6.6E-07	3.1E-05	Arsenic	Skin, Vascular	2.3E+00		5.1E-02	2.4E+00
			Barium					Barium	Kidney	9.6E-02		1.6E-03	9.7E-02
			Cadmium					Cadmium	Kidney	1.7E-01		8.1E-03	1.8E-01
			Iron					Iron	Liver/Blood/GI Tract	4.7E+01		5.5E-02	4.7E+01
			Manganese					Manganese	CNS	1.6E+01		4.6E-01	1.6E+01
			Mercury					Mercury	CNS	1.0E+00		1.7E-02	1.0E+00
			Selenium					Selenium	Blood/Skin/CNS	7.9E-02		9.2E-05	7.9E-02
			RDX	7.1E-08		1.5E-08		RDX	Prostate	7.6E-03		1.6E-03	9.1E-03

Total Risk Across Surface Soil: 2.0E-06
Total Risk Across Groundwater: 1.8E-04
Total Risk Across All Media and All Exposure Routes: 1.9E-04

Total Hazard Index Across All Media and All Exposure Routes: 1.0E+02

Total Liver HI =	4.7E+01
Total CNS HI =	4.9E+01
Total Blood HI =	4.8E+01
Total Prostate HI =	9.1E-03
Total Skin HI =	2.5E+00
Total Vascular HI =	2.4E+00
Total Lifetime HI =	2.0E-01
Total GI Tract HI =	4.7E+01
Total Kidney HI =	2.8E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 6-18.

SITE 4 - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FULL TIME WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.1E-06			4.1E-06	BAP EQUIVALENT					
			Aroclor-1260	1.1E-06		2.1E-06	3.2E-06	Aroclor-1260					
Groundwater	Water /Air	Onsite Air	Trichloroethene		1.7E-05		1.7E-05	Trichloroethene	CNS				
			Vinyl Chloride		1.1E-05		1.1E-05	Vinyl Chloride					
						Total Risk Across Surface Soil	7.4E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air	2.8E-05						

Total Risk Across All Media and All Exposure Routes 3.5E-05

SITE 4 - TABLE 10.1a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FULL TIME WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	6.5E-07			6.5E-07	BAP EQUIVALENT					
Groundwater	Water /Air	Onsite Air	Trichloroethene		2.6E-06		2.6E-06	Trichloroethene	CNS				
			Vinyl Chloride		1.8E-06		1.8E-06	Vinyl Chloride					
						Total Risk Across Surface Soil	6.5E-07					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air	4.4E-06						

Total Risk Across All Media and All Exposure Routes 5.1E-06

SITE 4 - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Subsuface Soil	Subsuface Soil	BAP EQUIVALENT	2.2E-07			2.2E-07	BAP EQUIVALENT					
Groundwater	Water / Air	Onsite	1,1,2,2-Tetrachloroethane		5.5E-10	2.1E-06	2.1E-06	1,1,2,2-Tetrachloroethane				4.9E-04	4.9E-04
			Trichloroethene		5.1E-09	6.7E-06	6.7E-06	Trichloroethene	CNS			2.8E-01	2.8E-01
			Vinyl Chloride		3.2E-09	1.7E-06	1.7E-06	Vinyl Chloride					
			Arsenic			2.1E-06	2.1E-06	Arsenic	Skin, Vascular			1.3E-02	1.3E-02

Total Risk Across Surface / Subsurface Soil: 2.2E-07
Total Risk Across Groundwater: 1.3E-05

Total Risk Across All Media and All Exposure Routes: 1.3E-05

Total Hazard Index Across All Media and All Exposure Routes: 3.0E-01

Total CNS HI = 2.8E-01
Total Vascular HI = 1.3E-02
Total Skin HI = 1.3E-02

SITE 4 - TABLE 10.2a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water / Air	Onsite	Trichloroethene		4.6E-10	1.2E-06	1.2E-06	Trichloroethene	CNS			1.4E-01	1.4E-01
						Total Risk Across Surface / Subsurface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.4E-01
						Total Risk Across Groundwater	1.2E-06						
												Total CNS HI =	1.4E-01
						Total Risk Across All Media and All Exposure Routes	1.2E-06						

SITE 4 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water / Air	Onsite	Trichloroethene		2.0E-09	1.3E-06	1.3E-06	Trichloroethene	CNS			1.4E+00	1.4E+00
						Total Risk Across Surface / Subsurface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.4E+00
						Total Risk Across Groundwater	1.3E-06						
												Total CNS HI =	1.4E+00
						Total Risk Across All Media and All Exposure Routes	1.3E-06						

SITE 4 - TABLE 10.3a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water / Air	Onsite	Trichloroethene		9.8E-10	1.3E-06	1.3E-06	Trichloroethene	CNS			1.4E+00	1.4E+00
						Total Risk Across Surface / Subsurface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.4E+00
						Total Risk Across Groundwater	1.3E-06						
												Total CNS HI =	1.4E+00
						Total Risk Across All Media and All Exposure Routes	1.3E-06						

SITE 4 - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADULT RECREATIONAL USER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.2E-07			3.2E-07	BAP EQUIVALENT					
						Total Risk Across Surface Soil	3.2E-07					Total Hazard Index Across All Media and All Exposure Routes	

Risk Across All Media and All Exposure Routes 3.2E-07

SITE 4 - TABLE 10.5. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.6E-07			5.6E-07	BAP EQUIVALENT					
						Total Risk Across Surface Soil	5.6E-07					Total Hazard Index Across All Media and All Exposure Routes	

Total Risk Across All Media and All Exposure Routes 5.6E-07

SITE 4 - TABLE 10.6. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.6E-06			4.6E-06	BAP EQUIVALENT					
			Aroclor-1260	1.3E-06		2.6E-06	3.9E-06	Aroclor-1260					
Groundwater	Water /Air	Onsite Air	Trichloroethene		8.9E-06		8.9E-06	Trichloroethene	CNS				
			Vinyl Chloride		6.1E-06		6.1E-06	Vinyl Chloride					
						Total Risk Across Surface Soil	8.5E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air	1.5E-05						

Total Risk Across All Media and All Exposure Routes 2.4E-05

SITE 4 - TABLE 10.6a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.0E-06			1.0E-06	BAP EQUIVALENT					
Groundwater	Water /Air	Onsite Air	Trichloroethene		1.9E-06		1.9E-06	Trichloroethene	CNS				
			Vinyl Chloride		1.3E-06		1.3E-06	Vinyl Chloride					
						Total Risk Across Surface Soil	1.0E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Groundwater/Air	3.3E-06						

Total Risk Across All Media and All Exposure Routes 4.3E-06

SITE 4 - TABLE 10.7. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.6E-06			5.6E-06	BAP EQUIVALENT					
			Aroclor-1260	1.5E-06		8.1E-06	9.6E-06	Aroclor-1260					
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	1.8E-04	2.8E-05	2.5E-05	2.3E-04	1,1,2,2-Tetrachloroethane		4.4E-02		6.0E-03	5.0E-02
			Tetrachloroethene	9.3E-07	1.4E-08	6.7E-07	1.6E-06	Tetrachloroethene	Liver	5.2E-03	1.4E-04	3.8E-03	9.1E-03
			Trichloroethene	4.2E-04	8.2E-05	8.0E-05	5.9E-04	Trichloroethene	CNS	1.9E+01		3.5E+00	2.2E+01
			Vinyl Chloride	3.5E-04	3.4E-05	1.8E-05	4.0E-04	Vinyl Chloride					
			Arsenic	2.3E-04		1.3E-05	2.4E-04	Arsenic	Skin, Vascular	1.5E+00		8.1E-02	1.6E+00
			Iron					Iron	Liver/Blood/GI Tract	3.0E+01		8.6E-02	3.0E+01
			Manganese					Manganese	CNS	1.0E+01		7.3E-01	1.1E+01

Total Risk Across Surface Soil: 1.5E-05
Total Risk Across Groundwater: 1.5E-03
Total Risk Across All Media and All Exposure Routes: 1.5E-03

Total Hazard Index Across All Media and All Exposure Routes: 6.5E+01

Total Liver HI = 3.0E+01
Total CNS HI = 1.1E+01
Total Blood HI = 3.0E+01
Total Skin HI = 1.6E+00
Total Vascular HI = 1.6E+00
Total GI Tract HI = 3.0E+01

SITE 4 - TABLE 10.7a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	5.4E-07			5.4E-07	BAP EQUIVALENT					
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	2.5E-05	3.1E-06	3.4E-06	3.1E-05	1,1,2,2-Tetrachloroethane		2.1E-02		2.9E-03	2.3E-02
			Trichloroethene	5.8E-05	1.1E-05	1.1E-05	8.0E-05	Trichloroethene	CNS	8.8E+00		1.7E+00	1.0E+01
			Vinyl Chloride	4.7E-05	5.0E-06	2.6E-06	5.5E-05	Vinyl Chloride					
			Arsenic	3.1E-05		1.4E-06	3.3E-05	Arsenic	Skin, Vascular	7.0E-01		3.2E-02	7.3E-01
			Iron					Iron	Liver/Blood/GI Tract	1.4E+01		3.4E-02	1.4E+01
			Manganese					Manganese	CNS	4.8E+00		2.8E-01	5.1E+00

Total Risk Across Surface Soil	5.4E-07
Total Risk Across Groundwater	2.0E-04
Total Risk Across All Media and All Exposure Routes	2.0E-04

Total Hazard Index Across All Media and All Exposure Routes	3.0E+01
Total CNS HI =	1.6E+01
Total Blood HI =	1.4E+01
Total Skin HI =	7.3E-01
Total Vascular HI =	7.3E-01
Total GI Tract HI =	1.4E+01
Total Liver HI =	1.4E+01

SITE 4 - TABLE 10.8. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-05			1.3E-05	BAP EQUIVALENT					
			Aroclor-1260	3.5E-06		3.7E-06	7.2E-06	Aroclor-1260					
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	1.1E-04	3.3E-05	8.8E-06	1.5E-04	1,1,2,2-Tetrachloroethane		1.0E-01		8.5E-03	1.1E-01
			Trichloroethene	2.5E-04	8.5E-05	2.8E-05	3.6E-04	Trichloroethene	CNS	4.4E+01		5.0E+00	4.9E+01
			Vinyl Chloride	2.0E-04	3.3E-05	6.5E-06	2.4E-04	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.7E+00		9.7E-02	1.8E+00
			Arsenic	1.3E-04		4.4E-06	1.4E-04	Arsenic	Skin, Vascular	3.5E+00		1.2E-01	3.6E+00
			Iron					Iron	Liver/Blood/GI Tract	7.0E+01		1.2E-01	7.0E+01
			Manganese					Manganese	CNS	2.4E+01		1.0E+00	2.5E+01
			Mercury					Mercury	CNS	1.5E+00		3.8E-02	1.6E+00

Total Risk Across Surface Soil: 2.0E-05
Total Risk Across Groundwater: 8.9E-04

Total Risk Across All Media and All Exposure Routes: 9.1E-04

Total Hazard Index Across All Media and All Exposure Routes: 1.5E+02

Total CNS HI = 7.5E+01
Total Blood HI = 7.2E+01
Total GI Tract HI= 7.0E+01
Total Vascular HI = 3.6E+00
Total Liver HI = 7.0E+01

SITE 4 - TABLE 10.8. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-05			1.3E-05	BAP EQUIVALENT					
			Aroclor-1260	3.5E-06		3.7E-06	7.2E-06	Aroclor-1260					
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	1.1E-04	3.3E-05	8.8E-06	1.5E-04	1,1,2,2-Tetrachloroethane		1.0E-01		8.5E-03	1.1E-01
			Trichloroethene	2.5E-04	8.5E-05	2.8E-05	3.6E-04	Trichloroethene	CNS	4.4E+01		5.0E+00	4.9E+01
			Vinyl Chloride	2.0E-04	3.3E-05	6.5E-06	2.4E-04	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.7E+00		9.7E-02	1.8E+00
			Arsenic	1.3E-04		4.4E-06	1.4E-04	Arsenic	Skin, Vascular	3.5E+00		1.2E-01	3.6E+00
			Iron					Iron	Liver/Blood/GI Tract	7.0E+01		1.2E-01	7.0E+01
			Manganese					Manganese	CNS	2.4E+01		1.0E+00	2.5E+01
			Mercury					Mercury	CNS	1.5E+00		3.8E-02	1.6E+00

Total Risk Across Surface Soil: 2.0E-05
Total Risk Across Groundwater: 8.9E-04
Total Risk Across All Media and All Exposure Routes: 9.1E-04

Total Hazard Index Across All Media and All Exposure Routes: 1.5E+02

Total CNS HI = 7.5E+01
Total Blood HI = 7.2E+01
Total GI Tract HI = 7.0E+01
Total Vascular HI = 3.6E+00
Total Skin HI = 3.6E+00
Total Liver HI = 7.0E+01

SITE 4 - TABLE 10.8a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 4 - CHEMICAL BURIAL AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.4E-06			1.4E-06	BAP EQUIVALENT					
Groundwater	Water /Air	Onsite	1,1,2,2-Tetrachloroethane	2.3E-05	4.1E-06	1.6E-06	2.9E-05	1,1,2,2-Tetrachloroethane		6.9E-02		4.7E-03	7.3E-02
			Trichloroethene	5.5E-05	1.2E-05	5.2E-06	7.2E-05	Trichloroethene	CNS	2.9E+01		2.7E+00	3.2E+01
			Vinyl Chloride	4.5E-05	5.1E-06	1.2E-06	5.1E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.2E+00		5.3E-02	1.2E+00
			Arsenic	3.0E-05		6.6E-07	3.1E-05	Arsenic	Skin, Vascular	2.3E+00		5.1E-02	2.4E+00
			Iron					Iron	Liver/Blood/GI Tract	4.7E+01		5.5E-02	4.7E+01
			Manganese					Manganese	CNS	1.6E+01		4.6E-01	1.6E+01
			Mercury					Mercury	CNS	1.0E+00		1.7E-02	1.0E+00

Total Risk Across Surface Soil: 1.4E-06
Total Risk Across Groundwater: 1.8E-04

Total Risk Across All Media and All Exposure Routes: 1.8E-04

Total Hazard Index Across All Media and All Exposure Routes: 1.0E+02

Total CNS HI = 4.9E+01
Total Blood HI = 4.8E+01
Total Vascular HI = 2.4E+00
Total GI Tract HI = 4.7E+01
Total Skin HI = 2.4E+00
Total Liver HI = 4.7E+01

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SITE 4 - CHEMICAL BURIAL AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2,2-Tetrachloroethane	9.62E-02	1.68E+02	3.44E-04	1.02E+01	9.82E+02	5.92E+00	7.79E+00	2.20E-02	1.83E-02	3.02E-02
1,1,2-Trichloroethane	7.30E-04	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	2.39E-04	1.99E-04	4.32E-02
1,2-Dichloroethane	6.25E-04	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	2.33E-04	1.94E-04	4.91E-02
Benzene	1.20E-03	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	5.61E-04	4.68E-04	6.17E-02
Chlorobenzene	2.20E-02	1.13E+02	3.71E-03	1.25E+01	1.20E+03	1.17E+01	1.54E+01	8.82E-03	7.35E-03	5.30E-02
Chloroform	8.60E-04	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	3.38E-04	2.82E-04	5.19E-02
Tetrachloroethene	1.90E-03	1.66E+02	1.84E-02	1.03E+01	9.88E+02	1.02E+01	1.34E+01	6.83E-04	5.69E-04	4.75E-02
Trichloroethene	4.11E+00	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.61E+00	1.34E+00	5.16E-02
Vinyl Chloride	1.95E-02	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	1.00E-02	8.37E-03	6.82E-02
cis-1,2-dichloroethene	2.70E-01	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.15E-01	9.60E-02	5.63E-02

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SITE 4 - CHEMICAL BURIAL AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1,2,2-Tetrachloroethane	9.62E-02	7.10E-02	7.90E-06	2.97E+03	1.41E-02	5.54E-03	1.18E-04	3.14E-03	5.54E-03	1.52E-04	5.58E-04	5.37E-05
1,1,2-Trichloroethane	7.30E-04	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	1.03E-06
1,2-Dichloroethane	6.25E-04	1.04E-01	9.90E-06	8.52E+03	4.01E-02	8.12E-03	6.14E-05	2.55E-03	8.12E-03	1.23E-04	1.92E-03	1.20E-06
Benzene	1.20E-03	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	7.70E-06
Chlorobenzene	2.20E-02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	5.70E-03	2.06E-05	1.02E-03	5.70E-03	4.91E-05	3.95E-03	8.67E-05
Chloroform	8.60E-04	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	4.55E-06
Tetrachloroethene	1.90E-03	7.20E-02	8.20E-06	2.00E+02	7.54E-01	5.62E-03	1.14E-05	6.12E-04	5.62E-03	2.95E-05	1.44E-02	2.74E-05
Trichloroethene	4.11E+00	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.94E-02
Vinyl Chloride	1.95E-02	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	5.43E-04
cis-1,2-dichloroethene	2.70E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.23E-03

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.83E-02	1.4E-04	4.0E-04	2.00E-01		2.7E-05	25.7%	NA	NA
1,1,2-Trichloroethane	1.99E-04	1.5E-06	4.3E-06	5.60E-02		8.3E-08	0.1%	NA	NA
1,2-Dichloroethane	1.94E-04	1.4E-06	4.2E-06	9.10E-02	1.40E-03	1.3E-07	0.1%	3.0E-03	3.4%
Benzene	4.68E-04	3.5E-06	1.0E-05	2.90E-02	1.70E-03	1.0E-07	0.1%	6.0E-03	6.7%
Chlorobenzene	7.35E-03	5.5E-05	1.6E-04		1.70E-02	NA	NA	9.4E-03	10.5%
Chloroform	2.82E-04	2.1E-06	6.1E-06	8.10E-02	8.60E-05	1.7E-07	0.2%	7.1E-02	79.4%
Tetrachloroethene	5.69E-04	4.2E-06	1.2E-05	2.00E-03	1.40E-01	8.5E-09	0.0%	8.8E-05	0.1%
Trichloroethene	1.34E+00	1.0E-02	2.9E-02	6.00E-03		6.0E-05	56.3%	NA	NA
Vinyl Chloride	8.37E-03	6.2E-05	1.8E-04	3.00E-01		1.9E-05	17.6%	NA	NA
cis-1,2-dichloroethene	9.60E-02	7.1E-04	2.1E-03			NA	NA	NA	NA
					Total	**1.1E-04**	**100.0%**	**9.0E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	3.96	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	6	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.83E-02	1.6E-04	1.9E-03	2.00E-01		3.2E-05	25.7%	NA	NA
1,1,2-Trichloroethane	1.99E-04	1.7E-06	2.0E-05	5.60E-02		9.7E-08	0.1%	NA	NA
1,2-Dichloroethane	1.94E-04	1.7E-06	2.0E-05	9.10E-02	1.40E-03	1.5E-07	0.1%	1.4E-02	3.4%
Benzene	4.68E-04	4.1E-06	4.7E-05	2.90E-02	1.70E-03	1.2E-07	0.1%	2.8E-02	6.7%
Chlorobenzene	7.35E-03	6.4E-05	7.4E-04		1.70E-02	NA	NA	4.4E-02	10.5%
Chloroform	2.82E-04	2.4E-06	2.9E-05	8.10E-02	8.60E-05	2.0E-07	0.2%	3.3E-01	79.4%
Tetrachloroethene	5.69E-04	4.9E-06	5.8E-05	2.00E-03	1.40E-01	9.9E-09	0.0%	4.1E-04	0.1%
Trichloroethene	1.34E+00	1.2E-02	1.4E-01	6.00E-03		7.0E-05	56.3%	NA	NA
Vinyl Chloride	8.37E-03	7.3E-05	8.5E-04	3.00E-01		2.2E-05	17.6%	NA	NA
cis-1,2-dichloroethene	9.60E-02	8.3E-04	9.7E-03			NA	NA	NA	NA
					Total	**1.2E-04**	**100.0%**	**4.2E-01**	**100.0%**

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SITE 4 - CHEMICAL BURIAL AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2,2-Tetrachloroethane	9.62E-02	1.68E+02	3.44E-04	1.02E+01	9.82E+02	5.92E+00	7.79E+00	2.20E-02	1.83E-02	1.67E-02
1,1,2-Trichloroethane	7.30E-04	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	2.39E-04	1.99E-04	2.39E-02
1,2-Dichloroethane	6.25E-04	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	2.33E-04	1.94E-04	2.72E-02
Benzene	1.20E-03	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	5.61E-04	4.68E-04	3.42E-02
Chlorobenzene	2.20E-02	1.13E+02	3.71E-03	1.25E+01	1.20E+03	1.17E+01	1.54E+01	8.82E-03	7.35E-03	2.93E-02
Chloroform	8.60E-04	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	3.38E-04	2.82E-04	2.87E-02
Tetrachloroethene	1.90E-03	1.66E+02	1.84E-02	1.03E+01	9.88E+02	1.02E+01	1.34E+01	6.83E-04	5.69E-04	2.63E-02
Trichloroethene	4.11E+00	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.61E+00	1.34E+00	2.86E-02
Vinyl Chloride	1.95E-02	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	1.00E-02	8.37E-03	3.77E-02
cis-1,2-dichloroethene	2.70E-01	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.15E-01	9.60E-02	3.12E-02

Vapor Intrusion from Groundwater - CTE
Source: ASTM E 1739-95
SITE 4 - CHEMICAL BURIAL AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1,2,2-Tetrachloroethane	9.62E-02	7.10E-02	7.90E-06	2.97E+03	1.41E-02	5.54E-03	1.18E-04	3.14E-03	5.54E-03	1.52E-04	5.58E-04	5.37E-05
1,1,2-Trichloroethane	7.30E-04	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	1.03E-06
1,2-Dichloroethane	6.25E-04	1.04E-01	9.90E-06	8.52E+03	4.01E-02	8.12E-03	6.14E-05	2.55E-03	8.12E-03	1.23E-04	1.92E-03	1.20E-06
Benzene	1.20E-03	8.80E-02	9.80E-06	1.75E+03	2.28E-01	6.87E-03	1.97E-05	1.01E-03	6.87E-03	4.89E-05	6.42E-03	7.70E-06
Chlorobenzene	2.20E-02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	5.70E-03	2.06E-05	1.02E-03	5.70E-03	4.91E-05	3.95E-03	8.67E-05
Chloroform	8.60E-04	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	4.55E-06
Tetrachloroethene	1.90E-03	7.20E-02	8.20E-06	2.00E+02	7.54E-01	5.62E-03	1.14E-05	6.12E-04	5.62E-03	2.95E-05	1.44E-02	2.74E-05
Trichloroethene	4.11E+00	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.94E-02
Vinyl Chloride	1.95E-02	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	5.43E-04
cis-1,2-dichloroethene	2.70E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.23E-03

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.83E-02	1.5E-05	1.5E-04	2.00E-01		2.9E-06	25.7%	NA	NA
1,1,2-Trichloroethane	1.99E-04	1.6E-07	1.6E-06	5.60E-02		8.9E-09	0.1%	NA	NA
1,2-Dichloroethane	1.94E-04	1.6E-07	1.6E-06	9.10E-02	1.40E-03	1.4E-08	0.1%	1.1E-03	3.4%
Benzene	4.68E-04	3.8E-07	3.8E-06	2.90E-02	1.70E-03	1.1E-08	0.1%	2.2E-03	6.7%
Chlorobenzene	7.35E-03	5.9E-06	5.9E-05		1.70E-02	NA	NA	3.5E-03	10.5%
Chloroform	2.82E-04	2.3E-07	2.3E-06	8.10E-02	8.60E-05	1.8E-08	0.2%	2.6E-02	79.4%
Tetrachloroethene	5.69E-04	4.6E-07	4.6E-06	2.00E-03	1.40E-01	9.1E-10	0.0%	3.3E-05	0.1%
Trichloroethene	1.34E+00	1.1E-03	1.1E-02	6.00E-03		6.5E-06	56.3%	NA	NA
Vinyl Chloride	8.37E-03	6.7E-06	6.7E-05	3.00E-01		2.0E-06	17.6%	NA	NA
cis-1,2-dichloroethene	9.60E-02	7.7E-05	7.7E-04			NA	NA	NA	NA
					Total	**1.1E-05**	**100.0%**	**3.3E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

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ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	2	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	730	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER (PAGE TWO)

SITE NAME: SITE 4 - CHEMICAL BURIAL AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/14/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.83E-02	2.0E-05	6.9E-04	2.00E-01		3.9E-06	25.7%	NA	NA
1,1,2-Trichloroethane	1.99E-04	2.1E-07	7.4E-06	5.60E-02		1.2E-08	0.1%	NA	NA
1,2-Dichloroethane	1.94E-04	2.1E-07	7.3E-06	9.10E-02	1.40E-03	1.9E-08	0.1%	5.2E-03	3.4%
Benzene	4.68E-04	5.0E-07	1.8E-05	2.90E-02	1.70E-03	1.5E-08	0.1%	1.0E-02	6.7%
Chlorobenzene	7.35E-03	7.9E-06	2.8E-04		1.70E-02	NA	NA	1.6E-02	10.5%
Chloroform	2.82E-04	3.0E-07	1.1E-05	8.10E-02	8.60E-05	2.4E-08	0.2%	1.2E-01	79.4%
Tetrachloroethene	5.69E-04	6.1E-07	2.1E-05	2.00E-03	1.40E-01	1.2E-09	0.0%	1.5E-04	0.1%
Trichloroethene	1.34E+00	1.4E-03	5.0E-02	6.00E-03		8.6E-06	56.3%	NA	NA
Vinyl Chloride	8.37E-03	9.0E-06	3.1E-04	3.00E-01		2.7E-06	17.6%	NA	NA
cis-1,2-dichloroethene	9.60E-02	1.0E-04	3.6E-03			NA	NA	NA	NA
					Total	**1.5E-05**	**100.0%**	**1.5E-01**	**100.0%**

SITE 7

RISK ASSESSMENT CALCULATIONS

SITE 7 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND
PAGE 1 OF 2

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 7 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	Surface Water	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water is not present at this site.
						Dermal	On-site	None	Surface water is not present at this site.
		Air	Vapors from Surface Water	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	Sediment	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water / sediment is not present at this site.
						Dermal	On-site	None	Surface water / sediment is not present at this site.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 7 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
75-09-2	Methylene Chloride	0.013		0.013		mg/kg	7SS1020300	1/7	0.01 - 0.011	0.013	NA	85	C	0.001 13	SSL_MIGR SSL_INH	No	BSL
120-12-7	Anthracene	0.056	J	0.066	J	mg/kg	7SS1020100	2/7	0.34 - 0.36	0.066	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.044	L	0.38		mg/kg	7SS1020300	3/7	0.34 - 0.36	0.38	NA	0.87	C	0.08	SSL_MIGR NA	No	BSL
50-32-8	Benzo(a)pyrene	0.043	L	0.35		mg/kg	7SS1020300	3/7	0.34 - 0.36	0.35	NA	0.087	C	0.4	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.074	L	0.54		mg/kg	7SS1020300	3/7	0.34 - 0.36	0.54	NA	0.87	C	0.2	SSL_MIGR NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.078	J	0.081	J	mg/kg	7SS1020100	2/7	0.34 - 0.36	0.081	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.19	J	0.22	J	mg/kg	7SS1020300	2/7	0.34 - 0.36	0.22	NA	8.7	C	2	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.049	L	0.42		mg/kg	7SS1020300	3/7	0.34 - 0.36	0.42	NA	87	C	8	SSL_MIGR NA	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.036	J	0.047	J	mg/kg	7SS1020300	2/7	0.34 - 0.36	0.047	NA	0.087	C	0.08	SSL_MIGR SSL_INH	No	BSL
206-44-0	Fluoranthene	0.042	J	0.95		mg/kg	7SS1020300	4/7	0.34 - 0.35	0.95	NA	310	N	210	SSL_MIGR SSL_INH	No	BSL
67-72-1	Hexachloroethane	0.07	J	0.07	J	mg/kg	7SS1040100	1/7	0.34 - 0.36	0.07	NA	46	C	0.02 55	SSL_MIGR SSL_INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.15	J	0.15	J	mg/kg	7SS1020100	2/7	0.34 - 0.36	0.15	NA	0.87	C	0.7	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.068	L	0.48		mg/kg	7SS1020100	3/7	0.34 - 0.36	0.48	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.059	L	0.58		mg/kg	7SS1020300	3/7	0.34 - 0.36	0.58	NA	230	N	210	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.00037	J	0.00051	J	mg/kg	7SS1060100	2/6	0.0035 - 0.034	0.00051	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.00049	J	0.00049	J	mg/kg	7SS1030100	1/6	0.0034 - 0.034	0.00049	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0019		0.0028	J	mg/kg	7SS1010100	2/6	0.0017 - 0.017	0.0028	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11096-82-5	Aroclor-1260	0.0075	J	0.38		mg/kg	7SS1050100	3/7	0.034 - 0.34	0.38	NA	0.32	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.00027	J	0.00029	J	mg/kg	7SS1060100	2/6	0.0035 - 0.034	0.00029	NA	0.04	C	0.0002 1	SSL_MIGR SSL_INH	No	BSL
5103-74-2	gamma-Chlordane	0.00091	J	0.00091	J	mg/kg	7SS1030100	1/7	0.0017 - 0.017	0.00091	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.00082	J	0.00082	J	mg/kg	7SS1030100	1/6	0.0017 - 0.017	0.00082	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
7429-90-5	Aluminum	3190		8870		mg/kg	7SS1050100	7/7		8870	NA	7800	N		NA NA	No	BKG

SITE 7 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-38-2	Arsenic	1.9	K	2.7	K	mg/kg	7SS1020100	7/7		2.7	NA	0.43	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	12.4		474		mg/kg	7SS1060100	7/7		474	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-70-2	Calcium	232		785		mg/kg	7SS1050100	5/7	104 - 196	785	NA	NA			NA NA	No	NUT, BKG
7440-47-3	Chromium	7.5		16.7		mg/kg	7SS1050100	7/7		16.7	NA	23 (8)	N	2 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	1.9		9.9		mg/kg	7SS1050100	6/7	0.92	9.9	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	3.6		32.3		mg/kg	7SS1010100	7/7		32.3	NA	310	N		NA NA	No	BSL
7439-89-6	Iron	4380		13000		mg/kg	7SS1050100	7/7		13000	NA	2300	N		NA NA	No	BKG
7439-92-1	Lead	13.2		42.1		mg/kg	7SS1010100	7/7		42.1	NA	400 (9)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	264		1830		mg/kg	7SS1050100	7/7		1830	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	58.6	J	562		mg/kg	7SS1050100	7/7		562	NA	160 (10)	N		NA NA	No	BKG
7439-97-6	Mercury	0.07		0.17		mg/kg	7SS1010100	4/7	0.05	0.17	NA	2.3 (11)	N	0.1 10	SSL_MIGR SSL_INH	No	BSL, BKG
7440-02-0	Nickel	3.3		19.1		mg/kg	7SS1050100	7/7		19.1	NA	160	N	7 13000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-09-7	Potassium	92.6		967		mg/kg	7SS1050100	7/7		967	NA	NA			NA NA	No	NUT, BKG
7440-22-4	Silver	2.4		2.4		mg/kg	7SS1010100	1/7	0.14 - 0.41	2.4	NA	39	N	2	NA NA	No	BSL
7440-62-2	Vanadium	11.8		22.8		mg/kg	7SS1050100	7/7		22.8	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	19.3	J	73.8	J	mg/kg	7SS1010100	7/7		73.8	NA	2300	N	620	SSL_MIGR NA	No	BSL
118-96-7	2,4,6-Trinitrotoluene	0.039	J	7.1	J	mg/kg	7SS1010100	2/7	0.25	7.1	NA	21	C		NA NA	No	BSL
2691-41-0	HMX	0.61		860		mg/kg	7SS1010100	2/7	0.5	860	NA	390	N		NA NA	Yes	ASL
98-95-3	Nitrobenzene (exp)	0.31		0.31		mg/kg	7SS1060100	1/7	0.25 - 25	0.31	NA	3.9	N	0.007 92	SSL_MIGR SSL_INH	No	BSL

SITE 7 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
121-82-4	RDX	0.83		42	J	mg/kg	7SS1010100	2/7	0.5	42	NA	5.8	C	1	SSL_MIGR NA	Yes	ASL
	Chemical Oxygen Demand	120000		120000		mg/kg	7SS1030100	1/1		120000	NA	NA			NA	No	NTX
TTNUS17	pH	4.8		4.8			7SS1030100	1/1		4.8	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	6300		6300		mg/L	7SS1030100	1/1		6300	NA	NA			NA	No	NTX

Associated Samples:
7SS1010100
7SS1020100
7SS1020300
7SS1030100
7SS1040100
7SS1050100
7SS1060100

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based *PCOC screening level and facility-wide background levels.*
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 *Manganese-Nonfood*
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-*INH* = *Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)*
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 7 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE/SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	0.02	J	0.02	J	mg/kg	7SU1060200	1/13	0.01 - 0.011	0.02	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
75-09-2	Methylene Chloride	0.002	J	0.013		mg/kg	7SS1020300	3/13	0.01 - 0.011	0.013	NA	85	C	0.001 13	SSL_MIGR SSL_INH	No	BSL
120-12-7	Anthracene	0.056	J	0.066	J	mg/kg	7SS1020100	2/13	0.33 - 0.36	0.066	NA	2300	N	590	SSL_MIGR NA	No	BSL
56-55-3	Benzo(a)anthracene	0.044	L	0.38		mg/kg	7SS1020300	3/13	0.33 - 0.36	0.38	NA	0.87	C	**0.08**	SSL_MIGR NA	No	BSL
50-32-8	Benzo(a)pyrene	0.043	L	0.35		mg/kg	7SS1020300	3/13	0.33 - 0.36	0.35	NA	**0.087**	C	0.4	SSL_MIGR NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.074	L	0.54		mg/kg	7SS1020300	3/13	0.33 - 0.36	0.54	NA	0.87	C	**0.2**	SSL_MIGR NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.078	J	0.081	J	mg/kg	7SS1020100	2/13	0.33 - 0.36	0.081	NA	160	N		NA NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.19	J	0.22	J	mg/kg	7SS1020300	2/13	0.33 - 0.36	0.22	NA	8.7	C	2	SSL_MIGR NA	No	BSL
218-01-9	Chrysene	0.049	L	0.42		mg/kg	7SS1020300	3/13	0.33 - 0.36	0.42	NA	87	C	8	SSL_MIGR NA	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.036	J	0.047	J	mg/kg	7SS1020300	2/13	0.33 - 0.36	0.047	NA	0.087	C	0.08	SSL_MIGR NA	No	BSL
206-44-0	Fluoranthene	0.042	J	0.95		mg/kg	7SS1020300	4/13	0.33 - 0.35	0.95	NA	310	N	210	SSL_MIGR NA	No	BSL
67-72-1	Hexachloroethane	0.07	J	0.12	J	mg/kg	7SU1040200	3/13	0.33 - 0.36	0.12	NA	46	C	**0.02** 55	SSL_MIGR SSL_INH	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.15	J	0.15	J	mg/kg	7SS1020100	2/13	0.33 - 0.36	0.15	NA	0.87	C	0.7	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.068	L	0.48		mg/kg	7SS1020100	3/13	0.33 - 0.36	0.48	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.059	L	0.58		mg/kg	7SS1020300	3/13	0.33 - 0.36	0.58	NA	230	N	210	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.00037	J	0.00051	J	mg/kg	7SS1060100	2/12	0.0034 - 0.034	0.00051	NA	1.9	C	3	SSL_MIGR NA	No	BSL
50-29-3	4,4'-DDT	0.00049	J	0.00049	J	mg/kg	7SS1030100	1/12	0.0034 - 0.034	0.00049	NA	1.9	C	2	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0019		0.017		mg/kg	7SU1010200	3/12	0.0017 - 0.017	0.017	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL

SITE 7 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE/SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
11096-82-5	Aroclor-1260	0.0075	J	0.38		mg/kg	7SS1050100	4/13	0.034 - 0.34	0.38	NA	**0.32**	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.00027	J	0.00029	J	mg/kg	7SS1060100	2/11	0.0034 - 0.034	0.00029	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
959-98-8	Endosulfan I	0.0036		0.0036		mg/kg	7SU1010200	1/11	0.0017 - 0.017	0.0036	NA	47	N	0.9	SSL_MIGR NA	No	BSL
5103-74-2	gamma-Chlordane	0.00091	J	0.018		mg/kg	7SU1010200	2/13	0.0017 - 0.017	0.018	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
1024-57-3	Heptachlor Epoxide	0.00082	J	0.00082	J	mg/kg	7SS1030100	1/11	0.0017 - 0.017	0.00082	NA	0.07	C	0.03 5	SSL_MIGR SSL_INH	No	BSL
72-43-5	Methoxychlor	0.0023	J	0.0023	J	mg/kg	7SU1010200	1/9	0.017 - 0.09	0.0023	NA	39	N	8	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	783		9480		mg/kg	7SU1010200	13/13		9480	NA	**7800**	N		NA NA	No	BKG
7440-38-2	Arsenic	0.61	K	4.4		mg/kg	7SU1010200	13/13		4.4	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	2.6		474		mg/kg	7SS1060100	13/13		474	NA	550	N	**82** 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-70-2	Calcium	147	J	785		mg/kg	7SS1050100	10/13	62.9 - 196	785	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	2.3		16.7		mg/kg	7SS1050100	13/13		16.7	NA	23 (8)	N	**2** 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	1.2		9.9		mg/kg	7SS1050100	11/13	0.25 - 0.92	9.9	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	3.6		32.3		mg/kg	7SS1010100	12/13	1.2	32.3	NA	310	N		NA NA	No	BSL, BKG
7439-89-6	Iron	1030		13000		mg/kg	7SS1050100	13/13		13000	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	5.7		42.1		mg/kg	7SS1010100	12/13	1.8	42.1	NA	400 (9)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	238		1830		mg/kg	7SS1050100	12/13	47.8	1830	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	7.5		782		mg/kg	7SU1060200	13/13		782	NA	**160 (10)**	N		NA NA	No	BKG
7439-97-6	Mercury	0.07		0.17		mg/kg	7SS1010100	4/13	0.05	0.17	NA	2.3 (11)	N	**0.1** 10	NA SSL_INH	No	BSL, BKG

SITE 7 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE/SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-02-0	Nickel	2.3		19.1		mg/kg	7SS1050100	12/13	0.88	19.1	NA	160	N	7 13000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-09-7	Potassium	92.6		967		mg/kg	7SS1050100	12/13	45.5	967	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	3.2	J	3.2	J	mg/kg	7SU1020200	1/13	0.57 - 1.9	3.2	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL, BKG
7440-22-4	Silver	2.4		2.4		mg/kg	7SS1010100	1/13	0.14 - 0.41	2.4	NA	39	N	**2**	SSL_MIGR NA	No	BSL, BKG
7440-62-2	Vanadium	2.9		22.8		mg/kg	7SS1050100	13/13		22.8	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	5.2	J	73.8	J	mg/kg	7SS1010100	12/13	12.2	73.8	NA	2300	N	620	SSL_MIGR NA	No	BSL, BKG
118-96-7	2,4,6-Trinitrotoluene	0.039	J	14		mg/kg	7SU1010200	3/13	0.25	14	NA	21	C		NA NA	No	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	2.3	J	2.3	J	mg/kg	7SU1010200	1/13	0.25 - 25	2.3	NA	**0.47**	N		NA NA	Yes	ASL
88-72-2	2-Nitrotoluene	0.84	J	0.84	J	mg/kg	7SU1010200	1/13	0.25 - 25	0.84	NA	78	N		NA NA	No	BSL
19406-51-0	4-Amino-2,6-dinitrotoluene	6.3		6.3		mg/kg	7SU1010200	1/13	0.25 - 25	6.3	NA	**0.47**	N		NA NA	Yes	ASL
2691-41-0	HMX	0.61		860		mg/kg	7SS1010100	3/13	0.5	860	NA	**390**	N		NA NA	Yes	ASL
98-95-3	Nitrobenzene	0.31		0.31		mg/kg	7SS1060100	1/13	0.25 - 25	0.31	NA	3.9	N	**0.007** 92	NA NA	No	BSL
121-82-4	RDX	0.17	J	42	J	mg/kg	7SS1010100	4/13	0.5	42	NA	**5.8**	C		NA NA	Yes	ASL
479-45-8	Tetryl	0.77	J	0.77	J	mg/kg	7SU1010200	1/13	0.65 - 65	0.77	NA	78	N		NA NA	No	BSL
	Chemical Oxygen Demand	120		120		mg/L	7SS1030100	1/2	10	120	NA	NA			NA	No	NTX
TTNUS17	pH	4.8		5.4			7SU1030200	2/2		5.4	NA	NA			NA	No	NTX
TTNUS22	Total Organic Carbon	290		6300		mg/kg	7SS1030100	2/2		6300	NA	NA			NA	No	NTX

SITE 7 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE/SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:
7SS1010100
7SS1020100
7SS1020300
7SS1030100
7SS1040100
7SS1050100
7SS1060100
7SU1010200
7SU1020200
7SU1030200
7SU1040200
7SU1050200
7SU1060200

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation.

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 7 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
71-55-6	1,1,1-Trichloroethane	1.2		1.2		µg/L	7GW410001	1/9	1 - 20	1.2	NA	54	N	200	FED-MCL	No	BSL
79-34-5	1,1,2,2-Tetrachloroethane	6.5		77		µg/L	7GW410001	3/9	1	77	NA	**0.053**	C	NA	NA	Yes	ASL
79-00-5	1,1,2-Trichloroethane	0.46	J	1.3		µg/L	7GW410001	2/9	1 - 20	1.3	NA	**0.19**	C	5	FED-MCL	Yes	ASL
75-34-3	1,1-Dichloroethane	0.41	J	0.41	J	µg/L	7GW410001	1/9	1 - 20	0.41	NA	80	N	NA	NA	No	BSL
75-35-4	1,1-Dichloroethene	0.3	J	1.5		µg/L	7GW430001	2/9	1 - 20	1.5	NA	**0.044**	C	7	FED-MCL	Yes	ASL
107-06-2	1,2-Dichloroethane	0.93	J	1.8		µg/L	7GW410001	2/9	1 - 20	1.8	NA	**0.12**	C	5	FED-MCL	Yes	ASL
541-73-1	1,3 Dichlorobenzene	0.35	J	0.35	J	µg/L	7GW410001	1/9	1 - 20	0.35	NA	0.55	N	NA	NA	No	BSL
106-46-7	1,4 Dichlorobenzene	0.26	J	0.26	J	µg/L	7GW410001	1/9	1 - 20	0.26	NA	0.47	C	75	FED-MCL	No	BSL
108-90-7	Chlorobenzene	0.42	J	0.42	J	µg/L	7GW430001	1/9	1 - 20	0.42	NA	11	N	100	FED-MCL	No	BSL
67-66-3	Chloroform	0.32	J	1.8		µg/L	7GW1040001	6/9	1 - 20	1.8	NA	**0.15**	C	80	FED-MCL	Yes	ASL
127-18-4	Tetrachloroethene	0.53	J	0.63	J	µg/L	7GW410001	2/9	1 - 20	0.63	NA	1.1	C	5	FED-MCL	No	BSL
108-88-3	Toluene	0.41	J	0.41	J	µg/L	7GW1040001	1/9	1 - 20	0.41	NA	75	N	1000	FED-MCL	No	BSL
156-60-5	Trans-1,2-dichloroethene	0.34	J	0.46	J	µg/L	7GW430001	2/9	1 - 20	0.46	NA	12	N	100	FED-MCL	No	BSL
79-01-6	Trichloroethene	1.6		370		µg/L	7GW410001	4/9	1	370	NA	**1.6**	C	**5**	FED-MCL	Yes	ASL
75-01-4	Vinyl Chloride	0.36	J	1.6		µg/L	7GW410001	2/9	1 - 20	1.6	NA	**0.019**	C	2	FED-MCL	Yes	ASL
1330-20-7	Xylenes, Total	0.49	J	0.49	J	µg/L	7GW1040001	1/9	1 - 20	0.49	NA	1200	N	10000	FED-MCL	No	BSL
156-59-2	cis-1,2-dichloroethene	21		43		µg/L	7GW410001	3/9	1	43	NA	**6.1**	N	70	FED-MCL	Yes	ASL
606-20-2	2,6-Dinitrotoluene	1.3	J	1.3	J	µg/L	7GW080001	1/9	5	1.3	NA	3.7	N	NA	NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	1.1	J	1.1	J	µg/L	7GW1050001	2/9	5	1.1	NA	4.8	C	6	FED-MCL	No	BSL
84-74-2	Di-n-butyl phthalate	1.1	J	1.9	J	µg/L	7GW1020001-D	1/9	5	1.9	NA	370	N	NA	NA	No	BSL
5103-71-9	alpha-Chlordane	0.052	J	0.052	J	µg/L	7GW1050001	1/9	0.05 - 0.058	0.052	NA	0.19 (7)	C	2	FED-MCL	No	BSL
58-89-9	gamma-BHC (Lindane)	0.058		0.058		µg/L	7GW1010001	1/9	0.05 - 0.056	0.058	NA	**0.052**	C	0.2	FED-MCL	Yes	ASL
7429-90-5	Aluminum	220	K	1010	K	µg/L	7GW1020001	4/9	95.2 - 390	1010	NA	3700	N	**50-200 (8)**	FED-MCL	No	BSL, BKG
7440-38-2	Arsenic	1.9		2.8		µg/L	7GW410001-D	2/9	1.5	2.8	NA	**0.045**	C	50	FED-MCL	No	ASL
7440-39-3	Barium	18.6		63.8		µg/L	7GW420001	9/9	0	63.8	NA	260	N	2000	FED-MCL	No	BSL, BKG
7440-70-2	Calcium	3410		16400		µg/L	7GW410001-D	9/9	0	16400	NA	NA		NA	NA	No	NUT, BKG
7440-47-3	Chromium	4		59		µg/L	7GW1020001-D	6/9	2.6 - 10	59	NA	11 (9)	N	100	FED-MCL	No	BKG
7440-48-4	Cobalt	9		25		µg/L	7GW1020001-D	4/9	3.6 - 11.1	25	NA	220	N	NA	NA	No	BSL, BKG
7439-89-6	Iron	460		3780	J	µg/L	7GW1020001	8/9	80.2	3780	NA	**1100**	N	**300 (8)**	FED-MCL	No	BKG
7439-92-1	Lead	3.1		3.1		µg/L	7GW080001	1/9	1	3.1	NA	15		15	FED-AL	No	BSL, BKG
7439-95-4	Magnesium	2390		11400		µg/L	7GW410001-D	9/9	0	11400	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	20.4		139		µg/L	7GW430001	9/9	0	139	NA	73 (10)	N	**50 (8)**	FED-MCL	No	BKG
7439-97-6	Mercury	0.55		5.5		µg/L	7GW420001	5/9	0.2	5.5	NA	**1.1 (11)**	N	**2**	FED-AL	No	ASL
7440-02-0	Nickel	7.7		153		µg/L	7GW080001	5/9	7.5	153	NA	**73**	N	**100**	FED-MCL	No	BKG
7440-09-7	Potassium	1150		1500		µg/L	7GW410001-D	4/9	1480 - 2320	1500	NA	NA		NA	NA	No	NUT, BKG
7782-49-2	Selenium	2.8	J	4.9	J	µg/L	7GW410001	3/9	2.5	4.9	NA	18	N	50	FED-MCL	No	BSL
7440-23-5	Sodium	3680		15800		µg/L	7GW430001	9/9	0	15800	NA	NA		NA	NA	No	NUT, BKG
7440-28-0	Thallium	3.2		5.6		µg/L	7GW1050001	3/9	2.9	5.6	NA	**0.26**	N	**2**	FED-MCL	Yes	ASL
7440-66-6	Zinc	14.4		22.2		µg/L	7GW1030001	4/9	2.8 - 11	22.2	NA	1100	N	5000 (8)	FED-MCL	No	BSL, BKG

SITE 7 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
99-35-4	1,3,5-Trinitrobenzene	2.3		2.3		µg/L	7GW1030001	1/9	0.2 - 10	2.3	NA	110	N	NA	NA	No	BSL
118-96-7	2,4,6-Trinitrotoluene	2.2		210		µg/L	7GW080001	4/9	0.2	210	NA	2.2	C	NA	NA	Yes	ASL
35572-78-2	2-Amino-4,6-dinitrotoluene	1.4		62		µg/L	7GW080001	4/9	0.2	62	NA	0.22	N	NA	NA	Yes	ASL
19406-51-0	4-Amino-2,6-dinitrotoluene	0.2		110		µg/L	7GW080001	5/9	0.2	110	NA	0.22	N	NA	NA	Yes	ASL
2691-41-0	HMX	0.57		140		µg/L	7GW1040001	6/9	0.5	140	NA	180	N	NA	NA	No	BSL
121-82-4	RDX	1.4		510		µg/L	7GW080001	6/9	0.5	510	NA	0.61	C	NA	NA	Yes	ASL
TTNUS99	Ammonium Perchlorate	5.19		28.4	L	µg/L	7GW1030001	6/9	5	28.4	NA	NA	N	**18 (12)**	NA	Yes	ASL

Associated Samples:
7GW080001
7GW1010001
7GW1020001
7GW1020001-D
7GW1030001
7GW1040001
7GW1050001
7GW410001
7GW410001-D
7GW420001
7GW430001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 *To determine whether metal concentrations are within background levels, a comparison of site concentrations* with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) *or an incremental cancer* risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chlordane as Chlordane.
8 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
9 Hexavalent Chromium.
10 Manganese-Nonfood.
11 Mercury as Mercuric Chloride.
12 Health based action level (California Department of Health Services, January, 1999).

