

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type															
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
General and Inorganic Parameters															
pH (in 0.01M CaCl ₂)	6.0-8.5	6.0-8.5	-	-	6.0-8.5	6.0-8.5	-	-	-	-	-	-	-	-	-
Cyanide (free)	0.90	0.90	-	-	0.90	0.90	-	11	-	-	-	-	-	-	-
Fluoride	200	200	-	-	200	200	-	-	-	-	-	-	-	-	-
Sulphur (elemental) ^a	500	500	-	-	500	500	-	-	-	-	-	-	-	-	-
Metals															
Antimony	20	20	-	-	20	20	-	-	-	-	-	-	-	-	-
Arsenic (inorganic)	17	17	-	-	17	17	-	380	-	-	-	-	-	-	-
Barium (non-barite)	750	750	-	-	750	750	-	-	-	-	-	-	-	-	-
Barite-barium ^b	10,000	10,000	-	-	200,000	200,000	-	30,000	10,000	-	-	-	-	-	-
Beryllium	5.0	5.0	-	-	5.0	5.0	-	-	-	-	-	-	-	-	-
Boron (mg/L in saturated paste extract) ^k	3.3	3.3	65	120	3.3	3.3	-	-	-	5.0	5.0	17	17	-	-
Cadmium	3.8	3.8	-	-	10	10	54	3.8	-	-	-	-	-	-	-
Chromium (hexavalent)	0.40	0.40	-	-	0.40	0.40	-	-	-	-	-	-	-	-	-
Chromium (total)	64	64	-	-	64	64	-	-	-	-	-	-	-	-	-
Cobalt	20	20	-	-	20	20	-	-	-	-	-	-	-	-	-
Copper	63	63	-	-	63	63	350	300	-	-	-	-	-	-	-
Lead	70	70	-	-	300	300	720	70	-	-	-	-	-	-	-
Mercury (inorganic)	12	12	-	-	12	12	20	-	-	-	-	-	-	-	-
Molybdenum	4.0	4.0	-	-	4.0	4.0	-	-	-	-	-	-	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other			
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit		
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse					Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type																
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Nickel	45	45	-	-	45	45	170	530	-	-	-	-	-	-	-	-
Selenium	1.0	1.0	-	-	1.0	1.0	-	4.5	-	-	-	-	-	-	-	-
Silver	20	20	-	-	20	20	-	-	-	-	-	-	-	-	-	-
Thallium	1.0	1.0	-	-	1.4	1.4	-	1.0	-	-	-	-	-	-	-	-
Tin	5.0	5.0	-	-	5.0	5.0	-	-	-	-	-	-	-	-	-	-
Uranium	33	33	-	-	500	500	-	33	-	-	-	-	-	-	-	-
Vanadium	130	130	-	-	130	130	260	-	-	-	-	-	-	-	-	-
Zinc	250	250	-	-	250	250	280	980	-	-	-	-	-	-	-	-
Hydrocarbons																
Benzene	0.046	0.078	0.046	0.078	60	31	-	44	18	7.9	0.17	15	0.33	-	-	-
Toluene	0.52	0.12	0.52	0.95	110	75	-	2,500	980	63,000	0.12	NGR	1,000	-	-	-
Ethylbenzene	0.073	0.14	0.073	0.14	120	55	-	1,600	640	NGR	540	NGR	17,000	-	-	-
Xylenes	0.99	1.9	0.99	1.9	65	95	-	6,600	2,600	NGR	41	NGR	16,000	-	-	-
Styrene	0.68	0.8	110	210	-	-	-	-	-	0.68	0.8	-	-	-	-	-
F1	210	210	1,100	2,200	210	210	-	27,000	11,000	30,000	1,300	30,000	30,000	800	700	-
F2	150	150	1,500	2,900	150	150	-	25,000	9,800	30,000	520	30,000	30,000	1,000	1,000	-
F3	1,300	300	-	-	1,300	300	-	30,000	16,000	-	-	-	-	3,500	2,500	-
F4	5,600	2,800	-	-	5,600	2,800	-	21,000	8,400	-	-	-	-	10,000	10,000	-
Acenaphthene	0.33	0.38	NGR	NGR	-	-	-	22	22	0.33	0.38	NGR	NGR	-	-	-
Anthracene	1.3	0.0056	NGR	NGR	2.5	2.5	-	62	62	1.3	0.0056	NGR	NGR	-	-	-
Fluoranthene	15	0.055	NGR	NGR	50	50	-	15	15	NGR	0.055	NGR	NGR	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type															
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Fluorene	0.40	0.34	NGR	NGR	-	-	-	15	15	0.40	0.34	NGR	NGR	-	-
Naphthalene	0.014	0.017	28	53	-	-	-	8.8	8.8	0.014	0.017	NGR	NGR	-	-
Phenanthrene	0.11	0.061	-	-	-	-	-	43	43	0.11	0.061	NGR	NGR	-	-
Pyrene	7.7	0.15	NGR	NGR	-	-	-	7.7	7.7	NGR	0.15	NGR	NGR	-	-
Carcinogenic PAHs	IACR<1.0 ^c	IACR<1.0 ^c	IACR<1.0 ^c	IACR<1.0 ^c	-	-	-	-	-	-	-	-	-	-	-
Benz[a]anthracene ^d	6.2	6.2	6.4	12	-	-	-	6.2	6.2	NGR	NGR	NGR	NGR	-	-
Benzo[b+j]fluoranthene ^d	6.2	6.2	3.0	5.8	-	-	-	6.2	6.2	-	-	NGR	NGR	-	-
Benzo[k]fluoranthene ^d	6.2	6.2	0.64	1.2	-	-	-	6.2	6.2	-	-	NGR	NGR	-	-
Benzo[g,h,i]perylene	-	-	130	250	-	-	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene ^d	0.60	0.60	7.0	14	20	20	-	0.60	0.60	NGR	NGR	NGR	NGR	-	-
Chrysene ^d	6.2	6.2	40	78	-	-	-	6.2	6.2	-	-	NGR	NGR	-	-
Dibenz[a,h]anthracene	-	-	4.4	8.5	-	-	-	-	-	-	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene	-	-	51	98	-	-	-	-	-	-	-	-	-	-	-
Chlorinated Aliphatics															
Vinyl chloride	0.014	0.020	0.014	0.020	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	0.15	0.24	0.15	0.24	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene (Trichloroethylene, TCE)	0.054	0.081	0.054	0.093	3.0	3.0	-	-	-	0.72	0.081	-	-	-	-
Tetrachloroethene (Tetrachloroethylene, Perchloroethylene, PCE)	0.26	0.46	0.26	0.46	-	-	-	-	-	0.69	0.77	-	-	-	-