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = *Nocarcinogen*
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 7 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	2.41E-01	NA	5.07E-01		mg/kg	5.07E-01	Maximum	N<10(1)	2.41E-01	Average	N<10(1)
Aroclor-1260	mg/kg	1.27E-01	NA	3.80E-01		mg/kg	3.80E-01	Maximum	N<10(1)	1.27E-01	Average	N<10(1)
HMX	mg/kg	1.23E+02	NA	8.60E+02		mg/kg	8.60E+02	Maximum	N<10(1)	1.23E+02	Average	N<10(1)
RDX	mg/kg	6.30E+00	NA	4.20E+01	J	mg/kg	4.20E+01	Maximum	N<10(1)	6.30E+00	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

SITE 7 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Surface / Surbsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	2.09E-01	NA	5.07E-01		mg/kg	2.91E-01	95% UCL-T	W - Test (1)	2.91E-01	95% UCL-T	W - Test (1)
Aroclor-1260	mg/kg	7.83E-02	NA	3.80E-01		mg/kg	2.50E-01	95% UCL-T	W - Test (1)	2.50E-01	95% UCL-T	W - Test (1)
2-Amino-4,6-dinitrotoluene	mg/kg	1.24E+00	NA	2.30E+00	J	mg/kg	2.30E+00	Maximum	W - Test (2)	2.30E+00	Maximum	W - Test (2)
4-Amino-2,6-dinitrotoluene	mg/kg	1.55E+00	NA	6.30E+00		mg/kg	5.65E+00	95% UCL-T	W - Test (1)	5.65E+00	95% UCL-T	W - Test (1)
HMX	mg/kg	6.98E+01	NA	8.60E+02		mg/kg	8.60E+02	Maximum	W - Test (2)	8.60E+02	Maximum	W - Test (2)
RDX	mg/kg	4.24E+00	NA	4.20E+01	J	mg/kg	1.68E+01	95% UCL-T	W - Test (1)	1.68E+01	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 7 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2,2-Tetrachloroethane	mg/L	1.34E-02	NA	7.70E-02		mg/L	7.70E-02	Maximum	N<10(1)	1.34E-02	Average	N<10(1)
1,1,2-Trichloroethane	mg/L	1.08E-03	NA	1.30E-03		mg/L	1.30E-03	Maximum	N<10(1)	1.08E-03	Average	N<10(1)
1,1-Dichloroethene	mg/L	1.09E-03	NA	1.50E-03		mg/L	1.50E-03	Maximum	N<10(1)	1.09E-03	Average	N<10(1)
1,2-Dichloroethane	mg/L	1.19E-03	NA	1.80E-03		mg/L	1.80E-03	Maximum	N<10(1)	1.19E-03	Average	N<10(1)
Chloroform	mg/L	1.20E-03	NA	1.80E-03		mg/L	1.80E-03	Maximum	N<10(1)	1.20E-03	Average	N<10(1)
Trichloroethene	mg/L	1.04E-01	NA	3.70E-01		mg/L	3.70E-01	Maximum	N<10(1)	1.04E-01	Average	N<10(1)
Vinyl Chloride	mg/L	1.11E-03	NA	1.60E-03		mg/L	1.60E-03	Maximum	N<10(1)	1.11E-03	Average	N<10(1)
cis-1,2-dichloroethene	mg/L	1.18E-02	NA	4.30E-02		mg/L	4.30E-02	Maximum	N<10(1)	1.18E-02	Average	N<10(1)
gamma-BHC (Lindane)	mg/L	3.00E-05	NA	5.80E-05		mg/L	5.80E-05	Maximum	N<10(1)	3.00E-05	Average	N<10(1)
Arsenic	mg/L	9.28E-04	NA	2.80E-03		mg/L	2.80E-03	Maximum	N<10(1)	9.28E-04	Average	N<10(1)
Mercury	mg/L	1.35E-03	NA	5.50E-03		mg/L	5.50E-03	Maximum	N<10(1)	1.35E-03	Average	N<10(1)
Thallium	mg/L	2.14E-03	NA	5.60E-03		mg/L	5.60E-03	Maximum	N<10(1)	2.14E-03	Average	N<10(1)
2,4,6-Trinitrotoluene	mg/L	3.96E-02	NA	2.10E-01		mg/L	2.10E-01	Maximum	N<10(1)	3.96E-02	Average	N<10(1)
2-Amino-4,6-dinitrotoluene	mg/L	1.21E-02	NA	6.20E-02		mg/L	6.20E-02	Maximum	N<10(1)	1.21E-02	Average	N<10(1)
4-Amino-2,6-dinitrotoluene	mg/L	2.13E-02	NA	1.10E-01		mg/L	1.10E-01	Maximum	N<10(1)	2.13E-02	Average	N<10(1)
RDX	mg/L	9.43E-02	NA	5.10E-01		mg/L	5.10E-01	Maximum	N<10(1)	9.43E-02	Average	N<10(1)
Ammonium Perchlorate	mg/L	9.07E-03	NA	2.84E-02	L	mg/L	2.84E-02	Maximum	N<10(1)	9.07E-03	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 groundwater samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 7 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.49E-07	Cancer Ingestion Intake - CTE	5.51E-08
Noncancer Ingestion Intake - RME	9.78E-07	Noncancer Ingestion Intake - CTE	4.29E-07
Cancer Dermal Intake - RME	1.10E-05	Cancer Dermal Intake - CTE	6.96E-07
Noncancer Dermal Intake - RME	3.09E-05	Noncancer Dermal Intake - CTE	5.42E-06

SITE 7 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	8.4E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.6E-02
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	4.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-02
	(total)												3.0E-02
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	7.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.7E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	5.1E-02
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.3E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.3E-02
	(total)												9.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.8E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.3E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.5E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	(total)										3.2E-06
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	7.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	9.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	4.6E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	(total)										5.6E-06
										Total Risk Across All Exposure Routes/Pathways	**8.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	5.3E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.0E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	2.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.0E-04
	(total)												1.9E-03
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	4.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	6.7E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.3E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	3.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-03
	(total)												2.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.3E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	7.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	6.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	3.5E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	(total)										1.5E-07
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.3E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	8.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	4.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	(total)										5.9E-08
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 7 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	5.4E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.0E-03
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	2.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.8E-04
	(total)												1.9E-03
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.8E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	9.3E-03
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	2.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.9E-03
	(total)												1.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.9E-08
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.1E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	(total)										2.4E-07
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.0E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	(total)										1.2E-06
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	3.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.9E-06	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	3.7E-05
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	9.9E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.3E-05
	(total)												7.0E-05
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	4.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	6.9E-06	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.3E-04
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	3.5E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-04
	(total)												2.5E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	4.9E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.6E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-10
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.3E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	(total)										5.5E-09
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	8.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	4.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	(total)										6.1E-09
										Total Risk Across All Exposure Routes/Pathways	**1.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 7 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.8E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	5.5E-03
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.6E-03
	(total)												1.0E-02
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	7.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	9.3E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.8E-02
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	4.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-02
	(total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	2.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	(total)										4.3E-07
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	6.5E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	(total)										7.8E-07
										Total Risk Across All Exposure Routes/Pathways	**1.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.0E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.0E-04
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	5.2E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-04
	(total)												3.7E-04
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	8.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.3E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.6E-04
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	6.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-04
	(total)												4.8E-04

Total Hazard Index Across All Exposure Routes/Pathways **8.5E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	6.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	5.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	3.0E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	(total)										1.3E-07
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	4.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	9.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	**2.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.91E-07	Cancer Ingestion Intake - CTE	8.57E-08
Noncancer Ingestion Intake - RME	4.57E-06	Noncancer Ingestion Intake - CTE	2.00E-06
Cancer Dermal Intake - RME	1.37E-05	Cancer Dermal Intake - CTE	1.20E-06
Noncancer Dermal Intake - RME	1.60E-04	Noncancer Dermal Intake - CTE	2.80E-05

SITE 7 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.9E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	7.6E-02
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.9E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.4E-02
	(total)												1.4E-01
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.4E-02	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.6E-01
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	6.7E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.2E-01
	(total)												4.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.6E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	(total)										3.6E-06
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	9.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.1E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	5.8E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-06
	(total)										7.0E-06
										Total Risk Across All Exposure Routes/Pathways	**1.1E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	4.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	2.5E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	4.7E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.2E-03
	(total)												8.9E-03
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	8.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	3.5E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	6.6E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.9E-03
	(total)												1.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	5.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	(total)										2.3E-07
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	3.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	9.2E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	7.6E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	(total)										1.0E-07
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) , Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 7 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	6.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.2E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.3E-02
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	5.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-02
	(total)												4.2E-02
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	8.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.1E-02	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.0E-01
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	5.2E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-01
	(total)												3.8E-01

Total Hazard Index Across All Exposure Routes/Pathways **4.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.4E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	2.0E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	(total)										4.3E-06
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	2.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	9.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	1.8E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-05
	(total)										2.1E-05
										Total Risk Across All Exposure Routes/Pathways	**2.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	5.6E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.1E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	2.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.6E-04
	(total)												2.0E-03
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	2.0E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	3.9E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.0E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.5E-03
	(total)												7.4E-03

Total Hazard Index Across All Exposure Routes/Pathways **9.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-08
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	5.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	2.9E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	(total)										1.2E-07
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	5.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**2.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 7 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	6.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.1E-02	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.1E-01
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	5.4E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.8E-01
	(total)												3.9E-01
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.9E-02	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	3.7E-01
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	9.4E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.1E-01
	(total)												6.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	5.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-06
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	9.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	4.6E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	(total)										9.9E-06
Dermal	BAP EQUIVALENT	5.07E-01	mg/kg	5.07E-01	mg/kg	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.4E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.8E-07
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	4.20E+01	mg/kg	4.20E+01	mg/kg	M	8.1E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.9E-06
	(total)										9.8E-06
										Total Risk Across All Exposure Routes/Pathways	**2.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	5.3E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	1.0E-02
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	2.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.0E-03
	(total)												1.9E-02
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	9.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	3.7E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	7.1E-03
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	1.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.3E-03
	(total)												1.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.9E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	7.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	(total)										3.3E-07
Dermal	BAP EQUIVALENT	2.41E-01	mg/kg	2.41E-01	mg/kg	M	2.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	6.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	HMX	1.23E+02	mg/kg	1.23E+02	mg/kg	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	6.30E+00	mg/kg	6.30E+00	mg/kg	M	5.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	(total)										7.2E-08
										Total Risk Across All Exposure Routes/Pathways	**4.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 7 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	4.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.4E-03
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	8.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.2E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.3E-03
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	2.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.9E-04
	(total)												2.2E-02
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	6.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-02
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.2E-02
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.8E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	7.4E-03
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	7.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.5E-03
	(total)												6.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**9.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.5E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	1.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	8.5E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	(total)										2.3E-07
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	6.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	2.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	9.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	2.7E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-07
	(total)										3.4E-07
										Total Risk Across All Exposure Routes/Pathways	**5.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	8.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	8.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.4E-03
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.3E-03
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.0E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	5.8E-04
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	5.9E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E-04
	(total)												5.4E-03
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	6.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-03
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.2E-03
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.8E-05	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	7.4E-04
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	7.5E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.5E-04
	(total)												6.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.3E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-09
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	1.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	7.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	(total)										2.0E-08
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	2.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	8.6E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	9.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	(total)										1.2E-08
										Total Risk Across All Exposure Routes/Pathways	**3.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 7 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	9.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	8.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	7.8E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-01
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	1.9E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.2E-01
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.9E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	5.6E-02
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	5.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-02
	(total)												5.2E-01
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	8.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	3.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	5.1E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.5E-02
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	1.3E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.1E-01
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.9E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	3.7E-02
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	3.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	(total)												3.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**8.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.4E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	1.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	4.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	8.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.9E-08
	(total)										2.2E-07
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	4.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.5E-09
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	7.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	5.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	(total)										6.8E-08
										Total Risk Across All Exposure Routes/Pathways	**2.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	4.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	3.9E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.5E-02
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	9.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-01
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	1.5E-03	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	2.8E-02
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	2.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.5E-03
	(total)												2.6E-01
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	6.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-02
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	2.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.2E-02
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	3.8E-04	mg/kg-day	5.20E-02	mg/kg-day	NA	NA	7.4E-03
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	7.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.5E-03
	(total)												6.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Semivolatiles - 0.1

SITE 7 - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	7.0E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	6.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	5.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	4.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-08
	(total)										1.1E-07
Dermal	BAP EQUIVALENT	2.91E-01	mg/kg	2.91E-01	mg/kg	M	2.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Aroclor-1260	2.50E-01	mg/kg	2.50E-01	mg/kg	M	9.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	2-Amino-4,6-dinitrotoluene	2.30E+00	mg/kg	2.30E+00	mg/kg	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	5.65E+00	mg/kg	5.65E+00	mg/kg	M	3.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	8.60E+02	mg/kg	8.60E+02	mg/kg	M	5.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.68E+01	mg/kg	1.68E+01	mg/kg	M	1.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	(total)										1.4E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Semivolatiles - 0.1

SITE 7 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	7.70E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	1.84E-06
1,1,2-Trichloroethane	1.30E-03		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	2.28E-08
1,1-Dichloroethene	1.50E-03		o		8.20E-01	1.00E+00	3.40E-01		1.60E-02		1.30E-02	4.02E-08
1,2-Dichloroethane	1.80E-03		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	1.62E-08
Chloroform	1.80E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	3.04E-08
Trichloroethene	3.70E-01		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.21E-05
Vinyl Chloride	1.60E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.66E-08
cis-1,2-dichloroethene	4.30E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	7.21E-07
gamma-BHC (Lindane)	5.80E-05		o		3.50E+01	1.00E+00	5.20E+00		1.40E-02		5.20E-01	5.12E-09
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Mercury	5.50E-03		i			1.00E+00			1.00E-03			5.50E-09
Thallium	5.60E-03		i			1.00E+00			1.00E-03			5.60E-09
2,4,6-Trinitrotoluene	2.10E-01		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	1.52E-06
2-Amino-4,6-dinitrotoluene	6.20E-02		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	4.49E-07
4-Amino-2,6-dinitrotoluene	1.10E-01		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	7.97E-07
RDX	5.10E-01		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	3.77E-05
Ammonium Perchlorate	2.84E-02		i			1.00E+00			1.00E-03			2.84E-08

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	6.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	1.9E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	2.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	3.3E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.4E-07
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	6.5E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.5E-06
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	2.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.8E-06
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	2.3E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.9E-04
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	2.9E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.2E-05
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	5.1E-07	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	5.7E-05
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	2.1E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.9E-06
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	3.8E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.8E-05
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	1.5E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.6E-02
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	9.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.1E-04
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	6.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	7.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.3E-03
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	7.1E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.0E-03
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	1.9E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.9E-02
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	5.7E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.5E-02
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.0E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-01
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	4.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-01
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	3.6E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.2E-04
	(total)												4.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	2.2E-09	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-10
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	6.8E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-12
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	7.5E-10	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	1.2E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	2.3E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	7.6E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.6E-10
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	8.7E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	5.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-09
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	8.3E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	1.0E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-09
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	1.8E-07	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	7.3E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-09
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	1.4E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.4E-10
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	5.5E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	7.5E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	2.3E-08	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	2.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	2.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	6.9E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	1.7E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-05
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.2E-05
										Total Risk Across All Exposure Routes/Pathways	**2.2E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,1,2,2-Tetrachloroethane	1.34E-02	o	2.20E+00	1.00E+00	9.20E-01	9.00E-03	2.50E-02	3.19E-07
1,1,2-Trichloroethane	1.08E-03	o	1.40E+00	1.00E+00	5.70E-01	8.40E-03	1.10E-02	1.90E-08
1,1-Dichloroethene	1.09E-03	o	8.20E-01	1.00E+00	3.40E-01	1.60E-02	1.30E-02	2.92E-08
1,2-Dichloroethane	1.19E-03	o	8.40E-01	1.00E+00	3.50E-01	5.30E-03	3.00E-03	1.07E-08
Chloroform	1.20E-03	o	1.10E+00	1.00E+00	4.70E-01	8.90E-03	9.30E-03	2.02E-08
Trichloroethene	1.04E-01	o	1.30E+00	1.00E+00	5.50E-01	1.60E-02	2.60E-02	3.40E-06
Vinyl Chloride	1.11E-03	o	5.10E-01	1.00E+00	2.10E-01	7.30E-03	2.30E-03	1.15E-08
cis-1,2-dichloroethene	1.18E-02	o	8.20E-01	1.00E+00	3.40E-01	1.00E-02	7.20E-03	1.99E-07
gamma-BHC (Lindane)	3.00E-05	o	3.50E+01	1.00E+00	5.20E+00	1.40E-02	5.20E-01	2.65E-09
Arsenic	9.28E-04	i		1.00E+00		1.00E-03		9.28E-10
Mercury	1.35E-03	i		1.00E+00		1.00E-03		1.35E-09
Thallium	2.14E-03	i		1.00E+00		1.00E-03		2.14E-09
2,4,6-Trinitrotoluene	3.96E-02	o	2.70E+00	1.00E+00	1.10E+00	2.50E-03	5.20E-03	2.87E-07
2-Amino-4,6-dinitrotoluene	1.21E-02	o	2.70E+00	1.00E+00	1.10E+00	2.50E-03	5.20E-03	8.74E-08
4-Amino-2,6-dinitrotoluene	2.13E-02	o	2.70E+00	1.00E+00	1.10E+00	2.50E-03	5.20E-03	1.55E-07
RDX	9.43E-02	o	4.75E+00	1.00E+00	1.98E+00	1.90E-02	7.41E-04	6.97E-06
Ammonium Perchlorate	9.07E-03	i		1.00E+00		1.00E-03		9.07E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	2.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	4.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	3.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	5.5E-11	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	3.9E-08
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	1.1E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.3E-06
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	4.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	9.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.3E-06
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.0E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.4E-05
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.2E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.0E-05
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	1.9E-07	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.1E-05
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	6.8E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.3E-06
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-05
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	2.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.6E-03
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	7.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-04
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	1.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.6E-05
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	5.9E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-05
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	8.5E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.1E-04
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	1.4E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.9E-04
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	1.8E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.6E-03
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	5.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.2E-03
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	9.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-02
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	4.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-02
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	5.8E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.2E-04
	(total)												4.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	3.4E-11	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-12
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	5.1E-12	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-13
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	4.9E-11	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	8.6E-12
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	7.1E-12	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	6.4E-13
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	1.4E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	1.9E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-11
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	5.4E-11	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	1.3E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.5E-11
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.6E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.5E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	8.8E-10
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	2.4E-08	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	8.8E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.6E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	2.8E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	9.3E-09	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	2.2E-09	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	7.6E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	1.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	2.3E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-09
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	7.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	5.7E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-07
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	7.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.5E-07
										Total Risk Across All Exposure Routes/Pathways	**7.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: **SITE 7 - ORDNANCE BURN AREA**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/18/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	7.70E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	1.84E-06
1,1,2-Trichloroethane	1.30E-03		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	2.28E-08
1,1-Dichloroethene	1.50E-03		o		8.20E-01	1.00E+00	3.40E-01		1.60E-02		1.30E-02	4.02E-08
1,2-Dichloroethane	1.80E-03		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	1.62E-08
Chloroform	1.80E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	3.04E-08
Trichloroethene	3.70E-01		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	1.21E-05
Vinyl Chloride	1.60E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.66E-08
cis-1,2-dichloroethene	4.30E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	7.21E-07
gamma-BHC (Lindane)	5.80E-05		o		3.50E+01	1.00E+00	5.20E+00		1.40E-02		5.20E-01	5.12E-09
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Mercury	5.50E-03		i			1.00E+00			1.00E-03			5.50E-09
Thallium	5.60E-03		i			1.00E+00			1.00E-03			5.60E-09
2,4,6-Trinitrotoluene	2.10E-01		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	1.52E-06
2-Amino-4,6-dinitrotoluene	6.20E-02		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	4.49E-07
4-Amino-2,6-dinitrotoluene	1.10E-01		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	7.97E-07
RDX	5.10E-01		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	3.77E-05
Ammonium Perchlorate	2.84E-02		i			1.00E+00			1.00E-03			2.84E-08

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	1.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	3.2E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.3E-06
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	6.2E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.2E-05
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.5E-05
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	1.2E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.9E-03
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	1.4E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.6E-04
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	2.6E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.8E-04
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	1.0E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.4E-05
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	1.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-04
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	7.7E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.3E-01
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	4.6E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.6E-03
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	3.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	3.5E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.7E-02
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	3.6E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.1E-03
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	9.6E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.9E-01
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	2.8E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.7E-01
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	5.1E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.4E-01
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	2.4E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.0E-01
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	1.8E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.6E-03
	(total)												2.5E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	8.4E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	2.6E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-12
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	2.9E-10	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-11
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	4.6E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	8.9E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-12
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	2.9E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	3.3E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	2.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.1E-10
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	1.7E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	2.1E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	3.6E-08	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	1.5E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	2.7E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	1.1E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	1.5E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	6.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	4.6E-09	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	5.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	1.4E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	4.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	7.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	3.4E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.3E-06
										Total Risk Across All Exposure Routes/Pathways	**4.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	1.34E-02		o		2.20E+00	1.00E+00	9.20E-01		9.00E-03		2.50E-02	3.19E-07
1,1,2-Trichloroethane	1.08E-03		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.90E-08
1,1-Dichloroethene	1.09E-03		o		8.20E-01	1.00E+00	3.40E-01		1.60E-02		1.30E-02	2.92E-08
1,2-Dichloroethane	1.19E-03		o		8.40E-01	1.00E+00	3.50E-01		5.30E-03		3.00E-03	1.07E-08
Chloroform	1.20E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	2.02E-08
Trichloroethene	1.04E-01		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.40E-06
Vinyl Chloride	1.11E-03		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	1.15E-08
cis-1,2-dichloroethene	1.18E-02		o		8.20E-01	1.00E+00	3.40E-01		1.00E-02		7.20E-03	1.99E-07
gamma-BHC (Lindane)	3.00E-05		o		3.50E+01	1.00E+00	5.20E+00		1.40E-02		5.20E-01	2.65E-09
Arsenic	9.28E-04		i			1.00E+00			1.00E-03			9.28E-10
Mercury	1.35E-03		i			1.00E+00			1.00E-03			1.35E-09
Thallium	2.14E-03		i			1.00E+00			1.00E-03			2.14E-09
2,4,6-Trinitrotoluene	3.96E-02		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	2.87E-07
2-Amino-4,6-dinitrotoluene	1.21E-02		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	8.74E-08
4-Amino-2,6-dinitrotoluene	2.13E-02		o		2.70E+00	1.00E+00	1.10E+00		2.50E-03		5.20E-03	1.55E-07
RDX	9.43E-02		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	6.97E-06
Ammonium Perchlorate	9.07E-03		i			1.00E+00			1.00E-03			9.07E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	5.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	7.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	7.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	1.1E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	7.5E-07
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	2.1E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.4E-05
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	8.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.5E-05
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.0E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.4E-04
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.2E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.0E-04
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	1.9E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.1E-04
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	6.8E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.3E-05
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-04
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	2.2E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.6E-02
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	7.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.3E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-03
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	1.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.6E-04
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	5.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-04
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	8.5E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.1E-03
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	1.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.9E-03
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	1.8E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.6E-02
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	5.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.2E-02
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	9.8E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-01
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	4.4E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-01
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	5.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.2E-03
	(total)												4.9E-01

Total Hazard Index Across All Exposure Routes/Pathways **4.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	7.3E-11	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	1.1E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	6.1E-13
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	1.1E-10	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-11
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	1.5E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-12
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	3.0E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-12
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	4.1E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-11
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	1.2E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-11
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	2.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.7E-11
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.9E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.7E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	9.8E-10
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	2.6E-08	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	9.7E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	8.8E-10
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.8E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-10
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	3.1E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	1.0E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	2.4E-09	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	8.4E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	2.6E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-09
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	7.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	6.3E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-07
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	8.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.4E-07
										Total Risk Across All Exposure Routes/Pathways	**8.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,1,2,2-Tetrachloroethane	7.70E-02	o	2.20E+00	2.50E-01	9.20E-01	9.00E-03	2.50E-02	9.19E-07
1,1,2-Trichloroethane	1.30E-03	o	1.40E+00	2.50E-01	5.70E-01	8.40E-03	1.10E-02	1.14E-08
1,1-Dichloroethene	1.50E-03	o	8.20E-01	2.50E-01	3.40E-01	1.60E-02	1.30E-02	1.93E-08
1,2-Dichloroethane	1.80E-03	o	8.40E-01	2.50E-01	3.50E-01	5.30E-03	3.00E-03	7.80E-09
Chloroform	1.80E-03	o	1.10E+00	2.50E-01	4.70E-01	8.90E-03	9.30E-03	1.52E-08
Trichloroethene	3.70E-01	o	1.30E+00	2.50E-01	5.50E-01	1.60E-02	2.60E-02	6.07E-06
Vinyl Chloride	1.60E-03	o	5.10E-01	2.50E-01	2.10E-01	7.30E-03	2.30E-03	7.40E-09
cis-1,2-dichloroethene	4.30E-02	o	8.20E-01	2.50E-01	3.40E-01	1.00E-02	7.20E-03	3.47E-07
gamma-BHC (Lindane)	5.80E-05	o	3.50E+01	2.50E-01	5.20E+00	1.40E-02	5.20E-01	2.56E-09
Arsenic	2.80E-03	i		2.50E-01		1.00E-03		7.00E-10
Mercury	5.50E-03	i		2.50E-01		1.00E-03		1.38E-09
Thallium	5.60E-03	i		2.50E-01		1.00E-03		1.40E-09
2,4,6-Trinitrotoluene	2.10E-01	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	7.61E-07
2-Amino-4,6-dinitrotoluene	6.20E-02	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	2.25E-07
4-Amino-2,6-dinitrotoluene	1.10E-01	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	3.99E-07
RDX	5.10E-01	o	4.75E+00	2.50E-01	1.98E+00	1.90E-02	7.41E-04	1.88E-05
Ammonium Perchlorate	2.84E-02	i		2.50E-01		1.00E-03		7.10E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	2.1E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.5E-02
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	3.6E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	8.9E-03
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	4.1E-05	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	4.6E-03
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	4.9E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.6E-03
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	4.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.9E-03
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	1.0E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.7E+00
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	4.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	1.2E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-01
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	1.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.3E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	7.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-01
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	1.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.0E-01
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	1.5E-04	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.2E+00
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	5.8E-03	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.2E+01
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	1.7E-03	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.8E+01
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.0E-03	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.0E+01
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	1.4E-02	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.7E+00
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	7.8E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.6E+00
	(total)												1.0E+02

SITE 7 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	2.9E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.8E-03
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	3.6E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	9.0E-04
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	6.1E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	6.8E-04
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	2.5E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.2E-05
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	4.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.8E-04
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	1.9E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.2E-01
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	1.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-02
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	8.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.4E-04
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	4.3E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.1E-02
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	4.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.3E-03
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	2.4E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.8E-01
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	7.1E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.2E+00
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.3E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.1E+00
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	5.9E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E+00
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	2.2E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.5E-03
	(total)												6.1E+00

SITE 7 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	1.47E-02	(mg/m^3- min)	R	3.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	3.54E-04	(mg/m^3- min)	R	7.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	5.54E-04	(mg/m^3- min)	R	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	5.58E-04	(mg/m^3- min)	R	1.2E-05	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	8.7E-03
	Chloroform	1.80E-03	mg/L	5.89E-04	(mg/m^3- min)	R	1.3E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.5E-01
	Trichloroethene	3.70E-01	mg/L	1.21E-01	(mg/m^3- min)	R	2.6E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	6.88E-04	(mg/m^3- min)	R	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.53E-02	(mg/m^3- min)	R	3.3E-04	mg/kg-day		mg/kg-day	NA	NA	
													1.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E+02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	7.2E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-04
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	1.2E-05	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-07
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	1.4E-05	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	8.5E-06
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	1.7E-05	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	1.7E-05	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	3.5E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-05
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	1.5E-05	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-05
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	4.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	5.4E-07	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.6E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-05
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	5.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	5.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	2.0E-03	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.9E-05
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	5.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.0E-03.	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	4.8E-03	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-04
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.5E-04

SITE 7 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	9.9E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-05
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	1.2E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	2.1E-06	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	8.4E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	1.6E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	6.6E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-06
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	8.0E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	3.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	2.8E-07	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	7.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	8.2E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-06
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	4.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	2.0E-03	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-04
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	7.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.6E-04

SITE 7 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	1.47E-02	(mg/m^3- min)	R	1.1E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.2E-05
	1,1,2-Trichloroethane	1.30E-03	mg/L	3.54E-04	(mg/m^3- min)	R	2.6E-06	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.5E-07
	1,1-Dichloroethene	1.50E-03	mg/L	5.54E-04	(mg/m^3- min)	R	4.1E-06	mg/kg-day	1.75E-01	(mg/kg-day)$^{-1}$	7.2E-07
	1,2-Dichloroethane	1.80E-03	mg/L	5.58E-04	(mg/m^3- min)	R	4.2E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	3.8E-07
	Chloroform	1.80E-03	mg/L	5.89E-04	(mg/m^3- min)	R	4.4E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	3.6E-07
	Trichloroethene	3.70E-01	mg/L	1.21E-01	(mg/m^3- min)	R	9.0E-04	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	5.4E-06
	Vinyl Chloride	1.60E-03	mg/L	6.88E-04	(mg/m^3- min)	R	5.1E-06	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	1.5E-06
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.53E-02	(mg/m^3- min)	R	1.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
											3.0E-05
										Total Risk Across All Exposure Routes/Pathways	**1.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	1.34E-02		o		2.20E+00	1.67E-01	9.20E-01		9.00E-03		2.50E-02	1.31E-07
1,1,2-Trichloroethane	1.08E-03		o		1.40E+00	1.67E-01	5.70E-01		8.40E-03		1.10E-02	7.77E-09
1,1-Dichloroethene	1.09E-03		o		8.20E-01	1.67E-01	3.40E-01		1.60E-02		1.30E-02	1.15E-08
1,2-Dichloroethane	1.19E-03		o		8.40E-01	1.67E-01	3.50E-01		5.30E-03		3.00E-03	4.22E-09
Chloroform	1.20E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	8.25E-09
Trichloroethene	1.04E-01		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	1.39E-06
Vinyl Chloride	1.11E-03		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	4.18E-09
cis-1,2-dichloroethene	1.18E-02		o		8.20E-01	1.67E-01	3.40E-01		1.00E-02		7.20E-03	7.79E-08
gamma-BHC (Lindane)	3.00E-05		o		3.50E+01	1.67E-01	5.20E+00		1.40E-02		5.20E-01	1.08E-09
Arsenic	9.28E-04		i			1.67E-01			1.00E-03			1.55E-10
Mercury	1.35E-03		i			1.67E-01			1.00E-03			2.25E-10
Thallium	2.14E-03		i			1.67E-01			1.00E-03			3.57E-10
2,4,6-Trinitrotoluene	3.96E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	1.17E-07
2-Amino-4,6-dinitrotoluene	1.21E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	3.57E-08
4-Amino-2,6-dinitrotoluene	2.13E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	6.32E-08
RDX	9.43E-02		o		4.75E+00	1.67E-01	1.98E+00		1.90E-02		7.41E-04	2.85E-06
Ammonium Perchlorate	9.07E-03		i			1.67E-01			1.00E-03			1.51E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	1.7E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.9E-03
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.4E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.5E-03
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	1.4E-05	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.6E-03
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	1.5E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.1E-04
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-03
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	1.3E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.2E-01
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-02
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	3.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	1.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.0E-02
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.8E-02
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	2.7E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.9E-01
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	5.1E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.0E+00
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	1.5E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.6E+00
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	2.7E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.6E+00
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	1.2E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.0E-01
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	1.2E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.3E-01
	(total)												9.5E+00

SITE 7 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.4E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.0E-04
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.4E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.6E-04
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	2.1E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.3E-04
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	7.7E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.6E-05
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-04
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	2.5E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.2E-02
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	7.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.4E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-03
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	2.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-04
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	2.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.5E-05
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	4.1E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.0E-03
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	6.5E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	9.3E-04
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	2.2E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.3E-02
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	6.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-01
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	1.2E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.9E-01
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	5.2E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-01
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	2.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.5E-04
	(total)												5.7E-01

SITE 7 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	2.55E-03	(mg/m^3- min)	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	2.95E-04	(mg/m^3- min)	R	2.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	4.02E-04	(mg/m^3- min)	R	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	3.70E-04	(mg/m^3- min)	R	3.0E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.1E-03
	Chloroform	1.20E-03	mg/L	3.92E-04	(mg/m^3- min)	R	3.1E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.7E-02
	Trichloroethene	1.04E-01	mg/L	3.38E-02	(mg/m^3- min)	R	2.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	4.76E-04	(mg/m^3- min)	R	3.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	4.21E-03	(mg/m^3- min)	R	3.4E-05	mg/kg-day		mg/kg-day	NA	NA	
													3.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	1.7E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-06
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.4E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-08
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	1.4E-06	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-07
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	1.5E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	1.3E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	1.4E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-06
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	3.8E-08	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	1.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	5.1E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	2.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	1.2E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-05

SITE 7 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	2.4E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.4E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	8.1E-09
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	2.1E-07	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	7.7E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-09
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	9.2E-10
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	2.5E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-07
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	7.7E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	2.0E-08	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	2.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-09
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	4.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	6.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	2.2E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	6.5E-08
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	6.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	5.2E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.7E-06
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	2.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.9E-06

SITE 7 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	2.55E-03	(mg/m^3- min)	R	2.0E-06	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	4.1E-07
	1,1,2-Trichloroethane	1.08E-03	mg/L	2.95E-04	(mg/m^3- min)	R	2.4E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.3E-08
	1,1-Dichloroethene	1.09E-03	mg/L	4.02E-04	(mg/m^3- min)	R	3.2E-07	mg/kg-day	1.75E-01	(mg/kg-day)$^{-1}$	5.6E-08
	1,2-Dichloroethane	1.19E-03	mg/L	3.70E-04	(mg/m^3- min)	R	3.0E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	2.7E-08
	Chloroform	1.20E-03	mg/L	3.92E-04	(mg/m^3- min)	R	3.1E-07	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	2.5E-08
	Trichloroethene	1.04E-01	mg/L	3.38E-02	(mg/m^3- min)	R	2.7E-05	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	1.6E-07
	Vinyl Chloride	1.11E-03	mg/L	4.76E-04	(mg/m^3- min)	R	3.8E-07	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	1.1E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	4.21E-03	(mg/m^3- min)	R	3.4E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
											8.1E-07
										Total Risk Across All Exposure Routes/Pathways	**3.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/18/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
1,1,2,2-Tetrachloroethane	7.70E-02	o	2.20E+00	2.50E-01	9.20E-01	9.00E-03	2.50E-02	9.19E-07
1,1,2-Trichloroethane	1.30E-03	o	1.40E+00	2.50E-01	5.70E-01	8.40E-03	1.10E-02	1.14E-08
1,1-Dichloroethene	1.50E-03	o	8.20E-01	2.50E-01	3.40E-01	1.60E-02	1.30E-02	1.93E-08
1,2-Dichloroethane	1.80E-03	o	8.40E-01	2.50E-01	3.50E-01	5.30E-03	3.00E-03	7.80E-09
Chloroform	1.80E-03	o	1.10E+00	2.50E-01	4.70E-01	8.90E-03	9.30E-03	1.52E-08
Trichloroethene	3.70E-01	o	1.30E+00	2.50E-01	5.50E-01	1.60E-02	2.60E-02	6.07E-06
Vinyl Chloride	1.60E-03	o	5.10E-01	2.50E-01	2.10E-01	7.30E-03	2.30E-03	7.40E-09
cis-1,2-dichloroethene	4.30E-02	o	8.20E-01	2.50E-01	3.40E-01	1.00E-02	7.20E-03	3.47E-07
gamma-BHC (Lindane)	5.80E-05	o	3.50E+01	2.50E-01	5.20E+00	1.40E-02	5.20E-01	2.56E-09
Arsenic	2.80E-03	i		2.50E-01		1.00E-03		7.00E-10
Mercury	5.50E-03	i		2.50E-01		1.00E-03		1.38E-09
Thallium	5.60E-03	i		2.50E-01		1.00E-03		1.40E-09
2,4,6-Trinitrotoluene	2.10E-01	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	7.61E-07
2-Amino-4,6-dinitrotoluene	6.20E-02	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	2.25E-07
4-Amino-2,6-dinitrotoluene	1.10E-01	o	2.70E+00	2.50E-01	1.10E+00	2.50E-03	5.20E-03	3.99E-07
RDX	5.10E-01	o	4.75E+00	2.50E-01	1.98E+00	1.90E-02	7.41E-04	1.88E-05
Ammonium Perchlorate	2.84E-02	i		2.50E-01		1.00E-03		7.10E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	4.9E-03	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.2E-02
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	8.3E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.1E-02
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	9.6E-05	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.1E-02
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	1.2E-04	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.8E-03
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	1.2E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-02
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	2.4E-02	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.9E+00
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	1.0E-04	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	2.7E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.7E-01
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	3.7E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-02
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-01
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	3.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E+00
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	3.6E-04	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.1E+00
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	1.3E-02	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E+01
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	4.0E-03	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.6E+01
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	7.0E-03	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.2E+02
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	3.3E-02	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E+01
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	1.8E-03	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.6E+00
	(total)												2.4E+02

SITE 7 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	4.1E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.8E-03
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	5.1E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.3E-03
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	8.6E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	9.6E-04
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	3.5E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.2E-04
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	8.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E-04
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	2.7E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.5E-01
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	3.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	1.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-02
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	1.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.8E-03
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-03
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	6.1E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.9E-02
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	6.2E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	8.9E-03
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	3.4E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.8E-01
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	1.0E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E+00
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.8E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.0E+00
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	8.4E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E+00
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	3.2E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.3E-03
	(total)												8.6E+00

SITE 7 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	1.47E-02	(mg/m^3- min)	R	1.5E-03	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	3.54E-04	(mg/m^3- min)	R	3.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	5.54E-04	(mg/m^3- min)	R	5.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	5.58E-04	(mg/m^3- min)	R	5.7E-05	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	4.0E-02
	Chloroform	1.80E-03	mg/L	5.89E-04	(mg/m^3- min)	R	6.0E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.9E-01
	Trichloroethene	3.70E-01	mg/L	1.21E-01	(mg/m^3- min)	R	1.2E-02	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	6.88E-04	(mg/m^3- min)	R	7.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.53E-02	(mg/m^3- min)	R	1.5E-03	mg/kg-day		mg/kg-day	NA	NA	
													7.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E+02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	4.2E-04	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-05
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	7.1E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	8.2E-06	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-06
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	9.9E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	9.0E-07
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	9.9E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-08
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	2.0E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-05
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	8.8E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-05
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	2.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	3.2E-07	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.5E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	3.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	3.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	1.2E-03	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-05
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	3.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	6.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	2.8E-03	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-04
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.9E-04

SITE 7 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	7.70E-02	mg/L	M	3.5E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	7.0E-06
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.30E-03	mg/L	M	4.4E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	1,1-Dichloroethene	1.50E-03	mg/L	1.50E-03	mg/L	M	7.4E-07	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-07
	1,2-Dichloroethane	1.80E-03	mg/L	1.80E-03	mg/L	M	3.0E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Chloroform	1.80E-03	mg/L	1.80E-03	mg/L	M	5.8E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Trichloroethene	3.70E-01	mg/L	3.70E-01	mg/L	M	2.3E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-06
	Vinyl Chloride	1.60E-03	mg/L	1.60E-03	mg/L	M	2.8E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	cis-1,2-dichloroethene	4.30E-02	mg/L	4.30E-02	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	5.80E-05	mg/L	5.80E-05	mg/L	M	9.8E-08	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Mercury	5.50E-03	mg/L	5.50E-03	mg/L	M	5.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.60E-03	mg/L	5.60E-03	mg/L	M	5.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.10E-01	mg/L	2.10E-01	mg/L	M	2.9E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	2-Amino-4,6-dinitrotoluene	6.20E-02	mg/L	6.20E-02	mg/L	M	8.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	5.10E-01	mg/L	5.10E-01	mg/L	M	7.2E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.9E-05
	Ammonium Perchlorate	2.84E-02	mg/L	2.84E-02	mg/L	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.1E-05

SITE 7 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	1.47E-02	(mg/m^3- min)	R	1.3E-04	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	2.5E-05
	1,1,2-Trichloroethane	1.30E-03	mg/L	3.54E-04	(mg/m^3- min)	R	3.1E-06	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.7E-07
	1,1-Dichloroethene	1.50E-03	mg/L	5.54E-04	(mg/m^3- min)	R	4.8E-06	mg/kg-day	1.75E-01	(mg/kg-day)$^{-1}$	8.4E-07
	1,2-Dichloroethane	1.80E-03	mg/L	5.58E-04	(mg/m^3- min)	R	4.8E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	4.4E-07
	Chloroform	1.80E-03	mg/L	5.89E-04	(mg/m^3- min)	R	5.1E-06	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	4.1E-07
	Trichloroethene	3.70E-01	mg/L	1.21E-01	(mg/m^3- min)	R	1.0E-03	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	6.3E-06
	Vinyl Chloride	1.60E-03	mg/L	6.88E-04	(mg/m^3- min)	R	6.0E-06	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	1.8E-06
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.53E-02	(mg/m^3- min)	R	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
											3.5E-05

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Total Risk Across All Exposure Routes/Pathways **6.2E-04**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER**

SITE NAME: **SITE 7 - ORDNANCE BURN AREA**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/18/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2,2-Tetrachloroethane	1.34E-02		o		2.20E+00	1.67E-01	9.20E-01		9.00E-03		2.50E-02	1.31E-07
1,1,2-Trichloroethane	1.08E-03		o		1.40E+00	1.67E-01	5.70E-01		8.40E-03		1.10E-02	7.77E-09
1,1-Dichloroethene	1.09E-03		o		8.20E-01	1.67E-01	3.40E-01		1.60E-02		1.30E-02	1.15E-08
1,2-Dichloroethane	1.19E-03		o		8.40E-01	1.67E-01	3.50E-01		5.30E-03		3.00E-03	4.22E-09
Chloroform	1.20E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	8.25E-09
Trichloroethene	1.04E-01		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	1.39E-06
Vinyl Chloride	1.11E-03		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	4.18E-09
cis-1,2-dichloroethene	1.18E-02		o		8.20E-01	1.67E-01	3.40E-01		1.00E-02		7.20E-03	7.79E-08
gamma-BHC (Lindane)	3.00E-05		o		3.50E+01	1.67E-01	5.20E+00		1.40E-02		5.20E-01	1.08E-09
Arsenic	9.28E-04		i			1.67E-01			1.00E-03			1.55E-10
Mercury	1.35E-03		i			1.67E-01			1.00E-03			2.25E-10
Thallium	2.14E-03		i			1.67E-01			1.00E-03			3.57E-10
2,4,6-Trinitrotoluene	3.96E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	1.17E-07
2-Amino-4,6-dinitrotoluene	1.21E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	3.57E-08
4-Amino-2,6-dinitrotoluene	2.13E-02		o		2.70E+00	1.67E-01	1.10E+00		2.50E-03		5.20E-03	6.32E-08
RDX	9.43E-02		o		4.75E+00	1.67E-01	1.98E+00		1.90E-02		7.41E-04	2.85E-06
Ammonium Perchlorate	9.07E-03		i			1.67E-01			1.00E-03			1.51E-09

2,6-Dinitrotoluene used as surrogate for 2,4,6-trinitrotouene, 2-amino-4,6-dinitrotoluene and 4-amino-4,6-dinitrotoluene (USEPA, 1992)

SITE 7 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	5.7E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	9.5E-03
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	4.6E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.2E-02
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	4.7E-05	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	5.2E-03
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	5.1E-05	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.7E-03
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	5.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.1E-03
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	4.4E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	7.4E-01
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	4.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	5.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.1E-02
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	1.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.3E-03
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	4.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-01
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	5.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.9E-01
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	9.1E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.3E+00
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	1.7E-03	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.4E+00
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	5.2E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.6E+00
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	9.1E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.5E+01
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	4.0E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E+00
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	3.9E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.8E-01
	(total)												3.2E+01

SITE 7 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	3.9E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.5E-04
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	2.3E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	5.8E-04
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	3.4E-06	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	3.8E-04
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	1.3E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.2E-05
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	2.5E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-04
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	4.1E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	6.9E-02
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	2.3E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.3E-03
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	3.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	4.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-04
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	6.7E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.2E-03
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.5E-03
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	3.5E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.0E-02
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	1.1E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-01
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	1.9E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.1E-01
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	8.5E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-01
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	4.5E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	9.0E-04
	(total)												9.2E-01

SITE 7 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	2.55E-03	(mg/m^3- min)	R	9.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	2.95E-04	(mg/m^3- min)	R	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	4.02E-04	(mg/m^3- min)	R	1.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	3.70E-04	(mg/m^3- min)	R	1.4E-05	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	9.9E-03
	Chloroform	1.20E-03	mg/L	3.92E-04	(mg/m^3- min)	R	1.5E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.7E-01
	Trichloroethene	1.04E-01	mg/L	3.38E-02	(mg/m^3- min)	R	1.3E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	4.76E-04	(mg/m^3- min)	R	1.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	4.21E-03	(mg/m^3- min)	R	1.6E-04	mg/kg-day		mg/kg-day	NA	NA	
													1.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	1.6E-05	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-06
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	1.3E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	1.3E-06	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	8.0E-07
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	1.5E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	1.5E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-09
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	1.3E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	1.4E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	3.7E-08	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	1.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	4.8E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	2.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	1.2E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.4E-05

SITE 7 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	1.34E-02	mg/L	M	1.1E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.08E-03	mg/L	M	6.6E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	1,1-Dichloroethene	1.09E-03	mg/L	1.09E-03	mg/L	M	9.8E-08	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	1,2-Dichloroethane	1.19E-03	mg/L	1.19E-03	mg/L	M	3.6E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Chloroform	1.20E-03	mg/L	1.20E-03	mg/L	M	7.0E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-10
	Trichloroethene	1.04E-01	mg/L	1.04E-01	mg/L	M	1.2E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Vinyl Chloride	1.11E-03	mg/L	1.11E-03	mg/L	M	3.6E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	6.8E-08
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.18E-02	mg/L	M	6.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	gamma-BHC (Lindane)	3.00E-05	mg/L	3.00E-05	mg/L	M	9.2E-09	mg/kg-day	1.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Arsenic	9.28E-04	mg/L	9.28E-04	mg/L	M	1.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Mercury	1.35E-03	mg/L	1.35E-03	mg/L	M	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	2.14E-03	mg/L	2.14E-03	mg/L	M	3.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	3.96E-02	mg/L	3.96E-02	mg/L	M	1.0E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	2-Amino-4,6-dinitrotoluene	1.21E-02	mg/L	1.21E-02	mg/L	M	3.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	2.13E-02	mg/L	2.13E-02	mg/L	M	5.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	9.43E-02	mg/L	9.43E-02	mg/L	M	2.4E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-06
	Ammonium Perchlorate	9.07E-03	mg/L	9.07E-03	mg/L	M	1.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-06

SITE 7 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	2.55E-03	(mg/m^3- min)	R	2.7E-06	mg/kg-day	2.00E-01	(mg/kg-day)$^{-1}$	5.5E-07
	1,1,2-Trichloroethane	1.08E-03	mg/L	2.95E-04	(mg/m^3- min)	R	3.2E-07	mg/kg-day	5.60E-02	(mg/kg-day)$^{-1}$	1.8E-08
	1,1-Dichloroethene	1.09E-03	mg/L	4.02E-04	(mg/m^3- min)	R	4.3E-07	mg/kg-day	1.75E-01	(mg/kg-day)$^{-1}$	7.5E-08
	1,2-Dichloroethane	1.19E-03	mg/L	3.70E-04	(mg/m^3- min)	R	4.0E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	3.6E-08
	Chloroform	1.20E-03	mg/L	3.92E-04	(mg/m^3- min)	R	4.2E-07	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	3.4E-08
	Trichloroethene	1.04E-01	mg/L	3.38E-02	(mg/m^3- min)	R	3.6E-05	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	2.2E-07
	Vinyl Chloride	1.11E-03	mg/L	4.76E-04	(mg/m^3- min)	R	5.1E-07	mg/kg-day	3.00E-01	(mg/kg-day)$^{-1}$	1.5E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	4.21E-03	(mg/m^3- min)	R	4.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.1E-06
										Total Risk Across All Exposure Routes/Pathways	**2.8E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 7 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	8.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	3.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	7.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	6.8E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	4.8E-04
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	1.9E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.2E-02
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	6.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	8.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	3.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	3.0E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	1.3E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-09
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	2.6E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	2.4E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	6.7E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-08
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	2.5E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	3.1E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-07
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.6E-06
										Total Risk Across All Exposure Routes/Pathways	**3.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	6.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	2.0E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.4E-04
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	5.4E-07	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.3E-03
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	8.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	2.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	4.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												6.5E-03

Total Hazard Index Across All Exposure Routes/Pathways **6.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	8.2E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	1.7E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-10
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	3.0E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	2.5E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	7.0E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-09
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	1.1E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	3.4E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.5E-07
										Total Risk Across All Exposure Routes/Pathways	**2.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 7 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	4.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	2.3E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.6E-06
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	4.5E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.2E-05
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	1.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	9.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.4E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**5.4E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation:

SITE 7 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	1.5E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	4.7E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-11
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	5.2E-09	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	9.2E-10
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	8.2E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-11
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	1.6E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	5.3E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	6.0E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	3.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.2E-09
										Total Risk Across All Exposure Routes/Pathways	**9.2E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	3.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	4.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	4.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	6.7E-10	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	4.8E-07
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	1.3E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.5E-05
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	5.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.6E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	4.2E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-11
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	6.2E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-12
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	6.0E-10	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	8.6E-11	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-12
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	1.7E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	2.3E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	6.6E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	1.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.5E-10
										Total Risk Across All Exposure Routes/Pathways	**5.5E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.76E-02
Noncancer Inhalation Intake(RME) = 4.38E-01

Cancer Inhalation Intake(CTE) = 8.23E-03
Noncancer Inhalation Intake(CTE) = 1.92E-01

SITE 7 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	1.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	8.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	1.5E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.1E-03
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	4.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.9E-02
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	1.6E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	8.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	1.6E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	6.9E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	1.4E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	1.3E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	3.6E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	1.3E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.0E-07
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	1.7E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	7.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.9E-06
										Total Risk Across All Exposure Routes/Pathways	**1.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	5.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	4.4E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	3.1E-04
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	1.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.4E-02
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	1.9E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	5.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	6.1E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	1.3E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-10
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	2.2E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	1.9E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	5.2E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	8.2E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	2.5E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	7.6E-08
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	4.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.8E-07
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

SITE 7 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	9.5E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	6.8E-04
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	2.6E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.0E-02
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	9.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	5.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	4.0E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	8.1E-07
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	1.7E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	9.6E-09
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	3.5E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	3.2E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	8.9E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	3.3E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-06
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	4.2E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.8E-06
										Total Risk Across All Exposure Routes/Pathways	**4.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	4.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	4.2E-07	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	3.0E-04
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	1.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.3E-02
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	1.8E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	5.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	9.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	1.4E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	2.8E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	4.9E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	8.6E-08
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	4.2E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	1.2E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	1.8E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	5.7E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	9.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.1E-07
										Total Risk Across All Exposure Routes/Pathways	**4.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 7 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	6.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	1.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	2.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	3.2E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.3E-06
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	6.3E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.3E-05
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	2.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.6E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**7.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	2.1E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	6.4E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.6E-11
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	7.0E-09	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	1.1E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	2.2E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	7.1E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-09
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	8.1E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	4.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.2E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	7.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	1.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	1.4E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.0E-06
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	2.8E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.3E-05
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.4E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	7.0E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	1.0E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-12
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	1.0E-09	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	1.4E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-11
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	2.8E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-11
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	3.9E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-10
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	1.1E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-10
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	2.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.2E-10
										Total Risk Across All Exposure Routes/Pathways	**9.2E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 7 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	3.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	2.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	2.7E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	1.9E-03
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	7.3E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	8.5E-02
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	2.7E-03	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	3.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	1.5E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**8.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	4.30E-05	mg/m^3	R	2.8E-06	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	5.7E-07
	1,1,2-Trichloroethane	1.30E-03	mg/L	1.83E-06	mg/m^3	R	1.2E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-09
	1,1-Dichloroethene	1.50E-03	mg/L	3.72E-05	mg/m^3	R	2.4E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	1,2-Dichloroethane	1.80E-03	mg/L	3.46E-06	mg/m^3	R	2.3E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Chloroform	1.80E-03	mg/L	9.53E-06	mg/m^3	R	6.3E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Trichloroethene	3.70E-01	mg/L	3.54E-03	mg/m^3	R	2.3E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Vinyl Chloride	1.60E-03	mg/L	4.46E-05	mg/m^3	R	2.9E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.8E-07
	cis-1,2-dichloroethene	4.30E-02	mg/L	1.95E-04	mg/m^3	R	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.4E-06
										Total Risk Across All Exposure Routes/Pathways	**3.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	3.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	7.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	1.2E-06	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	8.4E-04
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	3.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.8E-02
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	5.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	2.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	7.47E-06	mg/m^3	R	1.1E-07	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	1,1,2-Trichloroethane	1.08E-03	mg/L	1.53E-06	mg/m^3	R	2.2E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	1,1-Dichloroethene	1.09E-03	mg/L	2.70E-05	mg/m^3	R	4.0E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	1,2-Dichloroethane	1.19E-03	mg/L	2.29E-06	mg/m^3	R	3.4E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Chloroform	1.20E-03	mg/L	6.34E-06	mg/m^3	R	9.3E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Trichloroethene	1.04E-01	mg/L	9.94E-04	mg/m^3	R	1.5E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.7E-08
	Vinyl Chloride	1.11E-03	mg/L	3.09E-05	mg/m^3	R	4.5E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	cis-1,2-dichloroethene	1.18E-02	mg/L	5.37E-05	mg/m^3	R	7.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.3E-07
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 7 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	5.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	5.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	9.0E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	6.5E-06
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	1.8E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.1E-04
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	5.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	6.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.1E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	7.70E-02	mg/L	2.19E-07	mg/m^3	R	1.4E-08	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	1,1,2-Trichloroethane	1.30E-03	mg/L	6.77E-09	mg/m^3	R	4.5E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-11
	1,1-Dichloroethene	1.50E-03	mg/L	7.49E-08	mg/m^3	R	4.9E-09	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	8.6E-10
	1,2-Dichloroethane	1.80E-03	mg/L	1.18E-08	mg/m^3	R	7.8E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-11
	Chloroform	1.80E-03	mg/L	2.30E-08	mg/m^3	R	1.5E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Trichloroethene	3.70E-01	mg/L	7.60E-06	mg/m^3	R	5.0E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Vinyl Chloride	1.60E-03	mg/L	8.64E-08	mg/m^3	R	5.7E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	cis-1,2-dichloroethene	4.30E-02	mg/L	5.08E-07	mg/m^3	R	3.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.7E-09
										Total Risk Across All Exposure Routes/Pathways	**8.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 7.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	2.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	4.0E-09	mg/kg-day	1.40E-03	mg/kg-day	NA	NA	2.9E-06
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	7.8E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	9.1E-05
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	7.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												9.4E-05

Total Hazard Index Across All Exposure Routes/Pathways **9.4E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 7 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 7 - ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2,2-Tetrachloroethane	1.34E-02	mg/L	3.80E-08	mg/m^3	R	5.6E-10	mg/kg-day	2.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-10
	1,1,2-Trichloroethane	1.08E-03	mg/L	5.65E-09	mg/m^3	R	8.3E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-12
	1,1-Dichloroethene	1.09E-03	mg/L	5.44E-08	mg/m^3	R	8.0E-10	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	1,2-Dichloroethane	1.19E-03	mg/L	7.81E-09	mg/m^3	R	1.1E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-11
	Chloroform	1.20E-03	mg/L	1.53E-08	mg/m^3	R	2.2E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-11
	Trichloroethene	1.04E-01	mg/L	2.13E-06	mg/m^3	R	3.1E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-10
	Vinyl Chloride	1.11E-03	mg/L	5.98E-08	mg/m^3	R	8.8E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	cis-1,2-dichloroethene	1.18E-02	mg/L	1.40E-07	mg/m^3	R	2.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.3E-10
										Total Risk Across All Exposure Routes/Pathways	**7.3E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 7 - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1260	2.7E-07		5.0E-07	7.7E-07	Aroclor-1260					
			HMX					HMX	Liver, Blood	1.6E-02		5.1E-02	6.7E-02
			RDX	1.6E-06		5.1E-06	6.7E-06	RDX	Prostate	1.4E-02		4.3E-02	5.7E-02
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2,2-Tetrachloroethane		6.0E-07		6.0E-07	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		7.2E-09		7.2E-09	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene		4.6E-07		4.6E-07	1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		2.2E-08		2.2E-08	1,2-Dichloroethane			4.8E-04		4.8E-04
			Chloroform		5.4E-08		5.4E-08	Chloroform	Liver		2.2E-02		2.2E-02
			Trichloroethene		1.5E-06		1.5E-06	Trichloroethene	CNS				
			Vinyl Chloride		9.4E-07		9.4E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil	8.8E-06
Total Risk Across Groundwater	3.6E-06
Total Risk Across All Media and All Exposure Routes	1.2E-05

Total Hazard Index Across All Media and All Exposure Routes	1.5E-01
Total Liver HI =	8.9E-02
Total Blood HI =	6.7E-02
Total Prostate HI =	5.7E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 7-9.

SITE 7 - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.7E-08			9.7E-08	BAP EQUIVALENT					
			Aroclor-1260	1.4E-08		1.1E-08	2.5E-08	Aroclor-1260					
			HMX					HMX	Liver, Blood	1.0E-03		1.3E-03	2.3E-03
			RDX	3.8E-08		4.8E-08	8.6E-08	RDX	Prostate	9.0E-04		1.1E-03	2.0E-03
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2,2-Tetrachloroethane		1.7E-08		1.7E-08	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		9.5E-10		9.5E-10	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene		5.2E-08		5.2E-08	1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		2.3E-09		2.3E-09	1,2-Dichloroethane			1.4E-04		1.4E-04
			Chloroform		5.7E-09		5.7E-09	Chloroform	Liver		6.3E-03		6.3E-03
			Trichloroethene		6.6E-08		6.6E-08	Trichloroethene	CNS				
			Vinyl Chloride		1.0E-07		1.0E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 2.1E-07
Total Risk Across Groundwater: 2.5E-07
Total Risk Across All Media and All Exposure Routes: 4.5E-07

Total Hazard Index Across All Media and All Exposure Routes: 1.1E-02

Total Liver HI = 8.6E-03
Total Blood HI = 2.3E-03
Total Prostate HI = 2.0E-03

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 7-18.

SITE 7 - TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	BAP EQUIVALENT	1.1E-07			1.1E-07	BAP EQUIVALENT					
			Aroclor-1260	2.5E-08		4.8E-08	7.3E-08	Aroclor-1260					
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		5.4E-03		1.7E-02	2.2E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.3E-02		4.2E-02	5.5E-02
			HMX					HMX	Liver, Blood	2.3E-03		7.4E-03	9.7E-03
			RDX	9.3E-08		2.9E-07	3.9E-07	RDX	Prostate	7.9E-04		2.5E-03	3.3E-03
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane		4.4E-10	1.7E-06	1.7E-06	1,1,2,2-Tetrachloroethane				3.9E-04	3.9E-04
			1,1,2-Trichloroethane		3.8E-12	5.9E-09	5.9E-09	1,1,2-Trichloroethane	Liver			7.2E-05	7.2E-05
			1,1-Dichloroethene		1.3E-10	1.1E-07	1.1E-07	1,1-Dichloroethene	Liver			5.7E-05	5.7E-05
			1,2-Dichloroethane		1.1E-11	6.7E-09	6.7E-09	1,2-Dichloroethane			2.4E-07	6.9E-06	7.1E-06
			Chloroform		1.9E-11	8.4E-10	8.6E-10	Chloroform	Liver		7.5E-06	3.8E-05	4.6E-05
			Trichloroethene		4.6E-10	6.0E-07	6.0E-07	Trichloroethene	CNS			2.6E-02	2.6E-02
			Vinyl Chloride		2.6E-10	1.4E-07	1.4E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			9.1E-04	9.1E-04
			gamma-BHC (Lindane)			3.0E-08	3.0E-08	gamma-BHC (Lindane)	Liver, Kidney			2.2E-04	2.2E-04
			Arsenic			1.9E-08	1.9E-08	Arsenic	Skin, Vascular			1.2E-04	1.2E-04
			Mercury					Mercury	CNS			3.3E-03	3.3E-03
			Thallium					Thallium	Liver			1.0E-03	1.0E-03
			2,4,6-Trinitrotoluene			2.1E-07	2.1E-07	2,4,6-Trinitrotoluene	Liver			3.9E-02	3.9E-02
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene				9.5E-02	9.5E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene				1.7E-01	1.7E-01
			RDX			1.9E-05	1.9E-05	RDX	Prostate			1.6E-01	1.6E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			7.2E-04	7.2E-04

Total Risk Across Surface Soil	5.7E-07
Total Risk Across Groundwater	2.2E-05
Total Risk Across All Media and All Exposure Routes	2.2E-05

Total Hazard Index Across All Media and All Exposure Routes	5.8E-01
Total Liver HI =	4.9E-02
Total CNS HI =	2.9E-02
Total Blood HI =	2.3E-02
Total Prostate HI =	1.6E-01
Total Kidney HI =	2.2E-04
Total Thyroid HI =	7.2E-04
Total Skin HI =	1.2E-04
Total Vascular HI =	1.2E-04

SITE 7 - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	BAP EQUIVALENT	9.6E-09			9.6E-09	BAP EQUIVALENT					
			Aroclor-1260	2.3E-09		1.7E-09	4.0E-09	Aroclor-1260					
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		1.4E-03		1.7E-03	3.1E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		3.3E-03		4.2E-03	7.5E-03
			HMX					HMX	Liver, Blood	5.8E-04		7.4E-04	1.3E-03
			RDX	8.4E-09		1.1E-08	1.9E-08	RDX	Prostate	2.0E-04		2.5E-04	4.5E-04
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane		6.9E-12	5.2E-08	5.2E-08	1,1,2,2-Tetrachloroethane				3.4E-05	3.4E-05
			1,1,2-Trichloroethane		2.9E-13	8.8E-10	8.8E-10	1,1,2-Trichloroethane	Liver			3.0E-05	3.0E-05
			1,1-Dichloroethene		8.6E-12	1.4E-08	1.4E-08	1,1-Dichloroethene	Liver			2.1E-05	2.1E-05
			1,2-Dichloroethane		6.4E-13	8.0E-10	8.0E-10	1,2-Dichloroethane			3.9E-08	2.3E-06	2.3E-06
			Chloroform		1.1E-12	1.0E-10	1.0E-10	Chloroform	Liver		1.3E-06	1.3E-05	1.4E-05
			Trichloroethene		1.2E-11	3.1E-08	3.1E-08	Trichloroethene	CNS			3.6E-03	3.6E-03
			Vinyl Chloride		1.6E-11	1.8E-08	1.8E-08	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			1.3E-04	1.3E-04
			gamma-BHC (Lindane)			2.8E-09	2.8E-09	gamma-BHC (Lindane)	Liver, Kidney			5.6E-05	5.6E-05
			Arsenic			1.1E-09	1.1E-09	Arsenic	Skin, Vascular			2.0E-05	2.0E-05
			Mercury					Mercury	CNS			4.1E-04	4.1E-04
			Thallium					Thallium	Liver			1.9E-04	1.9E-04
			2,4,6-Trinitrotoluene			7.0E-09	7.0E-09	2,4,6-Trinitrotoluene	Liver			3.6E-03	3.6E-03
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene				9.2E-03	9.2E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene				1.6E-02	1.6E-02
			RDX			6.3E-07	6.3E-07	RDX	Prostate			1.5E-02	1.5E-02
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			1.2E-04	1.2E-04

Total Risk Across Surface Soil: 3.3E-08
Total Risk Across Groundwater: 7.5E-07

Total Risk Across All Media and All Exposure Routes: 7.9E-07

Total Hazard Index Across All Media and All Exposure Routes: 6.1E-02

Total Liver HI = 5.2E-03
Total CNS HI = 4.0E-03
Total Blood HI = 3.2E-03
Total Prostate HI = 1.5E-02
Total Kidney HI = 5.6E-05
Total Thyroid HI = 1.2E-04
Total Skin HI = 2.0E-05
Total Vascular HI = 2.0E-05

SITE 7 - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	BAP EQUIVALENT	1.0E-07			1.0E-07	BAP EQUIVALENT					
			Aroclor-1260	2.4E-08		9.5E-09	3.4E-08	Aroclor-1260					
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		1.3E-01		8.5E-02	2.1E-01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		3.2E-01		2.1E-01	5.3E-01
			HMX					HMX	Liver, Blood	5.6E-02		3.7E-02	9.3E-02
			RDX	8.9E-08		5.9E-08	1.5E-07	RDX	Prostate	1.9E-02		1.2E-02	3.1E-02
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane		1.7E-10	3.3E-07	3.3E-07	1,1,2,2-Tetrachloroethane				1.9E-03	1.9E-03
			1,1,2-Trichloroethane		1.5E-12	1.2E-09	1.2E-09	1,1,2-Trichloroethane	Liver			3.6E-04	3.6E-04
			1,1-Dichloroethene		5.1E-11	2.2E-08	2.2E-08	1,1-Dichloroethene	Liver			2.8E-04	2.8E-04
			1,2-Dichloroethane		4.1E-12	1.3E-09	1.3E-09	1,2-Dichloroethane			2.3E-06	3.4E-05	3.7E-05
			Chloroform		7.2E-12	1.7E-10	1.7E-10	Chloroform	Liver		7.2E-05	1.9E-04	2.6E-04
			Trichloroethene		1.8E-10	1.2E-07	1.2E-07	Trichloroethene	CNS			1.3E-01	1.3E-01
			Vinyl Chloride		1.0E-10	2.9E-08	2.9E-08	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			4.6E-03	4.6E-03
			gamma-BHC (Lindane)			6.0E-09	6.0E-09	gamma-BHC (Lindane)	Liver, Kidney			1.1E-03	1.1E-03
			Arsenic			3.8E-09	3.8E-09	Arsenic	Skin, Vascular			5.9E-04	5.9E-04
			Mercury					Mercury	CNS			1.7E-02	1.7E-02
			Thallium					Thallium	Liver			5.1E-03	5.1E-03
			2,4,6-Trinitrotoluene			4.1E-08	4.1E-08	2,4,6-Trinitrotoluene	Liver			1.9E-01	1.9E-01
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene				4.7E-01	4.7E-01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene				8.4E-01	8.4E-01
			RDX			3.8E-06	3.8E-06	RDX	Prostate			8.0E-01	8.0E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			3.6E-03	3.6E-03

Total Risk Across Surface Soil	2.8E-07
Total Risk Across Groundwater	4.3E-06
Total Risk Across All Media and All Exposure Routes	4.6E-06

Total Hazard Index Across All Media and All Exposure Routes	3.3E+00
Total Liver HI =	2.9E-01
Total CNS HI =	1.4E-01
Total Blood HI =	2.2E-01
Total Prostate HI =	8.3E-01
Total Kidney HI =	1.1E-03
Total Thyroid HI =	3.6E-03
Total Skin HI =	5.9E-04
Total Vascular HI =	5.9E-04

SITE 7 - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	BAP EQUIVALENT	5.1E-08			5.1E-08	BAP EQUIVALENT					
			Aroclor-1260	1.2E-08		1.9E-09	1.4E-08	Aroclor-1260					
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		6.5E-02		1.7E-02	8.2E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.6E-01		4.2E-02	2.0E-01
			HMX					HMX	Liver, Blood	2.8E-02		7.4E-03	3.5E-02
			RDX	4.5E-08		1.2E-08	5.6E-08	RDX	Prostate	9.5E-03		2.5E-03	1.2E-02
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane		1.5E-11	5.8E-08	5.8E-08	1,1,2,2-Tetrachloroethane				3.4E-04	3.4E-04
			1,1,2-Trichloroethane		6.1E-13	9.8E-10	9.8E-10	1,1,2-Trichloroethane	Liver			3.0E-04	3.0E-04
			1,1-Dichloroethene		1.8E-11	1.6E-08	1.6E-08	1,1-Dichloroethene	Liver			2.1E-04	2.1E-04
			1,2-Dichloroethane		1.4E-12	8.8E-10	8.9E-10	1,2-Dichloroethane			7.5E-07	2.3E-05	2.3E-05
			Chloroform		2.4E-12	1.1E-10	1.1E-10	Chloroform	Liver		2.4E-05	1.3E-04	1.5E-04
			Trichloroethene		2.5E-11	3.4E-08	3.4E-08	Trichloroethene	CNS			3.6E-02	3.6E-02
			Vinyl Chloride		3.5E-11	2.0E-08	2.0E-08	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood			1.3E-03	1.3E-03
			gamma-BHC (Lindane)			3.1E-09	3.1E-09	gamma-BHC (Lindane)	Liver, Kidney			5.6E-04	5.6E-04
			Arsenic			1.3E-09	1.3E-09	Arsenic	Skin, Vascular			2.0E-04	2.0E-04
			Mercury					Mercury	CNS			4.1E-03	4.1E-03
			Thallium					Thallium	Liver			1.9E-03	1.9E-03
			2,4,6-Trinitrotoluene			7.8E-09	7.8E-09	2,4,6-Trinitrotoluene	Liver			3.6E-02	3.6E-02
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene				9.2E-02	9.2E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene				1.6E-01	1.6E-01
			RDX			6.9E-07	6.9E-07	RDX	Prostate			1.5E-01	1.5E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			1.2E-03	1.2E-03

Total Risk Across Surface Soil	1.2E-07
Total Risk Across Groundwater	8.4E-07
Total Risk Across All Media and All Exposure Routes	9.6E-07

Total Hazard Index Across All Media and All Exposure Routes	8.2E-01
Total Liver HI =	7.4E-02
Total CNS HI =	4.0E-02
Total Blood HI =	8.3E-02
Total Prostate HI =	1.6E-01
Total Kidney HI =	5.6E-04
Total Thyroid HI =	1.2E-03
Total Skin HI =	2.0E-04
Total Vascular HI =	2.0E-04

SITE 7 - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.9E-08			9.9E-08	BAP EQUIVALENT					
			Aroclor-1260	2.0E-08		1.1E-07	1.3E-07	Aroclor-1260					
			HMX					HMX	Liver, Blood	1.0E-03		9.3E-03	1.0E-02
			RDX	1.2E-07		1.1E-06	1.2E-06	RDX	Prostate	8.8E-04		7.9E-03	8.8E-03
						Total Risk Across Surface Soil	1.5E-06					Total Hazard Index Across All Media and All Exposure Routes	1.9E-02

k Across All Media and All Exposure Routes 1.5E-06

Total Liver HI = 1.0E-02
Total Blood HI = 1.0E-02
Total Prostate HI = 8.8E-03

SITE 7 - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	3.5E-09			3.5E-09	BAP EQUIVALENT					
			Aroclor-1260	5.1E-10		1.1E-09	1.6E-09	Aroclor-1260					
			HMX					HMX	Liver, Blood	3.7E-05		1.3E-04	1.7E-04
			RDX	1.4E-09		5.0E-09	6.4E-09	RDX	Prostate	3.3E-05		1.2E-04	1.5E-04
						Total Risk Across Surface Soil	1.2E-08					*Total Hazard Index Across All Media and All Exposure Routes*	3.2E-04

k Across All Media and All Exposure Routes 1.2E-08

Total Liver HI = 1.7E-04
Total Blood HI = 1.7E-04
Total Prostate HI = 1.5E-04

SITE 7 - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.8E-07			1.8E-07	BAP EQUIVALENT					
			Aroclor-1260	3.6E-08		7.0E-08	1.1E-07	Aroclor-1260					
			HMX					HMX	Liver, Blood	5.5E-03		1.8E-02	2.3E-02
			RDX	2.2E-07		7.1E-07	9.3E-07	RDX	Prostate	4.6E-03		1.5E-02	2.0E-02
						Total Risk Across Surface Soil	1.2E-06					Total Hazard Index Across All Media and All Exposure Routes	4.3E-02

k Across All Media and All Exposure Routes 1.2E-06

Total Liver HI = 2.3E-02
Total Blood HI = 2.3E-02
Total Prostate HI = 2.0E-02

SITE 7 - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.3E-08			8.3E-08	BAP EQUIVALENT					
			Aroclor-1260	1.2E-08		2.4E-08	3.6E-08	Aroclor-1260					
			HMX					HMX	Liver, Blood	2.0E-04		2.6E-04	4.5E-04
			RDX	3.3E-08		1.1E-07	1.4E-07	RDX	Prostate	1.7E-04		2.3E-04	4.0E-04
						Total Risk Across Surface Soil	2.6E-07					Total Hazard Index Across All Media and All Exposure Routes	8.5E-04

k Across All Media and All Exposure Routes 2.6E-07

Total Liver HI = 4.5E-04
Total Blood HI = 4.5E-04
Total Prostate HI = 4.0E-04

SITE 7 - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.4E-06			1.4E-06	BAP EQUIVALENT					
			Aroclor-1260	3.0E-07		6.3E-07	9.2E-07	Aroclor-1260					
			HMX					HMX	Liver, Blood	7.6E-02		2.6E-01	3.4E-01
			RDX	1.8E-06		6.3E-06	8.1E-06	RDX	Prostate	6.4E-02		2.2E-01	2.9E-01
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2,2-Tetrachloroethane		3.2E-07		3.2E-07	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		3.9E-09		3.9E-09	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene		2.4E-07		2.4E-07	1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		1.2E-08		1.2E-08	1,2-Dichloroethane			1.1E-03		1.1E-03
			Chloroform		2.9E-08		2.9E-08	Chloroform	Liver		4.9E-02		4.9E-02
			Trichloroethene		8.0E-07		8.0E-07	Trichloroethene	CNS				
			Vinyl Chloride		5.0E-07		5.0E-07	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil: 1.1E-05
Total Risk Across Groundwater: 1.9E-06
Total Risk Across All Media and All Exposure Routes: 1.2E-05

Total Hazard Index Across All Media and All Exposure Routes: 6.8E-01

Total Liver HI = 3.9E-01
Total Blood HI = 3.4E-01
Total Prostate HI = 2.9E-01

SITE 7 - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.5E-07			1.5E-07	BAP EQUIVALENT					
			Aroclor-1260	2.2E-08		1.8E-08	4.0E-08	Aroclor-1260					
			HMX					HMX	Liver, Blood	4.7E-03		6.6E-03	1.1E-02
			RDX	5.9E-08		8.3E-08	1.4E-07	RDX	Prostate	4.2E-03		5.9E-03	1.0E-02
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2,2-Tetrachloroethane		1.2E-08		1.2E-08	1,1,2,2-Tetrachloroethane					
			1,1,2-Trichloroethane		7.0E-10		7.0E-10	1,1,2-Trichloroethane	Liver				
			1,1-Dichloroethene		3.9E-08		3.9E-08	1,1-Dichloroethene	Liver				
			1,2-Dichloroethane		1.7E-09		1.7E-09	1,2-Dichloroethane			3.1E-04		3.1E-04
			Chloroform		4.2E-09		4.2E-09	Chloroform	Liver		1.4E-02		1.4E-02
			Trichloroethene		4.9E-08		4.9E-08	Trichloroethene	CNS				
			Vinyl Chloride		7.6E-08		7.6E-08	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood				

Total Risk Across Surface Soil 3.3E-07

Total Risk Across Groundwater 1.8E-07

Total Risk Across All Media and All Exposure Routes 5.2E-07

Total Hazard Index Across All Media and All Exposure Routes 3.6E-02

Total Liver HI = 2.6E-02

Total Blood HI = 1.1E-02

Total Prostate HI = 1.0E-02

SITE 7 - TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.7E-06			1.7E-06	BAP EQUIVALENT					
			Aroclor-1260	3.6E-07		1.9E-06	2.3E-06	Aroclor-1260					
			HMX					HMX	Liver, Blood	2.3E-02		2.0E-01	2.3E-01
			RDX	2.2E-06		2.0E-05	2.2E-05	RDX	Prostate	1.9E-02		1.7E-01	1.9E-01
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	1.4E-04	2.3E-05	2.0E-05	1.9E-04	1,1,2,2-Tetrachloroethane		3.5E-02		4.8E-03	4.0E-02
			1,1,2-Trichloroethane	7.0E-07	1.6E-07	7.0E-08	9.2E-07	1,1,2-Trichloroethane	Liver	8.9E-03		9.0E-04	9.8E-03
			1,1-Dichloroethene	8.5E-06	1.3E-06	1.3E-06	1.1E-05	1,1-Dichloroethene	Liver	4.6E-03		6.8E-04	5.2E-03
			1,2-Dichloroethane	1.5E-06	4.1E-07	7.7E-08	2.0E-06	1,2-Dichloroethane		1.6E-03	9.3E-03	8.2E-05	1.1E-02
			Chloroform	1.0E-07	4.3E-07	1.0E-08	5.4E-07	Chloroform	Liver	4.9E-03	1.8E-01	4.8E-04	1.8E-01
			Trichloroethene	3.8E-05	7.4E-06	7.2E-06	5.3E-05	Trichloroethene	CNS	1.7E+00		3.2E-01	2.0E+00
			Vinyl Chloride	2.9E-05	2.8E-06	1.5E-06	3.3E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.2E-01		1.1E-02	1.3E-01
			gamma-BHC (Lindane)	7.1E-07		3.6E-07	1.1E-06	gamma-BHC (Lindane)	Liver, Kidney	5.3E-03		2.7E-03	8.0E-03
			Arsenic	3.9E-05		1.1E-07	4.0E-05	Arsenic	Skin, Vascular	2.6E-01		7.4E-04	2.6E-01
			Mercury					Mercury	CNS	5.0E-01		2.1E-02	5.2E-01
			Thallium					Thallium	Liver	2.2E+00		6.3E-03	2.2E+00
			2,4,6-Trinitrotoluene	5.9E-05		2.5E-06	6.2E-05	2,4,6-Trinitrotoluene	Liver	1.2E+01		4.8E-01	1.2E+01
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		2.8E+01		1.2E+00	2.9E+01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		5.0E+01		2.1E+00	5.2E+01
			RDX	5.3E-04		2.2E-04	7.5E-04	RDX	Prostate	4.7E+00		2.0E+00	6.6E+00
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	1.6E+00		4.5E-03	1.6E+00

Total Risk Across Surface Soil: 2.6E-05
Total Risk Across Groundwater: 1.1E-03

Total Risk Across All Media and All Exposure Routes: 1.2E-03

Total Hazard Index Across All Media and All Exposure Routes: 1.1E+02

Total Liver HI =	1.5E+01
Total CNS HI =	2.5E+00
Total Blood HI =	3.6E-01
Total Prostate HI =	6.9E+00
Total Kidney HI =	8.0E-03
Total Thyroid HI =	1.6E+00
Total Skin HI =	2.6E-01
Total Vascular HI =	2.6E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 7-9.

SITE 7 - TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	8.1E-08			8.1E-08	BAP EQUIVALENT					
			Aroclor-1260	1.2E-08		2.5E-08	3.7E-08	Aroclor-1260					
			HMX					HMX	Liver, Blood	1.1E-03		3.9E-03	5.0E-03
			RDX	3.2E-08		1.1E-07	1.5E-07	RDX	Prostate	9.6E-04		3.5E-03	4.4E-03
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	3.4E-06	4.4E-07	4.8E-07	4.3E-06	1,1,2,2-Tetrachloroethane		2.9E-03		4.0E-04	3.3E-03
			1,1,2-Trichloroethane	7.9E-08	1.5E-08	8.1E-09	1.0E-07	1,1,2-Trichloroethane	Liver	3.5E-03		3.6E-04	3.8E-03
			1,1-Dichloroethene	8.4E-07	1.4E-07	1.3E-07	1.1E-06	1,1-Dichloroethene	Liver	1.6E-03		2.3E-04	1.8E-03
			1,2-Dichloroethane	1.4E-07	3.1E-08	7.0E-09	1.8E-07	1,2-Dichloroethane		5.1E-04	2.4E-03	2.6E-05	3.0E-03
			Chloroform	9.4E-09	3.5E-08	9.2E-10	4.5E-08	Chloroform	Liver	1.5E-03	5.0E-02	1.5E-04	5.2E-02
			Trichloroethene	1.5E-06	2.7E-07	2.8E-07	2.0E-06	Trichloroethene	CNS	2.2E-01		4.2E-02	2.6E-01
			Vinyl Chloride	2.7E-06	2.8E-07	1.5E-07	3.1E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	1.5E-02		1.4E-03	1.7E-02
			gamma-BHC (Lindane)	5.0E-08		2.6E-08	7.6E-08	gamma-BHC (Lindane)	Liver, Kidney	1.3E-03		6.6E-04	1.9E-03
			Arsenic	1.8E-06		4.3E-09	1.8E-06	Arsenic	Skin, Vascular	4.0E-02		9.5E-05	4.0E-02
			Mercury					Mercury	CNS	5.8E-02		2.0E-03	5.9E-02
			Thallium					Thallium	Liver	3.9E-01		9.3E-04	3.9E-01
			2,4,6-Trinitrotoluene	1.5E-06		6.5E-08	1.6E-06	2,4,6-Trinitrotoluene	Liver	1.0E+00		4.3E-02	1.1E+00
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		2.6E+00		1.1E-01	2.7E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		4.6E+00		1.9E-01	4.8E+00
			RDX	1.3E-05		5.7E-06	1.9E-05	RDX	Prostate	4.0E-01		1.7E-01	5.8E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	2.3E-01		5.5E-04	2.3E-01

Total Risk Across Surface Soil	2.6E-07
Total Risk Across Groundwater	3.3E-05
Total Risk Across All Media and All Exposure Routes	3.4E-05

Total Hazard Index Across All Media and All Exposure Routes	1.0E+01
Total Liver HI =	1.5E+00
Total CNS HI =	3.2E-01
Total Blood HI =	2.2E-02
Total Prostate HI =	5.8E-01
Total Kidney HI =	1.9E-03
Total Thyroid HI =	2.3E-01
Total Skin HI =	4.0E-02
Total Vascular HI =	4.0E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 7-18.

SITE 7 - TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.1E-06			4.1E-06	BAP EQUIVALENT					
			Aroclor-1260	8.3E-07		8.8E-07	1.7E-06	Aroclor-1260					
			HMX					HMX	Liver, Blood	2.1E-01		3.7E-01	5.8E-01
			RDX	5.1E-06		8.9E-06	1.4E-05	RDX	Prostate	1.8E-01		3.1E-01	4.9E-01
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	8.4E-05	2.6E-05	7.0E-06	1.2E-04	1,1,2,2-Tetrachloroethane		8.2E-02		6.8E-03	8.9E-02
			1,1,2-Trichloroethane	4.1E-07	1.8E-07	2.5E-08	6.1E-07	1,1,2-Trichloroethane	Liver	2.1E-02		1.3E-03	2.2E-02
			1,1-Dichloroethene	4.9E-06	1.3E-06	4.4E-07	6.6E-06	1,1-Dichloroethene	Liver	1.1E-02		9.6E-04	1.2E-02
			1,2-Dichloroethane	9.0E-07	4.6E-07	2.7E-08	1.4E-06	1,2-Dichloroethane		3.8E-03	4.2E-02	1.2E-04	4.6E-02
			Chloroform	6.0E-08	4.7E-07	3.5E-09	5.3E-07	Chloroform	Liver	1.2E-02	7.8E-01	6.8E-04	7.9E-01
			Trichloroethene	2.2E-05	7.7E-06	2.5E-06	3.3E-05	Trichloroethene	CNS	3.9E+00		4.5E-01	4.4E+00
			Vinyl Chloride	1.7E-05	2.7E-06	5.4E-07	2.0E-05	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	2.7E-01		1.5E-02	2.9E-01
			gamma-BHC (Lindane)	4.1E-07		1.3E-07	5.4E-07	gamma-BHC (Lindane)	Liver, Kidney	1.2E-02		3.8E-03	1.6E-02
			Arsenic	2.3E-05		4.0E-08	2.3E-05	Arsenic	Skin, Vascular	6.0E-01		1.0E-03	6.0E-01
			Mercury					Mercury	CNS	1.2E+00		2.9E-02	1.2E+00
			Thallium					Thallium	Liver	5.1E+00		8.9E-03	5.1E+00
			2,4,6-Trinitrotoluene	3.5E-05		8.7E-07	3.5E-05	2,4,6-Trinitrotoluene	Liver	2.7E+01		6.8E-01	2.8E+01
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		6.6E+01		1.7E+00	6.8E+01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.2E+02		3.0E+00	1.2E+02
			RDX	3.1E-04		7.9E-05	3.9E-04	RDX	Prostate	1.1E+01		2.8E+00	1.4E+01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	3.6E+00		6.3E-03	3.6E+00

Total Risk Across Surface Soil	2.0E-05
Total Risk Across Groundwater	6.2E-04
Total Risk Across All Media and All Exposure Routes	6.4E-04

Total Hazard Index Across All Media and All Exposure Routes	2.5E+02
Total Liver HI =	3.4E+01
Total CNS HI =	5.6E+00
Total Blood HI =	8.7E-01
Total Prostate HI =	1.4E+01
Total Kidney HI =	1.6E-02
Total Thyroid HI =	3.6E+00
Total Skin HI =	6.0E-01
Total Vascular HI =	6.0E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 7-9.

SITE 7 - TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	2.1E-07			2.1E-07	BAP EQUIVALENT					
			Aroclor-1260	3.1E-08		1.3E-08	4.4E-08	Aroclor-1260					
			HMX					HMX	Liver, Blood	1.0E-02		7.1E-03	1.7E-02
			RDX	8.5E-08		5.9E-08	1.4E-07	RDX	Prostate	9.0E-03		6.3E-03	1.5E-02
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	3.3E-06	5.7E-07	2.2E-07	4.1E-06	1,1,2,2-Tetrachloroethane		9.5E-03		6.5E-04	1.0E-02
			1,1,2-Trichloroethane	7.5E-08	1.9E-08	3.8E-09	9.8E-08	1,1,2-Trichloroethane	Liver	1.2E-02		5.8E-04	1.2E-02
			1,1-Dichloroethene	8.0E-07	1.4E-07	5.9E-08	1.0E-06	1,1-Dichloroethene	Liver	5.2E-03		3.8E-04	5.6E-03
			1,2-Dichloroethane	1.3E-07	3.9E-08	3.3E-09	1.7E-07	1,2-Dichloroethane		1.7E-03	1.1E-02	4.2E-05	1.2E-02
			Chloroform	8.9E-09	4.2E-08	4.3E-10	5.1E-08	Chloroform	Liver	5.1E-03	2.1E-01	2.5E-04	2.1E-01
			Trichloroethene	1.4E-06	3.0E-07	1.3E-07	1.8E-06	Trichloroethene	CNS	7.4E-01		6.9E-02	8.1E-01
			Vinyl Chloride	2.6E-06	2.9E-07	6.8E-08	2.9E-06	Vinyl Chloride					
			cis-1,2-dichloroethene					cis-1,2-dichloroethene	Blood	5.1E-02		2.3E-03	5.3E-02
			gamma-BHC (Lindane)	4.8E-08		1.2E-08	6.0E-08	gamma-BHC (Lindane)	Liver, Kidney	4.3E-03		1.1E-03	5.3E-03
			Arsenic	1.7E-06		2.0E-09	1.7E-06	Arsenic	Skin, Vascular	1.3E-01		1.5E-04	1.3E-01
			Mercury					Mercury	CNS	1.9E-01		3.2E-03	1.9E-01
			Thallium					Thallium	Liver	1.3E+00		1.5E-03	1.3E+00
			2,4,6-Trinitrotoluene	1.5E-06		3.0E-08	1.5E-06	2,4,6-Trinitrotoluene	Liver	3.4E+00		7.0E-02	3.5E+00
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		8.6E+00		1.8E-01	8.8E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.5E+01		3.1E-01	1.6E+01
			RDX	1.3E-05		2.7E-06	1.5E-05	RDX	Prostate	1.3E+00		2.8E-01	1.6E+00
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	7.8E-01		9.0E-04	7.8E-01

Total Risk Across Surface Soil	4.0E-07
Total Risk Across Groundwater	2.9E-05
Total Risk Across All Media and All Exposure Routes	2.9E-05

Total Hazard Index Across All Media and All Exposure Routes	3.3E+01
Total Liver HI =	5.0E+00
Total CNS HI =	1.0E+00
Total Blood HI =	7.0E-02
Total Prostate HI =	1.6E+00
Total Kidney HI =	5.3E-03
Total Thyroid HI =	7.8E-01
Total Skin HI =	1.3E-01
Total Vascular HI =	1.3E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 7-18.

SITE 7 - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FULL TIME WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.3E-06			1.3E-06	BAP EQUIVALENT					
			Aroclor-1260	2.7E-07		5.0E-07	7.7E-07	Aroclor-1260					
			RDX	1.6E-06		5.1E-06	6.7E-06	RDX	Prostate	1.4E-02		4.3E-02	5.7E-02
Groundwater	Water	Onsite	Trichloroethene		1.5E-06		1.5E-06	Trichloroethene	CNS				
						Total Risk Across Surface Soil	8.8E-06					Total Hazard Index Across All Media and All Exposure Routes	5.7E-02
						Total Risk Across Groundwater	1.5E-06						
												Total Prostate HI =	5.7E-02
						Total Risk Across All Media and All Exposure Routes	1.0E-05						

SITE 7 - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane		4.4E-10	1.7E-06	1.7E-06	1,1,2,2-Tetrachloroethane				3.9E-04	3.9E-04
			RDX			1.9E-05	1.9E-05	RDX	Prostate			1.6E-01	1.6E-01
						Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	1.6E-01
						Total Risk Across Groundwater	2.0E-05						
												Total Liver HI =	1.6E-01
						Total Risk Across All Media and All Exposure Routes	2.0E-05						

SITE 7 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene				8.4E-01	8.4E-01
			RDX			3.8E-06	3.8E-06	RDX	Prostate			8.0E-01	8.0E-01

Total Risk Across Surface Soil
Total Risk Across Groundwater 3.8E-06

Total Risk Across All Media and All Exposure Routes 3.8E-06

Total Hazard Index Across All Media and All Exposure Routes 1.6E+00

Total Prostate HI = 8.0E-01

SITE 7 - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADULT RECREATIONAL USER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	9.9E-08			9.9E-08	BAP EQUIVALENT					
			RDX	1.2E-07		1.1E-06	1.2E-06	RDX	Prostate	8.8E-04		7.9E-03	8.8E-03
						Total Risk Across Surface Soil	1.3E-06					Total Hazard Index Across All Media and All Exposure Routes	8.8E-03

k Across All Media and All Exposure Routes 1.3E-06

Total Prostate HI = 8.8E-03

SITE 7 - TABLE 10.5. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.8E-07			1.8E-07	BAP EQUIVALENT					
			RDX	2.2E-07		7.1E-07	9.3E-07	RDX	Prostate	4.6E-03		1.5E-02	2.0E-02
						Total Risk Across Surface Soil	1.1E-06					Total Hazard Index Across All Media and All Exposure Routes	2.0E-02

k Across All Media and All Exposure Routes 1.1E-06

Total Prostate HI = 2.0E-02

SITE 7 - TABLE 10.6. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.4E-06			1.4E-06	BAP EQUIVALENT					
			Aroclor-1260	3.0E-07		6.3E-07	9.2E-07	Aroclor-1260					
			RDX	1.8E-06		6.3E-06	8.1E-06	RDX	Prostate	6.4E-02		2.2E-01	2.9E-01

Total Risk Across Surface Soil: 1.1E-05
Total Risk Across Groundwater:

Total Hazard Index Across All Media and All Exposure Routes: 2.9E-01

Total Prostate HI = 2.9E-01

Total Risk Across All Media and All Exposure Routes: 1.1E-05

SITE 7 - TABLE 10.7. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	1.7E-06			1.7E-06	BAP EQUIVALENT					
			Aroclor-1260	3.6E-07		1.9E-06	2.3E-06	Aroclor-1260					
			RDX	2.2E-06		2.0E-05	2.2E-05	RDX	Prostate	1.9E-02		1.7E-01	1.9E-01
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	1.4E-04	2.3E-05	2.0E-05	1.9E-04	1,1,2,2-Tetrachloroethane		3.5E-02		4.8E-03	4.0E-02
			1,1-Dichloroethene	8.5E-06	1.3E-06	1.3E-06	1.1E-05	1,1-Dichloroethene	Liver	4.6E-03		6.8E-04	5.2E-03
			1,2-Dichloroethane	1.5E-06	4.1E-07	7.7E-08	2.0E-06	1,2-Dichloroethane		1.6E-03	9.3E-03	8.2E-05	1.1E-02
			Trichloroethene	3.8E-05	7.4E-06	7.2E-06	5.3E-05	Trichloroethene	CNS	1.7E+00		3.2E-01	2.0E+00
			Vinyl Chloride	2.9E-05	2.8E-06	1.5E-06	3.3E-05	Vinyl Chloride					
			gamma-BHC (Lindane)	7.1E-07		3.6E-07	1.1E-06	gamma-BHC (Lindane)	Liver, Kidney	5.3E-03		2.7E-03	8.0E-03
			Arsenic	3.9E-05		1.1E-07	4.0E-05	Arsenic	Skin, Vascular	2.6E-01		7.4E-04	2.6E-01
			Thallium					Thallium	Liver	2.2E+00		6.3E-03	2.2E+00
			2,4,6-Trinitrotoluene	5.9E-05		2.5E-06	6.2E-05	2,4,6-Trinitrotoluene	Liver	1.2E+01		4.8E-01	1.2E+01
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		2.8E+01		1.2E+00	2.9E+01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		5.0E+01		2.1E+00	5.2E+01
			RDX	5.3E-04		2.2E-04	7.5E-04	RDX	Prostate	4.7E+00		2.0E+00	6.6E+00
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	1.6E+00		4.5E-03	1.6E+00

Total Risk Across Surface Soil: 2.6E-05
Total Risk Across Groundwater: 1.1E-03

Total Risk Across All Media and All Exposure Routes: 1.2E-03

Total Hazard Index Across All Media and All Exposure Routes: 1.1E+02

Total Liver HI = 1.4E+01
Total CNS HI = 2.0E+00
Total Prostate HI = 6.8E+00
Total Kidney HI = 8.0E-03
Total Thyroid HI = 1.6E+00
Total Skin HI = 2.6E-01
Total Vascular HI = 2.6E-01

SITE 7 - TABLE 10.7a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	3.4E-06	4.4E-07	4.8E-07	4.3E-06	1,1,2,2-Tetrachloroethane		2.9E-03		4.0E-04	3.3E-03
			1,1-Dichloroethene	8.4E-07	1.4E-07	1.3E-07	1.1E-06	1,1-Dichloroethene	Liver	1.6E-03		2.3E-04	1.8E-03
			Trichloroethene	1.5E-06	2.7E-07	2.8E-07	2.0E-06	Trichloroethene	CNS	2.2E-01		4.2E-02	2.6E-01
			Vinyl Chloride	2.7E-06	2.8E-07	1.5E-07	3.1E-06	Vinyl Chloride					
			Arsenic	1.8E-06		4.3E-09	1.8E-06	Arsenic	Skin, Vascular	4.0E-02		9.5E-05	4.0E-02
			2,4,6-Trinitrotoluene	1.5E-06		6.5E-08	1.6E-06	2,4,6-Trinitrotoluene	Liver	1.0E+00		4.3E-02	1.1E+00
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		2.6E+00		1.1E-01	2.7E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		4.6E+00		1.9E-01	4.8E+00
			RDX	1.3E-05		5.7E-06	1.9E-05	RDX	Prostate	4.0E-01		1.7E-01	5.8E-01

Total Risk Across Surface Soil	
Total Risk Across Groundwater	3.3E-05
Total Risk Across All Media and All Exposure Routes	3.3E-05

Total Hazard Index Across All Media and All Exposure Routes	9.4E+00
Total Liver HI =	1.1E+00
Total CNS HI =	2.6E-01
Total Prostate HI =	5.8E-01
Total Skin HI =	4.0E-02
Total Vascular HI =	4.0E-02

SITE 7 - TABLE 10.8. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BAP EQUIVALENT	4.1E 06			4.1E-06	BAP EQUIVALENT					
			Aroclor-1260	8.3E-07		8.8E-07	1.7E-06	Aroclor-1260					
			RDX	5.1E-06		8.9E-06	1.4E-05	RDX	Prostate	1.8E-01		3.1E-01	4.9E-01
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	8.4E-05	2.6E-05	7.0E-06	1.2E-04	1,1,2,2-Tetrachloroethane		8.2E-02		6.8E-03	8.9E-02
			1,1-Dichloroethene	4.9E-06	1.3E-06	4.4E-07	6.6E-06	1,1-Dichloroethene	Liver	1.1E-02		9.6E-04	1.2E-02
			1,2-Dichloroethane	9.0E-07	4.6E-07	2.7E-08	1.4E-06	1,2-Dichloroethane		3.8E-03	4.2E-02	1.2E-04	4.6E-02
			Trichloroethene	2.2E-05	7.7E-06	2.5E-06	3.3E-05	Trichloroethene	CNS	3.9E+00		4.5E-01	4.4E+00
			Vinyl Chloride	1.7E-05	2.7E-06	5.4E-07	2.0E-05	Vinyl Chloride					
			Arsenic	2.3E-05		4.0E-08	2.3E-05	Arsenic	Skin, Vascular	6.0E-01		1.0E-03	6.0E-01
			Mercury					Mercury	CNS	1.2E+00		2.9E-02	1.2E+00
			Thallium					Thallium	Liver	5.1E+00		8.9E-03	5.1E+00
			2,4,6-Trinitrotoluene	3.5E-05		8.7E-07	3.5E-05	2,4,6-Trinitrotoluene	Liver	2.7E+01		6.8E-01	2.8E+01
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		6.6E+01		1.7E+00	6.8E+01
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.2E+02		3.0E+00	1.2E+02
			RDX	3.1E-04		7.9E-05	3.9E-04	RDX	Prostate	1.1E+01		2.8E+00	1.4E+01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	3.6E+00		6.3E-03	3.6E+00

Total Risk Across Surface Soil: 2.0E-05
Total Risk Across Groundwater: 6.2E-04
Total Risk Across All Media and All Exposure Routes: 6.4E-04

Total Hazard Index Across All Media and All Exposure Routes: 2.4E+02

Total Liver HI = 3.3E+01
Total CNS HI = 4.4E+00
Total Prostate HI = 1.4E+01
Total Thyroid HI = 3.6E+00
Total Skin HI = 1.2E+00
Total Vascular HI = 1.2E+00

SITE 7 - TABLE 10.8a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 7- ORDNANCE BURN AREA
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,1,2,2-Tetrachloroethane	3.3E-06	5.7E-07	2.2E-07	4.1E-06	1,1,2,2-Tetrachloroethane		9.5E-03		6.5E-04	1.0E-02
			1,1-Dichloroethene	8.0E-07	1.4E-07	5.9E-08	1.0E-06	1,1-Dichloroethene	Liver	5.2E-03		3.8E-04	5.6E-03
			Trichloroethene	1.4E-06	3.0E-07	1.3E-07	1.8E-06	Trichloroethene	CNS	7.4E-01		6.9E-02	8.1E-01
			Vinyl Chloride	2.6E-06	2.9E-07	6.8E-08	2.9E-06	Vinyl Chloride					
			Arsenic	1.7E-06		2.0E-09	1.7E-06	Arsenic	Skin, Vascular	1.3E-01		1.5E-04	1.3E-01
			Thallium					Thallium	Liver	1.3E+00		1.5E-03	1.3E+00
			2,4,6-Trinitrotoluene	1.5E-06		3.0E-08	1.5E-06	2,4,6-Trinitrotoluene	Liver	3.4E+00		7.0E-02	3.5E+00
			2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene		8.6E+00		1.8E-01	8.8E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene		1.5E+01		3.1E-01	1.6E+01
			RDX	1.3E-05		2:7E-06	1.5E-05	RDX	Prostate	1.3E+00		2.8E-01	1.6E+00
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	7.8E-01		9.0E-04	7.8E-01

Total Risk Across Surface Soil:
Total Risk Across Groundwater: 2.8E-05

Total Risk Across All Media and All Exposure Routes: 2.8E-05

Total Hazard Index Across All Media and All Exposure Routes: 3.2E+01

Total Liver HI = 4.8E+00
Total CNS HI = 8.1E-01
Total Prostate HI = 1.6E+00
Total Thyroid HI = 7.8E-01
Total Skin HI = 1.3E-01
Total Vascular HI = 1.3E-01

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SITE 7 - ORDNANCE BURN AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2,2-Tetrachloroethane	7.70E-02	1.68E+02	3.44E-04	1.02E+01	9.82E+02	5.92E+00	7.79E+00	1.76E-02	1.47E-02	3.02E-02
1,1,2-Trichloroethane	1.30E-03	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	4.25E-04	3.54E-04	4.32E-02
1,1-Dichloroethene	1.50E-03	9.70E+01	2.61E-02	1.35E+01	1.29E+03	1.33E+01	1.75E+01	6.64E-04	5.54E-04	5.85E-02
1,2-Dichloroethane	1.80E-03	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	6.70E-04	5.58E-04	4.91E-02
Chloroform	1.80E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	7.07E-04	5.89E-04	5.19E-02
Trichloroethene	3.70E-01	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.45E-01	1.21E-01	5.16E-02
Vinyl Chloride	1.60E-03	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	8.26E-04	6.88E-04	6.82E-02
cis-1,2-dichloroethene	4.30E-02	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	1.83E-02	1.53E-02	5.63E-02

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SITE 7 - ORDNANCE BURN AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Calr (mg/m^3)
1,1,2,2-Tetrachloroethane	7.70E-02	7.10E-02	7.90E-06	2.97E+03	1.41E-02	5.54E-03	1.18E-04	3.14E-03	5.54E-03	1.52E-04	5.58E-04	4.30E-05
1,1,2-Trichloroethane	1.30E-03	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	1.83E-06
1,1-Dichloroethene	1.50E-03	9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	7.02E-03	3.52E-05	2.48E-02	3.72E-05
1,2-Dichloroethane	1.80E-03	1.04E-01	9.90E-06	8.52E+03	4.01E-02	8.12E-03	6.14E-05	2.55E-03	8.12E-03	1.23E-04	1.92E-03	3.46E-06
Chloroform	1.80E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	9.53E-06
Trichloroethene	3.70E-01	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.54E-03
Vinyl Chloride	1.60E-03	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	4.46E-05
cis-1,2-dichloroethene	4.30E-02	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	1.95E-04

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.47E-02	1.1E-04	3.2E-04	2.00E-01		2.2E-05	71.9%	NA	NA
1,1,2-Trichloroethane	3.54E-04	2.6E-06	7.7E-06	5.60E-02		1.5E-07	0.5%	NA	NA
1,1-Dichloroethene	5.54E-04	4.1E-06	1.2E-05	1.75E-01		7.2E-07	2.4%	NA	NA
1,2-Dichloroethane	5.58E-04	4.2E-06	1.2E-05	9.10E-02	1.40E-03	3.8E-07	1.2%	8.7E-03	5.5%
Chloroform	5.89E-04	4.4E-06	1.3E-05	8.10E-02	8.60E-05	3.6E-07	1.2%	1.5E-01	94.5%
Trichloroethene	1.21E-01	9.0E-04	2.6E-03	6.00E-03		5.4E-06	17.7%	NA	NA
Vinyl Chloride	6.88E-04	5.1E-06	1.5E-05	3.00E-01		1.5E-06	5.1%	NA	NA
cis-1,2-dichloroethene	1.53E-02	1.1E-04	3.3E-04			NA	NA	NA	NA
					Total	**3.0E-05**	**100.0%**	**1.6E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	6	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	1.47E-02	1.3E-04	1.5E-03	2.00E-01		2.5E-05	71.9%	NA	NA
1,1,2-Trichloroethane	3.54E-04	3.1E-06	3.6E-05	5.60E-02		1.7E-07	0.5%	NA	NA
1,1-Dichloroethene	5.54E-04	4.8E-06	5.6E-05	1.75E-01		8.4E-07	2.4%	NA	NA
1,2-Dichloroethane	5.58E-04	4.8E-06	5.7E-05	9.10E-02	1.40E-03	4.4E-07	1.2%	4.0E-02	5.5%
Chloroform	5.89E-04	5.1E-06	6.0E-05	8.10E-02	8.60E-05	4.1E-07	1.2%	6.9E-01	94.5%
Trichloroethene	1.21E-01	1.0E-03	1.2E-02	6.00E-03		6.3E-06	17.7%	NA	NA
Vinyl Chloride	6.88E-04	6.0E-06	7.0E-05	3.00E-01		1.8E-06	5.1%	NA	NA
cis-1,2-dichloroethene	1.53E-02	1.3E-04	1.5E-03			NA	NA	NA	NA
					Total	**3.5E-05**	**100.0%**	**7.3E-01**	**100.0%**

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SITE 7 - ORDNANCE BURN AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2,2-Tetrachloroethane	1.34E-02	1.68E+02	3.44E-04	1.02E+01	9.82E+02	5.92E+00	7.79E+00	3.06E-03	2.55E-03	1.67E-02
1,1,2-Trichloroethane	1.08E-03	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	3.54E-04	2.95E-04	2.39E-02
1,1-Dichloroethene	1.09E-03	9.70E+01	2.61E-02	1.35E+01	1.29E+03	1.33E+01	1.75E+01	4.82E-04	4.02E-04	3.24E-02
1,2-Dichloroethane	1.19E-03	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	4.44E-04	3.70E-04	2.72E-02
Chloroform	1.20E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	4.70E-04	3.92E-04	2.87E-02
Trichloroethene	1.04E-01	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	4.06E-02	3.38E-02	2.86E-02
Vinyl Chloride	1.11E-03	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	5.71E-04	4.76E-04	3.77E-02
cis-1,2-dichloroethene	1.18E-02	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	5.05E-03	4.21E-03	3.12E-02