1,2-Dichloroethane	0.025	0.041	0.025	0.041	-	-	-	-	-	0.12	0.12	-	-	-	-
Dichloromethane (Methylene chloride)	0.10	0.095	0.21	0.32	-	-	-	-	-	0.10	0.095	-	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Trichloromethane (Chloroform) ¹	0.16	0.030	0.53	0.88	-	-	-	-	-	0.16	0.030	-	-	-	-
Tetrachloromethane (Carbon tetrachloride)	0.037	0.062	0.037	0.062	-	-	-	-	-	0.059	0.062	-	-	-	-
Dibromochloromethane	0.91	1.5	0.91	1.5	-	-	-	-	-	-	-	-	-	-	-
Chlorinated Aromatics															
Chlorobenzene ^e	0.61	1.1	0.61	1.1	-	-	-	-	-	BDL	BDL	-	-	-	-
1,2-Dichlorobenzene ^e	0.097	0.18	0.097	0.18	-	-	-	-	-	BDL	BDL	-	-	-	-
1,4-Dichlorobenzene	0.051	0.098	0.051	0.098	-	-	-	-	-	0.32	0.38	-	-	-	-
1,2,3-Trichlorobenzene	0.26	0.31	1.9	3.6	-	-	-	-	-	0.26	0.31	-	-	-	-
1,2,4-Trichlorobenzene	0.78	0.93	2.0	3.9	-	-	-	-	-	0.78	0.93	-	-	-	-
1,3,5-Trichlorobenzene	1.9	3.6	1.9	3.6	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	0.042	0.050	3.1	5.9	-	-	-	-	-	0.042	0.050	-	-	-	-
1,2,3,5-Tetrachlorobenzene	0.37	0.70	0.37	0.70	-	-	-	-	-	-	-	-	-	-	-
1,2,4,5-Tetrachlorobenzene	0.19	0.37	0.19	0.37	-	-	-	-	-	-	-	-	-	-	-
Pentachlorobenzene	24	5.2	24	47	-	-	-	-	-	NGR	5.2	-	-	-	-
Hexachlorobenzene	1.8	3.6	1.8	3.6	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	0.0029	0.0034	0.018	0.034	-	-	-	-	-	0.0029	0.0034	-	-	-	-
2,4,6-Trichlorophenol	0.19	0.37	0.19	0.37	-	-	-	-	-	0.42	0.50	-	-	-	-
2,3,4,6-Tetrachlorophenol	0.039	0.047	0.16	0.31	-	-	-	-	-	0.039	0.047	-	-	-	-
Pentachlorophenol	0.025	0.029	6.0	12	11	11	-	-	-	0.025	0.029	-	-	-	-
Dioxins & Furans ^{f,g}	0.00025	0.00025	-	-	-	-	-	-	0.00025	0.00025	-	-	-	-	-
PCBs	1.3	1.3	-	-	33	33	-	-	1.3	1.3	-	-	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Pesticides															
Aldicarb ^e	0.041	0.065	0.041	0.065	-	-	-	-	-	BDL	BDL	-	-	-	-
Aldrin	0.24	0.46	0.24	0.46	-	-	-	-	-	-	-	-	-	-	-
Atrazine and metabolites	0.0088	0.010	0.10	0.19	-	-	-	-	-	0.0088	0.010	-	-	-	-
Azniphos-methyl (Guthion)	0.41	0.75	0.41	0.75	-	-	-	-	-	-	-	-	-	-	-
Bromacil ^l	0.0090	0.0090	7.0	10	0.20	0.12	-	-	-	0.0090	0.0090	-	-	-	-
Bromoxynil	0.044	0.052	0.18	0.35	-	-	-	-	-	0.044	0.052	-	-	-	-
Carbaryl ^e	1.9	3.6	1.9	3.6	-	-	-	-	-	BDL	BDL	-	-	-	-
Carbofuran ^e	0.68	1.2	0.68	1.2	-	-	-	-	-	BDL	BDL	-	-	-	-
Chlorothalonil	0.0085	0.010	27	53	-	-	-	-	-	0.0085	0.010	-	-	-	-
Chlorpyrifos ^e	49	95	49	95	-	-	-	-	-	BDL	BDL	-	-	-	-
2,4-D ^e	0.43	0.67	0.43	0.67	-	-	-	-	-	BDL	BDL	-	-	-	-
DDT	0.70	0.70	89	170	12	12	547	0.70	0.70	-	-	-	-	-	-
Diazinon ^e	2.2	4.2	2.2	4.2	-	-	-	-	-	BDL	BDL	-	-	-	-
Dicamba ^e	0.50	0.79	0.50	0.79	-	-	-	-	-	BDL	BDL	-	-	-	-
Diclofop-methyl	NGR	2.4	NGR	NGR	-	-	-	-	-	NGR	2.4	-	-	-	-
Dieldrin	0.025	0.048	0.025	0.048	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	0.0058	0.0055	0.077	0.12	-	-	-	-	-	0.0058	0.0055	-	-	-	-
Dinoseb ^e	2.8	5.5	2.8	5.5	-	-	-	-	-	BDL	BDL	-	-	-	-
Diquat	11	21	11	21	-	-	-	-	-	-	-	-	-	-	-
Diuron	1.9	3.5	1.9	3.5	-	-	-	-	-	-	-	-	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Endosulfan	0.80	0.0016	99	190	-	-	-	-	-	0.80	0.0016	-	-	-	-
Endrin	2.4	4.7	2.4	4.7	-	-	-	-	-	-	-	-	-	-	-
Glyphosate	0.054	0.049	0.95	1.4	-	-	-	-	-	0.054	0.049	-	-	-	-
Heptachlor epoxide	0.039	0.076	0.039	0.076	-	-	-	-	-	-	-	-	-	-	-
Lindane °	0.31	0.60	0.31	0.60	-	-	-	-	-	BDL	BDL	-	-	-	-
Linuron	0.051	0.059	0.56	1.1	-	-	-	-	-	0.051	0.059	-	-	-	-
Malathion °	0.82	1.3	0.82	1.3	-	-	-	-	-	BDL	BDL	-	-	-	-
MCPA °	0.42	0.66	0.42	0.66	-	-	-	-	-	BDL	BDL	-	-	-	-
Methoxychlor	NGR	0.32	NGR	NGR	-	-	-	-	-	NGR	0.32	-	-	-	-
Metolachlor	0.048	0.055	1.3	2.4	-	-	-	-	-	0.048	0.055	-	-	-	-
Metribuzin	0.024	0.028	7.8	15	-	-	-	-	-	0.024	0.028	-	-	-	-
Paraquat (as dichloride)	1.1	2.2	1.1	2.2	-	-	-	-	-	-	-	-	-	-	-
Phorate	0.075	0.14	0.075	0.14	-	-	-	-	-	-	-	-	-	-	-
Picloram	0.024	0.022	0.64	0.94	-	-	-	-	-	0.024	0.022	-	-	-	-
Simazine	0.033	0.038	0.14	0.25	-	-	-	-	-	0.033	0.038	-	-	-	-
Tebuthiuron °j	0.046	0.046	2.5	3.7	0.046	0.046	-	-	-	BDL	BDL	-	-	-	-
Terbufos	0.080	0.15	0.080	0.15	-	-	-	-	-	-	-	-	-	-	-
Toxaphene	3.3	6.3	3.3	6.3	-	-	-	-	-	-	-	-	-	-	-
Triallate	0.0077	0.0092	16	31	-	-	-	-	-	0.0077	0.0092	-	-	-	-
Trifluralin	0.22	0.045	NGR	NGR	-	-	-	-	-	0.22	0.045	-	-	-	-