Vapor Intrusion from Groundwater - CTE
Source: ASTM E 1739-95
SITE 7 - ORDNANCE BURN AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1,2,2-Tetrachloroethane	1.34E-02	7.10E-02	7.90E-06	2.97E+03	1.41E-02	5.54E-03	1.18E-04	3.14E-03	5.54E-03	1.52E-04	5.58E-04	7.47E-06
1,1,2-Trichloroethane	1.08E-03	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	1.53E-06
1,1-Dichloroethene	1.09E-03	9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	7.02E-03	3.52E-05	2.48E-02	2.70E-05
1,2-Dichloroethane	1.19E-03	1.04E-01	9.90E-06	8.52E+03	4.01E-02	8.12E-03	6.14E-05	2.55E-03	8.12E-03	1.23E-04	1.92E-03	2.29E-06
Chloroform	1.20E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	6.34E-06
Trichloroethene	1.04E-01	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	9.94E-04
Vinyl Chloride	1.11E-03	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	3.09E-05
cis-1,2-dichloroethene	1.18E-02	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	5.37E-05

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	2.55E-03	2.0E-06	2.0E-05	2.00E-01		4.1E-07	50.6%	NA	NA
1,1,2-Trichloroethane	2.95E-04	2.4E-07	2.4E-06	5.60E-02		1.3E-08	1.6%	NA	NA
1,1-Dichloroethene	4.02E-04	3.2E-07	3.2E-06	1.75E-01		5.6E-08	7.0%	NA	NA
1,2-Dichloroethane	3.70E-04	3.0E-07	3.0E-06	9.10E-02	1.40E-03	2.7E-08	3.3%	2.1E-03	5.5%
Chloroform	3.92E-04	3.1E-07	3.1E-06	8.10E-02	8.60E-05	2.5E-08	3.1%	3.7E-02	94.5%
Trichloroethene	3.38E-02	2.7E-05	2.7E-04	6.00E-03		1.6E-07	20.1%	NA	NA
Vinyl Chloride	4.76E-04	3.8E-07	3.8E-06	3.00E-01		1.1E-07	14.2%	NA	NA
cis-1,2-dichloroethene	4.21E-03	3.4E-06	3.4E-05			NA	NA	NA	NA
					Total	**8.1E-07**	**100.0%**	**3.9E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	2.19	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	234	Exposure Frequency (days/year)
ED = :	2	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	730	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 7 - ORDNANCE BURN AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2,2-Tetrachloroethane	2.55E-03	2.7E-06	9.6E-05	2.00E-01		5.5E-07	50.6%	NA	NA
1,1,2-Trichloroethane	2.95E-04	3.2E-07	1.1E-05	5.60E-02		1.8E-08	1.6%	NA	NA
1,1-Dichloroethene	4.02E-04	4.3E-07	1.5E-05	1.75E-01		7.5E-08	7.0%	NA	NA
1,2-Dichloroethane	3.70E-04	4.0E-07	1.4E-05	9.10E-02	1.40E-03	3.6E-08	3.3%	9.9E-03	5.5%
Chloroform	3.92E-04	4.2E-07	1.5E-05	8.10E-02	8.60E-05	3.4E-08	3.1%	1.7E-01	94.5%
Trichloroethene	3.38E-02	3.6E-05	1.3E-03	6.00E-03		2.2E-07	20.1%	NA	NA
Vinyl Chloride	4.76E-04	5.1E-07	1.8E-05	3.00E-01		1.5E-07	14.2%	NA	NA
cis-1,2-dichloroethene	4.21E-03	4.5E-06	1.6E-04			NA	NA	NA	NA
					Total	**1.1E-06**	**100.0%**	**1.8E-01**	**100.0%**

SITE 8

RISK ASSESSMENT CALCULATIONS

SITE 8 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND
PAGE 1 OF 2

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 8 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	Surface Water	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water is not present at this site.
						Dermal	On-site	None	Surface water is not present at this site.
		Air	Vapors from Surface Water	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	Sediment	All Potential Receptors	Adult, Child, Adolescent	Ingestion	On-site	None	Surface water / sediment is not present at this site.
						Dermal	On-site	None	Surface water / sediment is not present at this site.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 8 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	0.16	J	0.16	J	mg/kg	8SS1030100	1/6	0.011 - 0.013	0.16	NA	780	N	**0.8** 100000	SSL_MIGR SSL_INH	No	BSL
75-09-2	Methylene Chloride	0.058		0.058		mg/kg	8SS1000100	1/6	0.004 - 0.033	0.058	NA	85	C	**0.001** 13	SSL_MIGR SSL_INH	No	BSL
108-88-3	Toluene	0.004	J	0.004	J	mg/kg	8SS1030100	1/6	0.011 - 0.013	0.004	NA	1600	N	0.6 650	SSL_MIGR SSL_INH	No	BSL
206-44-0	Fluoranthene	0.072	J	0.072	J	mg/kg	8SS1000100	1/6	0.4 - 0.44	0.072	NA	310	N	210	SSL_MIGR NA	No	BSL
129-00-0	Pyrene	0.07	J	0.07	J	mg/kg	8SS1000100	1/6	0.4 - 0.44	0.07	NA	230	N	210	SSL_MIGR NA	No	BSL
72-54-8	4,4'-DDD	0.013		0.013		mg/kg	8SS1010100	1/4	0.0037 - 0.42	0.013	NA	2.7	C	0.8	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0007	J	0.0026	J	mg/kg	8SS1030100	5/6	0.0018	0.0026	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11096-82-5	Aroclor-1260	0.008	J	0.42		mg/kg	8SS1000100	4/5	4.2	0.42	NA	**0.32**	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.0066	J	0.0066	J	mg/kg	8SS1000100	1/6	0.001 - 0.42	0.0066	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
72-20-8	Endrin	0.00063	J	0.00063	J	mg/kg	8SS1000100	1/6	0.004 - 0.42	0.00063	NA	2.3	N	0.05	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	2430	J	8760	J	mg/kg	8SS1050100	6/6		8760	NA	**7800**	N		NA NA	No	BKG
7440-38-2	Arsenic	8.1		8.1		mg/kg	8SS1010100	1/6	2.1 - 3.4	8.1	NA	**0.43**	C	**1** 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	15		66.1		mg/kg	8SS1050100	6/6		66.1	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-43-9	Cadmium	1.4		1.4		mg/kg	8SS1010100	1/6	0.05 - 0.26	1.4	NA	3.9	N	**0.4** 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	615	J	238000	J	mg/kg	8SS1000100	6/6		238000	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	8.7		16.2		mg/kg	8SS1000100	6/6		16.2	NA	23 (8)	N	**2** 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	2.1		7.8		mg/kg	8SS1050100	6/6		7.8	NA	470	N		NA NA	No	BSL, BKG

SITE 8 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-50-8	Copper	5.3		12.5	K	mg/kg	8SS1000100	6/6		12.5	NA	310	N		NA NA	No	BSL, BKG
57-12-5	Cyanide	0.17		0.17		mg/kg	8SS1040100	1/6	0.15 - 0.18	0.17	NA	160	N	2	SSL_MIGR NA	No	BSL
7439-89-6	Iron	7580		13500		mg/kg	8SS1030100	6/6		13500	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	10.9	K	40.9	K	mg/kg	8SS1010100	6/6		40.9	NA	400 (9)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	436		20800		mg/kg	8SS1000100	6/6		20800	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	177		827		mg/kg	8SS1050100	6/6		827	NA	**160 (10)**	N		NA NA	Yes	ASL
7439-97-6	Mercury	0.08	L	5.1	L	mg/kg	8SS1010100	5/6	0.06	5.1	NA	**2.3 (11)**	N	**0.1** 10	SSL_MIGR SSL_INH	Yes	ASL
7440-02-0	Nickel	3.7		109		mg/kg	8SS1000100	6/6		109	NA	160	N	7 13000	NA SSL_INH	No	BSL, BKG
7440-09-7	Potassium	258		459		mg/kg	8SS1010100	6/6		459	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	8.4		8.4		mg/kg	8SS1010100	1/6	0.62 - 0.74	8.4	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL
7440-23-5	Sodium	24.4		55.9	L	mg/kg	8SS1000100	2/6	19.7 - 21.7	55.9	NA	NA			NA NA	No	NUT
7440-62-2	Vanadium	8		21.2		mg/kg	8SS1050100	6/6		21.2	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	22		102		mg/kg	8SS1020100	6/6		102	NA	2300	N	620	SSL_MIGR NA	No	BSL

Associated Samples:
8SS1000100
8SS1010100
8SS1020100
8SS1030100
8SS1040100
8SS1050100

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias

SITE 8 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 8 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMCIAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	0.047	J	0.16	J	mg/kg	8SS1030100	2/17	0.011 - 0.013	0.16	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
75-09-2	Methylene Chloride	0.055		0.058		mg/kg	8SS1000100	2/17	0.003 - 0.042	0.058	NA	85	C	**0.001** 13	SSL_MIGR SSL_INH	No	BSL
108-88-3	Toluene	0.004	J	0.004	J	mg/kg	8SS1030100	1/17	0.011 - 0.013	0.004	NA	1600	N	0.6 650	SSL_MIGR SSL_INH	No	BSL
79-01-6	Trichloroethene	0.002	J	0.006	J	mg/kg	08-SB04-1112	2/17	0.011 - 0.064	0.006	NA	58	C	**0.003** 5	SSL_MIGR SSL_INH	No	BSL
206-44-0	Fluoranthene	0.072	J	0.072	J	mg/kg	8SS1000100	1/17	0.35 - 0.44	0.072	NA	310	N	210	SSL_MIGR NA	No	BSL
129-00-0	Pyrene	0.07	J	0.07	J	mg/kg	8SS1000100	1/17	0.35 - 0.44	0.07	NA	230	N	210	SSL_MIGR NA	No	BSL
72-54-8	4,4'-DDD	0.013		0.013		mg/kg	8SS1010100	1/8	0.0001 - 0.42	0.013	NA	2.7	C	0.8	SSL_MIGR NA	No	BSL
72-55-9	4,4'-DDE	0.00049	J	0.00068	J	mg/kg	8SU1030200-D	1/6	0.0004 - 0.42	0.00068	NA	1.9	C	3	SSL_MIGR NA	No	BSL
5103-71-9	alpha-Chlordane	0.0007	J	0.0026	J	mg/kg	8SS1030100	8/11	0.0018 - 0.002	0.0026	NA	1.8 (7)	C	0.5 20	SSL_MIGR SSL_INH	No	BSL
11096-82-5	Aroclor-1260	0.002	J	0.42		mg/kg	8SS1000100	6/11	0.039 - 4.2	0.42	NA	**0.32**	C		NA NA	Yes	ASL
60-57-1	Dieldrin	0.0066	J	0.0066	J	mg/kg	8SS1000100	1/12	0.0002 - 0.42	0.0066	NA	0.04	C	**0.0002** 1	SSL_MIGR SSL_INH	No	BSL
72-20-8	Endrin	0.00005	J	0.00063	J	mg/kg	8SS1000100	3/11	0.0035 - 0.42	0.00063	NA	2.3	N	0.05	SSL_MIGR NA	No	BSL
72-43-5	Methoxychlor	0.00036	J	0.00067	J	mg/kg	8SU1000200	2/11	0.018 - 2.1	0.00067	NA	39	N	8	SSL_MIGR NA	No	BSL
319-85-7	beta-BHC	0.00016	J	0.00016	J	mg/kg	8SU1030200-D	1/9	0.0018 - 0.21	0.00016	NA	0.35	C	0.0001	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	2430	J	17900	J	mg/kg	8SU1030200-D	17/17		17900	NA	**7800**	N		NA NA	No	BKG
7440-38-2	Arsenic	0.28	L	8.1		mg/kg	8SS1010100	7/17	0.19 - 7.9	8.1	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	3.2	K	66.1		mg/kg	8SS1050100	16/17	4.8	66.1	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-41-7	Beryllium	0.46	L	2.5		mg/kg	08-SB04-1112	3/17	0.01 - 0.66	2.5	NA	16	N	3 1300	SSL_MIGR SSL_INH	No	BSL, BKG

SITE 8 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMCIAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-43-9	Cadmium	1.4		1.4		mg/kg	8SS1010100	1/17	0.04 - 1.4	1.4	NA	3.9	N	0.4 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	79.6		238000	J	mg/kg	8SS1000100	15/17	39.1 - 58.2	238000	NA	NA			NA NA	No	NUT
7440-47-3	Chromium	5.7		77.6		mg/kg	8SU1000200	17/17		77.6	NA	23 (8)	N	2 270	SSL_MIGR SSL_INH	No	BKG
18540-29-9	Hexavalent Chromium	0.62		1.1		mg/kg	8SU1020200	3/3		1.1	NA	23	N	2 270	SSL_MIGR SSL_INH	No	BSL, BKG
7440-48-4	Cobalt	2.1		48.7		mg/kg	8SU1000200	17/17		48.7	NA	470	N		NA NA	No	BSL
7440-50-8	Copper	5.3		45.7		mg/kg	08-SB01-1416	16/17	16.3	45.7	NA	310	N		NA NA	No	BSL, BKG
57-12-5	Cyanide	0.17		0.17		mg/kg	8SS1040100	1/17	0.14 - 1.2	0.17	NA	160	N	2	SSL_MIGR NA	No	BSL
7439-89-6	Iron	7580		36500	J	mg/kg	08-SB02-1618	17/17		36500	NA	2300	N		NA NA	No	BKG
7439-92-1	Lead	1.4	J	40.9	K	mg/kg	8SS1010100	17/17		40.9	NA	400 (9)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	237		97600		mg/kg	8SU1000200	17/17		97600	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	40.6		1440	J	mg/kg	08-SB02-1618	17/17		1440	NA	160 (10)	N		NA NA	Yes	ASL
7439-97-6	Mercury	0.06	L	5.1	L	mg/kg	8SS1010100	8/17	0.05 - 0.34	5.1	NA	2.3 (11)	N	0.1 10	SSL_MIGR SSL_INH	Yes	ASL
7440-02-0	Nickel	2.8		892		mg/kg	8SU1000200	17/17		892	NA	160	N	7 13000	SSL_MIGR SSL_INH	No	BKG
7440-09-7	Potassium	87.8		1920		mg/kg	08-SB02-1618	17/17		1920	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	8.4		8.4		mg/kg	8SS1010100	1/17	0.3 - 1.3	8.4	NA	39	N	0.3	SSL_MIGR NA	No	BSL, BKG
7440-23-5	Sodium	24.4		83.2		mg/kg	08-SB02-1618	7/17	17 - 21.7	83.2	NA	NA			NA NA	No	NUT
7440-62-2	Vanadium	5.7		47.8		mg/kg	8SU1020200	17/17		47.8	NA	55	N	300	SSL_MIGR NA	No	BSL, BKG
7440-66-6	Zinc	10.3		102		mg/kg	8SS1020100	17/17		102	NA	2300	N	620	SSL_MIGR NA	No	BSL

SITE 8 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMCIAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRINGS, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
	BOD-5day (total)	35	L	50	L	mg/kg	8SU1010200	2/3	24	50	NA	NA		NA	No	NTX
TTNUS17	pH	4.53		5.03			08-SB06-1216	7/7		5.03	NA	NA		NA	No	NTX
TTNUS92	Total Kjeldahl Nitrogen	9.18		26.9		mg/kg	08-SB04-1112	2/5	7.74 - 16.2	26.9	NA	NA		NA	No	NTX
TTNUS22	Total Organic Carbon	700		2500		mg/kg	8SU1010200	3/3		2500	NA	NA		NA	No	NTX

Associated Samples:
08-SB01-1416
08-SB02-1618
08-SB04-1112
08-SB05-1618
08-SB06-1216
8SS1000100
8SS1010100
8SS1020100
8SS1030100
8SS1040100
8SS1050100
8SU1000200
8SU1010200
8SU1020200
8SU1030200
8SU1030200-D
8SU1040200
8SU1050200

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood
11 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 8 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
79-00-5	1,1,2-Trichloroethane	0.42	J	1.7		µg/L	8GW360001	3/6	1	1.7	NA	0.19	N	5	FED-MCL	Yes	ASL
67-66-3	Chloroform	0.95	J	7.2		µg/L	8GWB10001	5/6	1	7.2	NA	0.15	C	80	FED-MCL	Yes	ASL
108-88-3	Toluene	0.65	J	0.65	J	µg/L	8GW330001	1/6	1	0.65	NA	75	C	1000	FED-MCL	No	BSL
75-01-4	Vinyl Chloride	0.92	J	0.92	J	µg/L	8GW360001	1/6	1	0.92	NA	0.019	N	2	FED-MCL	Yes	ASL
1330-20-7	Xylenes, Total	1		1		µg/L	8GW330001	1/6	1	1	NA	1200	C	10000	FED-MCL	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	1.6	J	1.8	J	µg/L	8GW360001	2/6	5	1.8	NA	4.8	C	6	FED-MCL	No	BSL
84-66-2	Diethyl Phthalate	1.6	J	1.6	J	µg/L	8GWB10001	1/6	5	1.6	NA	2900	N	NA	NA	No	BSL
7429-90-5	Aluminum	367	K	16800	K	µg/L	8GW350001	6/6	0	16800	NA	3700	C	50-200 (7)	FED-MCL	Yes	ASL
7440-38-2	Arsenic	1.5		5.3		µg/L	8GW350001	4/6	1.5	5.3	NA	0.045	N	50	FED-MCL	Yes	ASL
7440-39-3	Barium	16.3		563		µg/L	8GW360001	6/6	0	563	NA	260	C	2000	FED-MCL	No	BKG
7440-41-7	Beryllium	7		7		µg/L	8GW360001	1/6	0.1 - 3.5	7	NA	7.3	C	4	FED-MCL	No	BSL, BKG
7440-43-9	Cadmium	13.5		13.5		µg/L	8GW360001	1/6	2.7	13.5	NA	1.8	N	5	FED-MCL	Yes	ASL
7440-70-2	Calcium	1940		25600		µg/L	8GW360001	6/6	0	25600	NA	NA	N	NA	NA	No	NUT, BKG
7440-47-3	Chromium	15		211		µg/L	8GW330001	5/6	2.3	211	NA	11 (8)	C	100	FED-MCL	Yes	ASL
7440-48-4	Cobalt	8.6		57.2		µg/L	8GW340001	6/6	0	57.2	NA	220	C	NA	NA	No	BSL
7440-50-8	Copper	28.4		93.1		µg/L	8GW360001	4/6	6.9 - 7.4	93.1	NA	150	N	1300	FED-MCL	No	BSL
7439-89-6	Iron	842	J	44700	J	µg/L	8GW360001	6/6	0	44700	NA	1100	N	300 (7)	FED-MCL	Yes	ASL
7439-92-1	Lead	5		22.8		µg/L	8GW360001	4/6	1	22.8	NA	15	N	15	FED-AL	No	BKG
7439-95-4	Magnesium	1330		14300		µg/L	8GW360001	6/6	0	14300	NA	NA	C	NA	NA	No	NUT, BKG
7439-96-5	Manganese	34.5		2430		µg/L	8GW360001	6/6	0	2430	NA	73 (9)	N	50 (7)	FED-MCL	No	BKG
7439-97-6	Mercury	0.28		0.28		µg/L	8GW360001	1/6	0.2	0.28	NA	1.1 (10)	C	2	FED-MCL	No	BSL
7440-02-0	Nickel	14.1		179		µg/L	8GW360001	5/6	7.5	179	NA	73	C	100	FED-MCL	No	BKG
7440-09-7	Potassium	1200		12500		µg/L	8GW360001	6/6	0	12500	NA	NA	N	NA	NA	No	NUT
7440-23-5	Sodium	3970		7960		µg/L	8GW360001	6/6	0	7960	NA	NA	C	NA	NA	No	NUT, BKG
7440-28-0	Thallium	3.3		4		µg/L	8GW350001	2/6	2.9	4	NA	0.26	N	2	FED-MCL	Yes	ASL
7440-62-2	Vanadium	16.5		40		µg/L	8GW350001	4/6	2.1	40	NA	26		NA	NA	Yes	ASL
7440-66-6	Zinc	20.9		178		µg/L	8GW360001	6/6	0	178	NA	1100	N	5000 (7)	FED-MCL	No	BSL

SITE 8 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:
8GW330001
8GW340001
8GW350001
8GW360001
8GW530001
8GWB10001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
8 Hexavalent Chromium
9 Manganese-Nonfood
10 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Nocarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 8 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	mg/kg	5.29E-01	NA	4.20E-01		mg/kg	4.20E-01	Maximum	N<10(1)	4.20E-01	Maximum(2)	N<10(1)
Manganese	mg/kg	4.58E+02	NA	8.27E+02		mg/kg	8.27E+02	Maximum	N<10(1)	4.58E+02	Average	N<10(1)
Mercury	mg/kg	9.40E-01	NA	5.10E+00	L	mg/kg	5.10E+00	Maximum	N<10(1)	9.40E-01	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

(2) Maximum value is used for the CTE for Aroclor-1260 because the average value is greater than the maximum.

SITE 8 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Surface / Surbsurface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	mg/kg	2.49E-01	NA	4.20E-01		mg/kg	4.20E-01	Maximum	W - Test (1)	4.20E-01	Maximum	W - Test (1)
Manganese	mg/kg	4.32E+02	NA	1.44E+03	J	mg/kg	9.58E+02	95% UCL-T	W - Test (2)	9.58E+02	95% UCL-T	W - Test (2)
Mercury	mg/kg	3.97E-01	NA	5.10E+00	L	mg/kg	6.28E-01	95% UCL-T	W - Test (3)	6.28E-01	95% UCL-T	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.

SITE 8 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1,2-Trichloroethane	mg/L	7.67E-04	NA	1.70E-03		mg/L	1.70E-03	Maximum	N<10(1)	7.67E-04	Average	N<10(1)
Chloroform	mg/L	3.69E-03	NA	7.20E-03		mg/L	7.20E-03	Maximum	N<10(1)	3.69E-03	Average	N<10(1)
Vinyl Chloride	mg/L	5.70E-04	NA	9.20E-04	J	mg/L	9.20E-04	Maximum	N<10(1)	5.70E-04	Average	N<10(1)
Aluminum	mg/L	8.51E+00	NA	1.68E+01	K	mg/L	1.68E+01	Maximum	N<10(1)	8.51E+00	Average	N<10(1)
Arsenic	mg/L	2.80E-03	NA	5.30E-03		mg/L	5.30E-03	Maximum	N<10(1)	2.80E-03	Average	N<10(1)
Cadmium	mg/L	3.38E-03	NA	1.35E-02		mg/L	1.35E-02	Maximum	N<10(1)	3.38E-03	Average	N<10(1)
Chromium	mg/L	6.42E-02	NA	2.11E-01		mg/L	2.11E-01	Maximum	N<10(1)	6.42E-02	Average	N<10(1)
Iron	mg/L	1.88E+01	NA	4.47E+01	J	mg/L	4.47E+01	Maximum	N<10(1)	1.88E+01	Average	N<10(1)
Thallium	mg/L	2.18E-03	NA	4.00E-03		mg/L	4.00E-03	Maximum	N<10(1)	2.18E-03	Average	N<10(1)
Vanadium	mg/L	1.92E-02	NA	4.00E-02		mg/L	4.00E-02	Maximum	N<10(1)	1.92E-02	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 groundwater samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA – ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 8 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.49E-07	Cancer Ingestion Intake - CTE	5.51E-08
Noncancer Ingestion Intake - RME	9.78E-07	Noncancer Ingestion Intake - CTE	4.29E-07
Cancer Dermal Intake - RME	1.10E-05	Cancer Dermal Intake - CTE	6.96E-07
Noncancer Dermal Intake - RME	3.09E-05	Noncancer Dermal Intake - CTE	5.42E-06

SITE 8 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	8.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.0E-02
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-02
	(total)												5.7E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	7.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	2.6E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.2E-01
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.6E-06	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	7.5E-02
	(total)												3.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.9E-07
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	9.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										5.6E-07
										Total Risk Across All Exposure Routes/Pathways	**8.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.8E-03
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	4.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	(total)												1.1E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.5E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.1E-02
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	5.1E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.4E-03
	(total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.5E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	5.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.6E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	6.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.5E-08
										Total Risk Across All Exposure Routes/Pathways	**8.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x FI x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 8 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	5.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-03
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												3.7E-03
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	4.7E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.8E-02
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.9E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.4E-02
	(total)												7.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**7.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.3E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	6.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	6.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	7.2E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.6E-04
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.9E-05
	(total)												4.1E-04
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.2E-03
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	5.3E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.5E-04
	(total)												3.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	8.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	9.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.7E-09
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	3.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	6.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.7E-09
										Total Risk Across All Exposure Routes/Pathways	**5.3E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	Fi	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 8 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	2.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-02
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.7E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.6E-03
	(total)												1.9E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	8.9E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.1E-01
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.5E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.6E-02
	(total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.0E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.8E-08
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.8E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	3.8E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E-03
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	7.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-04
	(total)												2.2E-03
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	5.0E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.2E-03
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	4.8E-04
	(total)												6.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**8.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	5.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.9E-09
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.8E-09
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.8E-09
										Total Risk Across All Exposure Routes/Pathways	**1.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	FI	Fraction Ingested	(unitless)	0.5	Professional Judgement	0.5	Professional Judgement	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional Judgement	3	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	1095	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	3.91E-07	Cancer Ingestion Intake - CTE	8.57E-08
Noncancer Ingestion Intake - RME	4.57E-06	Noncancer Ingestion Intake - CTE	2.00E-06
Cancer Dermal Intake - RME	1.37E-05	Cancer Dermal Intake - CTE	1.20E-06
Noncancer Dermal Intake - RME	1.60E-04	Noncancer Dermal Intake - CTE	2.80E-05

SITE 8 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	3.8E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E-01
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.3E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.8E-02
	(total)												2.7E-01
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.3E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.7E+00
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	8.2E-06	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.9E-01
	(total)												2.0E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.3E-07
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.9E-07
										Total Risk Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	8.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	9.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.6E-02
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.3E-03
	(total)												5.2E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	7.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	1.3E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.6E-01
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	2.6E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-02
	(total)												1.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	8.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										7.2E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	5.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.1E-08
										Total Risk Across All Exposure Routes/Pathways	**1.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 8 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.1E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.7E-02
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-02
	(total)												8.0E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	3.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.0E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.3E+00
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	6.3E-06	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.0E-01
	(total)												1.6E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	3.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.9E-07
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.1E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	3.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.1E-06
										Total Risk Across All Exposure Routes/Pathways	**2.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.1E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-02
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	4.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-03
	(total)												1.2E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	7.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.4E-02
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.5E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	7.4E-03
	(total)												1.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.9E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	4.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.8E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	7.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.3E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 8 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.1E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-01
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	6.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-01
	(total)												7.5E-01
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.9E-03	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.3E+00
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.1E-05	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	5.4E-01
	(total)												2.9E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**3.6E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.2E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	9.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.2E-07
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-07
	Manganese	8.27E+02	mg/kg	8.27E+02	mg/kg	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	5.10E+00	mg/kg	5.10E+00	mg/kg	M	9.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										9.7E-07
										Total Risk Across All Exposure Routes/Pathways	**1.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	2.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.8E-02
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	4.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-02
	(total)												1.1E-01
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	7.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	1.4E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.7E-01
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	2.8E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-02
	(total)												1.8E-01

Total Hazard Index Across All Exposure Routes/Pathways **3.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface Soil
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	5.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	1.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.0E-07
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	Manganese	4.58E+02	mg/kg	4.58E+02	mg/kg	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	9.40E-01	mg/kg	9.40E-01	mg/kg	M	8.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.3E-08
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 8 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	1.4E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.8E-03
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	8.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E-04
	(total)												7.0E-03
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.3E-02
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.8E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-03
	(total)												5.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.2E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	4.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										8.0E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	3.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-03
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.4E-05
	(total)												1.8E-03
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.3E-03
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.8E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-04
	(total)												5.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**7.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.8E-09
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	5.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	3.6E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.9E-09
										Total Risk Across All Exposure Routes/Pathways	**6.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 8 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	3.2E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E-01
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.1E-03
	(total)												1.7E-01
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	2.1E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-01
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	1.4E-07	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	6.7E-03
	(total)												2.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	2.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	3.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										4.1E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	8.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.6E-08
										Total Risk Across All Exposure Routes/Pathways	**5.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	7.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	1.6E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.1E-02
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	1.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-03
	(total)												8.5E-02
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	4.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.3E-02
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	2.8E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.3E-03
	(total)												5.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

Metals - 0.01

SITE 8 - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Surface / Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										2.0E-08
Dermal	Aroclor-1260	4.20E-01	mg/kg	4.20E-01	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	Manganese	9.58E+02	mg/kg	9.58E+02	mg/kg	M	6.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.28E-01	mg/kg	6.28E-01	mg/kg	M	4.0E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										3.2E-09
										Total Risk Across All Exposure Routes/Pathways	**2.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06
Metals - 0.01

SITE 8 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	1.70E-03		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	2.98E-08
Chloroform	7.20E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.21E-07
Vinyl Chloride	9.20E-04		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	9.53E-09
Aluminum	1.68E+01		i			1.00E+00			1.00E-03			1.68E-05
Arsenic	5.30E-03		i			1.00E+00			1.00E-03			5.30E-09
Cadmium	1.35E-02		i			1.00E+00			1.00E-03			1.35E-08
Chromium	2.11E-01		i			1.00E+00			2.00E-03			4.22E-07
Iron	4.47E+01		i			1.00E+00			1.00E-03			4.47E-05
Thallium	4.00E-03		i			1.00E+00			1.00E-03			4.00E-09
Vanadium	4.00E-02		i			1.00E+00			1.00E-03			4.00E-08

SITE 8 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	2.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	2.6E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.0E-05
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	1.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.0E-05
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	3.8E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	9.4E-05
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	1.5E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-04
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	2.1E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.1E-04
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	6.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	1.7E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.4E-02
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	5.4E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.4E-04
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	5.7E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-03
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	5.1E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	7.2E-04
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	5.1E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.8E-03
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	8.9E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-12
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	9.3E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-11
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	5.0E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-10
	(total)										2.3E-10
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	1.3E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	7.7E-09
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	5.5E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	4.3E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-08
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	2.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	(total)										1.3E-07
										Total Risk Across All Exposure Routes/Pathways	**1.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	7.67E-04		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.34E-08
Chloroform	3.69E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	6.23E-08
Vinyl Chloride	5.70E-04		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	5.90E-09
Aluminum	8.51E+00		i			1.00E+00			1.00E-03			8.51E-06
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Cadmium	3.38E-03		i			1.00E+00			1.00E-03			3.38E-09
Chromium	6.42E-02		i			1.00E+00			2.00E-03			1.28E-07
Iron	1.88E+01		i			1.00E+00			1.00E-03			1.88E-05
Thallium	2.18E-03		i			1.00E+00			1.00E-03			2.18E-09
Vanadium	1.92E-02		i			1.00E+00			1.00E-03			1.92E-08

SITE 8 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: *Future*
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	2.8E-11	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	3.3E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.9E-06
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	2.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.9E-06
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	8.5E-08	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.1E-05
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	3.9E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.9E-05
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	5.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.4E-05
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-05
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	2.1E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.7E-03
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	8.1E-07	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.2E-05
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	1.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.0E-04
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	1.4E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.0E-04
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	1.2E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	6.7E-04
	(total)												3.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	3.6E-12	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-13
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	4.3E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-12
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	2.8E-11	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-12
	(total)										1.2E-11
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	1.1E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-10
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	5.1E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-10
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	4.8E-09	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	9.1E-09
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	(total)										1.4E-08
										Total Risk Across All Exposure Routes/Pathways	**1.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1;1,2-Trichloroethane	1.70E-03		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	2.98E-08
Chloroform	7.20E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	1.21E-07
Vinyl Chloride	9.20E-04		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	9.53E-09
Aluminum	1.68E+01		i			1.00E+00			1.00E-03			1.68E-05
Arsenic	5.30E-03		i			1.00E+00			1.00E-03			5.30E-09
Cadmium	1.35E-02		i			1.00E+00			1.00E-03			1.35E-08
Chromium	2.11E-01		i			1.00E+00			2.00E-03			4.22E-07
Iron	4.47E+01		i			1.00E+00			1.00E-03			4.47E-05
Thallium	4.00E-03		i			1.00E+00			1.00E-03			4.00E-09
Vanadium	4.00E-02		i			1.00E+00			1.00E-03			4.00E-08

SITE 8 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	2.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	2.5E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.9E-04
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.9E-04
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	1.9E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.7E-04
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	7.7E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.7E-04
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	6.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	1.1E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.1E-03
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	3.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	8.6E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	6.8E-02
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	2.7E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	7.1E-04
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	2.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.4E-03
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	2.5E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.6E-03
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	2.5E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.4E-02
	(total)												1.0E-01

Total Hazard Index Across All Exposure Routes/Pathways **1.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	3.4E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-12
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	3.6E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-11
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	1.9E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-11
	(total)										8.8E-11
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	2.7E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	1.1E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	6.7E-10
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	8.6E-09	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	4.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-09
	(total)										2.6E-08
										Total Risk Across All Exposure Routes/Pathways	**2.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	7.67E-04		o		1.40E+00	1.00E+00	5.70E-01		8.40E-03		1.10E-02	1.34E-08
Chloroform	3.69E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	6.23E-08
Vinyl Chloride	5.70E-04		o		5.10E-01	1.00E+00	2.10E-01		7.30E-03		2.30E-03	5.90E-09
Aluminum	8.51E+00		i			1.00E+00			1.00E-03			8.51E-06
Arsenic	2.80E-03		i			1.00E+00			1.00E-03			2.80E-09
Cadmium	3.38E-03		i			1.00E+00			1.00E-03			3.38E-09
Chromium	6.42E-02		i			1.00E+00			2.00E-03			1.28E-07
Iron	1.88E+01		i			1.00E+00			1.00E-03			1.88E-05
Thallium	2.18E-03		i			1.00E+00			1.00E-03			2.18E-09
Vanadium	1.92E-02		i			1.00E+00			1.00E-03			1.92E-08

SITE 8 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	5.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	6.4E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	7.4E-05
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	4.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.4E-05
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	8.5E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.1E-04
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	3.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.9E-04
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	5.4E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.4E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	2.1E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.7E-02
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	8.1E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	2.2E-04
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	1.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.0E-03
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	1.4E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.0E-03
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	1.2E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	6.7E-03
	(total)												3.2E-02

Total Hazard Index Across All Exposure Routes/Pathways **3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	7.7E-12	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.3E-13
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	9.1E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.4E-12
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	5.9E-11	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-11
	(total)										2.6E-11
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	1.2E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-10
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	5.6E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-10
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	5.3E-09	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	(total)										1.5E-08
										Total Risk Across All Exposure Routes/Pathways	**1.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Mass Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	1.70E-03		o		1.40E+00	2.50E-01	5.70E-01		8.40E-03		1.10E-02	1.49E-08
Chloroform	7.20E-03		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	6.07E-08
Vinyl Chloride	9.20E-04		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	4.25E-09
Aluminum	1.68E+01		i			2.50E-01			1.00E-03			4.20E-06
Arsenic	5.30E-03		i			2.50E-01			1.00E-03			1.33E-09
Cadmium	1.35E-02		i			2.50E-01			1.00E-03			3.38E-09
Chromium	2.11E-01		i			2.50E-01			2.00E-03			1.06E-07
Iron	4.47E+01		i			2.50E-01			1.00E-03			1.12E-05
Thallium	4.00E-03		i			2.50E-01			1.00E-03			1.00E-09
Vanadium	4.00E-02		i			2.50E-01			1.00E-03			1.00E-08

SITE 8 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	4.7E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.2E-02
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	2.0E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.0E-02
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	2.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	4.6E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.6E-01
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	1.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.8E-01
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	3.7E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.4E-01
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	5.8E-03	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	3.9E-03
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	1.2E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.1E+00
	Manganese		mg/L		mg/L	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	1.1E-04	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E+00
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	1.1E-03	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.6E-01
	(total)												7.5E+00
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	4.7E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.2E-03
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	1.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-03
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	1.3E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.3E-03
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	4.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-03
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	1.1E-06	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	8.5E-02
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	3.3E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	8.9E-04
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	3.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-02
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	3.2E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.5E-03
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	3.2E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.7E-02
	(total)												1.3E-01
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	4.63E-04	(mg/m^3- min)	R	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	2.36E-03	(mg/m^3- min)	R	5.1E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.9E-01
	Vinyl Chloride	9.20E-04	mg/L	3.96E-04	(mg/m^3- min)	R	8.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.9E-01

Total Hazard Index Across All Exposure Routes/Pathways **8.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	1.6E-05	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	9.1E-07
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	6.8E-05	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	8.6E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	5.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-05
	(total)										9.2E-05
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	1.6E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	9.2E-08
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	6.6E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	4.6E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	(total)										1.2E-06
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	4.63E-04	$(mg/m^3\text{- min})$	R	3.4E-06	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Chloroform	7.20E-03	mg/L	2.36E-03	$(mg/m^3\text{- min})$	R	1.8E-05	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Vinyl Chloride	9.20E-04	mg/L	3.96E-04	$(mg/m^3\text{- min})$	R	2.9E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.8E-07
	(total)										2.5E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **9.6E-05**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	7.67E-04		o		1.40E+00	1.67E-01	5.70E-01		8.40E-03		1.10E-02	5.49E-09
Chloroform	3.69E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	2.54E-08
Vinyl Chloride	5.70E-04		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	2.15E-09
Aluminum	8.51E+00		i			1.67E-01			1.00E-03			1.42E-06
Arsenic	2.80E-03		i			1.67E-01			1.00E-03			4.68E-10
Cadmium	3.38E-03		i			1.67E-01			1.00E-03			5.64E-10
Chromium	6.42E-02		i			1.67E-01			2.00E-03			2.14E-08
Iron	1.88E+01		i			1.67E-01			1.00E-03			3.15E-06
Thallium	2.18E-03		i			1.67E-01			1.00E-03			3.65E-10
Vanadium	1.92E-02		i			1.67E-01			1.00E-03			3.20E-09

SITE 8 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	9.8E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.5E-03
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	4.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.7E-03
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	7.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	1.1E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.1E-01
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-01
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	4.3E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.7E-02
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	8.2E-04	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	5.5E-04
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	2.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.1E-01
	Manganese		mg/L		mg/L	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	2.8E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.0E-01
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	2.5E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	3.5E-02
	(total)												1.6E+00
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	1.0E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.5E-04
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	4.7E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.7E-04
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	2.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.6E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	8.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-04
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	1.0E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	8.3E-03
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	3.9E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.0E-04
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	5.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-03
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	6.7E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	9.5E-04
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	5.9E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.2E-03
	(total)												1.6E-02
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	2.09E-04	(mg/m^3- min)	R	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.21E-03	(mg/m^3- min)	R	9.7E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.1E-01
	Vinyl Chloride	5.70E-04	mg/L	2.45E-04	(mg/m^3- min)	R	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	9.8E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	4.7E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	7.3E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.6E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-06
	(total)										6.9E-06
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	1.0E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-09
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	4.7E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	3.9E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	8.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	(total)										9.6E-08
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	2.09E-04	$(mg/m^3\text{- min})$	R	1.7E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	Chloroform	3.69E-03	mg/L	1.21E-03	$(mg/m^3\text{- min})$	R	9.7E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-08
	Vinyl Chloride	5.70E-04	mg/L	2.45E-04	$(mg/m^3\text{- min})$	R	2.0E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	(total)										1.5E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **7.1E-06**

SITE 8 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population:- Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Mass Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Da + exp(-Ra x Dt)/Ra - [exp(Ra) x (Da-Dt)]/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Da	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	1.70E-03		o		1.40E+00	2.50E-01	5.70E-01		8.40E-03		1.10E-02	1.49E-08
Chloroform	7.20E-03		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	6.07E-08
Vinyl Chloride	9.20E-04		o		5.10E-01	2.50E-01	2.10E-01		7.30E-03		2.30E-03	4.25E-09
Aluminum	1.68E+01		i			2.50E-01			1.00E-03			4.20E-06
Arsenic	5.30E-03		i			2.50E-01			1.00E-03			1.33E-09
Cadmium	1.35E-02		i			2.50E-01			1.00E-03			3.38E-09
Chromium	2.11E-01		i			2.50E-01			2.00E-03			1.06E-07
Iron	4.47E+01		i			2.50E-01			1.00E-03			1.12E-05
Thallium	4.00E-03		i			2.50E-01			1.00E-03			1.00E-09
Vanadium	4.00E-02		i			2.50E-01			1.00E-03			1.00E-08

SITE 8 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	1.1E-04	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	2.7E-02
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	4.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.6E-02
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	5.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	1.1E+00	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.1E+00
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	3.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E+00
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	8.6E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.7E+00
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	1.3E-02	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	9.0E-03
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	2.9E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.5E+00
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	2.6E-04	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.7E+00
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	2.6E-03	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	3.7E-01
	(total)												1.8E+01
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	6.6E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.7E-03
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	2.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.7E-03
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.68E+01	mg/L	1.68E+01	mg/L	M	1.9E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.9E-03
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	5.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	Cadmium	1.35E-02	mg/L	1.35E-02	mg/L	M	1.5E-06	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.2E-01
	Chromium	2.11E-01	mg/L	2.11E-01	mg/L	M	4.7E-05	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.3E-03
	Iron	4.47E+01	mg/L	4.47E+01	mg/L	M	5.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-02
	Manganese		mg/L		mg/L	M		mg/kg-day	8.00E-04	mg/kg-day	NA	NA	
	Thallium	4.00E-03	mg/L	4.00E-03	mg/L	M	4.5E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	6.4E-03
	Vanadium	4.00E-02	mg/L	4.00E-02	mg/L	M	4.5E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.4E-02
	(total)												1.8E-01
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	4.63E-04	(mg/m^3- min)	R	4.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	2.36E-03	(mg/m^3- min)	R	2.4E-04	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.8E+00
	Vinyl Chloride	9.20E-04	mg/L	3.96E-04	(mg/m^3- min)	R	4.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.8E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	9.3E-06	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	3.9E-05	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	5.0E-06	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-06
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	2.9E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-05
	(total)										5.4E-05
Dermal	1,1,2-Trichloroethane	1.70E-03	mg/L	1.70E-03	mg/L	M	5.7E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	Chloroform	7.20E-03	mg/L	7.20E-03	mg/L	M	2.3E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Vinyl Chloride	9.20E-04	mg/L	9.20E-04	mg/L	M	1.6E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-07
	Arsenic	5.30E-03	mg/L	5.30E-03	mg/L	M	5.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-08
	(total)										4.3E-07
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	4.63E-04	$(mg/m^3\text{- min})$	R	4.0E-06	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Chloroform	7.20E-03	mg/L	2.36E-03	$(mg/m^3\text{- min})$	R	2.0E-05	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Vinyl Chloride	9.20E-04	mg/L	3.96E-04	$(mg/m^3\text{- min})$	R	3.4E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	(total)										2.9E-06
										Total Risk Across All Exposure Routes/Pathways	**5.7E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/11/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
1,1,2-Trichloroethane	7.67E-04		o		1.40E+00	1.67E-01	5.70E-01		8.40E-03		1.10E-02	5.49E-09
Chloroform	3.69E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	2.54E-08
Vinyl Chloride	5.70E-04		o		5.10E-01	1.67E-01	2.10E-01		7.30E-03		2.30E-03	2.15E-09
Aluminum	8.51E+00		i			1.67E-01			1.00E-03			1.42E-06
Arsenic	2.80E-03		i			1.67E-01			1.00E-03			4.68E-10
Cadmium	3.38E-03		i			1.67E-01			1.00E-03			5.64E-10
Chromium	6.42E-02		i			1.67E-01			2.00E-03			2.14E-08
Iron	1.88E+01		i			1.67E-01			1.00E-03			3.15E-06
Thallium	2.18E-03		i			1.67E-01			1.00E-03			3.65E-10
Vanadium	1.92E-02		i			1.67E-01			1.00E-03			3.20E-09

SITE 8 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	3.3E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	8.2E-03
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	1.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-02
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	2.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	3.6E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-01
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.2E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.0E-01
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	1.4E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.9E-01
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	2.7E-03	mg/kg-day	1.50E+00	mg/kg-day	NA	NA	1.8E-03
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	8.1E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E+00
	Manganese		mg/L		mg/L	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	9.3E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.3E+00
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	8.2E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.2E-01
	(total)												5.2E+00
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	1.6E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.1E-04
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	7.6E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.6E-04
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	6.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	8.51E+00	mg/L	8.51E+00	mg/L	M	4.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.2E-04
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	1.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.6E-04
	Cadmium	3.38E-03	mg/L	3.38E-03	mg/L	M	1.7E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.3E-02
	Chromium	6.42E-02	mg/L	6.42E-02	mg/L	M	6.4E-06	mg/kg-day	3.75E-02	mg/kg-day	NA	NA	1.7E-04
	Iron	1.88E+01	mg/L	1.88E+01	mg/L	M	9.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.1E-03
	Thallium	2.18E-03	mg/L	2.18E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-03
	Vanadium	1.92E-02	mg/L	1.92E-02	mg/L	M	9.5E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.2E-03
	(total)												2.6E-02
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	2.09E-04	(mg/m^3- min)	R	7.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.21E-03	(mg/m^3- min)	R	4.5E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.3E-01
	Vinyl Chloride	5.70E-04	mg/L	2.45E-04	(mg/m^3- min)	R	9.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**5.8E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	9.4E-07	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	4.5E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	7.0E-07	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	3.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	(total)										6.5E-06
Dermal	1,1,2-Trichloroethane	7.67E-04	mg/L	7.67E-04	mg/L	M	4.7E-08	mg/kg-day	5.70E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Chloroform	3.69E-03	mg/L	3.69E-03	mg/L	M	2.2E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Vinyl Chloride	5.70E-04	mg/L	5.70E-04	mg/L	M	1.8E-08	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Arsenic	2.80E-03	mg/L	2.80E-03	mg/L	M	4.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-09
	(total)										4.5E-08
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	2.09E-04	$(mg/m^3\text{-}min)$	R	2.2E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Chloroform	3.69E-03	mg/L	1.21E-03	$(mg/m^3\text{-}min)$	R	1.3E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Vinyl Chloride	5.70E-04	mg/L	2.45E-04	$(mg/m^3\text{-}min)$	R	2.6E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	7.9E-08
	(total)										2.0E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **6.8E-06**

SITE 8 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 8 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m³	R	4.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m³	R	7.5E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	8.7E-02
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m³	R	5.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**8.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	1.7E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	2.7E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	1.8E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	(total)										7.6E-07
										Total Risk Across All Exposure Routes/Pathways	**7.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	9.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	1.7E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.9E-02
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	1.2E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-10
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	2.2E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	1.8E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	(total)										7.1E-08
										Total Risk Across All Exposure Routes/Pathways	**7.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 8 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	1.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	1.8E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.1E-04
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	9.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.1E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	6.2E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-11
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	6.4E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-10
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	3.5E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	(total)										1.6E-09
										Total Risk Across All Exposure Routes/Pathways	**1.6E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	3.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	4.0E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.7E-05
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	2.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.7E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	4.4E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-12
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	5.2E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.2E-11
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	3.4E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	(total)										1.5E-10
										Total Risk Across All Exposure Routes/Pathways	**1.5E-10**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

SITE 8 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.76E-02
Noncancer Inhalation Intake(RME) = 4.38E-01

Cancer Inhalation Intake(CTE) = 8.23E-03
Noncancer Inhalation Intake(CTE) = 1.92E-01

SITE 8 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	1.7E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.9E-01
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	9.0E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	1.4E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	9.6E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-07
	(total)										4.1E-07
										Total Risk Across All Exposure Routes/Pathways	**4.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	3.8E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.4E-02
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	3.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	8.9E-09	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	5.0E-10
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	1.6E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	1.3E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	(total)										5.3E-08
										Total Risk Across All Exposure Routes/Pathways	**5.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 8 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	6.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	1.0E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-01
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	7.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	2.3E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	3.6E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-07
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	2.4E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-07
	(total)										1.0E-06
										Total Risk Across All Exposure Routes/Pathways	**1.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	3.6E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.2E-02
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	2.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**4.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	2.0E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	3.6E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	2.9E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	8.7E-08
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 8 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	2.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	2.5E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.9E-04
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.9E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**2.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	8.3E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-11
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	8.6E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-10
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	4.7E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	(total)										2.1E-09
										Total Risk Across All Exposure Routes/Pathways	**2.1E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	7.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	8.6E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.0E-04
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	5.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.0E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	7.3E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	8.6E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-11
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	5.6E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	(total)										2.4E-10
										Total Risk Across All Exposure Routes/Pathways	**2.4E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 8 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	2.9E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.4E-01
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-01**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

SITE 8 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	2.40E-06	mg/m^3	R	1.6E-07	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	8.8E-09
	Chloroform	7.20E-03	mg/L	3.81E-05	mg/m^3	R	2.5E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Vinyl Chloride	9.20E-04	mg/L	2.57E-05	mg/m^3	R	1.7E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-07
	(total)										7.2E-07
										Total Risk Across All Exposure Routes/Pathways	**7.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	5.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	1.0E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-01
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	8.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	1.08E-06	mg/m^3	R	1.6E-08	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	8.9E-10
	Chloroform	3.69E-03	mg/L	1.95E-05	mg/m^3	R	2.9E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Vinyl Chloride	5.70E-04	mg/L	1.59E-05	mg/m^3	R	2.3E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	(total)										9.4E-08
										Total Risk Across All Exposure Routes/Pathways	**9.4E-08**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

SITE 8 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 8 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	6.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	7.1E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	8.2E-04
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	3.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**8.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	1.70E-03	mg/L	8.86E-09	mg/m^3	R	5.8E-10	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-11
	Chloroform	7.20E-03	mg/L	9.20E-08	mg/m^3	R	6.0E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	Vinyl Chloride	9.20E-04	mg/L	4.97E-08	mg/m^3	R	3.3E-09	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	9.8E-10
	(total)										1.5E-09
										Total Risk Across All Exposure Routes/Pathways	**1.5E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 7.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	2.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	2.4E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.8E-04
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.8E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 8 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,2-Trichloroethane	7.67E-04	mg/L	3.99E-09	mg/m^3	R	5.9E-11	mg/kg-day	5.60E-02	$(mg/kg\text{-}day)^{-1}$	3.3E-12
	Chloroform	3.69E-03	mg/L	4.72E-08	mg/m^3	R	6.9E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-11
	Vinyl Chloride	5.70E-04	mg/L	3.08E-08	mg/m^3	R	4.5E-10	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	(total)										1.9E-10
										Total Risk Across All Exposure Routes/Pathways	**1.9E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 8 - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	2.9E-07		5.6E-07	8.5E-07	Aroclor-1260					
			Manganese					Manganese	CNS	4.0E-02		3.2E-01	3.6E-01
			Mercury					Mercury	CNS	1.7E-02		7.5E-02	9.2E-02
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2-Trichloroethane		9.4E-09		9.4E-09	1,1,2-Trichloroethane	Liver				
			Chloroform		2.2E-07		2.2E-07	Chloroform	Liver		8.7E-02		8.7E-02
			Vinyl Chloride		5.4E-07		5.4E-07	Vinyl Chloride					

Total Risk Across Surface Soil: 8.5E-07
Total Risk Across Groundwater / Air: 7.6E-07
Total Risk Across All Media and All Exposure Routes: 1.6E-06

Total Hazard Index Across All Media and All Exposure Routes: 5.4E-01
Total Liver HI = 8.7E-02
Total CNS HI = 4.5E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 8-9.