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human		Ecological								Other		
			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit	
Pathway	Fine	Coarse	Fine	Coarse	Fine	Coarse				Fine	Coarse	Fine	Coarse	Fine	Coarse
Soil Type															
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Other Organics															
Aniline ^e	0.36	0.60	0.36	0.60	-	-	-	-	-	BDL	BDL	-	-	-	-
Di- <i>n</i> -butyl phthalate	0.54	0.65	70	130	-	-	-	-	-	0.54	0.65	-	-	-	-
Dichlorobenzidine	0.60	1.2	0.60	1.2	-	-	-	-	-	-	-	-	-	-	-
Diethanolamine ^h	2.0	3.5	2.0	3.5	1,000	1,000	-	-	-	500,000	45	-	-	-	-
Diethylene glycol	10	15	10	15	1,000	1,000	-	-	-	2,000	65	-	-	-	-
Diisopropanolamine	14	17	130	250	360	360	-	-	-	14	17	-	-	-	-
Ethylene glycol	60	62	60	68	1,100	1,100	1,700	-	-	89	62	-	-	-	-
Hexachlorobutadiene	0.026	0.031	0.50	0.95	-	-	-	-	-	0.026	0.031	-	-	-	-
Methanol	37	11	37	42	1,200	1,200	-	-	-	300	11	-	-	750	750
Methylmethacrylate	36	49	36	49	-	-	-	-	-	-	-	-	-	-	-
Monoethanolamine ^h	20	10	20	40	1,500	1,500	-	-	-	300,000	10	-	-	-	-
MTBE	0.044	0.062	0.044	0.062	-	-	-	-	-	7.1	6.1	-	-	-	-
Nonylphenol + ethoxylates	5.7	5.7	-	-	5.7	5.7	-	-	-	NGR	2,000	-	-	-	-
Perfluorooctane sulfonate (PFOS)	0.010	0.010	0.070	0.14	10	10	-	0.010	0.010	0.19	0.23	1.5	1.8	-	-
Phenol	0.0028	0.0024	1.6	2.3	20	20	-	-	-	0.0028	0.0024	-	-	-	-
Sulfolane	0.18	0.21	0.18	0.21	210	210	-	-	-	24	18	-	-	-	-
Triethylene glycol	100	150	100	150	5,000	5,000	-	-	-	10,000	200	-	-	-	-