SITE 8 - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	4.6E-08		3.5E-08	8.1E-08	Aroclor-1260					
			Manganese					Manganese	CNS	9.8E-03		3.1E-02	4.1E-02
			Mercury					Mercury	CNS	1.3E-03		2.4E-03	3.8E-03
Groundwater	Water	Onsite	1,1,2-Trichloroethane		6.7E-10		6.7E-10	1,1,2-Trichloroethane	Liver				
		Indoor and	Chloroform		1.7E-08		1.7E-08	Chloroform	Liver		2.0E-02		2.0E-02
		Outdoor Air	Vinyl Chloride		5.3E-08		5.3E-08	Vinyl Chloride					
						Total Risk Across Surface Soil	8.1E-08					Total Hazard Index Across All Media and All Exposure Routes	6.4E-02
						Total Risk Across Groundwater / Air	7.1E-08						
												Total Liver HI =	2.0E-02
						Total Risk Across All Media and All Exposure Routes	1.5E-07					Total CNS HI =	4.5E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 8-18.

SITE 8 - TABLE 9.2 REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	Aroclor-1260	4.2E-08		8.0E-08	1.2E-07	Aroclor-1260					
			Manganese					Manganese	CNS	6.8E-03		5.3E-02	6.0E-02
			Mercury					Mercury	CNS	3.0E-04		1.3E-03	1.6E-03
Groundwater	Water	Onsite	1,1,2-Trichloroethane		5.0E-12	7.7E-09	7.7E-09	1,1,2-Trichloroethane	Liver			9.4E-05	9.4E-05
			Chloroform		7.5E-11	3.4E-09	3.4E-09	Chloroform	Liver		3.0E-05	1.5E-04	1.8E-04
			Vinyl Chloride		1.5E-10	8.2E-08	8.2E-08	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails			2.1E-04	2.1E-04
			Arsenic			3.6E-08	3.6E-08	Arsenic	Skin, Vascular			2.2E-04	2.2E-04
			Cadmium					Cadmium	Kidney			1.4E-02	1.4E-02
			Chromium					Chromium	NOAEL			1.4E-04	1.4E-04
			Iron					Iron	Liver/Blood/GI Tract			1.9E-03	1.9E-03
			Thallium					Thallium	Liver			7.2E-04	7.2E-04
			Vanadium					Vanadium	NOEL			2.8E-03	2.8E-03

Total Risk Across Surface Soil: 1.2E-07
Total Risk Across Groundwater: 1.3E-07

Total Risk Across All Media and All Exposure Routes: 2.5E-07

Total Hazard Index Across All Media and All Exposure Routes: 8.2E-02

Total Liver HI = 2.9E-03
Total CNS HI = 6.2E-02
Total Skin HI = 2.2E-04
Total Immune System HI = 2.1E-04
Total Kidney HI = 1.4E-02
Total Blood HI = 1.9E-03
Total Vascular HI = 2.2E-04
Total GI Tract HI = 1.9E-03

SITE 8 - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	Aroclor-1260	3.8E-09		2.9E-09	6.7E-09	Aroclor-1260					
			Manganese					Manganese	CNS	1.7E-03		5.3E-03	7.0E-03
			Mercury					Mercury	CNS	7.4E-05		1.3E-04	2.1E-04
Groundwater	Water	Onsite	1,1,2-Trichloroethane		2.0E-13	6.2E-10	6.2E-10	1,1,2-Trichloroethane	Liver			2.1E-05	2.1E-05
			Chloroform		3.5E-12	3.1E-10	3.1E-10	Chloroform	Liver		3.9E-06	3.9E-05	4.3E-05
			Vinyl Chloride		8.4E-12	9.1E-09	9.2E-09	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails			5.4E-05	5.4E-05
			Arsenic			3.4E-09	3.4E-09	Arsenic	Skin, Vascular			5.9E-05	5.9E-05
			Cadmium					Cadmium	Kidney			1.7E-03	1.7E-03
			Chromium					Chromium	NOAEL			2.2E-05	2.2E-05
			Iron					Iron	Liver/Blood/GI Tract			4.0E-04	4.0E-04
			Thallium					Thallium	Liver			2.0E-04	2.0E-04
			Vanadium					Vanadium	NOEL			6.7E-04	6.7E-04

Total Risk Across Surface Soil	6.7E-09
Total Risk Across Groundwater	1.4E-08
Total Risk Across All Media and All Exposure Routes	2.0E-08

Total Hazard Index Across All Media and All Exposure Routes	1.0E-02
Total Liver HI =	6.6E-04
Total CNS HI =	7.2E-03
Total Skin HI =	5.9E-05
Total Immune System HI =	5.4E-05
Total Kidney HI =	1.7E-03
Total Blood HI =	4.0E-04
Total Vascular HI =	5.9E-05
Total GI Tract HI =	4.0E-04

SITE 8 - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	Aroclor-1260	4.1E-08		1.6E-08	5.7E-08	Aroclor-1260					
			Manganese					Manganese	CNS	1.6E-01		2.7E-01	4.3E-01
			Mercury					Mercury	CNS	7.1E-03		6.7E-03	1.4E-02
Groundwater	Water	Onsite	1,1,2-Trichloroethane		1.9E-12	1.5E-09	1.5E-09	1,1,2-Trichloroethane	Liver			4.7E-04	4.7E-04
			Chloroform		2.9E-11	6.7E-10	7.0E-10	Chloroform	Liver		2.9E-04	7.7E-04	1.1E-03
			Vinyl Chloride		5.8E-11	1.6E-08	1.6E-08	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails			1.1E-03	1.1E-03
			Arsenic			7.2E-09	7.2E-09	Arsenic	Skin, Vascular			1.1E-03	1.1E-03
			Cadmium					Cadmium	Kidney			6.8E-02	6.8E-02
			Chromium					Chromium	NOAEL			7.1E-04	7.1E-04
			Iron					Iron	Liver/Blood/GI Tract			9.4E-03	9.4E-03
			Thallium					Thallium	Liver			3.6E-03	3.6E-03
			Vanadium					Vanadium	NOEL			1.4E-02	1.4E-02

Total Risk Across Surface Soil	5.7E-08
Total Risk Across Groundwater	2.6E-08
Total Risk Across All Media and All Exposure Routes	8.3E-08

Total Hazard Index Across All Media and All Exposure Routes	5.4E-01
Total Liver HI =	1.5E-02
Total CNS HI =	4.4E-01
Total Skin HI =	1.1E-03
Total Immune System HI =	1.1E-03
Total Kidney HI =	6.8E-02
Total Blood HI =	9.4E-03
Total Vascular HI =	1.1E-03
Total GI Tract HI =	9.4E-03

SITE 8 - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER

SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface/ Subsurface Soil	Aroclor-1260	2.0E-08		3.2E-09	2.3E-08	Aroclor-1260					
			Manganese					Manganese	CNS	8.1E-02		5.3E-02	1.3E-01
			Mercury					Mercury	CNS	3.5E-03		1.3E-03	4.9E-03
Groundwater	Water	Onsite	1,1,2-Trichloroethane		4.3E-13	6.9E-10	6.9E-10	1,1,2-Trichloroethane	Liver			2.1E-04	2.1E-04
			Chloroform		7.4E-12	3.4E-10	3.5E-10	Chloroform	Liver		7.4E-05	3.9E-04	4.7E-04
			Vinyl Chloride		1.8E-11	1.0E-08	1.0E-08	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails			5.4E-04	5.4E-04
			Arsenic			3.8E-09	3.8E-09	Arsenic	Skin, Vascular			5.9E-04	5.9E-04
			Cadmium					Cadmium	Kidney			1.7E-02	1.7E-02
			Chromium					Chromium	NOAEL			2.2E-04	2.2E-04
			Iron					Iron	Liver/Blood/GI Tract			4.0E-03	4.0E-03
			Thallium					Thallium	Liver			2.0E-03	2.0E-03
			Vanadium					Vanadium	NOEL			6.7E-03	6.7E-03

Total Risk Across Surface Soil: 2.3E-08

Total Risk Across Groundwater: 1.5E-08

Total Risk Across All Media and All Exposure Routes: 3.9E-08

Total Hazard Index Across All Media and All Exposure Routes: 1.7E-01

Total Liver HI = 6.6E-03

Total CNS HI = 1.4E-01

Total Skin HI = 5.9E-04

Total Immune System HI = 5.4E-04

Total Kidney HI = 1.7E-02

Total Blood HI = 4.0E-03

Total Vascular HI = 5.9E-04

Total GI Tract HI = 4.0E-03

SITE 8 - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER

SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: *Future*
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	*Soil*	*Surface Soil*	Aroclor-1260	2.3E-08		1.2E-07	1.4E-07	Aroclor-1260					
			Manganese					Manganese	CNS	2.6E-03		5.8E-02	6.1E-02
			Mercury					Mercury	CNS	1.1E-03		1.4E-02	1.5E-02
						Total Risk Across Surface Soil	1.4E-07					Total Hazard Index Across All Media and All Exposure Routes	7.6E-02

k Across All Media and All Exposure Routes 1.4E-07

Total CNS HI = 7.6E-02

SITE 8 - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	1.7E-09		3.7E-09	5.3E-09	Aroclor-1260					
			Manganese					Manganese	CNS	3.6E-04		3.2E-03	3.6E-03
			Mercury					Mercury	CNS	4.9E-05		2.5E-04	3.0E-04
						Total Risk Across Surface Soil	5.3E-09					Total Hazard Index Across All Media and All Exposure Routes	3.9E-03

k Across All Media and All Exposure Routes 5.3E-09

Total CNS HI = 3.9E-03

SITE 8 - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	4.0E-08		7.8E-08	1.2E-07	Aroclor-1260					
			Manganese					Manganese	CNS	1.4E-02		1.1E-01	1.3E-01
			Mercury					Mercury	CNS	5.6E-03		2.6E-02	3.2E-02
							Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes
							1.2E-07						1.6E-01

k Across All Media and All Exposure Routes 1.2E-07

Total CNS HI = 1.6E-01

SITE 8 - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER

SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	9.9E-09		7.8E-09	1.8E-08	Aroclor-1260					
			Manganese					Manganese	CNS	1.9E-03		6.2E-03	8.1E-03
			Mercury					Mercury	CNS	2.6E-04		4.8E-04	7.4E-04
							Total Risk Across Surface Soil 1.8E-08						Total Hazard Index Across All Media and All Exposure Routes 8.8E-03

k Across All Media and All Exposure Routes 1.8E-08

Total CNS HI = 8.8E-03

SITE 8 - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	3.3E-07		6.9E-07	1.0E-06	Aroclor-1260					
			Manganese					Manganese	CNS	1.9E-01		1.7E+00	1.8E+00
			Mercury					Mercury	CNS	7.8E-02		3.9E-01	4.7E-01
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2-Trichloroethane		5.0E-09		5.0E-09	1,1,2-Trichloroethane	Liver				
			Chloroform		1.2E-07		1.2E-07	Chloroform	Liver		1.9E-01		1.9E-01
			Vinyl Chloride		2.9E-07		2.9E-07	Vinyl Chloride					

Total Risk Across Surface Soil: 1.0E-06
Total Risk Across Groundwater / Air: 4.1E-07
Total Risk Across All Media and All Exposure Routes: 1.4E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.5E+00
Total Liver HI ≈: 1.9E-01
Total CNS HI ≈: 2.3E+00

SITE 8 - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD

SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	7.2E-08		6.1E-08	1.3E-07	Aroclor-1260					
			Manganese					Manganese	CNS	4.6E-02		1.6E-01	2.1E-01
			Mercury					Mercury	CNS	6.3E-03		1.3E-02	1.9E-02
Groundwater	Water	Onsite Indoor and Outdoor Air	1,1,2-Trichloroethane		5.0E-10		5.0E-10	1,1,2-Trichloroethane	Liver				
			Chloroform		1.3E-08		1.3E-08	Chloroform	Liver		4.4E-02		4.4E-02
			Vinyl Chloride		3.9E-08		3.9E-08	Vinyl Chloride					

Total Risk Across Surface Soil: 1.3E-07

Total Risk Across Groundwater / Air: 5.3E-08

Total Risk Across All Media and All Exposure Routes: 1.9E-07

Total Hazard Index Across All Media and All Exposure Routes: 2.7E-01

Total Liver HI = 4.4E-02

Total CNS HI = 2.3E-01

SITE 8 - TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	3.9E-07		2.1E-06	2.5E-06	Aroclor-1260					
			Manganese					Manganese	CNS	5.7E-02		1.3E+00	1.3E+00
			Mercury					Mercury	CNS	2.3E-02		3.0E-01	3.2E-01
Groundwater	Water	Onsite	1,1,2-Trichloroethane	9.1E-07	2.1E-07	9.2E-08	1.2E-06	1,1,2-Trichloroethane	Liver	1.2E-02		1.2E-03	1.3E-02
			Chloroform	4.1E-07	1.7E-06	4.0E-08	2.2E-06	Chloroform	Liver	2.0E-02	7.2E-01	1.9E-03	7.4E-01
			Vinyl Chloride	1.6E-05	1.6E-06	8.7E-07	1.9E-05	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails	4.6E-01		1.3E-03	4.6E-01
			Arsenic	7.5E-05		2.1E-07	7.5E-05	Arsenic	Skin, Vascular	4.8E-01		1.4E-03	4.9E-01
			Cadmium					Cadmium	Kidney	7.4E-01		8.5E-02	8.2E-01
			Chromium					Chromium	NOAEL	3.9E-03		8.9E-04	4.7E-03
			Iron					Iron	Liver/Blood/GI Tract	4.1E+00		1.2E-02	4.1E+00
			Thallium					Thallium	Liver	1.6E+00		4.5E-03	1.6E+00
			Vanadium					Vanadium	NOEL	1.6E-01		1.7E-02	1.7E-01

Total Risk Across Surface Soil: 2.5E-06
Total Risk Across Groundwater: 9.7E-05

Total Risk Across All Media and All Exposure Routes: 1.0E-04

Total Hazard Index Across All Media and All Exposure Routes: 1.0E+01

Total Liver HI = 6.4E+00
Total CNS HI = 1.7E+00
Total Skin HI = 4.9E-01
Total Immune System HI = 4.6E-01
Total Kidney HI = 8.2E-01
Total Blood HI = 4.1E+00
Total Vascular HI = 4.9E-01
Total GI Tract HI = 4.1E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 8-9.

SITE 8 - TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	3.8E-08		8.3E-08	1.2E-07	Aroclor-1260					
			Manganese					Manganese	CNS	1.0E-02		9.4E-02	1.0E-01
			Mercury					Mercury	CNS	1.4E-03		7.4E-03	8.8E-03
Groundwater	Water	Onsite	1,1,2-Trichloroethane	5.6E-08	1.1E-08	5.7E-09	7.2E-08	1,1,2-Trichloroethane	Liver	2.5E-03		2.5E-04	2.7E-03
			Chloroform	2.9E-08	1.1E-07	2.8E-09	1.4E-07	Chloroform	Liver	4.7E-03	1.5E-01	4.7E-04	1.6E-01
			Vinyl Chloride	1.4E-06	1.5E-07	7.5E-08	1.6E-06	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails	1.1E-01		2.6E-04	1.1E-01
			Arsenic	5.4E-06		1.3E-08	5.4E-06	Arsenic	Skin, Vascular	1.2E-01		2.9E-04	1.2E-01
			Cadmium					Cadmium	Kidney	8.7E-02		8.3E-03	9.5E-02
			Chromium					Chromium	NOAEL	5.5E-04		1.0E-04	6.5E-04
			Iron					Iron	Liver/Blood/GI Tract	8.1E-01		1.9E-03	8.1E-01
			Thallium					Thallium	Liver	4.0E-01		9.5E-04	4.0E-01
			Vanadium					Vanadium	NOEL	3.5E-02		3.2E-03	3.8E-02

Total Risk Across Surface Soil	1.2E-07
Total Risk Across Groundwater	7.2E-06
Total Risk Across All Media and All Exposure Routes	7.3E-06

Total Hazard Index Across All Media and All Exposure Routes	1.8E+00
Total Liver HI =	1.4E+00
Total CNS HI =	1.1E-01
Total Skin HI =	1.2E-01
Total Immune System HI =	1.1E-01
Total Kidney HI =	9.5E-02
Total Blood HI =	8.1E-01
Total Vascular HI =	1.2E-01
Total GI Tract HI =	8.1E-01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 8-18.

SITE 8 - TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	9.2E-07		9.7E-07	1.9E-06	Aroclor-1260					
			Manganese					Manganese	CNS	5.3E-01		2.3E+00	2.8E+00
			Mercury					Mercury	CNS	2.2E-01		5.4E-01	7.6E-01
Groundwater	Water	Onsite	1,1,2-Trichloroethane	5.3E-07	2.3E-07	3.2E-08	8.0E-07	1,1,2-Trichloroethane	Liver	2.7E-02		1.7E-03	2.9E-02
			Chloroform	2.4E-07	1.9E-06	1.4E-08	2.1E-06	Chloroform	Liver	4.6E-02	3.1E+00	2.7E-03	3.2E+00
			Vinyl Chloride	9.6E-06	1.5E-06	3.1E-07	1.1E-05	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails	1.1E+00		1.9E-03	1.1E+00
			Arsenic	4.4E-05		7.6E-08	4.4E-05	Arsenic	Skin, Vascular	1.1E+00		2.0E-03	1.1E+00
			Cadmium					Cadmium	Kidney	1.7E+00		1.2E-01	1.8E+00
			Chromium					Chromium	NOAEL	9.0E-03		1.3E-03	1.0E-02
			Iron					Iron	Liver/Blood/GI Tract	9.5E+00		1.7E-02	9.5E+00
			Thallium					Thallium	Liver	3.7E+00		6.4E-03	3.7E+00
			Vanadium					Vanadium	NOEL	3.7E-01		2.4E-02	3.9E-01

Total Risk Across Surface Soil: 1.9E-06
Total Risk Across Groundwater: 5.8E-05

Total Risk Across All Media and All Exposure Routes: 6.0E-05

Total Hazard Index Across All Media and All Exposure Routes: 2.4E+01

Total Liver HI = 1.6E+01
Total CNS HI = 3.6E+00
Total Skin HI = 1.1E+00
Total Immune System HI = 1.1E+00
Total Kidney HI = 1.8E+00
Total Blood HI = 9.5E+00
Total Vascular HI = 1.1E+00
Total GI Tract HI = 9.5E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 8-9.

SITE 8 - TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	1.0E-07		4.3E-08	1.5E-07	Aroclor-1260					
			Manganese					Manganese	CNS	9.8E-02		1.7E-01	2.7E-01
			Mercury					Mercury	CNS	1.3E-02		1.3E-02	2.7E-02
Groundwater	Water	Onsite	1,1,2-Trichloroethane	5.3E-08	1.3E-08	2.7E-09	6.9E-08	1,1,2-Trichloroethane	Liver	8.2E-03		4.1E-04	8.6E-03
			Chloroform	2.7E-08	1.3E-07	1.3E-09	1.6E-07	Chloroform	Liver	1.6E-02	6.4E-01	7.6E-04	6.6E-01
			Vinyl Chloride	1.3E-06	1.5E-07	3.5E-08	1.5E-06	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails	3.6E-01		4.2E-04	3.6E-01
			Arsenic	5.1E-06		6.0E-09	5.1E-06	Arsenic	Skin, Vascular	4.0E-01		4.6E-04	4.0E-01
			Cadmium					Cadmium	Kidney	2.9E-01		1.3E-02	3.0E-01
			Chromium					Chromium	NOAEL	1.8E-03		1.7E-04	2.0E-03
			Iron					Iron	Liver/Blood/GI Tract	2.7E+00		3.1E-03	2.7E+00
			Thallium					Thallium	Liver	1.3E+00		1.6E-03	1.3E+00
			Vanadium					Vanadium	NOEL	1.2E-01		5.2E-03	1.2E-01

Total Risk Across Surface Soil	1.5E-07
Total Risk Across Groundwater	6.9E-06
Total Risk Across All Media and All Exposure Routes	7.0E-06

Total Hazard Index Across All Media and All Exposure Routes	6.2E+00
Total Liver HI =	4.7E+00
Total CNS HI =	3.0E-01
Total Skin HI =	4.0E-01
Total Immune System HI =	3.6E-01
Total Kidney HI =	3.0E-01
Total Blood HI =	2.7E+00
Total Vascular HI =	4.0E-01
Total GI Tract HI =	2.7E+00

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 8-18.

SITE 8 - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - DAY CARE CENTER CHILD
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	*Exposure* Medium	*Exposure* Point	*Chemical*	*Carcinogenic Risk*				*Chemical*	*Non-Carcinogenic Hazard Quotient*				
				Ingestion	Inhalation	Dermal	Exposure *Routes Total*		Primary *Target Organ*	Ingestion	Inhalation	Dermal	Exposure *Routes Total*
Soil	Soil	Surface Soil	Aroclor-1260	3.3E-07		6.9E-07	1.0E-06	Aroclor-1260					
			Manganese					Manganese	CNS	1.9E-01		1.7E+00	1.8E+00

Total Risk Across Surface Soil: 1.0E-06
Total Risk Across Groundwater / Air:
Total Risk Across All Media and All Exposure Routes: 1.0E-06

Total Hazard Index Across All Media and All Exposure Routes: 1.8E+00
Total CNS HI = 1.8E+00

SITE 8 - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	3.9E-07		2.1E-06	2.5E-06	Aroclor-1260					
Groundwater	Water	Onsite	1,1,2-Trichloroethane	9.1E-07	2.1E-07	9.2E-08	1.2E-06	1,1,2-Trichloroethane	Liver	1.2E-02		1.2E-03	1.3E-02
			Chloroform	4.1E-07	1.7E-06	4.0E-08	2.2E-06	Chloroform	Liver	2.0E-02	7.2E-01	1.9E-03	7.4E-01
			Vinyl Chloride	1.6E-05	1.6E-06	8.7E-07	1.9E-05	Vinyl Chloride					
			Arsenic	7.5E-05		2.1E-07	7.5E-05	Arsenic	Skin, Vascular	4.8E-01		1.4E-03	4.9E-01
			Iron					Iron	Liver/Blood/GI Tract	4.1E+00		1.2E-02	4.1E+00
			Thallium					Thallium	Liver	1.6E+00		4.5E-03	1.6E+00

Total Risk Across Surface Soil	2.5E-06
Total Risk Across Groundwater	9.7E-05
Total Risk Across All Media and All Exposure Routes	1.0E-04

Total Hazard Index Across All Media and All Exposure Routes	6.9E+00
Total Liver HI =	6.4E+00
Total Skin HI =	4.9E-01
Total Blood HI =	4.1E+00
Total Vascular HI =	4.9E-01
Total GI Tract HI =	4.1E+00

SITE 8 - TABLE 10.2a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	Vinyl Chloride	1.4E-06	1.5E-07	7.5E-08	1.6E-06	Vinyl Chloride					
			Arsenic	5.4E-06		1.3E-08	5.4E-06	Arsenic	Skin, Vascular	1.2E-01		2.9E-04	1.2E-01

Total Risk Across Surface Soil
Total Risk Across Groundwater 7.0E-06

Total Risk Across All Media and All Exposure Routes 7.0E-06

Total Hazard Index Across All Media and All Exposure Routes 1.2E-01

Total Skin HI = 1.2E-01
Total Vascular HI = 1.2E-01

SITE 8 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	Aroclor-1260	9.2E-07		9.7E-07	1.9E-06	Aroclor-1260					
			Manganese					Manganese	CNS	5.3E-01		2.3E+00	2.8E+00
Groundwater	Water	Onsite	Chloroform	2.4E-07	1.9E-06	1.4E-08	2.1E-06	Chloroform	Liver	4.6E-02	3.1E+00	2.7E-03	3.2E+00
			Vinyl Chloride	9.6E-06	1.5E-06	3.1E-07	1.1E-05	Vinyl Chloride					
			Aluminum					Aluminum	Immunological, Nails	1.1E+00		1.9E-03	1.1E+00
			Arsenic	4.4E-05		7.6E-08	4.4E-05	Arsenic	Skin, Vascular	1.1E+00		2.0E-03	1.1E+00
			Cadmium					Cadmium	Kidney	1.7E+00		1.2E-01	1.8E+00
			Iron					Iron	Liver/Blood/GI Tract	9.5E+00		1.7E-02	9.5E+00
			Thallium					Thallium	Liver	3.7E+00		6.4E-03	3.7E+00

Total Risk Across Surface Soil	1.9E-06
Total Risk Across Groundwater	5.7E-05
Total Risk Across All Media and All Exposure Routes	5.9E-05

Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
Total Liver HI =	1.6E+01
Total CNS HI =	2.8E+00
Total Skin HI =	1.1E+00
Total Immune System HI =	1.1E+00
Total Kidney HI =	1.8E+00
Total Blood HI =	9.5E+00
Total Vascular HI =	1.1E+00
Total GI Tract HI =	9.5E+00

SITE 8 - TABLE 10.3a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	Chloroform	2.7E-08	1.3E-07	1.3E-09	1.6E-07	Chloroform	Liver	1.6E-02	6.4E-01	7.6E-04	6.6E-01
			Vinyl Chloride	1.3E-06	1.5E-07	3.5E-08	1.5E-06	Vinyl Chloride					
			Arsenic	5.1E-06		6.0E-09	5.1E-06	Arsenic	Skin, Vascular	4.0E-01		4.6E-04	4.0E-01
			Iron					Iron	Liver/Blood/GI Tract	2.7E+00		3.1E-03	2.7E+00
			Thallium					Thallium	Liver	1.3E+00		1.6E-03	1.3E+00

Total Risk Across Surface Soil
Total Risk Across Groundwater 6.8E-06

Total Risk Across All Media and All Exposure Routes 6.8E-06

Total Hazard Index Across All Media and All Exposure Routes 5.1E+00

Total Liver HI = 4.7E+00
Total Skin HI = 4.0E-01
Total Blood HI = 2.7E+00
Total Vascular HI = 4.0E-01
Total GI Tract HI = 2.7E+00

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2-Trichloroethane	1.70E-03	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	5.56E-04	4.63E-04	4.32E-02
Chloroform	7.20E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	2.83E-03	2.36E-03	5.19E-02
Vinyl Chloride	9.20E-04	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	4.75E-04	3.96E-04	6.82E-02

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1,2-Trichloroethane	1.70E-03	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	2.40E-06
Chloroform	7.20E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	3.81E-05
Vinyl Chloride	9.20E-04	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	2.57E-05

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2-Trichloroethane	4.63E-04	3.4E-06	1.0E-05	5.60E-02		1.9E-07	7.7%	NA	NA
Chloroform	2.36E-03	1.8E-05	5.1E-05	8.10E-02	8.60E-05	1.4E-06	56.9%	5.9E-01	100.0%
Vinyl Chloride	3.96E-04	2.9E-06	8.6E-06	3.00E-01		8.8E-07	35.4%	NA	NA
					Total	**2.5E-06**	**100.0%**	**5.9E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	6	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2-Trichloroethane	4.63E-04	4.0E-06	4.7E-05	5.60E-02		2.3E-07	7.7%	NA	NA
Chloroform	2.36E-03	2.0E-05	2.4E-04	8.10E-02	8.60E-05	1.7E-06	56.9%	2.8E+00	100.0%
Vinyl Chloride	3.96E-04	3.4E-06	4.0E-05	3.00E-01		1.0E-06	35.4%	NA	NA
					Total	**2.9E-06**	**100.0%**	**2.8E+00**	**100.0%**

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,1,2-Trichloroethane	7.67E-04	1.33E+02	9.12E-04	1.15E+01	1.10E+03	9.03E+00	1.19E+01	2.51E-04	2.09E-04	2.39E-02
Chloroform	3.69E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	1.45E-03	1.21E-03	2.87E-02
Vinyl Chloride	5.70E-04	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	2.94E-04	2.45E-04	3.77E-02

Vapor Intrusion from Groundwater - CTE
Source: ASTM E 1739-95
SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1,2-Trichloroethane	7.67E-04	7.80E-02	8.80E-06	4.42E+03	3.74E-02	6.09E-03	5.58E-05	2.17E-03	6.09E-03	1.05E-04	1.41E-03	1.08E-06
Chloroform	3.69E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	1.95E-05
Vinyl Chloride	5.70E-04	1.06E-01	1.23E-06	2.76E+03	1.11E+00	8.27E-03	1.39E-05	7.59E-04	8.27E-03	3.67E-05	2.79E-02	1.59E-05

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT- CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT- CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2-Trichloroethane	2.09E-04	1.7E-07	1.7E-06	5.60E-02		9.4E-09	6.4%	NA	NA
Chloroform	1.21E-03	9.7E-07	9.7E-06	8.10E-02	8.60E-05	7.9E-08	53.5%	1.1E-01	100.0%
Vinyl Chloride	2.45E-04	2.0E-07	2.0E-06	3.00E-01		5.9E-08	40.2%	NA	NA
					Total	**1.5E-07**	**100.0%**	**1.1E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	2	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	730	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 8 - ABANDONED CHEMICAL DISPOSAL PIT
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,1,2-Trichloroethane	2.09E-04	2.2E-07	7.8E-06	5.60E-02		1.3E-08	6.4%	NA	NA
Chloroform	1.21E-03	1.3E-06	4.5E-05	8.10E-02	8.60E-05	1.0E-07	53.5%	5.3E-01	100.0%
Vinyl Chloride	2.45E-04	2.6E-07	9.2E-06	3.00E-01		7.9E-08	40.2%	NA	NA
					Total	**2.0E-07**	**100.0%**	**5.3E-01**	**100.0%**

SITE 9

RISK ASSESSMENT CALCULATIONS

SITE 9 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Subsurface Soil(1)	Subsurface Soil	Entire Site	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	Excavation/construction or intrusive activities may occur at the site. Excavation/construction or intrusive activities may occur at the site.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Utility/ Construction Workers	Adult	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	Quant(2) Quant(2)	Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing. Exposure to surface soil may occur if potential receptors are exposed during typical receptor-related activities, such as digging and playing.
		Air	Vapors and Particulates in Air - Entire Site	All Potential Receptors, i.e., Workers, Recreational Users, Trespassers, Day Care Center Children, and Future Residents	Adult, Child, Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs (4)for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Maintenance/Utility/ Construction Workers	Adult	Ingestion Dermal	On-site On-site	None Quant	Minimal exposure is anticipated. Excavation/construction or intrusive activities may occur at the site.
				Full-time Employees, Recreational Users, Trespassers, Day Care Center Children	Adult, Child, Adolescent	Ingestion Dermal	On-site On-site	None None	Surficial aquifer is not expected to be used as a domestic water supply. Surficial aquifer is not expected to be used as a domestic water supply.
				Residents	Adult and Child	Ingestion Dermal	On-site On-site	Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions. Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Maintenance/Utility/ Construction Workers	Adult	Inhalation	Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into outdoor ambient air.
				Full-time Workers	Adult	Inhalation	Indoor and Outdoor On-site	Quant	Workers may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air.
				Recreational Users	Adult	Inhalation	Outdoor On-site	None	Exposure of recreational users to vapors from groundwater is expected to be minimal.
				Trespassers	Adolescent	Inhalation	Outdoor On-site	None	Exposure of trespassers to vapors from groundwater is expected to be minimal.
				Day Care Center Children	Child	Inhalation	Indoor On-site	Quant	Children may be exposed to volatile organic compounds volatilizing from groundwater into indoor ambient air.
				Residents	Adult and Child	Inhalation	Indoor and Outdoor On-site	Quant	Future residents may be exposed to volatile organic compounds volatilizing from groundwater into indoor and outdoor ambient air and while bathing or showering.

SITE 9 - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors from Water in On-site Ditches	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	On-Site Ditches and Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.

Footnotes:

1 Subsurface soil is defined as soil collected from depths greater than 0.5 feet below ground surface (bgs).

2 Quantitative.

3 Qualitative.

4 Soil Screening Levels (USEPA, May 1996).

SITE 9 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
108-10-1	4-Methyl-2-pentanone	0.001	J	0.002	J	mg/kg	09-SB12-1012	3/12	0.011 - 0.012	0.002	NA	630	N		NA NA	No	BSL
67-64-1	Acetone	0.007	J	0.012	J	mg/kg	09-SB03-CUT	2/12	0.005 - 0.012	0.012	NA	780	N	0.8 100000	SSL_MIGR SSL_INH	No	BSL
100-41-4	Ethylbenzene	0.001	J	0.001	J	mg/kg	09-SB07-1012	1/12	0.011 - 0.012	0.001	NA	780	N	0.7 400	SSL_MIGR SSL_INH	No	BSL
75-09-2	Methylene Chloride	0.062		0.062		mg/kg	09-SB02-1012	1/12	0.002 - 0.022	0.062	NA	85	C	0.001 13	SSL_MIGR SSL_INH	No	BSL
79-01-6	Trichloroethene	0.001	J	0.005	J	mg/kg	09-SB19-1012	3/12	0.011 - 0.012	0.005	NA	58	C	**0.003** 5	SSL_MIGR SSL_INH	No	BSL
1330-20-7	Xylenes, Total	0.006	J	0.006	J	mg/kg	09-SB07-1012	1/12	0.011 - 0.012	0.006	NA	16000	N	9 410	SSL_MIGR SSL_INH	No	BSL
120-12-7	Anthracene	0.061	J	0.061	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.061	NA	2300	N	590	SSL_MIGR NA	No	BSL
206-44-0	Fluoranthene	0.17	J	0.17	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.17	NA	310	N	210	SSL_MIGR NA	No	BSL
85-01-8	Phenanthrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	160	N		NA NA	No	BSL
129-00-0	Pyrene	0.19	J	0.19	J	mg/kg	09-SB03-CUT	1/9	0.37 - 0.41	0.19	NA	230	N	210	SSL_MIGR NA	No	BSL
7429-90-5	Aluminum	897	J	15900		mg/kg	09-SB06-1214	12/12		15900	NA	**7800**	N		NA NA	No	BKG
7440-36-0	Antimony	0.35	L	0.35	L	mg/kg	09-SB04-1012	1/12	0.24 - 1.1	0.35	NA	3.1	N	**0.3**	SSL_MIGR NA	No	BSL
7440-38-2	Arsenic	0.27		4.7		mg/kg	09-SB04-1012	9/12	1.4 - 4.2	4.7	NA	**0.43**	C	1 750	SSL_MIGR SSL_INH	No	BKG
7440-39-3	Barium	1.6		78.2		mg/kg	09-SB06-1214	10/12	4 - 5.6	78.2	NA	550	N	82 690000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-41-7	Beryllium	0.16	L	1.9		mg/kg	09-SB05-1012	4/12	0.06 - 0.53	1.9	NA	16	N	3 1300	SSL_MIGR SSL_INH	No	BSL
7440-43-9	Cadmium	1.1		1.1		mg/kg	09-SB06-1214	1/12	0.25 - 1.3	1.1	NA	7.8	N	**0.4** 1800	SSL_MIGR SSL_INH	No	BSL
7440-70-2	Calcium	12.1		916		mg/kg	09-SB05-1012	5/12	9 - 61	916	NA				NA NA	No	NUT, BKG
7440-47-3	Chromium	2.3	J	34.2		mg/kg	09-SB19-1012	12/12		34.2	NA	**23 (7)**	N	2 270	SSL_MIGR SSL_INH	No	BKG

SITE 9 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-48-4	Cobalt	1.9		18.9		mg/kg	09-SB06-1214	5/12	1.5 - 3.3	18.9	NA	470	N		NA NA	No	BSL, BKG
7440-50-8	Copper	1.8	J	46.7		mg/kg	09-SB06-1214	7/12	7.1 - 16	46.7	NA	310	N		NA NA	No	BSL, BKG
7439-89-6	Iron	412	J	50500		mg/kg	09-SB06-1214	12/12		50500	NA	**2300**	N		NA NA	No	BKG
7439-92-1	Lead	1.7	L	9.3		mg/kg	09-SB04-1012	11/12	1.4	9.3	NA	400 (8)			NA NA	No	BSL, BKG
7439-95-4	Magnesium	22.9	J	5570		mg/kg	09-SB06-1214	12/12		5570	NA	NA			NA NA	No	NUT, BKG
7439-96-5	Manganese	1.3	L	1120	J	mg/kg	09-SB06-1214	11/12	0.45 - 0.47	1120	NA	**160 (9)**	N		NA NA	No	BKG
7439-97-6	Mercury	0.06		0.89	J	mg/kg	09-SB05-1012	6/12	0.11 - 0.32	0.89	NA	2.3 (10)	N	**0.1** 10	SSL_MIGR SSL_INH	No	BSL
7440-02-0	Nickel	4.1		18		mg/kg	09-SB06-1214	5/12	1.8 - 4	18	NA	160	N	7 13000	SSL_MIGR SSL_INH	No	BSL, BKG
7440-09-7	Potassium	75.4		3950		mg/kg	09-SB05-1012	9/12	158 - 3650	3950	NA	NA			NA NA	No	NUT, BKG
7782-49-2	Selenium	0.34	K	1.2	L	mg/kg	09-SB15-1214-D	4/12	0.32 - 0.34	1.2	NA	39	N	**0.3**	SSL_MIGR NA	No	BSL, BKG
7440-28-0	Thallium	0.5		0.5		mg/kg	09-SB06-1214	1/12	0.25 - 0.28	0.5	NA	0.55	N	**0.04**	SSL_MIGR NA	No	BSL, BKG
7440-62-2	Vanadium	3.6		56.7		mg/kg	09-SB07-1012	11/12	12.8	56.7	NA	**55**	N	300	SSL_MIGR NA	No	BKG
7440-66-6	Zinc	1.5		76.1		mg/kg	09-SB06-1214	7/12	0.66 - 9.1	76.1	NA	2300	N	620	SSL_MIGR NA	No	BSL, BKG
TTNUS17	pH	4.41		6.78			09-SB03-CUT	12/12		6.78	NA	NA			NA	No	NTX
TTNUS92	Total Kjeldahl Nitrogen	14.9		248		mg/kg	09-SB13-0810	10/12	20.5 - 38.3	248	NA	NA			NA	No	NTX

Associated Samples:
09-SB02-1012 09-SB13-0810
09-SB03-CUT 09-SB14-1012
09-SB04-1012 09-SB15-1214
09-SB05-1012 09-SB15-1214-D
09-SB06-1214 09-SB19-1012
09-SB07-1012
09-SB08-1214
09-SB12-1012

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

SITE 9 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SUBSURFACE SOIL
SITE 9 - INDUSTRIAL WASTWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Hexavalent Chromium.
8 OSWER soil screening level for residential land use (USEPA, July 1994)
9 Manganese-Nonfood
10 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

SSL-INH = Soil Screening Level for transfers from soil to air (Inhalation) (USEPA, May 1996)
SSL-MIGR = Soil Screening Level for migration from soil to groundwater, Dilution and Attenuation

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 9 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
71-55-6	1,1,1-Trichloroethane	0.34	J	0.34	J	µg/L	9GW440001	1/31	1 - 3	0.34	NA	54	N	200	FED-MCL	No	BSL, FREQ
79-34-5	1,1,2,2-Tetrachloroethane	3.3		3.3		µg/L	9GWC60001	1/31	1	3.3	NA	**0.053**	C	NA	NA	No	FREQ
67-64-1	Acetone	12	L	12	L	µg/L	9TW0010001	1/12	1.6 - 2.8	12	NA	61	N	NA	NA	No	BSL
71-43-2	Benzene	0.19	J	0.19	J	µg/L	9TW0010001	1/31	1 - 3	0.19	NA	0.36	C	5	FED-MCL	No	BSL, FREQ
75-27-4	Bromodichloromethane	0.32	J	0.92	J	µg/L	9GW550001	4/31	0.33 - 3	0.92	NA	**0.17**	C	80	FED-MCL	Yes	ASL
74-83-9	Bromomethane	0.24	J	0.24	J	µg/L	9GW030001	1/31	1 - 3	0.24	NA	0.85	N	NA	NA	No	BSL, FREQ
56-23-5	Carbon Tetrachloride	0.24	J	0.58	J	µg/L	9GW020001	3/31	1 - 3	0.58	NA	**0.16**	C	5	FED-MCL	Yes	ASL
67-66-3	Chloroform	0.2	J	22		µg/L	9GW070001	15/31	0.7 - 9.6	22	NA	**0.15**	C	80	FED-MCL	Yes	ASL
100-41-4	Ethylbenzene	0.11	J	0.11	J	µg/L	9TW0010001	1/31	1 - 3	0.11	NA	130	N	700	FED-MCL	No	BSL, FREQ
127-18-4	Tetrachloroethene	0.2	J	5		µg/L	9GW020001	9/31	1 - 3	5	NA	**1.1**	C	5	FED-MCL	Yes	ASL
108-88-3	Toluene	0.17	J	0.47	J	µg/L	9GW1050001	3/31	1 - 3	0.47	NA	75	N	1000	FED-MCL	No	BSL
79-01-6	Trichloroethene	0.28	J	45		µg/L	9GWC60001	18/31	1	45	NA	**1.6**	C	**5**	FED-MCL	Yes	ASL
156-59-2	cis-1,2-dichloroethene	0.21	J	4.9		µg/L	9GW1050001	12/31	1	4.9	NA	6.1	N	70	FED-MCL	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	1.7	J	3	J	µg/L	9GW1060001	4/31	5 - 5.2	3	NA	4.8	C	6	FED-MCL	No	BSL
84-74-2	Di-n-butyl phthalate	1.2	J	1.4	J	µg/L	9GW580001	2/31	5 - 5.2	1.4	NA	370	N	NA	NA	No	BSL
50-29-3	4,4'-DDT	0.0049	J	0.0049	J	µg/L	9TW0020001	1/31	0.1 - 0.11	0.0049	NA	0.2	C	NA	NA	No	BSL, FREQ
5103-71-9	alpha-Chlordane	0.29		0.31		µg/L	9GW010001-D	1/31	0.05 - 0.056	0.31	NA	**0.19 (7)**	C	2	FED-MCL	No	FREQ
5103-74-2	gamma-Chlordane	0.24		0.26		µg/L	9GW010001-D	1/31	0.05 - 0.056	0.26	NA	**0.19 (7)**	C	2	FED-AL	No	FREQ
1024-57-3	Heptachlor Epoxide	0.013	J	0.013	J	µg/L	9TW0020001	1/31	0.05 - 0.056	0.013	NA	**0.0074**	C	0.2	FED-MCL	No	FREQ
7429-90-5	Aluminum	140		108000		µg/L	9GW57S0001	22/31	12.7 - 231	108000	NA	**3700**	N	**50-200 (8)**	FED-MCL	No	BKG
7440-36-0	Antimony	2		2		µg/L	9GW830001	2/31	1.9 - 5.9	2	NA	**1.5**	N	6	FED-MCL	Yes	ASL
7440-38-2	Arsenic	2		25		µg/L	9GW050001	11/31	1.5	25	NA	**0.045**	C	50	FED-MCL	Yes	ASL
7440-39-3	Barium	13	J	369		µg/L	9GW57S0001	31/31	0	369	NA	**260**	N	2000	FED-MCL	No	BKG
7440-41-7	Beryllium	8.3		8.3		µg/L	9GW57S0001	1/31	0.06 - 1.1	8.3	NA	**7.3**	N	**4**	FED-MCL	No	BKG, FREQ
7440-43-9	Cadmium	26.9		26.9		µg/L	9GW040001	1/31	0.2 - 3.7	26.9	NA	**3.7**	N	**5**	FED-MCL	No	FREQ
7440-70-2	Calcium	1050	J	62200		µg/L	9GWC140001	31/31	0	62200	NA	NA		NA	NA	No	BKG, NUT
7440-47-3	Chromium	4.7		193		µg/L	9TW0010001	19/31	2.3 - 12.3	193	NA	**11(9)**	N	**100**	FED-MCL	No	BKG
7440-48-4	Cobalt	4.6		87.5	K	µg/L	9GW57S0001	19/31	3.3 - 16.2	87.5	NA	220	N	NA	NA	No	BSL
7440-50-8	Copper	3.1		129		µg/L	9GW57S0001	16/31	2.4 - 14.7	129	NA	150	N	1300	FED-MCL	No	BSL, BKG
7439-89-6	Iron	169	J	136000	J	µg/L	9GW57S0001	26/31	58.9 - 246	136000	NA	**1100**	N	**300 (8)**	FED-MCL	Yes	ASL
7439-92-1	Lead	1.2		58.7		µg/L	9GW57S0001	8/31	1 - 4.8	58.7	NA	**15**		**15**	FED-AL	No	BKG
7439-95-4	Magnesium	1030		14000		µg/L	9GW57S0001	31/31	0	14000	NA	NA		NA	NA	No	BKG, NUT
7439-96-5	Manganese	12.4		1930		µg/L	9GW830001	31/31	0	1930	NA	**73 (10)**	N	**50 (8)**	FED-MCL	No	BKG
7439-97-6	Mercury	0.23	K	12		µg/L	9GW050001	8/31	0.1 - 0.2	12	NA	**1.1 (11)**	N	**2**	FED-MCL	Yes	ASL
7440-02-0	Nickel	8.3		85.8		µg/L	9GW070001	19/31	7.5	85.8	NA	**73**	N	100	FED-MCL	No	BKG
7440-09-7	Potassium	1250		11800		µg/L	9GWC140001	27/31	1110 - 2460	11800	NA	NA		NA	NA	No	BKG, NUT
7782-49-2	Selenium	2.8		24.8		µg/L	9GW050001	6/31	2.5 - 2.8	24.8	NA	**18**	N	50	FED-MCL	Yes	ASL
7440-23-5	Sodium	4040		47800		µg/L	9GW440001	31/31	0	47800	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	2.4		209		µg/L	9GW580001	11/31	2.1 - 17.4	209	NA	**26**	N	NA	NA	Yes	ASL
7440-66-6	Zinc	8.1	J	627	J	µg/L	9GWBLD3670001	26/31	3.2 - 30.1	627	NA	1100	N	5000 (8)	FED-MCL	No	BSL

SITE 9 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
118-96-7	2,4,6-Trinitrotoluene	0.47		0.47		µg/L	9GWC140001	1/31	0.2 - 4	0.47	NA	2.2	C	NA	NA	No	BSL, FREQ
606-20-2	2,6 Dinitrotoluene	0.3		0.3		µg/L	9GW550001	1/31	0.2 - 4	0.3	NA	3.7	N	NA	NA	No	BSL, FREQ
35572-78-2	2-Amino-4,6-dinitrotoluene	0.41		0.41		µg/L	9GW580001	1/31	0.2 - 4	0.41	NA	**0.22**	N	NA	NA	No	FREQ
2691-41-0	HMX	0.57		10		µg/L	9GW010001-D	13/31	0.5	10	NA	180	N	NA	NA	No	BSL
121-82-4	RDX	0.83		130		µg/L	9GW010001-D	15/31	0.5	130	NA	**0.61**	C	NA	NA	Yes	ASL
TTNUS99	Ammonium Perchlorate	7.9	L	71	K	µg/L	9GWC50001	8/31	5 - 8	71	NA	NA	N	**18 (12)**	NA	Yes	ASL

Associated Samples:

9GW010001	9GW1070001
9GW010001-D	9GW1080001
9GW020001	9GW440001
9GW030001	9GW550001
9GW040001	9GW57D0001
9GW050001	9GW57S0001
9GW060001	9GW590001
9GW070001	9GW5B0001
9GW1000001	9GW740001
9GW1010001	9GW750001
9GW1020001	9GW830001
9GW1020001-[	9GWBLD3670001
9GW1030001	9GWC140001
9GW1030001-[	9GWC50001
9GW1040001	9GWC60001
9GW1050001	9TW0010001
9GW1060001	9TW0020001

Footnotes:

1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil PCOC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chlordane and gamma-Chlordane as Chlordane.
8 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
9 Hexavalent Chromium.
10 Manganese-Nonfood.
11 Mercury as Mercuric Chloride.
12 Health based action level (California Department of Health Services, January, 1999).

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
PCOC = Potential Constituent of Concern
FED-AL = Federal Action Level (USEPA, October. 1996)
FED-MCL = Federal Maximum Contaminant Level (USEPA, October 1996)
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Nocarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:

For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient

SITE 9 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-64-1	Acetone	4.5	J	5.1	J	µg/L	9SW1060001	3/3		5.1	NA	61	N		NA	No	BSL
71-43-2	Benzene	0.12	J	0.13	J	µg/L	9SW1050001-D	1/9	1	0.13	NA	0.36	C	1.2	NRWQC	No	BSL
56-23-5	Carbon Tetrachloride	0.17	J	0.17	J	µg/L	9SW1020001	1/9	1	0.17	NA	**0.16**	C	0.25	NRWQC	Yes	ASL
75-09-2	Methylene Chloride	0.66	J	0.66	J	µg/L	9SW1070001	1/9	0.48 - 8.2	0.66	NA	4.1	C	4.7	NRWQC	No	BSL
127-18-4	Tetrachloroethene	0.12	J	0.13	J	µg/L	9SW1020001	2/9	1	0.13	NA	1.1	C	0.8	NRWQC	No	BSL
100-02-7	4-Nitrophenol	1.6	J	1.6	J	µg/L	9SW1000001	1/9	20	1.6	NA	29	N		NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	2.4	J	2.4	J	µg/L	9SW1070001	1/9	5	2.4	NA	4.8	C	**1.8**	NRWQC	No	BSL
50-29-3	4,4'-DDT	0.0011	J	0.006	J	µg/L	9SW1030001	3/9	0.1	0.006	NA	0.2	C	**0.00059**	NRWQC	No	BSL
5103-71-9	alpha-Chlordane	0.0041	J	0.018	J	µg/L	9SW1000001	3/9	0.05	0.018	NA	0.19 (7)	C	**0.0021**	NRWQC	No	BSL
11141-16-5	Aroclor-1232	1	J	1	J	µg/L	9SW1010001	1/9	1	1	NA	**0.033**	C	**0.00017**	NRWQC	Yes	ASL
53469-21-9	Aroclor-1242	0.62	J	0.62	J	µg/L	9SW1000001	1/9	1	0.62	NA	**0.033**	C	**0.00017**	NRWQC	Yes	ASL
11096-82-5	Aroclor-1260	0.14	J	0.37	J	µg/L	9SW1030001	2/9	1	0.37	NA	**0.033**	C	**0.00017**	NRWQC	Yes	ASL
1031-07-8	Endosulfan Sulfate	0.0018	J	0.0018	J	µg/L	9SW1000001	1/9	0.1	0.0018	NA	22 (8)	N	110	NRWQC	No	BSL
5103-74-2	gamma-Chlordane	0.0043	J	0.0083	J	µg/L	9SW1000001	2/9	0.05	0.0083	NA	0.19 (7)	C	**0.0021**	NRWQC	No	BSL
1024-57-3	Heptachlor Epoxide	0.0033	J	0.0033	J	µg/L	9SW1030001	1/9	0.0011 - 0.05	0.0033	NA	0.0074	C	**0.0001**	NRWQC	No	BSL
319-84-6	alpha-BHC	0.0016	J	0.0081	J	µg/L	9SW1010001	2/9	0.05	0.0081	NA	0.011	C	**0.0039**	NRWQC	No	BSL
319-85-7	beta-BHC	0.00099	J	0.0091	J	µg/L	9SW1000001	4/9	0.05	0.0091	NA	0.037	C	0.014	NRWQC	No	BSL
58-89-9	gamma-BHC (Lindane)	0.00079	J	0.00079	J	µg/L	9SW1030001	1/9	0.05	0.00079	NA	0.052	C	0.019	NRWQC	No	BSL
7429-90-5	Aluminum	397		3180		µg/L	9SW1070001	3/9	59.4 - 395	3180	NA	3700	N		NA	No	BSL
7440-38-2	Arsenic	3.1	K	3.2	K	µg/L	9SW1020001	2/9	1.5 - 2.7	3.2	NA	**0.045**	C	**0.018**	NRWQC	No	BKG
7440-39-3	Barium	17.6		90.4		µg/L	9SW1040001	8/9	52.8	90.4	NA	260	N	1000	NRWQC	No	BSL
7440-70-2	Calcium	8750		50200		µg/L	9SW1070001	9/9		50200	NA	NA			NA	No	NUT
7440-47-3	Chromium	2.6		2.6		µg/L	9SW1010001	1/9	0.9 - 10.6	2.6	NA	11 (9)	N		NA	No	BSL
7440-48-4	Cobalt	0.93		3.6		µg/L	9SW1070001	3/9	0.6 - 3.3	3.6	NA	220	N		NA	No	BSL
7440-50-8	Copper	20.6	K	81.2		µg/L	9SW1050001-D	2/9	1.3 - 12.5	81.2	NA	150	N	1000	NRWQC	No	BSL, BKG
57-12-5	Cyanide	3.8		6		µg/L	9SW1070001	3/9	2.7	6	NA	73	N	700	NRWQC	No	BSL
7439-89-6	Iron	660		5360	J	µg/L	9SW1070001	5/9	139 - 330	5360	NA	**1100**	N	**300**	NRWQC	Yes	ASL
7439-92-1	Lead	2.1		14.5		µg/L	9SW1010001	5/9	1.5	14.5	NA	15 (10)			NA	No	BSL
7439-95-4	Magnesium	1090		17800		µg/L	9SW1040001	9/9		17800	NA	NA			NA	No	NUT
7439-96-5	Manganese	9.7	K	376		µg/L	9SW1010001	9/9		376	NA	**73 (11)**	N	**50**	NRWQC	Yes	ASL
7439-97-6	Mercury	0.1		0.91		µg/L	9SW1010001	5/9	0.1 - 0.2	0.91	NA	1.1 (12)	N	**0.05**	NRWQC	No	BSL
7440-02-0	Nickel	2.6		23.6	L	µg/L	9SW1070001	4/9	1.2 - 7.5	23.6	NA	73	N	610	NRWQC	No	BSL, BKG
7440-09-7	Potassium	1390		10200		µg/L	9SW1050001-D	9/9		10200	NA	NA			NA	No	NUT, BKG
7440-23-5	Sodium	2240		277000		µg/L	9SW1050001-D	9/9		277000	NA	NA			NA	No	NUT
7440-62-2	Vanadium	5.9		5.9		µg/L	9SW1010001	1/9	0.6 - 10.9	5.9	NA	26	N		NA	No	BSL, BKG
7440-66-6	Zinc	47.1		105	J	µg/L	9SW1010001	5/9	14.1 - 27.7	105	NA	1100	N	5000	NRWQC	No	BSL
121-82-4	RDX	0.74		1.1		µg/L	9SW1020001	2/9	0.5	1.1	NA	**0.61**	C		NA	Yes	ASL

SITE 9 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
TTNUS21	Total Dissolved Solids	61		1100		mg/L	9SW1050001-D	9/9		1100	NA	NA	250000	NRWQC	No	NTX
	Total Suspended Solids	8		85		mg/L	9SW1070001	6/9	4	85	NA	NA		NA	No	NTX

Associated Samples:
9SW1000001
9SW1010001
9SW1020001
9SW1030001
9SW1040001
9SW1050001
9SW1050001-D
9SW1060001
9SW1070001
9SW1080001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan Sulfate as Endosulfan.
9 Hexavalent Chromium.
10 Action level at the TAP(USEPA, October 1996).
11 Manganese-Nonfood
12 Mercury as Mercuric Chloride

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
NRWQC = National Recommended Water Quality Criteria (USEPA, April 1999)

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 9 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
67-66-3	Chloroform	0.001	J	0.002	J	mg/kg	9SD1070001	3/9	0.012 - 0.014	0.002	NA	100	C	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	0.056	J	0.15	J	mg/kg	9SD1000001	2/9	0.37 - 0.44	0.15	NA	0.87	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	0.051	J	0.1	J	mg/kg	9SD1000001	2/9	0.37 - 0.44	0.1	NA	**0.087**	C	NA	NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.06	J	0.19	J	mg/kg	9SD1000001	3/9	0.37 - 0.42	0.19	NA	0.87	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.046	J	0.046	J	mg/kg	9SD1000001	1/9	0.37 - 0.44	0.046	NA	160	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.053	J	0.053	J	mg/kg	9SD1000001	1/9	0.37 - 0.44	0.053	NA	8.7	C	NA	NA	No	BSL
117-81-7	Bis(2-Ethylhexyl)phthalate	0.089	J	0.089	J	mg/kg	9SD1010001	1/9	0.37 - 0.44	0.089	NA	46	C	NA	NA	No	BSL
218-01-9	Chrysene	0.085	J	0.2	J	mg/kg	9SD1000001	3/9	0.37 - 0.44	0.2	NA	87	C	NA	NA	No	BSL
206-44-0	Fluoranthene	0.11	J	0.43		mg/kg	9SD1000001	4/9	0.37 - 0.42	0.43	NA	310	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.062	J	0.062	J	mg/kg	9SD1000001	1/9	0.37 - 0.44	0.062	NA	0.87	C	NA	NA	No	BSL
85-01-8	Phenanthrene	0.045	J	0.17	J	mg/kg	9SD1000001	3/9	0.37 - 0.44	0.17	NA	160	N	NA	NA	No	BSL
129-00-0	Pyrene	0.069	J	0.2	J	mg/kg	9SD1000001	4/9	0.37 - 0.42	0.2	NA	230	N	NA	NA	No	BSL
72-55-9	4,4'-DDE	0.00071	J	0.042	J	mg/kg	9SD1080001	2/8	0.0039 - 0.0044	0.042	NA	1.9	C	NA	NA	No	BSL
5103-71-9	alpha-Chlordane	0.0013	J	0.011	J	mg/kg	9SD1010001	5/9	0.0019 - 0.0022	0.011	NA	1.8 (7)	C	NA	NA	No	BSL
12672-29-6	Aroclor-1248	0.032	L	0.12	J	mg/kg	9SD1020001	3/9	0.038 - 0.042	0.12	NA	0.32	C	NA	NA	No	BSL
11097-69-1	Aroclor-1254	0.039	J	1.7	J	mg/kg	9SD1080001	4/9	0.039 - 0.044	1.7	NA	**0.32**	C	NA	NA	Yes	ASL
11096-82-5	Aroclor-1260	0.1	J	0.1	J	mg/kg	9SD1010001	1/9	0.038 - 0.044	0.1	NA	0.32	C	NA	NA	No	BSL
60-57-1	Dieldrin	0.00058	J	0.039	J	mg/kg	9SD1080001	3/9	0.0039 - 0.0044	0.039	NA	0.04	C	NA	NA	No	BSL
1031-07-8	Endosulfan Sulfate	0.00024	J	0.04	J	mg/kg	9SD1080001	3/9	0.0039 - 0.0044	0.04	NA	47 (8)	N	NA	NA	No	BSL
7421-93-4	Endrin Aldehyde	0.00034	J	0.0021	J	mg/kg	9SD1010001	2/9	0.0038 - 0.0044	0.0021	NA	2.3 (9)	N	NA	NA	No	BSL
5103-74-2	gamma-Chlordane	0.0026	J	0.0097		mg/kg	9SD1010001	2/6	0.002 - 0.0023	0.0097	NA	1.8 (7)	C	NA	NA	No	BSL
58-89-9	gamma-BHC (Lindane)	0.0019	J	0.0019	J	mg/kg	9SD1000001	1/9	0.0019 - 0.0023	0.0019	NA	0.49	C	NA	NA	No	BSL
7429-90-5	Aluminum	520	J	2920		mg/kg	9SD1070001	9/9		2920	NA	7800	N	NA	NA	No	BSL, BKG
7440-38-2	Arsenic	0.68		9.8		mg/kg	9SD1050001-D	6/9	0.59 - 0.7	9.8	NA	**0.43**	C	NA	NA	No	BKG
7440-39-3	Barium	3.7		37		mg/kg	9SD1000001	9/9		37	NA	550	N	NA	NA	No	BSL, BKG
7440-70-2	Calcium	182		7360		mg/kg	9SD1000001	5/9	148 - 353	7360	NA	NA		NA	NA	No	NUT, BKG
7440-47-3	Chromium	3.4	J	41.9		mg/kg	9SD1000001	9/9		41.9	NA	**23 (10)**	N	NA	NA	No	BKG
7440-48-4	Cobalt	0.81		8.1		mg/kg	9SD1040001	9/9		8.1	NA	470	N	NA	NA	No	BSL, BKG
7440-50-8	Copper	5.6	K	59.8		mg/kg	9SD1000001	5/9	2.3 - 7.5	59.8	NA	310	N	NA	NA	No	BSL, BKG
7439-89-6	Iron	1560	J	18800	J	mg/kg	9SD1050001-D	9/9		18800	NA	**2300**	N	NA	NA	No	BKG
7439-92-1	Lead	1.4	L	134	J	mg/kg	9SD1000001	9/9		134	NA	400 (11)		NA	NA	No	BSL, BKG
7439-95-4	Magnesium	167		2690		mg/kg	9SD1000001	9/9		2690	NA	NA		NA	NA	No	NUT, BKG
7439-96-5	Manganese	32.6		515		mg/kg	9SD1040001	9/9		515	NA	**160 (12)**	N	NA	NA	No	BKG
7439-97-6	Mercury	0.25		1.2		mg/kg	9SD1020001	3/9	0.06	1.2	NA	2.3 (13)	N	NA	NA	No	BSL
7440-02-0	Nickel	4		21.4		mg/kg	9SD1000001	9/9		21.4	NA	160	N	NA	NA	No	BSL, BKG
7440-09-7	Potassium	100		421		mg/kg	9SD1070001	8/9	54.1	421	NA	NA		NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.72	L	1.3	L	mg/kg	9SD1010001	3/9	0.63 - 0.75	1.3	NA	39	N	NA	NA	No	BSL, BKG
7440-62-2	Vanadium	3		12.9		mg/kg	9SD1000001	9/9		12.9	NA	55	N	NA	NA	No	BSL, BKG
7440-66-6	Zinc	16.9	J	84.4		mg/kg	9SD1000001	8/9	13.5 - 15.4	84.4	NA	2300	N	NA	NA	No	BSL, BKG
TTNUS22	Total Organic Carbon	380		1900		mg/kg	9SD1000001	5/9	120 - 130	1900	NA	NA		NA	NA	No	NTX

SITE 9 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:
9SD1000001
9SD1010001
9SD1020001
9SD1030001
9SD1040001
9SD1050001
9SD1050001-D
9SD1060001
9SD1070001
9SD1080001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Endosulfan Sulfate as Endosulfan.
9 Endrin Aldehyde as Endrin.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994)
12 Manganese-Nonfood
13 Mercury as Mercuric Chloride

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

SITE 9 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Groundwater

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Bromodichloromethane	mg/L	5.13E-04	NA	9.20E-04	J	mg/L	5.78E-04	95% UCL-T	W - Test (1)	5.78E-04	95% UCL-T	W - Test (1)
Carbon Tetrachloride	mg/L	5.26E-04	NA	5.80E-04	J	mg/L	5.66E-04	95% UCL-T	W - Test (1)	5.66E-04	95% UCL-T	W - Test (1)
Chloroform	mg/L	2.50E-03	NA	2.20E-02		mg/L	3.98E-03	95% UCL-T	W - Test (1)	3.98E-03	95% UCL-T	W - Test (1)
Tetrachloroethene	mg/L	6.82E-04	NA	5.00E-03		mg/L	7.73E-04	95% UCL-T	W - Test (1)	7.73E-04	95% UCL-T	W - Test (1)
Trichloroethene	mg/L	5.39E-03	NA	4.50E-02		mg/L	1.12E-02	95% UCL-T	W - Test (1)	1.12E-02	95% UCL-T	W - Test (1)
Antimony	mg/L	1.12E-03	NA	2.00E-03		mg/L	1.21E-03	95% UCL-T	W - Test (1)	1.21E-03	95% UCL-T	W - Test (1)
Arsenic	mg/L	4.49E-03	NA	2.50E-02		mg/L	6.85E-03	95% UCL-T	W - Test (1)	6.85E-03	95% UCL-T	W - Test (1)
Iron	mg/L	1.75E+01	NA	1.36E+02	J	mg/L	1.36E+02	Maximum	W - Test (2)	1.36E+02	Maximum	W - Test (2)
Mercury	mg/L	6.93E-04	NA	1.20E-02		mg/L	6.30E-04	95% UCL-T	W - Test (1)	6.30E-04	95% UCL-T	W - Test (1)
Selenium	mg/L	3.40E-03	NA	2.48E-02		mg/L	4.01E-03	95% UCL-T	W - Test (1)	4.01E-03	95% UCL-T	W - Test (1)
Vanadium	mg/L	2.94E-02	NA	2.09E-01		mg/L	7.45E-02	95% UCL-T	W - Test (1)	7.45E-02	95% UCL-T	W - Test (1)
RDX	mg/L	7.51E-03	NA	1.30E-01		mg/L	1.55E-02	95% UCL-T	W - Test (1)	1.55E-02	95% UCL-T	W - Test (1)
Ammonium Perchlorate	mg/L	7.99E-03	NA	7.10E-02	K	mg/L	9.89E-03	95% UCL-T	W - Test (1)	9.89E-03	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test is inconclusive. Data are assumed to be log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration is used for EPC.

SITE 9 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Carbon Tetrachloride	mg/L	4.63E-04	NA	1.70E-04	J	mg/L	1.70E-04	Maximum	N<10(1)	1.70E-04	Maximum(2)	N<10(1)
Total PCBs	mg/L	5.70E-04	NA	1.00E-03	J	mg/L	1.00E-03	Maximum	N<10(1)	5.70E-04	Average	N<10(1)
Iron	mg/L	1.20E+00	NA	5.36E+00	J	mg/L	5.36E+00	Maximum	N<10(1)	1.20E+00	Average	N<10(1)
Manganese	mg/L	1.74E-01	NA	3.76E-01		mg/L	3.76E-01	Maximum	N<10(1)	1.74E-01	Average	N<10(1)
RDX	mg/L	3.99E-04	NA	1.10E-03		mg/L	1.10E-03	Maximum	N<10(1)	3.99E-04	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

(2) Maximum value is used for the CTE for carbon tetrachloride because the average value is greater than the maximum.

SITE 9 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	1.32E-01	NA	1.41E-01	J	mg/kg	1.41E-01	Maximum	N<10(1)	1.32E-01	Average	N<10(1)
Total PCBs	mg/kg	2.49E-01	NA	1.70E+00	J	mg/kg	1.70E+00	Maximum	N<10(1)	2.49E-01	Average	N<10(1)
Aroclor-1254	mg/kg	2.23E-01	NA	1.70E+00	J	mg/kg	1.70E+00	Maximum	N<10(1)	2.23E-01	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 sediment samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

(2) Maximum value is used for the CTE for Aroclor-1260 because the average value is greater than the maximum.

TABLE 5.1

NON-CANCER TOXICITY DATA – ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA. November 1998.
2 *RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)*
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal Cancer Slope Factor(2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date(3)
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA – INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SITE 9 - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

Cancer Inhalation Intake(RME) = 1.01E-02
Noncancer Inhalation Intake(RME) = 2.82E-02

Cancer Inhalation Intake(CTE) = 9.06E-04
Noncancer Inhalation Intake(CTE) = 7.05E-03

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	1.00E+00	8.70E-01		5.80E-03		1.20E-02	8.65E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	3.00E-08
Chloroform	3.98E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	6.71E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	9.73E-08
Trichloroethene	1.12E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.67E-07
Antimony	1.21E-03		i			1.00E+00			1.00E-03			1.21E-09
Arsenic	6.85E-03		i			1.00E+00			1.00E-03			6.85E-09
Iron	1.36E+02		i			1.00E+00			1.00E-03			1.36E-04
Mercury	6.30E-04		i			1.00E+00			1.00E-03			6.30E-10
Selenium	4.01E-03		i			1.00E+00			1.00E-03			4.01E-09
Vanadium	7.45E-02		i			1.00E+00			1.00E-03			7.45E-08
RDX	1.55E-02		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	1.15E-06
Ammonium Perchlorate	9.89E-03		i			1.00E+00			1.00E-03			9.89E-09

SITE 9 - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	7.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	7.9E-10	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.4E-06
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	1.4E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.7E-05
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	6.4E-10	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	4.6E-09
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	6.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.8E-05
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.1E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.5E-06
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	3.8E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.4E-04
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	8.5E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.5E-05
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	1.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-04
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	4.7E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	7.8E-04
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	1.5E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.6E-04
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	8.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-04
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.7E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.7E-03
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	8.0E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.8E-04
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	5.1E-08	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.0E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	9.4E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	5.2E-03
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.8E-03
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.5E-04
	(total)												1.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	2.7E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.8E-10	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	5.1E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-11
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	2.3E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.6E-13
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	2.3E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	(total)										7.1E-11
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	3.9E-08	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.4E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	3.0E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	4.4E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.7E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	5.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	3.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-08
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	6.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	2.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	1.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	3.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	5.2E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.7E-07
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	4.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										6.8E-07
										Total Risk Across All Exposure Routes/Pathways	**6.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	1.00E+00	8.70E-01		5.80E-03		1.20E-02	8.65E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	3.00E-08
Chloroform	3.98E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	6.71E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	9.73E-08
Trichloroethene	1.12E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.67E-07
Antimony	1.21E-03		i			1.00E+00			1.00E-03			1.21E-09
Arsenic	6.85E-03		i			1.00E+00			1.00E-03			6.85E-09
Iron	1.36E+02		i			1.00E+00			1.00E-03			1.36E-04
Mercury	6.30E-04		i			1.00E+00			1.00E-03			6.30E-10
Selenium	4.01E-03		i			1.00E+00			1.00E-03			4.01E-09
Vanadium	7.45E-02		i			1.00E+00			1.00E-03			7.45E-08
RDX	1.55E-02		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	1.15E-06
Ammonium Perchlorate	9.89E-03		i			1.00E+00			1.00E-03			9.89E-09

SITE 9 - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	1.9E-11	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.0E-10	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	3.5E-07
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	3.6E-10	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.2E-06
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	1.6E-10	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.2E-09
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	1.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.5E-06
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	5.5E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-06
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.9E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.7E-04
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	4.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.3E-05
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	6.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.2E-05
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.3E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.9E-04
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	7.7E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-04
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	4.3E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-04
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	8.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-03
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	4.0E-09	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.9E-04
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	2.5E-08	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.1E-06
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	4.7E-07	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.6E-03
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	7.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-03
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	6.3E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-04
	(total)												9.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**9.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	2.5E-12	mg/kg-day		(mg/kg-day)$^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.5E-11	mg/kg-day	5.30E-02	(mg/kg-day)$^{-1}$	1.3E-12
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	4.6E-11	mg/kg-day	8.10E-02	(mg/kg-day)$^{-1}$	3.7E-12
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	2.1E-11	mg/kg-day	2.00E-03	(mg/kg-day)$^{-1}$	4.1E-14
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	2.1E-10	mg/kg-day	6.00E-03	(mg/kg-day)$^{-1}$	1.3E-12
	(total)										6.4E-12
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.0E-09	mg/kg-day	6.20E-02	(mg/kg-day)$^{-1}$	4.4E-10
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.4E-08	mg/kg-day	1.30E-01	(mg/kg-day)$^{-1}$	3.2E-09
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	5.5E-08	mg/kg-day	6.10E-03	(mg/kg-day)$^{-1}$	3.3E-10
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	7.9E-08	mg/kg-day	5.20E-02	(mg/kg-day)$^{-1}$	4.1E-09
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	3.0E-07	mg/kg-day	1.10E-02	(mg/kg-day)$^{-1}$	3.3E-09
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	9.9E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	5.6E-09	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	8.4E-09
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	5.1E-10	mg/kg-day		(mg/kg-day)$^{-1}$	
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	3.3E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	6.1E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	9.3E-07	mg/kg-day	1.10E-01	(mg/kg-day)$^{-1}$	1.0E-07
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	8.1E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	4.8	EPA 1989a	4.8	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

Cancer Inhalation Intake(RME) = 3.86E-03
Noncancer Inhalation Intake(RME) = 2.71E-01

Cancer Inhalation Intake(CTE) = 1.93E-03
Noncancer Inhalation Intake(CTE) = 1.35E-01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
Bromodichloromethane	5.78E-04	o	2.10E+00	1.00E+00	8.70E-01	5.80E-03	1.20E-02	8.65E-09
Carbon Tetrachloride	5.66E-04	o	1.80E+00	1.00E+00	7.60E-01	2.20E-02	6.80E-02	3.00E-08
Chloroform	3.98E-03	o	1.10E+00	1.00E+00	4.70E-01	8.90E-03	9.30E-03	6.71E-08
Tetrachloroethene	7.73E-04	o	4.30E+00	1.00E+00	9.00E-01	4.80E-02	2.50E-01	9.73E-08
Trichloroethene	1.12E-02	o	1.30E+00	1.00E+00	5.50E-01	1.60E-02	2.60E-02	3.67E-07
Antimony	1.21E-03	i		1.00E+00		1.00E-03		1.21E-09
Arsenic	6.85E-03	i		1.00E+00		1.00E-03		6.85E-09
Iron	1.36E+02	i		1.00E+00		1.00E-03		1.36E-04
Mercury	6.30E-04	i		1.00E+00		1.00E-03		6.30E-10
Selenium	4.01E-03	i		1.00E+00		1.00E-03		4.01E-09
Vanadium	7.45E-02	i		1.00E+00		1.00E-03		7.45E-08
RDX	1.55E-02	o	4.75E+00	1.00E+00	1.98E+00	1.90E-02	7.41E-04	1.15E-06
Ammonium Perchlorate	9.89E-03	i		1.00E+00		1.00E-03		9.89E-09

SITE 9 - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	7.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	7.6E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.3E-05
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	1.4E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.6E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	6.2E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	4.4E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	6.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.7E-04
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	5.5E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.9E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.7E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	4.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.3E-04
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	6.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.2E-04
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.3E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.9E-03
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	7.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-03
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	4.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-03
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	8.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	4.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.9E-03
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	2.5E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.1E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	4.7E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.6E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	7.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	6.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-03
	(total)												9.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**9.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	1.0E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	1.1E-10	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-12
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	2.0E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	8.8E-11	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-13
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	8.9E-10	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.3E-12
	(total)										2.7E-11
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.8E-09	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.7E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	6.1E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	8.8E-08	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	3.3E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	6.2E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.3E-09
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	5.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	3.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	6.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	9.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	1.00E+00	8.70E-01		5.80E-03		1.20E-02	8.65E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	3.00E-08
Chloroform	3.98E-03		o		1.10E+00	1.00E+00	4.70E-01		8.90E-03		9.30E-03	6.71E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	1.00E+00	9.00E-01		4.80E-02		2.50E-01	9.73E-08
Trichloroethene	1.12E-02		o		1.30E+00	1.00E+00	5.50E-01		1.60E-02		2.60E-02	3.67E-07
Antimony	1.21E-03		i			1.00E+00			1.00E-03			1.21E-09
Arsenic	6.85E-03		i			1.00E+00			1.00E-03			6.85E-09
Iron	1.36E+02		i			1.00E+00			1.00E-03			1.36E-04
Mercury	6.30E-04		i			1.00E+00			1.00E-03			6.30E-10
Selenium	4.01E-03		i			1.00E+00			1.00E-03			4.01E-09
Vanadium	7.45E-02		i			1.00E+00			1.00E-03			7.45E-08
RDX	1.55E-02		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	1.15E-06
Ammonium Perchlorate	9.89E-03		i			1.00E+00			1.00E-03			9.89E-09

SITE 9 - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	3.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	3.8E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	6.6E-06
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	6.9E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	8.0E-05
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	3.1E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	2.2E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												8.7E-05
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	5.5E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.9E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.7E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	4.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.3E-04
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	6.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.2E-04
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.3E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.9E-03
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	7.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-03
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	4.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-03
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	8.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	4.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.9E-03
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	2.5E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.1E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	4.7E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.6E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	7.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	6.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-03
	(total)												9.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**9.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	5.2E-12	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	5.4E-11	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-12
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	9.8E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	8.0E-12
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	4.4E-11	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.8E-14
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	4.4E-10	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-12
	(total)										1.4E-11
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.8E-09	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.7E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	6.1E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	8.8E-08	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	3.3E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	6.2E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.3E-09
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	5.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	3.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	6.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	9.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.4E-07
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	2	EPA 1993a	1.4	EPA 1993a	Cw x IRw x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	23,000	EPA 1997a	20,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x Ra x CF
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - (exp(Ra) x (Ds-Dt))/F
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 1.08E+02
Noncancer Dermal Intake(RME) = 3.15E+02

Cancer Dermal Intake(CTE) = 1.83E+01
Noncancer Dermal Intake(CTE) = 1.83E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	2.50E-01	8.70E-01		5.80E-03		1.20E-02	4.32E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	2.50E-01	7.60E-01		2.20E-02		6.80E-02	1.50E-08
Chloroform	3.98E-03		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	3.36E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	2.50E-01	9.00E-01		4.80E-02		2.50E-01	4.87E-08
Trichloroethene	1.12E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	1.84E-07
Antimony	1.21E-03		i			2.50E-01			1.00E-03			3.03E-10
Arsenic	6.85E-03		i			2.50E-01			1.00E-03			1.71E-09
Iron	1.36E+02		i			2.50E-01			1.00E-03			3.40E-05
Mercury	6.30E-04		i			2.50E-01			1.00E-03			1.58E-10
Selenium	4.01E-03		i			2.50E-01			1.00E-03			1.00E-09
Vanadium	7.45E-02		i			2.50E-01			1.00E-03			1.86E-08
RDX	1.55E-02		o		4.75E+00	2.50E-01	1.98E+00		1.90E-02		7.41E-04	5.73E-07
Ammonium Perchlorate	9.89E-03		i			2.50E-01			1.00E-03			2.47E-09

SITE 9 - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.9E-04
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.5E-05	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.2E-02
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	1.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-02
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	2.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.1E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	3.1E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.1E-02
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	3.3E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	8.3E-02
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	1.9E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.3E-01
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	3.7E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E+01
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	1.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.8E-02
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	1.1E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.2E-02
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	2.0E-03	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.9E-01
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	4.3E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.4E-01
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	2.7E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.4E-01
	(total)												1.4E+01
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.8E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	4.7E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	6.7E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	1.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-03
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	1.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	5.8E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	9.6E-03
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	9.6E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-03
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	5.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-03
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	5.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	2.4E-03
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	3.2E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	6.3E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	5.9E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	3.2E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.0E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	7.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.6E-03
	(total)												1.5E-01
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	(mg/m^3- min)	R	3.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	(mg/m^3- min)	R	3.8E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	6.7E-03
	Chloroform	3.98E-03	mg/L	1.30E-03	(mg/m^3- min)	R	2.8E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.3E-01
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	(mg/m^3- min)	R	5.0E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.6E-05
	Trichloroethene	1.12E-02	mg/L	3.65E-03	(mg/m^3- min)	R	7.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	5.4E-06	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	5.3E-06	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-07
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	3.7E-05	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	7.3E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.1E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	6.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-05
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.5E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	(total)										1.2E-04
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	4.7E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.6E-06	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	3.6E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	5.3E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.0E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	1.9E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-07
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	6.2E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-06
	(total)										7.8E-06
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	$(mg/m^3\text{-}min)$	R	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	$(mg/m^3\text{-}min)$	R	1.3E-06	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Chloroform	3.98E-03	mg/L	1.30E-03	$(mg/m^3\text{-}min)$	R	9.7E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-07
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	$(mg/m^3\text{-}min)$	R	1.7E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Trichloroethene	1.12E-02	mg/L	3.65E-03	$(mg/m^3\text{-}min)$	R	2.7E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	(total)										1.0E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.2E-04**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	1.67E-01	8.70E-01		5.80E-03		1.20E-02	3.53E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	1.67E-01	7.60E-01		2.20E-02		6.80E-02	1.23E-08
Chloroform	3.98E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	2.74E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	1.67E-01	9.00E-01		4.80E-02		2.50E-01	3.98E-08
Trichloroethene	1.12E-02		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	1.50E-07
Antimony	1.21E-03		i			1.67E-01			1.00E-03			2.03E-10
Arsenic	6.85E-03		i			1.67E-01			1.00E-03			1.14E-09
Iron	1.36E+02		i			1.67E-01			1.00E-03			2.27E-05
Mercury	6.30E-04		i			1.67E-01			1.00E-03			1.05E-10
Selenium	4.01E-03		i			1.67E-01			1.00E-03			6.70E-10
Vanadium	7.45E-02		i			1.67E-01			1.00E-03			1.24E-08
RDX	1.55E-02		o		4.75E+00	1.67E-01	1.98E+00		1.90E-02		7.41E-04	4.69E-07
Ammonium Perchlorate	9.89E-03		i			1.67E-01			1.00E-03			1.65E-09

SITE 9 - TABLE 8.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.4E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	7.3E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	5.1E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	9.9E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.4E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	8.8E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	2.0E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	(total)										1.6E-05
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	6.5E-08	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.2E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	5.0E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	7.3E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.8E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	2.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	8.6E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-07
	(total)										1.1E-06
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	$(mg/m^3\text{-}min)$	R	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	$(mg/m^3\text{-}min)$	R	1.4E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Chloroform	3.98E-03	mg/L	1.30E-03	$(mg/m^3\text{-}min)$	R	1.0E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	$(mg/m^3\text{-}min)$	R	1.9E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	Trichloroethene	1.12E-02	mg/L	3.65E-03	$(mg/m^3\text{-}min)$	R	2.9E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	(total)										1.1E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.7E-05**

SITE 9 - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.7E-04
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	7.3E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.0E-02
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	5.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.1E-03
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	9.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.9E-04
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.4E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.4E-02
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	1.6E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.9E-02
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	8.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-01
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.7E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.8E+00
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	8.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-02
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	5.1E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.0E-02
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	9.5E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.4E-01
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	2.0E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.6E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	1.3E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.5E-01
	(total)												6.7E+00
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	6.5E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.2E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.2E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	3.2E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	5.0E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.0E-04
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	7.3E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.3E-04
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	2.8E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.6E-03
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	3.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.2E-04
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	2.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.0E-04
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	4.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	1.9E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	9.2E-04
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	1.2E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.5E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	2.3E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	1.3E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	8.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	3.0E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.1E-04
	(total)												6.7E-02
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	(mg/m^3- min)	R	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	(mg/m^3- min)	R	1.4E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	2.5E-03
	Chloroform	3.98E-03	mg/L	1.30E-03	(mg/m^3- min)	R	1.0E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-01
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	(mg/m^3- min)	R	1.9E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.3E-05
	Trichloroethene	1.12E-02	mg/L	3.65E-03	(mg/m^3- min)	R	2.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.9E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRw	Ingestion Rate of Water	(L/day)	1	EPA 1997a	1	EPA 1997a	Cw x IRw x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	SA	Skin Surface Area	(cm^2)	6,970	EPA 1997a	6,970	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	0.25	EPA 1992d	0.167	EPA 1992d	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/F
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 1992d	10	EPA 1992d	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.82E+01
Noncancer Dermal Intake(RME) = 4.46E+02

Cancer Dermal Intake(CTE) = 8.51E+00
Noncancer Dermal Intake(CTE) = 2.98E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	2.50E-01	8.70E-01		5.80E-03		1.20E-02	4.32E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	2.50E-01	7.60E-01		2.20E-02		6.80E-02	1.50E-08
Chloroform	3.98E-03		o		1.10E+00	2.50E-01	4.70E-01		8.90E-03		9.30E-03	3.36E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	2.50E-01	9.00E-01		4.80E-02		2.50E-01	4.87E-08
Trichloroethene	1.12E-02		o		1.30E+00	2.50E-01	5.50E-01		1.60E-02		2.60E-02	1.84E-07
Antimony	1.21E-03		i			2.50E-01			1.00E-03			3.03E-10
Arsenic	6.85E-03		i			2.50E-01			1.00E-03			1.71E-09
Iron	1.36E+02		i			2.50E-01			1.00E-03			3.40E-05
Mercury	6.30E-04		i			2.50E-01			1.00E-03			1.58E-10
Selenium	4.01E-03		i			2.50E-01			1.00E-03			1.00E-09
Vanadium	7.45E-02		i			2.50E-01			1.00E-03			1.86E-08
RDX	1.55E-02		o		4.75E+00	2.50E-01	1.98E+00		1.90E-02		7.41E-04	5.73E-07
Ammonium Perchlorate	9.89E-03		i			2.50E-01			1.00E-03			2.47E-09

SITE 9 - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	3.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-03
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	3.6E-05	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.2E-02
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	2.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-02
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	4.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.9E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	7.2E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.2E-01
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	7.8E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.9E-01
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	4.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E+00
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	8.7E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.9E+01
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	4.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-01
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	2.6E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	5.1E-02
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	4.8E-03	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	6.8E-01
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	9.9E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.3E-01
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	6.3E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E+00
	(total)												3.3E+01
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.9E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.6E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	6.7E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	9.5E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	1.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-03
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	2.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.2E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	8.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E-02
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	1.4E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.3E-03
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	7.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-03
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	1.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.0E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	7.0E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	3.3E-03
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	4.5E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	8.9E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	8.3E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	4.6E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	2.6E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.5E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	1.1E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.2E-03
	(total)												2.2E-01
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	(mg/m^3- min)	R	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	(mg/m^3- min)	R	1.8E-05	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	3.1E-02
	Chloroform	3.98E-03	mg/L	1.30E-03	(mg/m^3- min)	R	1.3E-04	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.5E+00
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	(mg/m^3- min)	R	2.3E-05	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.7E-04
	Trichloroethene	1.12E-02	mg/L	3.65E-03	(mg/m^3- min)	R	3.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.6E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.5E+01

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	3.2E-06	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	3.1E-06	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	2.2E-05	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	4.2E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	6.1E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-07
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	3.8E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-05
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	8.5E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-06
	(total)										6.7E-05
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.7E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	5.7E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	7.4E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	1.3E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	7.8E-09
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	1.9E-06	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	7.0E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	6.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.8E-08
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	2.2E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-06
	(total)										2.8E-06
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	$(mg/m^3\text{- min})$	R	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	$(mg/m^3\text{- min})$	R	1.5E-06	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	8.1E-08
	Chloroform	3.98E-03	mg/L	1.30E-03	$(mg/m^3\text{- min})$	R	1.1E-05	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	9.2E-07
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	$(mg/m^3\text{- min})$	R	2.0E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Trichloroethene	1.12E-02	mg/L	3.65E-03	$(mg/m^3\text{- min})$	R	3.2E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	(total)										1.2E-06

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **7.1E-05**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Bromodichloromethane	5.78E-04		o		2.10E+00	1.67E-01	8.70E-01		5.80E-03		1.20E-02	3.53E-09
Carbon Tetrachloride	5.66E-04		o		1.80E+00	1.67E-01	7.60E-01		2.20E-02		6.80E-02	1.23E-08
Chloroform	3.98E-03		o		1.10E+00	1.67E-01	4.70E-01		8.90E-03		9.30E-03	2.74E-08
Tetrachloroethene	7.73E-04		o		4.30E+00	1.67E-01	9.00E-01		4.80E-02		2.50E-01	3.98E-08
Trichloroethene	1.12E-02		o		1.30E+00	1.67E-01	5.50E-01		1.60E-02		2.60E-02	1.50E-07
Antimony	1.21E-03		i			1.67E-01			1.00E-03			2.03E-10
Arsenic	6.85E-03		i			1.67E-01			1.00E-03			1.14E-09
Iron	1.36E+02		i			1.67E-01			1.00E-03			2.27E-05
Mercury	6.30E-04		i			1.67E-01			1.00E-03			1.05E-10
Selenium	4.01E-03		i			1.67E-01			1.00E-03			6.70E-10
Vanadium	7.45E-02		i			1.67E-01			1.00E-03			1.24E-08
RDX	1.55E-02		o		4.75E+00	1.67E-01	1.98E+00		1.90E-02		7.41E-04	4.69E-07
Ammonium Perchlorate	9.89E-03		i			1.67E-01			1.00E-03			1.65E-09

SITE 9 - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	2.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-03
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	2.4E-05	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	3.5E-02
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	1.7E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.7E-02
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	3.3E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.3E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	4.8E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	8.0E-02
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	5.2E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.3E-01
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	2.9E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.8E-01
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	5.8E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E+01
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	2.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.0E-02
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	1.7E-04	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	3.4E-02
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	3.2E-03	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	4.5E-01
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	6.6E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.2E-01
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	4.2E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.5E-01
	(total)												2.2E+01
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	1.1E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-05
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	3.6E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.2E-03
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	8.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.2E-04
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	1.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-03
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	4.5E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	7.5E-03
	Antimony	1.21E-03	mg/L	1.21E-03	mg/L	M	6.0E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.0E-03
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	3.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	1.36E+02	mg/L	1.36E+02	mg/L	M	6.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-02
	Mercury	6.30E-04	mg/L	6.30E-04	mg/L	M	3.1E-08	mg/kg-day	2.10E-05	mg/kg-day	NA	NA	1.5E-03
	Selenium	4.01E-03	mg/L	4.01E-03	mg/L	M	2.0E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	4.0E-05
	Vanadium	7.45E-02	mg/L	7.45E-02	mg/L	M	3.7E-06	mg/kg-day	1.82E-04	mg/kg-day	NA	NA	2.0E-02
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.4E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.7E-02
	Ammonium Perchlorate	9.89E-03	mg/L	9.89E-03	mg/L	M	4.9E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	9.8E-04
	(total)												1.1E-01
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	(mg/m^3- min)	R	5.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	(mg/m^3- min)	R	6.8E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.1E-02
	Chloroform	3.98E-03	mg/L	1.30E-03	(mg/m^3- min)	R	4.9E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.7E-01
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	(mg/m^3- min)	R	8.7E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	6.2E-05
	Trichloroethene	1.12E-02	mg/L	3.65E-03	(mg/m^3- min)	R	1.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.8E-01

Total Hazard Index Across All Exposure Routes/Pathways **2.3E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	7.1E-07	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	4.4E-08
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	6.9E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	9.0E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	4.9E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	9.4E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.4E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	8.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	1.9E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	(total)										1.5E-05
Dermal	Bromodichloromethane	5.78E-04	mg/L	5.78E-04	mg/L	M	3.0E-08	mg/kg-day	6.20E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Carbon Tetrachloride	5.66E-04	mg/L	5.66E-04	mg/L	M	1.0E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Chloroform	3.98E-03	mg/L	3.98E-03	mg/L	M	2.3E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Tetrachloroethene	7.73E-04	mg/L	7.73E-04	mg/L	M	3.4E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Trichloroethene	1.12E-02	mg/L	1.12E-02	mg/L	M	1.3E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Arsenic	6.85E-03	mg/L	6.85E-03	mg/L	M	9.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	RDX	1.55E-02	mg/L	1.55E-02	mg/L	M	4.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-07
	(total)										5.0E-07
Inhalation	Bromodichloromethane	5.78E-04	mg/L	1.57E-04	$(mg/m^3\text{-}min)$	R	1.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.75E-04	$(mg/m^3\text{-}min)$	R	1.9E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	Chloroform	3.98E-03	mg/L	1.30E-03	$(mg/m^3\text{-}min)$	R	1.4E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Tetrachloroethene	7.73E-04	mg/L	2.32E-04	$(mg/m^3\text{-}min)$	R	2.5E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.0E-10
	Trichloroethene	1.12E-02	mg/L	3.65E-03	$(mg/m^3\text{-}min)$	R	3.9E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	(total)										1.5E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Total Risk Across All Exposure Routes/Pathways **1.6E-05**

SITE 9 - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	1.00E-03		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	7.34E-06
Iron	5.36E+00		i			1.00E+00			1.00E-03			5.36E-06
Manganese	3.76E-01		i			1.00E+00			1.00E-03			3.76E-07
RDX	1.10E-03		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	8.13E-08

SITE 9 - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.1E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.6E-04
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	9.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	6.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-04
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	4.8E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	6.0E-03
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.4E-04
	(total)												6.7E-03

Total Hazard Index Across All Exposure Routes/Pathways **6.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	4.1E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	3.3E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-05
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	3.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	(total)										6.7E-05
										Total Risk Across All Exposure Routes/Pathways	**6.7E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER**

SITE NAME: **SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.7E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	8.2E-05
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	2.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	7.6E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.5E-05
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.4E-03
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.9E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.2E-05
	(total)												1.6E-03

Total Hazard Index Across All Exposure Routes/Pathways **1.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	7.3E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	9.6E-10
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.4E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.8E-06
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	9.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.4E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	(total)										6.8E-06
										Total Risk Across All Exposure Routes/Pathways	**6.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	1.00E-03		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	7.34E-06
Iron	5.36E+00		i			1.00E+00			1.00E-03			5.36E-06
Manganese	3.76E-01		i			1.00E+00			1.00E-03			3.76E-07
RDX	1.10E-03		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	8.13E-08

SITE 9 - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.7E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	8.2E-04
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	4.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	3.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-03
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	2.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.0E-02
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	5.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.7E-03
	(total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	8.2E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	6.7E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	3.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	7.4E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.1E-09
	(total)										1.3E-05
										Total Risk Across All Exposure Routes/Pathways	**1.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER**

SITE NAME: **SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.7E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	8.2E-04
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	2.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	7.6E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.5E-04
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.1E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.4E-02
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.9E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.2E-04
	(total)												1.6E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	8.2E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.8E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-06
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.7E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	(total)										7.6E-06
										Total Risk Across All Exposure Routes/Pathways	**7.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.34E-05
Noncancer Ingestion Intake(RME) = 3.13E-05

Cancer Ingestion Intake(CTE) = 4.03E-06
Noncancer Ingestion Intake(CTE) = 3.13E-05

Cancer Dermal Intake(RME) = 2.42E+00
Noncancer Dermal Intake(RME) = 5.64E+00

Cancer Dermal Intake(CTE) = 7.25E-01
Noncancer Dermal Intake(CTE) = 5.64E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	1.00E-03		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	7.34E-06
Iron	5.36E+00		i			1.00E+00			1.00E-03			5.36E-06
Manganese	3.76E-01		i			1.00E+00			1.00E-03			3.76E-07
RDX	1.10E-03		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	8.13E-08

SITE 9 - TABLE 7.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.3E-09	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	7.6E-06
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	3.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	1.7E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.6E-04
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.9E-04
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	3.4E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-05
	(total)												1.2E-03
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.1E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	7.3E-05
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	4.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	3.0E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-04
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	2.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.6E-03
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	4.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-04
	(total)												3.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.3E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	7.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	5.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.5E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	(total)										2.9E-08
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.2E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.8E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-05
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	9.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	2.0E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	(total)										3.5E-05
										Total Risk Across All Exposure Routes/Pathways	**3.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

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

FOR ORGANICS: IF tevent < t*, DAevent = $2Kp \times C \times CF \times (6T \times tevent/3.141592654)^{0.5}$
IF tevent > t*, DAevent = $Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B)/(1 + B))))$

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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.3E-09	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	7.6E-06
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	3.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-04
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	5.5E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-04
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.2E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.2E-06
	(total)												4.1E-04
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.1E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	7.3E-05
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	2.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	6.8E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-05
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	9.8E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-03
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.7E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-05
	(total)												1.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	6.8E-10	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	8.9E-11
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	2.3E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	4.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	7.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.6E-09	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	(total)										4.9E-09
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	6.5E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	8.5E-10
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.0E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-06
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	8.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.1E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	(total)										6.1E-06
										Total Risk Across All Exposure Routes/Pathways	**6.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3,260	EPA 1997a	3,260	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.37E-05
Noncancer Ingestion Intake(RME) = 1.66E-04

Cancer Ingestion Intake(CTE) = 1.18E-05
Noncancer Ingestion Intake(CTE) = 8.28E-05

Cancer Dermal Intake(RME) = 1.54E+00
Noncancer Dermal Intake(RME) = 1.08E+01

Cancer Dermal Intake(CTE) = 7.71E-01
Noncancer Dermal Intake(CTE) = 5.40E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent
Carbon Tetrachloride	1.70E-04	o	1.80E+00	1.00E+00	7.60E-01	2.20E-02	6.80E-02	9.01E-09
Total PCBs	1.00E-03	o	6.60E+01	1.00E+00	1.40E+01	7.10E-01	5.20E+02	7.34E-06
Iron	5.36E+00	i		1.00E+00		1.00E-03		5.36E-06
Manganese	3.76E-01	i		1.00E+00		1.00E-03		3.76E-07
RDX	1.10E-03	o	4.75E+00	1.00E+00	1.98E+00	1.90E-02	7.41E-04	8.13E-08

SITE 9 - TABLE 7.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.8E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	4.0E-05
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	8.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E-03
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	6.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.1E-03
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.1E-05
	(total)												6.2E-03
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	9.7E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.4E-04
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	7.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	5.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-04
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	4.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	5.1E-03
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	8.8E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-04
	(total)												5.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	4.0E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-10
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	2.4E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-08
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	8.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	2.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	(total)										5.1E-08
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.4E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.1E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	8.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	5.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.3E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	(total)										2.3E-05
										Total Risk Across All Exposure Routes/Pathways	**2.3E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.4E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.0E-05
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	4.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.3E-04
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.2E-04
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	3.3E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-05
	(total)												1.1E-03
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	4.9E-08	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	7.0E-05
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	2.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	6.5E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-05
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	9.4E-07	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-03
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.3E-05
	(total)												1.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.0E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	6.7E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	2.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	4.7E-09	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-10
	(total)										1.4E-08
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	7.0E-09	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	9.0E-10
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.2E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-06
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	9.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.3E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	(total)										6.5E-06
										Total Risk Across All Exposure Routes/Pathways	**6.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	Professional judgement	7	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.70E-04
Noncancer Ingestion Intake(RME) = 1.37E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.23E+01
Noncancer Dermal Intake(RME) = 1.23E+02

Cancer Dermal Intake(CTE) = 8.24E+00
Noncancer Dermal Intake(CTE) = 8.24E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	2.00E+00	7.60E-01		2.20E-02		6.80E-02	1.34E-08
Total PCBs	1.00E-03		o		6.60E+01	2.00E+00	1.40E+01		7.10E-01		5.20E+02	1.04E-05
Iron	5.36E+00		i			2.00E+00			1.00E-03			1.07E-05
Manganese	3.76E-01		i			2.00E+00			1.00E-03			7.52E-07
RDX	1.10E-03		o		4.75E+00	2.00E+00	1.98E+00		1.90E-02		7.41E-04	1.15E-07

SITE 9 - TABLE 7.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.3E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	3.3E-04
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	7.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-02
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	5.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-02
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.0E-04
	(total)												5.1E-02
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.7E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.4E-03
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-03	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	1.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-03
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	9.3E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-01
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	1.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.7E-03
	(total)												1.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	8.0E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	4.7E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.4E-07
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	2.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	1.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	5.2E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.7E-08
	(total)										1.0E-06
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	5.7E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	7.4E-08
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	4.4E-04	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.8E-04
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	4.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	4.9E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	(total)										8.8E-04
										Total Risk Across All Exposure Routes/Pathways	**8.8E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.6E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	2.2E-04
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.7E-03
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.0E-03
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	3.7E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-04
	(total)												1.2E-02
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	7.4E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.1E-03
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.4E-04	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	9.9E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.3E-04
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.4E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.8E-02
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.1E-04
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.6E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	5.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	3.7E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	(total)										1.1E-07
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	7.4E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	9.7E-09
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.4E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-05
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	9.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	(total)										6.9E-05
										Total Risk Across All Exposure Routes/Pathways	**6.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-04
Noncancer Ingestion Intake(RME) = 6.39E-03

Cancer Ingestion Intake(CTE) = 6.11E-05
Noncancer Ingestion Intake(CTE) = 2.14E-03

Cancer Dermal Intake(RME) = 1.92E+01
Noncancer Dermal Intake(RME) = 2.24E+02

Cancer Dermal Intake(CTE) = 4.28E+00
Noncancer Dermal Intake(CTE) = 1.50E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: **SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	2.00E+00	7.60E-01		2.20E-02		6.80E-02	1.34E-08
Total PCBs	1.00E-03		o		6.60E+01	2.00E+00	1.40E+01		7.10E-01		5.20E+02	1.04E-05
Iron	5.36E+00		i			2.00E+00			1.00E-03			1.07E-05
Manganese	3.76E-01		i			2.00E+00			1.00E-03			7.52E-07
RDX	1.10E-03		o		4.75E+00	2.00E+00	1.98E+00		1.90E-02		7.41E-04	1.15E-07

SITE 9 - TABLE 7.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.1E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.6E-03
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	6.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	3.4E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-01
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	2.4E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-01
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	7.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-03
	(total)												2.4E-01
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	3.0E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	4.3E-03
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	2.3E-03	mg/kg-day		mg/kg-day	NA	NA	
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	2.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.0E-03
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	1.7E-04	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.1E-01
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	2.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.6E-03
	(total)												2.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	9.3E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	5.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	2.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	6.0E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	(total)										1.2E-06
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	2.6E-07	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Total PCBs	1.00E-03	mg/L	1.00E-03	mg/L	M	2.0E-04	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-04
	Iron	5.36E+00	mg/L	5.36E+00	mg/L	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.76E-01	mg/L	3.76E-01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.10E-03	mg/L	1.10E-03	mg/L	M	2.2E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	(total)										4.0E-04
										Total Risk Across All Exposure Routes/Pathways	**4.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Carbon Tetrachloride	1.70E-04		o		1.80E+00	1.00E+00	7.60E-01		2.20E-02		6.80E-02	9.01E-09
Total PCBs	5.70E-04		o		6.60E+01	1.00E+00	1.40E+01		7.10E-01		5.20E+02	4.19E-06
Iron	1.20E+00		i			1.00E+00			1.00E-03			1.20E-06
Manganese	1.74E-01		i			1.00E+00			1.00E-03			1.74E-07
RDX	3.99E-04		o		4.75E+00	1.00E+00	1.98E+00		1.90E-02		7.41E-04	2.95E-08

SITE 9 - TABLE 7.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	3.6E-07	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	5.2E-04
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	2.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E-03
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	3.7E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.9E-02
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	8.5E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-04
	(total)												2.8E-02
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.4E-06	mg/kg-day	7.00E-04	mg/kg-day	NA	NA	1.9E-03
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	6.3E-04	mg/kg-day		mg/kg-day	NA	NA	
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	1.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E-04
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	2.6E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	3.3E-02
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	4.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-03
	(total)												3.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.5E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	1.0E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	3.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	7.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	2.4E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	(total)										7.4E-08
Dermal	Carbon Tetrachloride	1.70E-04	mg/L	1.70E-04	mg/L	M	3.9E-08	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	5.0E-09
	Total PCBs	5.70E-04	mg/L	5.70E-04	mg/L	M	1.8E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-05
	Iron	1.20E+00	mg/L	1.20E+00	mg/L	M	5.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.74E-01	mg/L	1.74E-01	mg/L	M	7.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	3.99E-04	mg/L	3.99E-04	mg/L	M	1.3E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	(total)										3.6E-05
										Total Risk Across All Exposure Routes/Pathways	**3.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

SITE 9 - TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.4E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.2E-02
	(total)												1.2E-02
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	4.5E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.3E-02
	(total)												2.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.5E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	7.1E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	8.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	(total)										2.2E-07
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	2.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	(total)										3.2E-07
										Total Risk Across All Exposure Routes/Pathways	**5.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	7.9E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.9E-04
	(total)												3.9E-04
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	6.0E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.0E-04
	(total)												3.0E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**6.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	6.0E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	1.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	(total)										6.6E-09
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	9.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	8.6E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	(total)										1.7E-09
										Total Risk Across All Exposure Routes/Pathways	**8.3E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

SITE 9 - TABLE 7.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	5.7E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.9E-01
	(total)												2.9E-01
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.3E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.1E-01
	(total)												1.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**4.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	3.8E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.9E-02
	(total)												1.9E-02
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	6.0E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.0E-03
	(total)												3.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	6.8E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	8.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	(total)										2.1E-07
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	5.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	3.2E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-08
	(total)										6.5E-08
										Total Risk Across All Exposure Routes/Pathways	**2.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	3.2E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	6.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	(total)										3.5E-08
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	9.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	(total)										1.9E-09
										Total Risk Across All Exposure Routes/Pathways	**3.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

SITE 9 - TABLE 7.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.1E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.3E-03
	(total)												5.3E-03
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	5.7E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.9E-02
	(total)												2.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.13. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	3.8E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	4.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.1E-08
	(total)										1.2E-07
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	4.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.5E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-07
	(total)										4.9E-07
										Total Risk Across All Exposure Routes/Pathways	**6.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	3.5E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.7E-04
	(total)												1.7E-04
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	7.5E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.8E-04
	(total)												3.8E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**5.5E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.13a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	2.7E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	5.0E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	(total)										2.9E-09
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	1.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	1.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	(total)										2.2E-09
										Total Risk Across All Exposure Routes/Pathways	**5.1E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.14

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

SITE 9 - TABLE 7.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	5.6E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-02
	(total)												2.8E-02
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.1E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.5E-02
	(total)												5.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**8.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.14. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	6.7E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	8.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	(total)										2.1E-07
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	2.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.6E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-07
	(total)										3.2E-07
										Total Risk Across All Exposure Routes/Pathways	**5.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.2E-04
	(total)												9.2E-04
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	1.4E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	7.2E-04
	(total)												7.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.14a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	1.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	2.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-09
	(total)										1.7E-08
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	2.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	2.3E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	(total)										4.6E-09
										Total Risk Across All Exposure Routes/Pathways	**2.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.15

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

SITE 9 - TABLE 7.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.3E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.2E-01
	(total)												1.2E-01
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.3E-05	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	6.3E-01
	(total)												6.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**7.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.15. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	6.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	8.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	(total)										2.1E-06
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	7.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	4.3E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-06
	(total)										8.6E-06
										Total Risk Across All Exposure Routes/Pathways	**1.1E-05**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	1.0E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.1E-03
	(total)												5.1E-03
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	2.2E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.1E-02
	(total)												1.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.15a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	6.0E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-08
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	1.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	(total)										6.7E-08
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	2.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	2.5E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	(total)										4.9E-08
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.16

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

SITE 9 - TABLE 7.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.2E-05	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.1E+00
	(total)												1.1E+00
Dermal	Aroclor-1254	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.3E-05	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.1E+00
	(total)												1.1E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.16. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	1.5E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	1.9E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-06
	(total)										4.9E-06
Dermal	BAP EQUIVALENT	1.41E-01	mg/kg	1.41E-01	mg/kg	M	3.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	1.70E+00	mg/kg	1.70E+00	mg/kg	M	2.0E-06	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-06
	(total)										3.9E-06
										Total Risk Across All Exposure Routes/Pathways	**8.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 7.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	9.5E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	4.8E-02
	(total)												4.8E-02
Dermal	Aroclor-1254	2.23E-01	mg/kg	2.23E-01	mg/kg	M	4.0E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.0E-02
	(total)												2.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**6.8E-02**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 8.16a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	1.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	3.0E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-08
	(total)										1.8E-07
Dermal	BAP EQUIVALENT	1.32E-01	mg/kg	1.32E-01	mg/kg	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Total PCBs	2.49E-01	mg/kg	2.49E-01	mg/kg	M	1.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	(total)										2.6E-08
										Total Risk Across All Exposure Routes/Pathways	**2.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PCBs - 0.06

SITE 9 - TABLE 4.17

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 9 - TABLE 7.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	2.7E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	4.8E-03
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	4.1E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.8E-02
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	2.2E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.6E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	2.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.17. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	4.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	9.8E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	1.5E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	7.8E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	7.5E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-08
	(total)										2.2E-07
										Total Risk Across All Exposure Routes/Pathways	**2.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.17a CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	1.2E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	2.1E-03
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	1.8E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	2.1E-02
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	9.6E-07	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	6.8E-06
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	9.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.17a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	6.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	1.5E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	8.2E-09
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	2.3E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	1.2E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	1.2E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.1E-09
	(total)										3.4E-08
										Total Risk Across All Exposure Routes/Pathways	**3.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	EPA 1989a	2.5	EPA 1989a	Cair x IRa x ET x EF x ED
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.99E-02
Noncancer Inhalation Intake(RME) = 1.96E-01

Cancer Inhalation Intake(CTE) = 1.10E-02
Noncancer Inhalation Intake(CTE) = 8.57E-02

SITE 9 - TABLE 7.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	5.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	5.5E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	9.6E-06
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	1.0E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.2E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	4.5E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.2E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	4.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.3E-04

Total Hazard Index Across All Exposure Routes/Pathways **1.3E-04**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.*

SITE 9 - TABLE 8.18. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	1.9E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.0E-09	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	3.6E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-10
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	1.6E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-12
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	1.6E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.6E-11
	(total)										4.9E-10
										Total Risk Across All Exposure Routes/Pathways	**4.9E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	2.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.4E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	4.2E-06
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	4.4E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	5.1E-05
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	2.0E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.4E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.5E-05
												Total Hazard Index Across All Exposure Routes/Pathways	**5.5E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.18a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FULL TIME WORKERS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Full Time Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	3.0E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	3.1E-10	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	5.6E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-11
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	2.5E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.0E-13
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	2.5E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	(total)										7.7E-11
										Total Risk Across All Exposure Routes/Pathways	**7.7E-11**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989c	Derived	EPA 1989c	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	1.2	EPA 1996a	1.2	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	250	EPA 1993a	219	EPA 1993a	
	ED	Exposure Duration	(years)	6	Professional judgement	3	Professional Judgement	
	ET	Exposure Time	(hr/day)	8	Professional judgement	4	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989c	15	EPA 1989c	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989c	25,550	EPA 1989c	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989c	1,095	EPA 1989c	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 3.76E-02
Noncancer Inhalation Intake(RME) = 4.38E-01

Cancer Inhalation Intake(CTE) = 8.23E-03
Noncancer Inhalation Intake(CTE) = 1.92E-01

SITE 9 - TABLE 7.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	2.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	6.1E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.1E-02
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	9.2E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.1E-01
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	4.9E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.5E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	4.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.19. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	2.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	5.3E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	7.9E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.4E-08
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	4.2E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.4E-10
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	4.0E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	(total)										1.2E-07
										Total Risk Across All Exposure Routes/Pathways	**1.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	2.7E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	4.7E-03
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	4.0E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.7E-02
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	2.1E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.5E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	2.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												5.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.19a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF DAY CARE CENTER CHILDREN TO INDOOR AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Day Care Child
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	1.2E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	6.1E-09
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	1.7E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	9.2E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	8.8E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	(total)										2.6E-08
										Total Risk Across All Exposure Routes/Pathways	**2.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.20

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 9 - TABLE 7.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	3.8E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	6.7E-03
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	5.8E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	6.7E-02
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	3.1E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	2.2E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	2.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												7.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**7.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.20. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	5.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	1.3E-06	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	2.0E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	1.0E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	1.0E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-08
	(total)										2.9E-07
										Total Risk Across All Exposure Routes/Pathways	**2.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	2.6E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	4.5E-03
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	3.9E-06	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.5E-02
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	2.0E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.5E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	2.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.9E-02

Total Hazard Index Across All Exposure Routes/Pathways **4.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.20a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	2.6E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	3.9E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	2.0E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.1E-10
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	2.0E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	(total)										5.7E-08
										Total Risk Across All Exposure Routes/Pathways	**5.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.21

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.833	EPA 1996a	0.833	EPA 1996a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 9.39E-02
Noncancer Inhalation Intake(RME) = 2.74E-01

Cancer Inhalation Intake(CTE) = 1.83E-02
Noncancer Inhalation Intake(CTE) = 1.83E-01

SITE 9 - TABLE 7.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	7.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	7.7E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.3E-05
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	1.4E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.6E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	6.3E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	4.5E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	6.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.8E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.21. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	2.6E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.6E-09	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	4.8E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-10
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	2.1E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-12
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	2.2E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	(total)										6.6E-10
										Total Risk Across All Exposure Routes/Pathways	**6.6E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	5.0E-10	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	5.1E-09	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	9.0E-06
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	9.3E-09	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.1E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	4.2E-09	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	3.0E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.21a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	5.0E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	5.1E-10	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-11
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	9.3E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-11
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	4.2E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.4E-13
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	4.2E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-11
	(total)										1.3E-10
										Total Risk Across All Exposure Routes/Pathways	**1.3E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.22

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air / Outdoor Ambient Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Inhalation Intake = (Cair x Ira x Et x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 9 - TABLE 7.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m³	R	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m³	R	1.1E-05	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.9E-02
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m³	R	1.6E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.9E-01
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m³	R	8.6E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	6.1E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m³	R	8.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.22. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	4.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	9.2E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	1.4E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	7.3E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	7.1E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	(total)										2.0E-07
										Total Risk Across All Exposure Routes/Pathways	**2.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	3.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	7.2E-06	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	1.3E-02
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	1.1E-05	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	1.3E-01
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	5.7E-06	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	4.1E-05
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	5.5E-05	mg/kg-day		mg/kg-day	NA	NA	
	(total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.22a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO INDOOR AIR / OUTDOOR AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Indoor Air
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	6.02E-07	mg/m^3	R	8.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	1.40E-05	mg/m^3	R	2.1E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Chloroform	3.98E-03	mg/L	2.11E-05	mg/m^3	R	3.1E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Tetrachloroethene	7.73E-04	mg/L	1.12E-05	mg/m^3	R	1.6E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-10
	Trichloroethene	1.12E-02	mg/L	1.07E-04	mg/m^3	R	1.6E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.4E-09
	(total)										4.6E-08
										Total Risk Across All Exposure Routes/Pathways	**4.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 4.23

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	EPA 1989a	Derived	EPA 1989a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	0.5	EPA 1996a	0.5	EPA 1989a	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	24	EPA 1993a	24	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 6.58E-02
Noncancer Inhalation Intake(RME) = 7.67E-01

Cancer Inhalation Intake(CTE) = 1.47E-02
Noncancer Inhalation Intake(CTE) = 5.13E-01

SITE 9 - TABLE 7.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	2.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	2.1E-08	mg/kg-day	5.71E-04	mg/kg day	NA	NA	3.8E-05
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	3.9E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	4.5E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	1.8E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	1.3E-07
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												4.9E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.23. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	1.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	1.8E-09	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	9.8E-11
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	3.3E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	1.5E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.0E-12
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	1.5E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.1E-11
	(total)										4.6E-10
										Total Risk Across All Exposure Routes/Pathways	**4.6E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 7.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	1.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	1.4E-08	mg/kg-day	5.71E-04	mg/kg-day	NA	NA	2.5E-05
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	2.6E-08	mg/kg-day	8.60E-05	mg/kg-day	NA	NA	3.0E-04
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	1.2E-08	mg/kg-day	1.40E-01	mg/kg-day	NA	NA	8.4E-08
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	(total)												3.3E-04

Total Hazard Index Across All Exposure Routes/Pathways **3.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SITE 9 - TABLE 8.23a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO AMBIENT AIR
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Bromodichloromethane	5.78E-04	mg/L	2.72E-09	mg/m^3	R	4.0E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Carbon Tetrachloride	5.66E-04	mg/L	2.80E-08	mg/m^3	R	4.1E-10	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-11
	Chloroform	3.98E-03	mg/L	5.09E-08	mg/m^3	R	7.5E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.0E-11
	Tetrachloroethene	7.73E-04	mg/L	2.29E-08	mg/m^3	R	3.3E-10	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.7E-13
	Trichloroethene	1.12E-02	mg/L	2.30E-07	mg/m^3	R	3.4E-09	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-11
	(total)										1.0E-10
										Total Risk Across All Exposure Routes/Pathways	**1.0E-10**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SITE 9 - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite Air	Bromodichloromethane					Bromodichloromethane	Kidney				
			Carbon Tetrachloride		5.2E-08		5.2E-08	Carbon Tetrachloride	Liver		4.8E-03		4.8E-03
			Chloroform		1.2E-07		1.2E-07	Chloroform	Liver		4.8E-02		4.8E-02
			Tetrachloroethene		1.6E-09		1.6E-09	Tetrachloroethene	Liver		1.6E-05		1.6E-05
			Trichloroethene		4.5E-08		4.5E-08	Trichloroethene	CNS				
						Total Risk Across Groundwater / Air	2.2E-07					Total Hazard Index Across All Media and All Exposure Routes	5.3E-02

Risk Across All Media and All Exposure Routes 2.2E-07

Total Liver HI = 5.3E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 9-11.

SITE 9 - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FULL TIME WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Full Time Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite Air	Bromodichloromethane					Bromodichloromethane	Kidney				
			Carbon Tetrachloride		8.2E-09		8.2E-09	Carbon Tetrachloride	Liver		2.1E-03		2.1E-03
			Chloroform		1.9E-08		1.9E-08	Chloroform	Liver		2.1E-02		2.1E-02
			Tetrachloroethene		2.5E-10		2.5E-10	Tetrachloroethene	Liver		6.8E-06		6.8E-06
			Trichloroethene		7.1E-09		7.1E-09	Trichloroethene	CNS				
						Total Risk Across Groundwater / Air	3.4E-08					Total Hazard Index Across All Media and All Exposure Routes	2.3E-02

Risk Across All Media and All Exposure Routes 3.4E-08

Total Liver HI = 2.3E-02

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air and outdoor air.
The total risks from inhalation of indoor air and outdoor air are presented separately in Table 9-20.

SITE 9 - TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride			5.3E-09	5.3E-09	Carbon Tetrachloride	Liver			1.6E-04	1.6E-04
			Total PCBs			6.7E-05	6.7E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract			2.3E-04	2.3E-04
			Manganese					Manganese	CNS			6.0E-03	6.0E-03
			RDX			4.0E-08	4.0E-08	RDX	Prostate			3.4E-04	3.4E-04
Sediment	Sediment	Onsite	BAP EQUIVALENT	5.2E-08			5.2E-08	BAP EQUIVALENT					
			Total PCBs	1.7E-07		3.2E-07	5.0E-07	Aroclor-1254	Immunological, Nails	1.2E-02		2.3E-02	3.5E-02
Groundwater	Water	Onsite	Bromodichloromethane			2.4E-09	2.4E-09	Bromodichloromethane	Kidney			5.5E-06	5.5E-06
			Carbon Tetrachloride		1.5E-11	1.8E-08	1.8E-08	Carbon Tetrachloride	Liver		1.4E-06	5.4E-04	5.4E-04
			Chloroform		4.1E-11	1.9E-09	1.9E-09	Chloroform	Liver		1.7E-05	8.5E-05	1.0E-04
			Tetrachloroethene		4.6E-13	2.3E-08	2.3E-08	Tetrachloroethene	Liver		4.6E-09	1.2E-04	1.2E-04
			Trichloroethene		1.4E-11	1.8E-08	1.8E-08	Trichloroethene	CNS			7.8E-04	7.8E-04
			Antimony					Antimony	Lifespan			2.6E-04	2.6E-04
			Arsenic			4.7E-08	4.7E-08	Arsenic	Skin, Vascular			2.9E-04	2.9E-04
			Iron					Iron	Liver/Blood/GI Tract			5.7E-03	5.7E-03
			Mercury					Mercury	CNS			3.8E-04	3.8E-04
			Selenium					Selenium	Blood/Skin/CNS			1.0E-05	1.0E-05
			Vanadium					Vanadium	NOEL			5.2E-03	5.2E-03
			RDX			5.7E-07	5.7E-07	RDX	Prostate			4.8E-03	4.8E-03
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			2.5E-04	2.5E-04

Total Risk Across Surface Water	6.7E-05
Total Risk Across Sediment	5.5E-07
Total Risk Across Groundwater	6.8E-07
Total Risk Across All Media and All Exposure Routes	6.8E-05

Total Hazard Index Across All Media and All Exposure Routes	6.0E-02
Total Liver HI =	6.9E-03
Total CNS HI =	7.1E-03
Total Blood HI =	6.0E-03
Total Immune System HI =	3.5E-02
Total Prostate HI =	5.2E-03
Total Lifetime HI =	2.6E-04
Total Skin HI =	3.0E-04
Total Hair/Nails HI =	3.5E-02
Total Thyroid HI =	2.5E-04

SITE 9 - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride			9.6E-10	9.6E-10	Carbon Tetrachloride	Liver			8.2E-05	8.2E-05
			Total PCBs			6.8E-06	6.8E-06	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract			2.5E-05	2.5E-05
			Manganese					Manganese	CNS			1.4E-03	1.4E-03
			RDX			2.6E-09	2.6E-09	RDX	Prostate			6.2E-05	6.2E-05
Sediment	Sediment	Onsite	BAP EQUIVALENT	4.4E-09			4.4E-09	BAP EQUIVALENT					
			Total PCBs	2.3E-09		1.7E-09	4.0E-09	Aroclor-1254	Immunological, Nails	3.9E-04		3.0E-04	6.9E-04
Groundwater	Water	Onsite	Bromodichloromethane			4.4E-10	4.4E-10	Bromodichloromethane	Kidney			2.7E-06	2.7E-06
			Carbon Tetrachloride		1.3E-12	3.2E-09	3.2E-09	Carbon Tetrachloride	Liver		3.5E-07	2.7E-04	2.7E-04
			Chloroform		3.7E-12	3.3E-10	3.4E-10	Chloroform	Liver		4.2E-06	4.3E-05	4.7E-05
			Tetrachloroethene		4.1E-14	4.1E-09	4.1E-09	Tetrachloroethene	Liver		1.2E-09	6.2E-05	6.2E-05
			Trichloroethene		1.3E-12	3.3E-09	3.3E-09	Trichloroethene	CNS			3.9E-04	3.9E-04
			Antimony					Antimony	Lifespan			1.3E-04	1.3E-04
			Arsenic			8.4E-09	8.4E-09	Arsenic	Skin, Vascular			1.4E-04	1.4E-04
			Iron					Iron	Liver/Blood/GI Tract			2.9E-03	2.9E-03
			Mercury					Mercury	CNS			1.9E-04	1.9E-04
			Selenium					Selenium	Blood/Skin/CNS			5.1E-06	5.1E-06
			Vanadium					Vanadium	NOEL			2.6E-03	2.6E-03
			RDX			1.0E-07	1.0E-07	RDX	Prostate			2.4E-03	2.4E-03
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			1.3E-04	1.3E-04

Total Risk Across Surface Water	6.8E-06
Total Risk Across Sediment	8.3E-09
Total Risk Across Groundwater	1.2E-07
Total Risk Across All Media and All Exposure Routes	7.0E-06

Total Hazard Index Across All Media and All Exposure Routes	1.2E-02
Total Liver HI =	3.4E-03
Total CNS HI =	2.0E-03
Total Blood HI =	2.9E-03
Total Immune System HI =	6.9E-04
Total Prostate HI =	2.5E-03
Total Lifetime HI =	1.3E-04
Total Skin HI =	1.5E-04
Total Hair/Nails HI =	6.9E-04
Total Thyroid HI =	1.3E-04
Total Vascular HI =	1.4E-04
Total GI Tract HI =	2.9E-03

SITE 9 - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride			1.1E-09	1.1E-09	Carbon Tetrachloride	Liver			8.2E-04	8.2E-04
			Total PCBs			1.3E-05	1.3E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract			1.1E-03	1.1E-03
			Manganese					Manganese	CNS			3.0E-02	3.0E-02
			RDX			8.1E-09	8.1E-09	RDX	Prostate			1.7E-03	1.7E-03
Sediment	Sediment	Onsite	BAP EQUIVALENT	5.0E-08			5.0E-08	BAP EQUIVALENT					
			Total PCBs	1.6E-07		6.5E-08	2.3E-07	Aroclor-1254	Immunological, Nails	2.9E-01		1.1E-01	4.0E-01
Groundwater	Water	Onsite	Bromodichloromethane			4.9E-10	4.9E-10	Bromodichloromethane	Kidney			2.7E-05	2.7E-05
			Carbon Tetrachloride		5.7E-12	3.5E-09	3.5E-09	Carbon Tetrachloride	Liver		1.3E-05	2.7E-03	2.7E-03
			Chloroform		1.6E-11	3.7E-10	3.9E-10	Chloroform	Liver		1.6E-04	4.3E-04	5.9E-04
			Tetrachloroethene		1.8E-13	4.6E-09	4.6E-09	Tetrachloroethene	Liver		4.4E-08	6.2E-04	6.2E-04
			Trichloroethene		5.3E-12	3.7E-09	3.7E-09	Trichloroethene	CNS			3.9E-03	3.9E-03
			Antimony					Antimony	Lifespan			1.3E-03	1.3E-03
			Arsenic			9.3E-09	9.3E-09	Arsenic	Skin, Vascular			1.4E-03	1.4E-03
			Iron					Iron	Liver/Blood/GI Tract			2.9E-02	2.9E-02
			Mercury					Mercury	CNS			1.9E-03	1.9E-03
			Selenium					Selenium	Blood/Skin/CNS			5.1E-05	5.1E-05
			Vanadium					Vanadium	NOEL			2.6E-02	2.6E-02
			RDX			1.1E-07	1.1E-07	RDX	Prostate			2.4E-02	2.4E-02
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			1.3E-03	1.3E-03

Total Risk Across Surface Water	1.3E-05
Total Risk Across Sediment	2.8E-07
Total Risk Across Groundwater	1.4E-07
Total Risk Across All Media and All Exposure Routes	1.4E-05

Total Hazard Index Across All Media and All Exposure Routes	5.3E-01
Total Liver HI =	3.5E-02
Total CNS HI =	3.6E-02
Total Blood HI =	3.0E-02
Total Immune System HI =	4.0E-01
Total Prostate HI =	2.6E-02
Total Lifetime HI =	1.3E-03
Total Skin HI =	1.5E-03
Total Hair/Nails HI =	4.0E-01
Total Thyroid HI =	1.3E-03

SITE 9 - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride			1.1E-09	1.1E-09	Carbon Tetrachloride	Liver			8.2E-04	8.2E-04
			Total PCBs			7.6E-06	7.6E-06	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract			2.5E-04	2.5E-04
			Manganese					Manganese	CNS			1.4E-02	1.4E-02
			RDX			2.9E-09	2.9E-09	RDX	Prostate			6.2E-04	6.2E-04
Sediment	Sediment	Onsite	BAP EQUIVALENT	2.3E-08			2.3E-08	BAP EQUIVALENT					
			Total PCBs	1.2E-08		1.9E-09	1.4E-08	Aroclor-1254	Immunological, Nails	1.9E-02		3.0E-03	2.2E-02
Groundwater	Water	Onsite	Bromodichloromethane			4.9E-10	4.9E-10	Bromodichloromethane	Kidney			2.7E-05	2.7E-05
			Carbon Tetrachloride		2.9E-12	3.5E-09	3.5E-09	Carbon Tetrachloride	Liver		6.6E-06	2.7E-03	2.7E-03
			Chloroform		8.0E-12	3.7E-10	3.8E-10	Chloroform	Liver		8.0E-05	4.3E-04	5.1E-04
			Tetrachloroethene		8.8E-14	4.6E-09	4.6E-09	Tetrachloroethene	Liver		2.2E-08	6.2E-04	6.2E-04
			Trichloroethene		2.7E-12	3.7E-09	3.7E-09	Trichloroethene	CNS			3.9E-03	3.9E-03
			Antimony					Antimony	Lifespan			1.3E-03	1.3E-03
			Arsenic			9.3E-09	9.3E-09	Arsenic	Skin, Vascular			1.4E-03	1.4E-03
			Iron					Iron	Liver/Blood/GI Tract			2.9E-02	2.9E-02
			Mercury					Mercury	CNS			1.9E-03	1.9E-03
			Selenium					Selenium	Blood/Skin/CNS			5.1E-05	5.1E-05
			Vanadium					Vanadium	NOEL			2.6E-02	2.6E-02
			RDX			1.1E-07	1.1E-07	RDX	Prostate			2.4E-02	2.4E-02
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects			1.3E-03	1.3E-03

Total Risk Across Surface Water	7.6E-06
Total Risk Across Sediment	3.7E-08
Total Risk Across Groundwater	1.4E-07
Total Risk Across All Media and All Exposure Routes	7.8E-06

Total Hazard Index Across All Media and All Exposure Routes	1.3E-01
Total Liver HI =	3.4E-02
Total CNS HI =	2.0E-02
Total Blood HI =	2.9E-02
Total Immune System HI =	2.2E-02
Total Prostate HI =	2.5E-02
Total Lifetime HI =	1.3E-03
Total Skin HI =	1.5E-03
Total Hair/Nails HI =	2.2E-02
Total Thyroid HI =	1.3E-03
Total Vascular HI =	1.4E-03
Total GI Tract HI =	2.9E-02

SITE 9 - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER

SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	3.0E-10		2.8E-09	3.1E-09	Carbon Tetrachloride	Liver	7.6E-06		7.3E-05	8.0E-05
			Total PCBs	2.7E-08		3.5E-05	3.5E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	5.6E-04		1.0E-04	6.6E-04
			Manganese					Manganese	CNS	5.9E-04		2.6E-03	3.2E-03
			RDX	1.6E-09		2.2E-08	2.3E-08	RDX	Prostate	1.1E-05		1.5E-04	1.6E-04
Sediment	Sediment	Onsite	BAP EQUIVALENT	2.8E-08			2.8E-08	BAP EQUIVALENT					
			Total PCBs	9.1E-08		4.9E-07	5.8E-07	Aroclor-1254	Immunological, Nails	5.3E-03		2.9E-02	3.4E-02

Total Risk Across Surface Water: 3.6E-05

Total Risk Across Sediment: 6.1E-07

Total Risk Across All Media and All Exposure Routes: 3.6E-05

Total Hazard Index Across All Media and All Exposure Routes: 3.8E-02

Total Liver HI =	7.4E-04
Total CNS HI =	3.2E-03
Total Prostate HI =	1.6E-04
Total Immune System HI =	3.4E-02
Total Hair/Nails HI =	3.4E-02
Total Blood HI =	6.6E-04
Total GI Tract HI =	6.6E-04

SITE 9 - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	8.9E-11		8.5E-10	9.4E-10	Carbon Tetrachloride	Liver	7.6E-06		7.3E-05	8.0E-05
			Total PCBs	4.6E-09		6.1E-06	6.1E-06	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	1.3E-04		2.3E-05	1.5E-04
			Manganese					Manganese	CNS	2.7E-04		1.2E-03	1.5E-03
			RDX	1.8E-10		2.3E-09	2.5E-09	RDX	Prostate	4.2E-06		5.5E-05	6.0E-05
Sediment	Sediment	Onsite	BAP EQUIVALENT	1.9E-09			1.9E-09	BAP EQUIVALENT					
			Total PCBs	1.0E-09		2.2E-09	3.2E-09	Aroclor-1254	Immunological, Nails	1.7E-04		3.8E-04	5.5E-04

Total Risk Across Surface Water: 6.1E-06
Total Risk Across Sediment: 5.1E-09

Total Risk Across All Media and All Exposure Routes: 6.1E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.3E-03

Total Liver HI = 2.3E-04
Total CNS HI = 1.5E-03
Total Prostate HI = 6.0E-05
Total Immune System HI = 5.5E-04
Total Hair/Nails HI = 5.5E-04
Total Blood HI = 1.5E-04
Total GI Tract HI = 1.5E-04

SITE 9 - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	5.2E-10		1.8E-09	2.3E-09	Carbon Tetrachloride	Liver	4.0E-05		1.4E-04	1.8E-04
			Total PCBs	4.7E-08		2.3E-05	2.3E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	3.0E-03		1.9E-04	3.2E-03
			Manganese					Manganese	CNS	3.1E-03		5.1E-03	8.2E-03
			RDX	2.9E-09		1.4E-08	1.7E-08	RDX	Prostate	6.1E-05		2.9E-04	3.5E-04
Sediment	Sediment	Onsite	BAP EQUIVALENT	4.9E-08			4.9E-08	BAP EQUIVALENT					
			Total PCBs	1.6E-07		3.2E-07	4.8E-07	Aroclor-1254	Immunological, Nails	2.8E-02		5.5E-02	8.3E-02

Total Risk Across Surface Water	2.3E-05
Total Risk Across Sediment	5.2E-07
Total Risk Across All Media and All Exposure Routes	2.3E-05

Total Hazard Index Across All Media and All Exposure Routes	9.5E-02
Total Liver HI =	3.3E-03
Total CNS HI =	8.2E-03
Total Prostate HI =	3.5E-04
Total Immune System HI =	8.3E-02
Total Hair/Nails HI =	8.3E-02
Total Blood HI =	3.2E-03
Total GI Tract HI =	3.2E-03

SITE 9 - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	2.6E-10		9.0E-10	1.2E-09	Carbon Tetrachloride	Liver	2.0E-05		7.0E-05	9.0E-05
			Total PCBs	1.3E-08		6.5E-06	6.5E-06	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	3.3E-04		2.2E-05	3.5E-04
			Manganese					Manganese	CNS	7.2E-04		1.2E-03	1.9E-03
			RDX	5.2E-10		2.5E-09	3.0E-09	RDX	Prostate	1.1E-05		5.3E-05	6.4E-05
Sediment	Sediment	Onsite	BAP EQUIVALENT	1.1E-08			1.1E-08	BAP EQUIVALENT					
			Total PCBs	5.9E-09		4.6E-09	1.1E-08	Aroclor-1254	Immunological, Nails	9.2E-04		7.2E-04	1.6E-03

Total Risk Across Surface Water: 6.5E-06
Total Risk Across Sediment: 2.2E-08

Total Risk Across All Media and All Exposure Routes: 6.5E-06

Total Hazard Index Across All Media and All Exposure Routes: 4.1E-03

Total Liver HI = 4.4E-04
Total CNS HI = 1.9E-03
Total Prostate HI = 6.4E-05
Total Immune System HI = 1.6E-03
Total Hair/Nails HI = 1.6E-03
Total Blood HI = 3.5E-04
Total GI Tract HI = 3.5E-04

SITE 9 - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite Air	Bromodichloromethane					Bromodichloromethane	Kidney				
			Carbon Tetrachloride		2.8E-08		2.8E-08	Carbon Tetrachloride	Liver		1.1E-02		1.1E-02
			Chloroform		6.4E-08		6.4E-08	Chloroform	Liver		1.1E-01		1.1E-01
			Tetrachloroethene		8.4E-10		8.4E-10	Tetrachloroethene	Liver		3.5E-05		3.5E-05
			Trichloroethene		2.4E-08		2.4E-08	Trichloroethene	CNS				
						Total Risk Across Groundwater / Air	1.2E-07					Total Hazard Index Across All Media and All Exposure Routes	1.2E-01

Risk Across All Media and All Exposure Routes 1.2E-07

Total Liver HI = 1.2E-01

SITE 9 - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - DAY CARE CENTER CHILD
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Day Care Center Child
Receptor Age: Child (0-6 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite Air	Bromodichloromethane					Bromodichloromethane	Kidney				
			Carbon Tetrachloride		6.1E-09		6.1E-09	Carbon Tetrachloride	Liver		4.7E-03		4.7E-03
			Chloroform		1.4E-08		1.4E-08	Chloroform	Liver		4.7E-02		4.7E-02
			Tetrachloroethene		1.8E-10		1.8E-10	Tetrachloroethene	Liver		1.5E-05		1.5E-05
			Trichloroethene		5.3E-09		5.3E-09	Trichloroethene	CNS				
						Total Risk Across Groundwater / Air	2.6E-08					Total Hazard Index Across All Media and All Exposure Routes	5.2E-02

Risk Across All Media and All Exposure Routes 2.6E-08

Total Liver HI = 5.2E-02

SITE 9 - TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	1.0E-08		7.4E-08	8.4E-08	Carbon Tetrachloride	Liver	3.3E-04		2.4E-03	2.7E-03
			Total PCBs	9.4E-07		8.8E-04	8.8E-04	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	2.4E-02		4.4E-03	2.9E-02
			Manganese					Manganese	CNS	2.6E-02		1.2E-01	1.4E-01
			RDX	5.7E-08		5.3E-07	5.9E-07	RDX	Prostate	5.0E-04		4.7E-03	5.2E-03
Sediment	Sediment	Onsite	BAP EQUIVALENT	4.8E-07			4.8E-07	BAP EQUIVALENT					
			Total PCBs	1.6E-06		8.6E-06	1.0E-05	Aroclor-1254	Immunological, Nails	1.2E-01		6.3E-01	7.5E-01
Groundwater	Water	Onsite	Bromodichloromethane	3.4E-07		2.9E-08	3.7E-07	Bromodichloromethane	Kidney	7.9E-04		6.8E-05	8.6E-04
			Carbon Tetrachloride	6.9E-07	1.4E-07	2.1E-07	1.0E-06	Carbon Tetrachloride	Liver	2.2E-02	1.3E-02	6.7E-03	4.2E-02
			Chloroform	2.3E-07	9.5E-07	2.2E-08	1.2E-06	Chloroform	Liver	1.1E-02	4.0E-01	1.1E-03	4.1E-01
			Tetrachloroethene	3.8E-07	5.5E-09	2.7E-07	6.6E-07	Tetrachloroethene	Liver	2.1E-03	5.8E-05	1.5E-03	3.7E-03
			Trichloroethene	1.2E-06	2.2E-07	2.2E-07	1.6E-06	Trichloroethene	CNS	5.1E-02		9.6E-03	6.1E-02
			Antimony					Antimony	Lifespan	8.3E-02		1.6E-03	8.5E-02
			Arsenic	9.7E-05		2.8E-07	9.7E-05	Arsenic	Skin, Vascular	6.3E-01		1.8E-03	6.3E-01
			Iron					Iron	Liver/Blood/GI Tract	1.2E+01		3.6E-02	1.2E+01
			Mercury					Mercury	CNS	5.8E-02		2.4E-03	6.0E-02
			Selenium					Selenium	Blood/Skin/CNS	2.2E-02		6.3E-05	2.2E-02
			Vanadium					Vanadium	NOEL	2.9E-01		3.2E-02	3.2E-01
			RDX	1.6E-05		6.8E-06	2.3E-05	RDX	Prostate	1.4E-01		6.0E-02	2.0E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	5.4E-01		1.6E-03	5.4E-01

Total Risk Across Surface Water	8.8E-04
Total Risk Across Sediment	1.1E-05
Total Risk Across Groundwater	1.2E-04
Total Risk Across All Media and All Exposure Routes	1.0E-03

Total Hazard Index Across All Media and All Exposure Routes	1.6E+01
Total Liver HI =	1.3E+01
Total CNS HI =	2.8E-01
Total Blood HI =	1.3E+01
Total Immune System HI =	7.5E-01
Total Prostate HI =	2.1E-01
Total Lifetime HI =	8.5E-02
Total Skin HI =	6.5E-01
Total Hair/Nails HI =	7.5E-01
Total Thyroid HI =	5.4E-01

SITE 9 - TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	2.0E-09		9.7E-09	1.2E-08	Carbon Tetrachloride	Liver	2.2E-04		1.1E-03	1.3E-03
			Total PCBs	1.0E-07		6.9E-05	6.9E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	3.7E-03		3.3E-04	4.0E-03
			Manganese					Manganese	CNS	8.0E-03		1.8E-02	2.6E-02
			RDX	4.0E-09		2.7E-08	3.1E-08	RDX	Prostate	1.2E-04		8.1E-04	9.3E-04
Sediment	Sediment	Onsite	BAP EQUIVALENT	4.4E-08			4.4E-08	BAP EQUIVALENT					
			Total PCBs	2.3E-08		4.9E-08	7.2E-08	Aroclor-1254	Immunological, Nails	5.1E-03		1.1E-02	1.6E-02
Groundwater	Water	Onsite	Bromodichloromethane	4.6E-08		4.0E-09	5.0E-08	Bromodichloromethane	Kidney	3.7E-04		3.2E-05	4.0E-04
			Carbon Tetrachloride	9.4E-08	2.1E-08	2.9E-08	1.4E-07	Carbon Tetrachloride	Liver	1.0E-02	7.0E-03	3.2E-03	2.1E-02
			Chloroform	3.1E-08	1.2E-07	3.1E-09	1.5E-07	Chloroform	Liver	5.1E-03	1.7E-01	5.0E-04	1.7E-01
			Tetrachloroethene	5.2E-08	7.8E-10	3.8E-08	9.0E-08	Tetrachloroethene	Liver	9.9E-04	2.8E-05	7.3E-04	1.7E-03
			Trichloroethene	1.6E-07	2.9E-08	3.0E-08	2.2E-07	Trichloroethene	CNS	2.4E-02		4.6E-03	2.9E-02
			Antimony					Antimony	Lifespan	3.9E-02		6.2E-04	4.0E-02
			Arsenic	1.3E-05		3.1E-08	1.3E-05	Arsenic	Skin, Vascular	2.9E-01		7.0E-04	2.9E-01
			Iron					Iron	Liver/Blood/GI Tract	5.8E+00		1.4E-02	5.8E+00
			Mercury					Mercury	CNS	2.7E-02		9.2E-04	2.8E-02
			Selenium					Selenium	Blood/Skin/CNS	1.0E-02		2.5E-05	1.0E-02
			Vanadium					Vanadium	NOEL	1.4E-01		1.3E-02	1.5E-01
			RDX	2.2E-06		9.4E-07	3.1E-06	RDX	Prostate	6.6E-02		2.9E-02	9.5E-02
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	2.5E-01		6.1E-04	2.5E-01

Total Risk Across Surface Water	6.9E-05
Total Risk Across Sediment	1.2E-07
Total Risk Across Groundwater	1.7E-05
Total Risk Across All Media and All Exposure Routes	8.6E-05

Total Hazard Index Across All Media and All Exposure Routes	7.0E+00
Total Liver HI =	6.0E+00
Total CNS HI =	9.3E-02
Total Blood HI =	5.8E+00
Total Immune System HI =	1.6E-02
Total Prostate HI =	9.6E-02
Total Lifetime HI =	4.0E-02
Total Skin HI =	3.0E-01
Total Hair/Nails HI =	1.6E-02
Total Thyroid HI =	2.5E-01
Total Vascular HI =	2.9E-01
Total GI Tract HI =	5.8E+00

NOTE: *Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering.*
The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 9-20.

SITE 9 - TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	1.2E-08		3.3E-08	4.6E-08	Carbon Tetrachloride	Liver	1.6E-03		4.3E-03	5.8E-03
			Total PCBs	1.1E-06		4.0E-04	4.0E-04	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	1.1E-01		8.0E-03	1.2E-01
			Manganese					Manganese	CNS	1.2E-01		2.1E-01	3.3E-01
			RDX	6.6E-08		2.4E-07	3.1E-07	RDX	Prostate	2.3E-03		8.6E-03	1.1E-02
Sediment	Sediment	Onsite	BAP EQUIVALENT	1.1E-06			1.1E-06	BAP EQUIVALENT					
			Total PCBs	3.7E-06		3.9E-06	7.6E-06	Aroclor-1254	Immunological, Nails	1.1E+00		1.1E+00	2.2E+00
Groundwater	Water	Onsite	Bromodichloromethane	2.0E-07		1.0E-08	2.1E-07	Bromodichloromethane	Kidney	1.8E-03		9.6E-05	1.9E-03
			Carbon Tetrachloride	4.0E-07	1.3E-07	7.4E-08	6.1E-07	Carbon Tetrachloride	Liver	5.2E-02	5.0E-02	9.5E-03	1.1E-01
			Chloroform	1.3E-07	1.0E-06	7.8E-09	1.2E-06	Chloroform	Liver	2.5E-02	1.7E+00	1.5E-03	1.8E+00
			Tetrachloroethene	2.2E-07	5.5E-09	9.7E-08	3.2E-07	Tetrachloroethene	Liver	4.9E-03	2.3E-04	2.2E-03	7.3E-03
			Trichloroethene	6.8E-07	2.3E-07	7.7E-08	9.9E-07	Trichloroethene	CNS	1.2E-01		1.4E-02	1.3E-01
			Antimony					Antimony	Lifespan	1.9E-01		2.3E-03	2.0E-01
			Arsenic	5.6E-05		9.8E-08	5.6E-05	Arsenic	Skin, Vascular	1.5E+00		2.5E-03	1.5E+00
			Iron					Iron	Liver/Blood/GI Tract	2.9E+01		5.0E-02	2.9E+01
			Mercury					Mercury	CNS	1.3E-01		3.3E-03	1.4E-01
			Selenium					Selenium	Blood/Skin/CNS	5.1E-02		8.9E-05	5.1E-02
			Vanadium					Vanadium	NOEL	6.8E-01		4.6E-02	7.3E-01
			RDX	9.4E-06		2.4E-06	1.2E-05	RDX	Prostate	3.3E-01		8.5E-02	4.2E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	1.3E+00		2.2E-03	1.3E+00

Total Risk Across Surface Water	4.0E-04
Total Risk Across Sediment	8.8E-06
Total Risk Across Groundwater	7.1E-05
Total Risk Across All Media and All Exposure Routes	4.8E-04

Total Hazard Index Across All Media and All Exposure Routes	3.8E+01
Total Liver HI =	3.1E+01
Total CNS HI =	6.5E-01
Total Blood HI =	2.9E+01
Total Immune System HI =	2.2E+00
Total Prostate HI =	4.3E-01
Total Lifetime HI =	2.0E-01
Total Skin HI =	1.5E+00
Total Hair/Nails HI =	2.2E+00
Total Thyroid HI =	1.3E+00

SITE 9 - TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Carbon Tetrachloride	1.3E-09		5.0E-09	6.4E-09	Carbon Tetrachloride	Liver	5.2E-04		1.9E-03	2.4E-03
			Total PCBs	7.0E-08		3.6E-05	3.6E-05	Total PCBs					
			Iron					Iron	Liver/Blood/GI Tract	8.6E-03		6.0E-04	9.2E-03
			Manganese					Manganese	CNS	1.9E-02		3.3E-02	5.1E-02
			RDX	2.7E-09		1.4E-08	1.7E-08	RDX	Prostate	2.8E-04		1.5E-03	1.8E-03
Sediment	Sediment	Onsite	BAP EQUIVALENT	1.2E-07			1.2E-07	BAP EQUIVALENT					
			Total PCBs	6.1E-08		2.6E-08	8.6E-08	Aroclor-1254	Immunological, Nails	4.8E-02		2.0E-02	6.8E-02
Groundwater	Water	Onsite	Bromodichloromethane	4.4E-08		1.9E-09	4.6E-08	Bromodichloromethane	Kidney	1.2E-03		5.3E-05	1.3E-03
			Carbon Tetrachloride	9.0E-08	2.1E-08	1.4E-08	1.2E-07	Carbon Tetrachloride	Liver	3.5E-02	2.4E-02	5.2E-03	6.4E-02
			Chloroform	3.0E-08	1.4E-07	1.4E-09	1.7E-07	Chloroform	Liver	1.7E-02	6.9E-01	8.2E-04	7.1E-01
			Tetrachloroethene	4.9E-08	8.2E-10	1.8E-08	6.8E-08	Tetrachloroethene	Liver	3.3E-03	1.0E-04	1.2E-03	4.6E-03
			Trichloroethene	1.5E-07	3.3E-08	1.4E-08	2.0E-07	Trichloroethene	CNS	8.0E-02		7.5E-03	8.7E-02
			Antimony					Antimony	Lifespan	1.3E-01		1.0E-03	1.3E-01
			Arsenic	1.3E-05		1.5E-08	1.3E-05	Arsenic	Skin, Vascular	9.8E-01		1.1E-03	9.8E-01
			Iron					Iron	Liver/Blood/GI Tract	1.9E+01		2.3E-02	1.9E+01
			Mercury					Mercury	CNS	9.0E-02		1.5E-03	9.1E-02
			Selenium					Selenium	Blood/Skin/CNS	3.4E-02		4.0E-05	3.4E-02
			Vanadium					Vanadium	NOEL	4.5E-01		2.0E-02	4.8E-01
			RDX	2.1E-06		4.4E-07	2.5E-06	RDX	Prostate	2.2E-01		4.7E-02	2.7E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	8.5E-01		9.8E-04	8.5E-01

Total Risk Across Surface Water	3.6E-05
Total Risk Across Sediment	2.0E-07
Total Risk Across Groundwater	1.6E-05
Total Risk Across All Media and All Exposure Routes	5.2E-05

Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
Total Liver HI =	2.0E+01
Total CNS HI =	2.6E-01
Total Blood HI =	1.9E+01
Total Immune System HI =	6.8E-02
Total Prostate HI =	2.7E-01
Total Lifetime HI =	1.3E-01
Total Skin HI =	1.0E+00
Total Hair/Nails HI =	6.8E-02
Total Thyroid HI =	8.5E-01
Total Vascular HI =	9.8E-01
Total GI Tract HI =	1.9E+01

NOTE: Inhalation risks from exposure to vapors emitted from groundwater represent the sum of risks from indoor air, outdoor air, and risks from inhalation while showering. The total risks from inhalation of indoor air, outdoor air, and air while showering are presented separately in Table 9-20.

TABLE 9-20

CUMULATIVE RISK SUMMARY - CENTRAL TENDENCY EXPOSURE
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC - WHITE OAK, SILVER SPRING, MARYLAND

Exposure Route	Full Time Worker	Maintenance/Utility Worker	Construction Worker	Adult Recreational User	Adolescent Trespasser	Day Care Center Child	Future Adult Resident	Future Child Resident
HAZARD INDEX								
Ingestion of Groundwater							6.7E+00	2.2E+01
Dermal Contact with Groundwater		9.3E-03	9.3E-02				6.7E-02	1.1E-01
Inhalation of Volatiles from Groundwater While Showering							1.2E-01	5.8E-01
Inhalation of Volatiles from Groundwater by Vapor Intrusion - Indoors	2.3E-02					5.2E-02	4.9E-02	1.4E-01
Inhalation of Volatiles from Groundwater - Outdoors	5.5E-05	4.5E-06	8.7E-05				1.2E-04	3.3E-04
Incidental Ingestion Surface Water				4.1E-04	1.1E-03		1.2E-02	2.8E-02
Dermal Contact with Surface Water		1.6E-03	1.6E-02	1.4E-03	1.3E-03		2.0E-02	3.7E-02
Incidental Ingestion of Sediment		3.9E-04	1.9E-02	1.7E-04	9.2E-04		5.1E-03	4.8E-02
Dermal Contact with Sediment		3.0E-04	3.0E-03	3.8E-04	7.2E-04		1.1E-02	2.0E-02
Total Hazard Index	**2.3E-02**	**1.2E-02**	**1.3E-01**	**2.3E-03**	**4.1E-03**	**5.2E-02**	**7.0E+00**	**2.3E+01**
INCREMENTAL CANCER RISK								
Ingestion of Groundwater							1.6E-05	1.5E-05
Dermal Contact with Groundwater		1.2E-07	1.4E-07				1.1E-06	5.0E-07
Inhalation of Volatiles from Groundwater While Showering							1.1E-07	1.5E-07
Inhalation of Volatiles from Groundwater by Vapor Intrusion - Indoors	3.4E-08					2.6E-08	5.7E-08	4.6E-08
Inhalation of Volatiles from Groundwater - Outdoors	7.7E-11	6.4E-12	1.4E-11				1.3E-10	1.0E-10
Incidental Ingestion Surface Water				4.9E-09	1.4E-08		1.1E-07	7.4E-08
Dermal Contact with Surface Water		6.8E-06	7.6E-06	6.1E-06	6.5E-06		6.9E-05	3.6E-05
Incidental Ingestion of Sediment		6.6E-09	3.5E-08	2.9E-09	1.7E-08		6.7E-08	1.8E-07
Dermal Contact with Sediment		1.7E-09	1.9E-09	2.2E-09	4.6E-09		4.9E-08	2.6E-08
Total Cancer Risk	**3.4E-08**	**7.0E-06**	**7.8E-06**	**6.1E-06**	**6.5E-06**	**2.6E-08**	**8.6E-05**	**5.2E-05**

SITE 9 - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs			6.7E-05	6.7E-05	Total PCBs					
Sediment	Sediment	Onsite	Total PCBs	1.7E-07		3.2E-07	5.0E-07	Aroclor-1254	Immunological, Nails	1.2E-02		2.3E-02	3.5E-02
Groundwater	Water	Onsite	RDX			5.7E-07	5.7E-07	RDX	Prostate			4.8E-03	4.8E-03

Total Risk Across Surface Water	6.7E-05
Total Risk Across Sediment	5.0E-07
Total Risk Across Groundwater	5.7E-07
Total Risk Across All Media and All Exposure Routes	6.8E-05

Total Hazard Index Across All Media and All Exposure Routes	4.0E-02
Total Immune System HI =	3.5E-02
Total Prostate HI =	4.8E-03
Total Nails HI =	3.5E-02

SITE 9 - TABLE 10.1a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs			6.8E-06	6.8E-06	Total PCBs					
						Total Risk Across Surface Water	6.8E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment							
						Total Risk Across Groundwater							
						Total Risk Across All Media and All Exposure Routes	6.8E-06						

SITE 9 - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs			1.3E-05	1.3E-05	Total PCBs					

Total Risk Across Surface Water	1.3E-05
Total Risk Across Sediment	
Total Risk Across Groundwater	
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	

SITE 9 - TABLE 10.2a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - CONSTRUCTION WORKER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs			7.6E-06	7.6E-06	Total PCBs					
						Total Risk Across Surface Water	7.6E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment							
						Total Risk Across Groundwater							
						Total Risk Across All Media and All Exposure Routes	7.6E-06						

SITE 9 - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADULT RECREATIONAL USER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	2.7E-08		3.5E-05	3.5E-05	Total PCBs					
Sediment	Sediment	Onsite	Total PCBs	9.1E-08		4.9E-07	5.8E-07	Aroclor-1254	Immunological, Nails	5.3E-03		2.9E-02	3.4E-02

Total Risk Across Surface Water: 3.5E-05
Total Risk Across Sediment: 5.8E-07
Total Risk Across All Media and All Exposure Routes: 3.6E-05

Total Hazard Index Across All Media and All Exposure Routes: 3.4E-02
Total Immune System HI = 3.4E-02
Total Nails HI = 3.4E-02

SITE 9 - TABLE 10.3a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - ADULT RECREATIONAL USER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	4.6E-09		6.1E-06	6.1E-06	Total PCBs					
						Total Risk Across Surface Water	6.1E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment							

Total Risk Across All Media and All Exposure Routes 6.1E-06

SITE 9 - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	4.7E-08		2.3E-05	2.3E-05	Total PCBs					
Sediment	Sediment	Onsite	Total PCBs	1.6E-07		3.2E-07	4.8E-07	Aroclor-1254	Immunological, Nails	2.8E-02		5.5E-02	8.3E-02

Total Risk Across Surface Water: 2.3E-05
Total Risk Across Sediment: 4.8E-07
Total Risk Across All Media and All Exposure Routes: 2.3E-05

Total Hazard Index Across All Media and All Exposure Routes: 8.3E-02
Total Immune System HI = 8.3E-02
Total Nails HI = 8.3E-02

SITE 9 - TABLE 10.4a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	1.3E-08		6.5E-06	6.5E-06	Total PCBs					
						Total Risk Across Surface Water	6.5E-06					Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment							

Total Risk Across All Media and All Exposure Routes 6.5E-06

SITE 9 - TABLE 10.5. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	9.4E-07		8.8E-04	8.8E-04	Total PCBs					
			RDX	5.7E-08		5.3E-07	5.9E-07	RDX	Prostate	5.0E-04		4.7E-03	5.2E-03
Sediment	Sediment	Onsite	BAP EQUIVALENT	4.8E-07			4.8E-07	BAP EQUIVALENT					
			Total PCBs	1.6E-06		8.6E-06	1.0E-05	Aroclor-1254	Immunological, Nails	1.2E-01		6.3E-01	7.5E-01
Groundwater	Water	Onsite	Carbon Tetrachloride	6.9E-07	1.4E-07	2.1E-07	1.0E-06	Carbon Tetrachloride	Liver	2.2E-02	1.3E-02	6.7E-03	4.2E-02
			Chloroform	2.3E-07	9.5E-07	2.2E-08	1.2E-06	Chloroform	Liver	1.1E-02	4.0E-01	1.1E-03	4.1E-01
			Trichloroethene	1.2E-06	2.2E-07	2.2E-07	1.6E-06	Trichloroethene	CNS	5.1E-02		9.6E-03	6.1E-02
			Arsenic	9.7E-05		2.8E-07	9.7E-05	Arsenic	Skin, Vascular	6.3E-01		1.8E-03	6.3E-01
			Iron					Iron	Liver/Blood/GI Tract	1.2E+01		3.6E-02	1.2E+01
			RDX	1.6E-05		6.8E-06	2.3E-05	RDX	Prostate	1.4E-01		6.0E-02	2.0E-01

Total Risk Across Surface Water	8.8E-04
Total Risk Across Sediment	1.1E-05
Total Risk Across Groundwater	1.2E-04
Total Risk Across All Media and All Exposure Routes	1.0E-03

Total Hazard Index Across All Media and All Exposure Routes	1.5E+01
Total Liver HI =	1.3E+01
Total CNS HI =	6.1E-02
Total Immume System HI =	7.5E-01
Total Prostate HI =	2.1E-01
Total Skin HI =	6.3E-01
Total Nails HI =	7.5E-01
Total Vascular HI =	6.3E-01

SITE 9 - TABLE 10.5a. CENTRAL TENDENCY EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	1.0E-07		6.9E-05	6.9E-05
Groundwater	Water	Onsite	Arsenic	1.3E-05		3.1E-08	1.3E-05
			Iron				
			RDX	2.2E-06		9.4E-07	3.1E-06

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total PCBs					
Arsenic	Skin, Vascular	2.9E-01		7.0E-04	2.9E-01
Iron	Liver/Blood/GI Tract	5.8E+00		1.4E-02	5.8E+00
RDX	Prostate	6.6E-02		2.9E-02	9.5E-02

Total Risk Across Surface Water	6.9E-05
Total Risk Across Sediment	
Total Risk Across Groundwater	1.6E-05
Total Risk Across All Media and All Exposure Routes	8.5E-05

Total Hazard Index Across All Media and All Exposure Routes	6.2E+00
Total Liver HI =	5.8E+00
Total Blood HI =	5.8E+00
Total Prostate HI =	9.5E-02
Total Skin HI =	2.9E-01
Total Vascular HI =	2.9E-01
Total GI Tract HI =	5.8E+00

SITE 9 - TABLE 10.6. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	1.1E-06		4.0E-04	4.0E-04	Total PCBs					
Sediment	Sediment	Onsite	BAP EQUIVALENT	1.1E-06			1.1E-06	BAP EQUIVALENT					
			Total PCBs	3.7E-06		3.9E-06	7.6E-06	Aroclor-1254	Immunological, Nails	1.1E+00		1.1E+00	2.2E+00
Groundwater	Water	Onsite	Chloroform	1.3E-07	1.0E-06	7.8E-09	1.2E-06	Chloroform	Liver	2.5E-02	1.7E+00	1.5E-03	1.8E+00
			Arsenic	5.6E-05		9.8E-08	5.6E-05	Arsenic	Skin, Vascular	1.5E+00		2.5E-03	1.5E+00
			Iron					Iron	Liver/Blood/GI Tract	2.9E+01		5.0E-02	2.9E+01
			RDX	9.4E-06		2.4E-06	1.2E-05	RDX	Prostate	3.3E-01		8.5E-02	4.2E-01
			Ammonium Perchlorate					Ammonium Perchlorate	Thyroid Effects	1.3E+00		2.2E-03	1.3E+00

Total Risk Across Surface Water	4.0E-04
Total Risk Across Sediment	8.8E-06
Total Risk Across Groundwater	6.9E-05
Total Risk Across All Media and All Exposure Routes	4.8E-04

Total Hazard Index Across All Media and All Exposure Routes	3.6E+01
Total Liver HI =	3.1E+01
Total Blood HI =	2.9E+01
Total Immume System HI =	2.2E+00
Total Prostate HI =	4.2E-01
Total Skin HI =	1.5E+00
Total Nails HI =	2.2E+00
Total Thyroid HI =	1.3E+00
Total Vascular HI =	1.5E+00
Total GI Tract HI =	2.9E+01

SITE 9 - TABLE 10.6a. CENTRAL TENDENCY.EXPOSURE (CTE)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Onsite	Total PCBs	7.0E-08		3.6E-05	3.6E-05	Total PCBs					
Groundwater	Water	Onsite	Arsenic	1.3E-05		1.5E-08	1.3E-05	Arsenic	Skin, Vascular	9.8E-01		1.1E-03	9.8E-01
			Iron					Iron	Liver/Blood/GI Tract	1.9E+01		2.3E-02	1.9E+01
			RDX	2.1E-06		4.4E-07	2.5E-06	RDX	Prostate	2.2E-01		4.7E-02	2.7E-01

Total Risk Across Surface Water	3.6E-05
Total Risk Across Sediment	
Total Risk Across Groundwater	1.5E-05
Total Risk Across All Media and All Exposure Routes	5.1E-05

Total Hazard Index Across All Media and All Exposure Routes	2.1E+01
Total Liver HI =	1.9E+01
Total Blood HI =	1.9E+01
Total Prostate HI =	2.7E-01
Total Skin HI =	9.8E-01
Total Vascular HI =	9.8E-01
Total GI Tract HI =	1.9E+01

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
Bromodichloromethane	5.78E-04	1.64E+02	1.60E-03	1.04E+01	9.94E+02	8.96E+00	1.18E+01	1.88E-04	1.57E-04	4.29E-02
Carbon Tetrachloride	5.66E-04	1.54E+02	3.05E-02	1.07E+01	1.03E+03	1.06E+01	1.39E+01	2.10E-04	1.75E-04	4.91E-02
Chloroform	3.98E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	1.56E-03	1.30E-03	5.19E-02
Tetrachloroethene	7.73E-04	1.66E+02	1.84E-02	1.03E+01	9.88E+02	1.02E+01	1.34E+01	2.78E-04	2.32E-04	4.75E-02
Trichloroethene	1.12E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	4.38E-03	3.65E-03	5.16E-02

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
Bromodichloromethane	5.78E-04	2.98E-02	1.06E-05	6.74E+03	6.56E-02	2.33E-03	3.53E-05	1.12E-03	2.33E-03	5.40E-05	1.04E-03	6.02E-07
Carbon Tetrachloride	5.66E-04	7.80E-02	8.80E-06	7.93E+02	1.25E+00	6.09E-03	1.14E-05	6.18E-04	6.09E-03	2.99E-05	2.48E-02	1.40E-05
Chloroform	3.98E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	2.11E-05
Tetrachloroethene	7.73E-04	7.20E-02	8.20E-06	2.00E+02	7.54E-01	5.62E-03	1.14E-05	6.12E-04	5.62E-03	2.95E-05	1.44E-02	1.12E-05
Trichloroethene	1.12E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	1.07E-04

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	3.96	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	24	Exposure Duration (years)
BW = :	70	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Bromodichloromethane	1.57E-04	1.2E-06	3.4E-06			NA	NA	NA	NA
Carbon Tetrachloride	1.75E-04	1.3E-06	3.8E-06	5.30E-02	5.71E-04	6.9E-08	6.8%	6.7E-03	2.0%
Chloroform	1.30E-03	9.7E-06	2.8E-05	8.10E-02	8.60E-05	7.9E-07	76.9%	3.3E-01	98.0%
Tetrachloroethene	2.32E-04	1.7E-06	5.0E-06	2.00E-03	1.40E-01	3.4E-09	0.3%	3.6E-05	0.0%
Trichloroethene	3.65E-03	2.7E-05	7.9E-05	6.00E-03		1.6E-07	16.0%	NA	NA
					Total	**1.0E-06**	**100.0%**	**3.4E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	3.96	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	6	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Bromodichloromethane	1.57E-04	1.4E-06	1.6E-05			NA	NA	NA	NA
Carbon Tetrachloride	1.75E-04	1.5E-06	1.8E-05	5.30E-02	5.71E-04	8.1E-08	6.8%	3.1E-02	2.0%
Chloroform	1.30E-03	1.1E-05	1.3E-04	8.10E-02	8.60E-05	9.2E-07	76.9%	1.5E+00	98.0%
Tetrachloroethene	2.32E-04	2.0E-06	2.3E-05	2.00E-03	1.40E-01	4.0E-09	0.3%	1.7E-04	0.0%
Trichloroethene	3.65E-03	3.2E-05	3.7E-04	6.00E-03		1.9E-07	16.0%	NA	NA
					Total	**1.2E-06**	**100.0%**	**1.6E+00**	**100.0%**

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
Bromodichloromethane	5.78E-04	1.64E+02	1.60E-03	1.04E+01	9.94E+02	8.96E+00	1.18E+01	1.88E-04	1.57E-04	2.37E-02
Carbon Tetrachloride	5.66E-04	1.54E+02	3.05E-02	1.07E+01	1.03E+03	1.06E+01	1.39E+01	2.10E-04	1.75E-04	2.72E-02
Chloroform	3.98E-03	1.19E+02	3.66E-03	1.22E+01	1.17E+03	1.14E+01	1.50E+01	1.56E-03	1.30E-03	2.87E-02
Tetrachloroethene	7.73E-04	1.66E+02	1.84E-02	1.03E+01	9.88E+02	1.02E+01	1.34E+01	2.78E-04	2.32E-04	2.63E-02
Trichloroethene	1.12E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	4.38E-03	3.65E-03	2.86E-02

Vapor Intrusion from Groundwater - CTE
Source: ASTM E 1739-95
SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
Bromodichloromethane	5.78E-04	2.98E-02	1.06E-05	6.74E+03	6.56E-02	2.33E-03	3.53E-05	1.12E-03	2.33E-03	5.40E-05	1.04E-03	6.02E-07
Carbon Tetrachloride	5.66E-04	7.80E-02	8.80E-06	7.93E+02	1.25E+00	6.09E-03	1.14E-05	6.18E-04	6.09E-03	2.99E-05	2.48E-02	1.40E-05
Chloroform	3.98E-03	1.04E-01	1.00E-05	7.92E+03	1.50E-01	8.12E-03	2.64E-05	1.33E-03	8.12E-03	6.42E-05	5.29E-03	2.11E-05
Tetrachloroethene	7.73E-04	7.20E-02	8.20E-06	2.00E+02	7.54E-01	5.62E-03	1.14E-05	6.12E-04	5.62E-03	2.95E-05	1.44E-02	1.12E-05
Trichloroethene	1.12E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	1.07E-04

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: *09/20/00*

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Bromodichloromethane	1.57E-04	1.3E-07	1.3E-06			NA	NA	NA	NA
Carbon Tetrachloride	1.75E-04	1.4E-07	1.4E-06	5.30E-02	5.71E-04	7.5E-09	6.8%	2.5E-03	2.0%
Chloroform	1.30E-03	1.0E-06	1.0E-05	8.10E-02	8.60E-05	8.5E-08	76.9%	1.2E-01	98.0%
Tetrachloroethene	2.32E-04	1.9E-07	1.9E-06	2.00E-03	1.40E-01	3.7E-10	0.3%	1.3E-05	0.0%
Trichloroethene	3.65E-03	2.9E-06	2.9E-05	6.00E-03		1.8E-08	16.0%	NA	NA
					Total	**1.1E-07**	**100.0%**	**1.2E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	2.19	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	234	Exposure Frequency (days/year)
ED = :	2	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	730	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SITE 9 - INDUSTRIAL WASTEWATER DISPOSAL AREA 300
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 09/20/00

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Bromodichloromethane	1.57E-04	1.7E-07	5.9E-06			NA	NA	NA	NA
Carbon Tetrachloride	1.75E-04	1.9E-07	6.6E-06	5.30E-02	5.71E-04	9.9E-09	6.8%	1.1E-02	2.0%
Chloroform	1.30E-03	1.4E-06	4.9E-05	8.10E-02	8.60E-05	1.1E-07	76.9%	5.7E-01	98.0%
Tetrachloroethene	2.32E-04	2.5E-07	8.7E-06	2.00E-03	1.40E-01	5.0E-10	0.3%	6.2E-05	0.0%
Trichloroethene	3.65E-03	3.9E-06	1.4E-04	6.00E-03		2.3E-08	16.0%	NA	NA
					Total	**1.5E-07**	**100.0%**	**5.8E-01**	**100.0%**

PAINT BRANCH

RISK ASSESSMENT CALCULATIONS

PAINT BRANCH CREEK - TABLE 1

SELECTION OF EXPOSURE PATHWAYS
NSWC-WHITE OAK, SILVER SPRING, MARYLAND
PAGE 1 OF 1

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	Quant(1)	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors from Surface Water	All Potential Receptors	Adult, Child, Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated.
	Sediment	Sediment	Paint Branch Creek	Maintenance/Utility/ Construction Workers	Adults	Ingestion	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
						Dermal	On-site	Quant	Workers may be exposed in the course of work activities, such as digging trenches.
				Full-time Workers	Adults	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Recreational Users	Adults	Ingestion	On-site	Quant	Receptors may be exposed during on-site activities.
						Dermal	On-site	Quant	Receptors may be exposed during on-site activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Receptors may be exposed while trespassing on-site.
						Dermal	On-site	Quant	Receptors may be exposed while trespassing on-site.
				Day Care Center Children	Child	Ingestion	On-site	None	Minimal exposure is anticipated.
						Dermal	On-site	None	Minimal exposure is anticipated.
				Resident	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.

Footnotes:

1 Quantitative.

PAINT BRANCH CREEK - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SURFACE WATER
PAINT BRANCH
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
84-74-2	Di-n-butyl phthalate	1.2	J	1.2	J	µg/L	PBSW1000001-D	1/5	5	1.2	NA	370	N	2700	NRWQC	No	BSL
7429-90-5	Aluminum	143	K	963	K	µg/L	PBSW1000001	4/5	175	963	NA	3700	N		NA	No	BSL
7440-38-2	Arsenic	1.6		2		µg/L	PBSW1020001	3/5	1.5	2	NA	**0.045**	C	**0.018**	NRWQC	No	BKG
7440-39-3	Barium	33.3		42.2		µg/L	PBSW1000001-D	5/5		42.2	NA	260	N	1000	NRWQC	No	BSL, BKG
7440-70-2	Calcium	11400		14200		µg/L	PBSW1000001-D	5/5		14200	NA	NA			NA	No	NUT, BKG
7439-89-6	Iron	442	J	1790	J	µg/L	PBSW1000001	5/5		1790	NA	**1100**	N	**300**	NRWQC	Yes	ASL
7439-92-1	Lead	2.5		3.2		µg/L	PBSW1000001	1/5	1	3.2	NA	15 (7)	N		NA	No	BSL, BKG
7439-95-4	Magnesium	3590		4160		µg/L	PBSW1000001-D	5/5		4160	NA	NA			NA	No	NUT, BKG
7439-96-5	Manganese	50.1		72.4		µg/L	PBSW1000001-D	5/5		72.4	NA	73 (8)	N	**50**	NRWQC	No	BSL
7440-09-7	Potassium	2280		2890		µg/L	PBSW1000001	4/5	2790	2890	NA	NA			NA	No	NUT, BKG
7440-23-5	Sodium	38400		57000		µg/L	PBSW1000001-D	5/5		57000	NA	NA			NA	No	NUT
7440-28-0	Thallium	3		4.8		µg/L	PBSW1030001	5/5	2.9	4.8	NA	**0.26**	N	**1.7**	NRWQC	Yes	ASL
7440-66-6	Zinc	14.6	K	27		µg/L	PBSW1000001	5/5		27	NA	1100	N	5000	NRWQC	No	BSL
TTNUS21	Total Dissolved Solids	36		190		µg/L	PBSW1030001	5/5	10	190	NA	NA		250000	NRWQC	No	NTX
	Total Suspended Solids	20		48		µg/L	PBSW1000001	1/5	4	48	NA	NA			NA	No	NTX

Associated Samples:
PBSW1000001
PBSW1000001
PBSW1010001
PBSW1010001-D
PBSW1020001
PBSW1030001
PBSW1030001-D
PBSW1040001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 Action level at the TAP(USEPA, October 1996).
8 Manganese-Nonfood

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
C = Carcinogen
J = Estimated Value
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern
NRWQC = National Recommended Water Quality Criteria for the ingestion of water and organisms (USEPA, April 1999).

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity information

PAINT BRANCH CREEK - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
PAINT BRANCH
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)		Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)
56-55-3	Benzo(a)anthracene	0.048	J	0.36	J	mg/kg	PBSD1020001	5/5	0.43 - 0.44	0.36	NA	0.87	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	0.044	J	0.44	J	mg/kg	PBSD1020001	4/5	0.42 - 0.45	0.44	NA	**0.087**	C	NA	NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.074	J	0.73		mg/kg	PBSD1020001	5/5	0.44	0.73	NA	0.87	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.097	J	0.24	J	mg/kg	PBSD1020001	2/5	0.42 - 0.47	0.24	NA	160	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	0.051	J	0.27	J	mg/kg	PBSD1020001	3/5	0.42 - 0.45	0.27	NA	8.7	C	NA	NA	No	BSL
86-74-8	Carbazole	0.057	J	0.057	J	mg/kg	PBSD1020001	1/5	0.42 - 0.49	0.057	NA	32	C	NA	NA	No	BSL
218-01-9	Chrysene	0.059	J	0.53		mg/kg	PBSD1020001	5/5	0.44	0.53	NA	87	C	NA	NA	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.063	J	0.063	J	mg/kg	PBSD1020001	1/5	0.42 - 0.49	0.063	NA	0.087	C	NA	NA	No	BSL
206-44-0	Fluoranthene	0.069	J	1.2		mg/kg	PBSD1020001	5/5		1.2	NA	310	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.049	J	0.24	J	mg/kg	PBSD1020001	3/5	0.42 - 0.45	0.24	NA	0.87	C	NA	NA	No	BSL
85-01-8	Phenanthrene	0.05	J	0.45		mg/kg	PBSD1020001	5/5	0.44	0.45	NA	160	N	NA	NA	No	BSL
129-00-0	Pyrene	0.052	J	0.83		mg/kg	PBSD1020001	5/5		0.83	NA	230	N	NA	NA	No	BSL
5103-71-9	alpha-Chlordane	0.00045	J	0.0013	J	mg/kg	PBSD1000001-D	3/4	0.0022 - 0.012	0.0013	NA	1.8 (7)	C	NA	NA	No	BSL
11096-82-5	Aroclor-1260	0.0086	J	0.05		mg/kg	PBSD1010001	4/5	0.048 - 0.24	0.05	NA	0.32	C	NA	NA	No	BSL
60-57-1	Dieldrin	0.00054	J	0.00068	J	mg/kg	PBSD1020001	2/5	0.0041 - 0.024	0.00068	NA	0.04	C	NA	NA	No	BSL
1024-57-3	Heptachlor Epoxide	0.000096	J	0.000096	J	mg/kg	PBSD1010001	1/4	0.0023 - 0.012	0.000096	NA	0.07	C	NA	NA	No	BSL
7429-90-5	Aluminum	1770.0		4500.0		mg/kg	PBSD1020001	5/5		4500	NA	7800	N	NA	NA	No	BSL, BKG
7440-38-2	Arsenic	0.66		0.77		mg/kg	PBSD1000001-D	2/5	0.67 - 0.77	0.77	NA	**0.43**	C	NA	NA	No	BKG
7440-39-3	Barium	10.7		30.9		mg/kg	PBSD1020001	5/5		30.9	NA	550	N	NA	NA	No	BSL, BKG
7440-47-3	Chromium	7.5		26		mg/kg	PBSD1000001-D	5/5		26	NA	**23 (8)**	N	NA	NA	No	BKG
7440-48-4	Cobalt	3		5.4		mg/kg	PBSD1000001-D	5/5		5.4	NA	470	N	NA	NA	No	BSL, BKG
7439-89-6	Iron	7510	J	20200	J	mg/kg	PBSD1000001-D	5/5		20200	NA	**2300**	N	NA	NA	No	BKG
7439-92-1	Lead	4	K	7.9	K	mg/kg	PBSD1000001-D	5/5		7.9	NA	400 (9)		NA	NA	No	BSL, BKG
7439-95-4	Magnesium	747		1640		mg/kg	PBSD1030001-D	5/5		1640	NA	NA		NA	NA	No	NUT, BKG
7439-96-5	Manganese	93.8	K	201	K	mg/kg	PBSD1040001	5/5		201	NA	**160 (10)**	N	NA	NA	No	BKG
7440-02-0	Nickel	7.5		14		mg/kg	PBSD1030001-D	5/5		14	NA	160	N	NA	NA	No	BSL, BKG
7440-09-7	Potassium	308	J	1070	J	mg/kg	PBSD1020001	5/5		1070	NA	NA		NA	NA	No	NUT, BKG
7782-49-2	Selenium	0.97	L	0.97	L	mg/kg	PBSD1000001-D	1/5	0.69 - 0.82	0.97	NA	39	N	NA	NA	No	BSL
7440-22-4	Silver	0.18		0.18		mg/kg	PBSD1010001	1/5	0.17 - 0.21	0.18	NA	39	N	NA	NA	No	BSL
7440-62-2	Vanadium	7.9		21.8		mg/kg	PBSD1000001-D	5/5		21.8	NA	55	N	NA	NA	No	BSL, BKG
7440-66-6	Zinc	21.6	J	41.1	J	mg/kg	PBSD1020001	5/5		41.1	NA	2300	N	NA	NA	No	BSL, BKG
2691-41-0	HMX	0.051	J	0.087	J	mg/kg	PBSD1030001-D	1/5	0.5	0.087	NA	390	N	NA	NA	No	BSL
TTNUS22	Total Organic Carbon	600	J	3100	J	mg/kg	PBSD1030001-D	5/5		3100	NA	**160**	N	NA	NA	No	NTX

PAINT BRANCH CREEK - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF POTENTIAL CONSTITUENTS OF CONCERN - SEDIMENT
PAINT BRANCH
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Background Value (4)	Risk-Based PCOC Screening Level (5)	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	PCOC Flag	Rationale for Contaminant Deletion or Selection (6)

Associated Samples:
PBSD1000001
PBSD1000001-D
PBSD1010001
PBSD1010001-D
PBSD1020001
PBSD1030001
PBSD1030001-D
PBSD1040001

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations are within background levels, a comparison of site concentrations with Base-wide background data was made by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a PCOC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region III, April 1999).
6 The chemical is selected as a PCOC if the maximum detected concentration exceeds the risk-based PCOC screening level and facility-wide background levels.
7 alpha-Chordane and gamma-chlordane as Chlordane.
8 Hexavalent Chromium.
9 OSWER soil screening level for residential land use (USEPA, July 1994)
10 Manganese-Nonfood

Bolded values indicate that the maximum concentration exceeds the specified criterion.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
J = Estimated Value
K = Value Estimated with a High Bias
L = Value Estimated with a Low Bias
N = Noncarcinogen
NA = Not Applicable/Not Available.
PCOC = Potential Constituent of Concern

Rationale Codes:
For Selection as a PCOC:
ASL = Above PCOC Screening Level

For Elimination as a PCOC:
BKG = Within background levels
BSL = Below PCOC Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Information

PAINT BRANCH - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Iron	mg/L	7.49E-01	NA	1.79E+00	J	mg/L	1.79E+00	Maximum	N<10(1)	7.49E-01	Average	N<10(1)
Thallium	mg/L	3.48E-03	NA	4.80E-03		mg/L	4.80E-03	Maximum	N<10(1)	3.48E-03	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

PAINT BRANCH - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BAP EQUIVALENT	mg/kg	1.91E-01	NA	6.39E-01	J	mg/kg	6.39E-01	Maximum	N<10(1)	1.91E-01	Average	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used as the exposure point concentration for the RME and the average concentration is used for the CTE.

(2) Maximum value is used for the CTE for Aroclor-1260 because the average value is greater than the maximum.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal RfD[2]	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ[3]
1,1,2,2-Tetrachloroethane	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day			NCEA	04/12/99
1,1,2-Trichloroethane	chronic	4.0E-03	mg/kg-day	1	4.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	04/12/99
1,2-Dichloroethane	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day			NCEA	04/12/99
1,3-Dichlorobenzene	chronic	9.0E-04	mg/kg-day	1	9.00E-04	mg/kg-day			NCEA	04/12/99
1,4-Dichlorobenzene	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver		HEAST	07/97
2,2'-Oxybis(1-chloropropane)	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day	Blood	1,000	IRIS	04/12/99
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day			IRIS	04/12/99
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	04/12/99
Ammonium Perchlorate	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Thyroid Effects	300	NCEA	1992
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	04/12/99
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	04/12/99
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	04/12/99
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day			NCEA	04/12/99
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	04/12/99
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Bromodichloromethane	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Kidney	1,000	IRIS	04/12/99
Cadmium	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	04/12/99
Carbon Tetrachloride	chronic	7.0E-04	mg/kg-day	1	7.00E-04	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chlorobenzene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	04/12/99
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood		HEAST	07/97
Cobalt	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological		NCEA	04/12/99
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day			HEAST	07/97
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	04/12/99
gamma-BHC	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Liver, Kidney	1,000	IRIS	04/12/99
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	04/12/99
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract		NCEA	04/12/99
Manganese	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	04/12/99
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	04/12/99
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	04/12/99
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	04/12/99
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	04/12/99
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	04/12/99
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	04/12/99
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver		OTHER[4]	04/12/99
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS		NCEA	04/12/99
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	04/12/99

1 USEPA, November 1998.
2 RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA
4 Developed by USEPA Region III based weighted average of RfDs of thallium compounds listed in IRIS.

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, April 1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA RBC Table, April 12, 1999)
NA = Not applicable since an oral RfD is not available for this compound data
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
1,4-Dichlorobenzene	Chronic	8.0E+02	$\mu g/m^3$	2.29E-01	mg/kg-day	Liver	100	IRIS	4/12/99
1,2-Dichloroethane	Chronic	4.9E+00	$\mu g/m^3$	1.4E-03	mg/kg-day			NCEA	4/12/99
1,2-Dichloropropane	Chronic	4.0E+00	$\mu g/m^3$	1.14E-03	mg/kg-day	Nasal Mucosa	300	IRIS	4/12/99
Aluminum	Chronic	3.5E+00	$\mu g/m^3$	1.00E-03	mg/kg-day	Immunological, Nails		NCEA	4/12/99
Barium	Chronic	4.9E-01	$\mu g/m^3$	1.40E-04	mg/kg-day	Kidney		HEAST	07/97
Benzene	Chronic	6.0E+00	$\mu g/m^3$	1.70E-03	mg/kg-day			NCEA	4/12/99
Beryllium	Chronic	2.0E-02	$\mu g/m^3$	5.70E-06	mg/kg-day	Gastrointestinal	10	IRIS	4/12/99
Cadmium	Chronic	2.0E-01	$\mu g/m^3$	5.70E-05	mg/kg-day	Kidney		NCEA	4/12/99
Carbon Tetrachloride	Chronic	2.0E+00	$\mu g/m^3$	5.71E-04	mg/kg-day	Liver		NCEA	4/12/99
Chlorobenzene	Chronic	6.0E+01	$\mu g/m^3$	1.70E-02	mg/kg-day			NCEA	4/12/99
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver		NCEA	4/12/99
Manganese	Chronic	5.0E-02	$\mu g/m^3$	1.4E-05	mg/kg-day	CNS	1,000	IRIS	4/12/99
Mercury	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	CNS	30	IRIS	4/12/99
Tetrachloroethene	Chronic	4.9E+02	$\mu g/m^3$	1.4E-01	mg/kg-day	Liver		NCEA	4/12/99

IRIS = Integrated Risk Information System (Aprl 1999)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1,2,2-Tetrachloroethane	2.0E-01	1	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	5.7E-02	1	5.70E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	9.1E-02	1	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
1,2-Dichloropropane	6.8E-02	1	6.80E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
1,4-Dichlorobenzene	2.4E-02	1	2.40E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
2,2'-Oxybis(1-chloropropane)	7.0E-02	1	7.00E-02	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A-inhalation	IRIS	4/12/99
Benzo(a)pyrene Equivalent	7.3E+00	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Bromodichloromethane	6.2E-02	1	6.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Carbon Tetrachloride	1.3E-01	1	1.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
gamma-BHC	1.3E+00	1	1.30E+00	$(mg/kg\text{-}day)^{-1}$		HEAST	07/97
Polychlorinated Biphenyls	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Total PCBs	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chlioride	1.9E+00	1	1.90E+00	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

1 USEPA, November 1998.
2 CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
3 Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, July1999)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, April 12,1999)
NA = Not Applicable since oral CSF is not available

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6.2

CANCER TOXICITY DATA – INHALATION

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.7E-05	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,1,2-Trichloroethane	1.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.60E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,4-Dichlorobenzene	6.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.20E-02	$(mg/kg\text{-}day)^{-1}$	C	HEAST	07/97
1,1-Dichloroethene	5.0E-05	$(\mu g/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	4/12/99
1,2-Dichloroethane	2.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	9.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1254	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Aroclor-1260	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Benzo(a)pyrene	8.9E-04	$(\mu g/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Benzene	8.3E-06	$(\mu g/m^3)^{-1}$	3.5E+03	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Beryllium	2.4E-03	$(\mu g/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Bis(2-ethylhexyl)phthalate	4.0E-06	$(\mu g/m^3)^{-1}$	3.5E+03	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Bromodichloromethane		$(\mu g/m^3)^{-1}$	3.5E+03		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Cadmium	1.8E-03	$(\mu g/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	4/12/99
Carbon Tetrachloride	1.5E-05	$(\mu g/m^3)^{-1}$	3.5E+03	5.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chloroform	2.3E-05	$(\mu g/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Chromium	1.2E-02	$(\mu g/m^3)^{-1}$	3.5E+03	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/12/99
Dieldrin	4.6E-03	$(\mu g/m^3)^{-1}$	3.5E+03	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Polychlorinated Biphenyls	5.7E-04	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/12/99
Tetrachloroethene	5.7E-07	$(\mu g/m^3)^{-1}$	3.5E+03	2.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Trichloroethene	1.7E-06	$(\mu g/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	4/12/99
Vinyl Chloride	8.6E-05	$(\mu g/m^3)^{-1}$	3.5E+03	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	07/97

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment

(USEPA Region III RBC Table, April 12,1999)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

PAINT BRANCH - TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	36	Professional judgement	18	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.53E+00
Noncancer Dermal Intake(RME) = 1.27E+01

Cancer Dermal Intake(CTE) = 8.15E-01
Noncancer Dermal Intake(CTE) = 6.34E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		I			1.00E+00			1.00E-03			1.79E-06
Thallium	4.80E-03		I			1.00E+00			1.00E-03			4.80E-09

PAINT BRANCH - TABLE 7.1. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	2.3E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.6E-05
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	6.1E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	8.7E-04
	(total)												9.5E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**9.5E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) **EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER**

SITE NAME: **PAINT BRANCH CREEK**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.1a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Maintenance/Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	4.7E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-05
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	2.2E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.1E-04
	(total)												3.3E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.2

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	180	Professional judgement	180	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	1	EPA 1993a	1	EPA 1993a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 9.06E-01
Noncancer Dermal Intake(RME) = 6.34E+01

Cancer Dermal Intake(CTE) = 9.06E-01
Noncancer Dermal Intake(CTE) = 6.34E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		i			1.00E+00			1.00E-03			1.79E-06
Thallium	4.80E-03		i			1.00E+00			1.00E-03			4.80E-09

PAINT BRANCH - TABLE 7.2. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.8E-04
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	3.0E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.3E-03
	(total)												4.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.2a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	2.2E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.1E-03
	(total)												3.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.3

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	16	Professional judgement	16	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	30	Professional judgement	9	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.34E-05
Noncancer Ingestion Intake(RME) = 3.13E-05

Cancer Ingestion Intake(CTE) = 4.03E-06
Noncancer Ingestion Intake(CTE) = 3.13E-05

Cancer Dermal Intake(RME) = 2.42E+00
Noncancer Dermal Intake(RME) = 5.64E+00

Cancer Dermal Intake(CTE) = 7.25E-01
Noncancer Dermal Intake(CTE) = 5.64E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		i			1.00E+00			1.00E-03			1.79E-06
Thallium	4.80E-03		i			1.00E+00			1.00E-03			4.80E-09

PAINT BRANCH - TABLE 7.3. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	5.6E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-04
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	1.5E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.1E-03
	(total)												2.3E-03
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	1.0E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E-05
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	2.7E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.9E-04
	(total)												4.2E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.3a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	2.3E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.8E-05
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	1.1E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-03
	(total)												1.6E-03
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	4.2E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-05
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	2.0E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.8E-04
	(total)												2.9E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.4

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3,260	EPA 1997a	3,260	EPA 1997a	DAevent x EV x EF x ED x A / BW x AT
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	10	Professional judgement	10	Professional Judgement	
	BW	Body Weight	(kg)	43	EPA 1989a	43	EPA 1989a	
	tevent	Duration of Event	(hr/event)	1	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.37E-05
Noncancer Ingestion Intake(RME) = 1.66E-04

Cancer Ingestion Intake(CTE) = 1.18E-05
Noncancer Ingestion Intake(CTE) = 8.28E-05

Cancer Dermal Intake(RME) = 1.54E+00
Noncancer Dermal Intake(RME) = 1.08E+01

Cancer Dermal Intake(CTE) = 7.71E-01
Noncancer Dermal Intake(CTE) = 5.40E+00

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		i			1.00E+00			1.00E-03			1.79E-06
Thallium	4.80E-03		i			1.00E+00			1.00E-03			4.80E-09

PAINT BRANCH - TABLE 7.4. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	3.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.9E-04
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	8.0E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.1E-02
	(total)												1.2E-02
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	1.9E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.4E-05
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	5.2E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	7.4E-04
	(total)												8.1E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.4a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	6.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-04
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	2.9E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.1E-03
	(total)												4.3E-03
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	4.0E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-05
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	1.9E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.7E-04
	(total)												2.8E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**4.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.5

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	9,000	EPA 1997a	9,000	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	24	Professional judgement	7	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	2	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.70E-04
Noncancer Ingestion Intake(RME) = 1.37E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.23E+01
Noncancer Dermal Intake(RME) = 1.23E+02

Cancer Dermal Intake(CTE) = 8.24E+00
Noncancer Dermal Intake(CTE) = 8.24E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		i			2.00E+00			1.00E-03			3.58E-06
Thallium	4.80E-03		i			2.00E+00			1.00E-03			9.60E-09

PAINT BRANCH - TABLE 7.5. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	2.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.2E-03
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	6.6E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	9.4E-02
	(total)												1.0E-01
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	4.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-03
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	1.2E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.7E-02
	(total)												1.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER

SITE NAME: PAINT BRANCH CREEK
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
DATE: 09/20/00

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.5a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	6.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-03
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	3.2E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.5E-02
	(total)												4.8E-02
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	6.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-04
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	2.9E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.1E-03
	(total)												4.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**5.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.6

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	CR	Contact Rate with Surface Water	(L/hr)	0.05	EPA 1988d	0.05	EPA 1988d	Cw x CR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	2	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Dermally Absorbed Dose =
	A	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	DAevent x EV x EF x ED x A
	Kp	Permeability Constant	(cm/hr)	Chemical-specific	EPA 1992d	Chemical-specific	EPA 1992d	BW x AT
	EV	Event Frequency	(events/day)	1	Professional judgement	1	Professional Judgement	
	EF	Exposure Frequency	(days/year)	350	Professional judgement	234	Professional Judgement	DAevent = Constants x Kp x Cw x tevent
	ED	Exposure Duration	(years)	6	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	tevent	Duration of Event	(hr/event)	2	Professional judgement	1	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-04
Noncancer Ingestion Intake(RME) = 6.39E-03

Cancer Ingestion Intake(CTE) = 6.11E-05
Noncancer Ingestion Intake(CTE) = 2.14E-03

Cancer Dermal Intake(RME) = 1.92E+01
Noncancer Dermal Intake(RME) = 2.24E+02

Cancer Dermal Intake(CTE) = 4.28E+00
Noncancer Dermal Intake(CTE) = 1.50E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: **PAINT BRANCH CREEK**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	1.79E+00		i			2.00E+00			1.00E-03			3.58E-06
Thallium	4.80E-03		i			2.00E+00			1.00E-03			9.60E-09

PAINT BRANCH - TABLE 7.6. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	1.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.8E-02
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	3.1E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	4.4E-01
	(total)												4.8E-01
Dermal	Iron	1.79E+00	mg/L	1.79E+00	mg/L	M	8.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-03
	Thallium	4.80E-03	mg/L	4.80E-03	mg/L	M	2.2E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.1E-02
	(total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**5.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CENTRAL TENDENCY EXPOSURE (CTE) EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER

SITE NAME: **PAINT BRANCH CREEK**
LOCATION: **NSWC-WHITE OAK SILVER SPRING, MARYLAND**
DATE: **09/20/00**

REFERENCES: EPA, DECEMBER 1989 AND JANUARY 1992

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)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
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 (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	DAevent
Iron	7.49E-01		i			1.00E+00			1.00E-03			7.49E-07
Thallium	3.48E-03		i			1.00E+00			1.00E-03			3.48E-09

PAINT BRANCH - TABLE 7.6a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water
Receptor Population: Child Resident
Receptor Age: Child (0 -6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	1.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.3E-03
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	7.4E-06	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.1E-01
	(total)												1.1E-01
Dermal	Iron	7.49E-01	mg/L	7.49E-01	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.7E-04
	Thallium	3.48E-03	mg/L	3.48E-03	mg/L	M	5.2E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	7.4E-03
	(total)												7.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

PAINT BRANCH - TABLE 4.7

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	36	Professional Judgement	18	Professional Judgement	
	ED	Exposure Duration	(years)	25	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	9,125	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	5.03E-08	Cancer Ingestion Intake - CTE	4.53E-09
Noncancer Ingestion Intake - RME	1.41E-07	Noncancer Ingestion Intake - CTE	3.52E-08
Cancer Dermal Intake - RME	1.59E-06	Cancer Dermal Intake - CTE	5.72E-08
Noncancer Dermal Intake - RME	4.45E-06	Noncancer Dermal Intake - CTE	4.45E-07

PAINT BRANCH - TABLE 8.7. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	3.2E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	(total)										2.3E-07
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**2.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.7a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF MAINTENANCE / UTILITY WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	8.7E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-09
	(total)										6.3E-09
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	1.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**6.3E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 4.8

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	480	EPA 1993a	240	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3160	EPA 1997a	3160	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	180	Professional Judgement	180	Professional Judgement	
	ED	Exposure Duration	(years)	1	Professional Judgement	1	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	365	EPA 1989a	365	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.83E-08	Cancer Ingestion Intake - CTE	2.42E-08
Noncancer Ingestion Intake - RME	3.38E-06	Noncancer Ingestion Intake - CTE	1.69E-06
Cancer Dermal Intake - RME	3.18E-07	Cancer Dermal Intake - CTE	6.36E-08
Noncancer Dermal Intake - RME	2.23E-05	Noncancer Dermal Intake - CTE	4.45E-06

PAINT BRANCH - TABLE 8.8. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	3.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	(total)										2.3E-07
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	2.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**2.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.8a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	4.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	(total)										3.4E-08
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	1.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**3.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 4.9

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	16	Professional Judgement	8	Professional Judgement	
	ED	Exposure Duration	(years)	30	EPA 1993a	9	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	10,950	EPA 1989a	3,285	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	2.68E-08	Cancer Ingestion Intake - CTE	2.01E-09
Noncancer Ingestion Intake - RME	6.26E-08	Noncancer Ingestion Intake - CTE	1.57E-08
Cancer Dermal Intake - RME	2.42E-06	Cancer Dermal Intake - CTE	7.25E-08
Noncancer Dermal Intake - RME	5.64E-06	Noncancer Dermal Intake - CTE	5.64E-07

PAINT BRANCH - TABLE 8.9. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	1.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	(total)										1.3E-07
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**1.3E-07**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.9a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adult Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	3.8E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	(total)										2.8E-09
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	1.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**2.8E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3263	EPA 1997a	3263	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	52	Professional Judgement	26	Professional Judgement	
	ED	Exposure Duration	(years)	10	Professional Judgement	10	Professional Judgement	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	43	EPA 1997a	43	EPA 1997a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	3,650	EPA 1989a	3,650	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.73E-08	Cancer Ingestion Intake - CTE	1.18E-08
Noncancer Ingestion Intake - RME	3.31E-07	Noncancer Ingestion Intake - CTE	8.28E-08
Cancer Dermal Intake - RME	1.54E-06	Cancer Dermal Intake - CTE	1.54E-07
Noncancer Dermal Intake - RME	1.08E-05	Noncancer Dermal Intake - CTE	1.08E-06

PAINT BRANCH - TABLE 8.10. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	3.0E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	(total)										2.2E-07
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	1.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**2.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.10a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Adolescent Trespasser
Receptor Age: 7-16 Years

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	2.3E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	(total)										1.7E-08
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	3.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**1.7E-08**

(1) *Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.*

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	100	EPA 1993a	50	EPA 1993a	Cs x IRs x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT x CF
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED
	SA	Skin Surface Area	(cm^2)	9000	EPA 1997a	9000	EPA 1997a	BW x AT x CF
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	70	EPA 1989a	70	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	4.70E-07	Cancer Ingestion Intake - CTE	4.58E-08
Noncancer Ingestion Intake - RME	1.37E-06	Noncancer Ingestion Intake - CTE	4.58E-07
Cancer Dermal Intake - RME	4.23E-05	Cancer Dermal Intake - CTE	1.65E-06
Noncancer Dermal Intake - RME	1.23E-04	Noncancer Dermal Intake - CTE	1.65E-05

PAINT BRANCH - TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	3.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	(total)										2.2E-06
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**2.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	8.8E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-08
	(total)										6.4E-08
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	4.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**6.4E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cs	Chemical Concentration in Soil	(mg/kg)	95% UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	IRs	Ingestion Rate of Soil	(mg/day)	200	EPA 1993a	100	EPA 1993a	Cs x IRs x EF x ED / BW x AT x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	FI	Fraction Ingested	(unitless)	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	
Dermal	Cs	Chemical Concentration in Soil	(mg/kg)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day) =
	AF	Soil to Skin Adherence Factor	(mg/cm^2)	1	EPA 1993a	0.2	EPA 1993a	Cs x SA x ABS x AF x EF x ED / BW x AT x CF
	SA	Skin Surface Area	(cm^2)	3506	EPA 1997a	3506	EPA 1997a	
	ABS	Absorption Factor	(unitless)	chemical-specific	EPA 1995b	chemical-specific	EPA 1995b	
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	CF	Conversion Factor	(mg/kg)	1.00E+06	EPA 1989a	1.00E+06	EPA 1989a	
	BW	Body Weight	(kg)	15	EPA 1989a	15	EPA 1989a	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25,550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME	1.10E-06	Cancer Ingestion Intake - CTE	1.22E-07
Noncancer Ingestion Intake - RME	1.28E-05	Noncancer Ingestion Intake - CTE	4.27E-06
Cancer Dermal Intake - RME	1.92E-05	Cancer Dermal Intake - CTE	8.56E-07
Noncancer Dermal Intake - RME	2.24E-04	Noncancer Dermal Intake - CTE	3.00E-05

PAINT BRANCH - TABLE 8.12. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	7.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	(total)										5.1E-06
Dermal	BAP EQUIVALENT	6.39E-01	mg/kg	6.39E-01	mg/kg	M	1.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**5.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 8.12a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment
Receptor Population: Resident
Receptor Age: Child (0-6 Years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	2.3E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	(total)										1.7E-07
Dermal	BAP EQUIVALENT	1.91E-01	mg/kg	1.91E-01	mg/kg	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										
										Total Risk Across All Exposure Routes/Pathways	**1.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction (ABS)(USEPA, November, 1998):

PAINT BRANCH - TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract			7.6E-05	7.6E-05
			Thallium					Thallium	Liver			8.7E-04	8.7E-04
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.3E-07			2.3E-07	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 2.3E-07

Total Risk Across All Media and All Exposure Routes 2.3E-07

Total Hazard Index Across All Media and All Exposure Routes 9.5E-04

Total Liver HI = 9.5E-04
Total Blood HI = 7.6E-05
Total GI Tract HI = 7.6E-05

PAINT BRANCH - TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE / UTILITY WORKER

PAINT BRANCH CREEK

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract			1.6E-05	1.6E-05
			Thallium					Thallium	Liver			3.1E-04	3.1E-04
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	6.3E-09			6.3E-09	BAP EQUIVALENT					

Total Risk Across Surface Water:
Total Risk Across Sediment: 6.3E-09

Total Risk Across All Media and All Exposure Routes: 6.3E-09

Total Hazard Index Across All Media and All Exposure Routes: 3.3E-04

Total Liver HI = 3.3E-04
Total Blood HI = 1.6E-05
Total GI Tract HI = 1.6E-05

PAINT BRANCH - TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract			3.8E-04	3.8E-04
			Thallium					Thallium	Liver			4.3E-03	4.3E-03
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.3E-07			2.3E-07	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 2.3E-07

Total Risk Across All Media and All Exposure Routes 2.3E-07

Total Hazard Index Across All Media and All Exposure Routes 4.7E-03

Total Liver HI = 4.7E-03
Total Blood HI = 3.8E-04
Total GI Tract HI = 3.8E-04

PAINT BRANCH - TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract			1.6E-04	1.6E-04
			Thallium					Thallium	Liver			3.1E-03	3.1E-03
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	3.4E-08			3.4E-08	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 3.4E-08

Total Risk Across All Media and All Exposure Routes 3.4E-08

Total Hazard Index Across All Media and All Exposure Routes 3.3E-03

Total Liver HI = 3.3E-03
Total Blood HI = 1.6E-04
Total GI Tract HI = 1.6E-04

PAINT BRANCH - TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	1.9E-04		3.4E-05	2.2E-04
			Thallium					Thallium	Liver	2.1E-03		3.9E-04	2.5E-03
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	1.3E-07			1.3E-07	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 1.3E-07

Total Risk Across All Media and All Exposure Routes 1.3E-07

Total Hazard Index Across All Media and All Exposure Routes 2.8E-03

Total Liver HI = 2.8E-03
Total Blood HI = 2.2E-04
Total GI Tract HI = 2.2E-04

PAINT BRANCH - TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USER

PAINT BRANCH CREEK

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	7.8E-05		1.4E-05	9.2E-05
			Thallium					Thallium	Liver	1.6E-03		2.8E-04	1.8E-03
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.8E-09			2.8E-09	BAP EQUIVALENT					

Total Risk Across Surface Water

Total Risk Across Sediment 2.8E-09

Total Risk Across All Media and All Exposure Routes 2.8E-09

Total Hazard Index Across All Media and All Exposure Routes 1.9E-03

Total Liver HI = 1.9E-03

Total Blood HI = 9.2E-05

Total GI Tract HI = 9.2E-05

PAINT BRANCH - TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER

PAINT BRANCH CREEK

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent (7-16 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	9.9E-04		6.4E-05	1.1E-03
			Thallium					Thallium	Liver	1.1E-02		7.4E-04	1.2E-02
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.2E-07			2.2E-07	BAP EQUIVALENT					

Total Risk Across Surface Water:
Total Risk Across Sediment: 2.2E-07

Total Risk Across All Media and All Exposure Routes: 2.2E-07

Total Hazard Index Across All Media and All Exposure Routes: 1.3E-02

Total Liver HI = 1.3E-02
Total Blood HI = 1.1E-03
Total GI Tract HI = 1.1E-03

PAINT BRANCH - TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent (7-16 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Trac	2.1E-04		1.3E-05	2.2E-04
			Thallium					Thallium	Liver	4.1E-03		2.7E-04	4.4E-03
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	1.7E-08			1.7E-08	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 1.7E-08

Total Risk Across All Media and All Exposure Routes 1.7E-08

Total Hazard Index Across All Media and All Exposure Routes 4.6E-03

Total Liver HI = 4.6E-03
Total Blood HI = 2.2E-04
Total GI Tract HI = 2.2E-04

PAINT BRANCH - TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	8.2E-03		1.5E-03	9.6E-03
			Thallium					Thallium	Liver	9.4E-02		1.7E-02	1.1E-01
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.2E-06			2.2E-06	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment: 2.2E-06

Total Risk Across All Media and All Exposure Routes: 2.2E-06

Total Hazard Index Across All Media and All Exposure Routes: 1.2E-01

Total Liver HI = 1.2E-01
Total Blood HI = 9.6E-03
Total GI Tract HI = 9.6E-03

PAINT BRANCH - TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT

PAINT BRANCH CREEK

NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	2.3E-03		2.1E-04	2.5E-03
			Thallium					Thallium	Liver	4.5E-02		4.1E-03	5.0E-02
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	6.4E-08			6.4E-08	BAP EQUIVALENT					

Total Risk Across Surface Water:

Total Risk Across Sediment: 6.4E-08

Total Risk Across All Media and All Exposure Routes: 6.4E-08

Total Hazard Index Across All Media and All Exposure Routes: 5.2E-02

Total Liver HI = 5.2E-02

Total Blood HI = 2.5E-03

Total GI Tract HI = 2.5E-03

PAINT BRANCH - TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	3.8E-02		2.7E-03	4.1E-02
			Thallium					Thallium	Liver	4.4E-01		3.1E-02	4.7E-01
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	5.1E-06			5.1E-06	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 5.1E-06

Total Risk Across All Media and All Exposure Routes 5.1E-06

Total Hazard Index Across All Media and All Exposure Routes 5.1E-01

Total Liver HI = 5.1E-01
Total Blood HI = 4.1E-02
Total GI Tract HI = 4.1E-02

PAINT BRANCH - TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Paint Branch Creek	Iron					Iron	Liver/Blood/GI Tract	5.3E-03		3.7E-04	5.7E-03
			Thallium					Thallium	Liver	1.1E-01		7.4E-03	1.1E-01
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	1.7E-07			1.7E-07	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 1.7E-07

Total Risk Across All Media and All Exposure Routes 1.7E-07

Total Hazard Index Across All Media and All Exposure Routes 1.2E-01

Total Liver HI = 1.2E-01
Total Blood HI = 5.7E-03
Total GI Tract HI = 5.7E-03

PAINT BRANCH - TABLE 10.1. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - MAINTENANCE / UTILITY WORKER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Maintenance / Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.3E-07			2.3E-07	BAP EQUIVALENT					

Total Risk Across Surface Water
Total Risk Across Sediment 2.3E-07

Total Hazard Index Across All Media and All Exposure Routes

Total Risk Across All Media and All Exposure Routes 2.3E-07

PAINT BRANCH - TABLE 10.2. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - ADOLESCENT TRESPASSER
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent (7-16 Years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.2E-07			2.2E-07	BAP EQUIVALENT					
						Total Risk Across Surface Water						Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment	2.2E-07						
						Total Risk Across All Media and All Exposure Routes	2.2E-07						

PAINT BRANCH - TABLE 10.3. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE ADULT RESIDENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	2.2E-06			2.2E-06	BAP EQUIVALENT					
						Total Risk Across Surface Water						Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment	2.2E-06						
						Total Risk Across All Media and All Exposure Routes	2.2E-06						

PAINT BRANCH - TABLE 10.4. REASONABLE MAXIMUM EXPOSURE (RME)
RISK ASSESSMENT SUMMARY - FUTURE CHILD RESIDENT
PAINT BRANCH CREEK
NSWC-WHITE OAK, SILVER SPRING, MARYLAND

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Paint Branch Creek	BAP EQUIVALENT	5.1E-06			5.1E-06	BAP EQUIVALENT					
						Total Risk Across Surface Water						Total Hazard Index Across All Media and All Exposure Routes	
						Total Risk Across Sediment	5.1E-06						

Total Risk Across All Media and All Exposure Routes 5.1E-06