Notes:

a. For more information see *Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils* (AENV, 2011)

TABLE A-1. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

- b. True total barium as measured by fusion-XRF or fusion-ICP. For more information see Soil Remediation Guidelines for Barite: Environmental Health and Human Health (AENV, 2009)
- c. The Index of Additive Cancer Risk (IACR) is calculated by dividing the soil concentration of each carcinogenic PAH by its Protection of Domestic Use Aquifer guideline value to calculate a hazard index for each PAH and subsequently summing the hazard indexes for the entire PAH mixture, as follows:

Fine Soil:

$$IACR = \frac{[Benz(a)anthracene]}{6,4} + \frac{[Benzo(b + j)fluoranthene]}{3,0} + \frac{[Benzo(k)fluoranthene]}{0,64} + \frac{[Benzo(g, h, i)perylene]}{130} + \frac{[Benzo(a)pyrene]}{7,0} + \frac{[Chrysene]}{40} + \frac{[Dibenz(a, h)anthracene]}{4,4} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{51}$$

Coarse Soil:

$$IACR = \frac{[Benz(a)anthracene]}{12} + \frac{[Benzo(b + j)fluoranthene]}{5,8} + \frac{[Benzo(k)fluoranthene]}{1,2} + \frac{[Benzo(g, h, i)perylene]}{250} + \frac{[Benzo(a)pyrene]}{14} + \frac{[Chrysene]}{78} + \frac{[Dibenz(a, h)anthracene]}{8,5} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{98}$$

- d. Overall guideline value for ecological receptors only.
- e. Guideline for protection of aquatic life is below detection limit, groundwater monitoring is required.
- f. Expressed as toxic equivalents (TEQs) based on 2,3,7,8-PCDD (See CCME, 1999 and updates)
- g. Guideline values adopted directly from CCME (1999 and updates) without change.
- h. Analytical methodology specified in the *Soil and Groundwater Remediation Guidelines for Monoethanolamine and Diethanolamine* (AENV, 2010), or equivalent, must be used. See AENV (2010) for further details.
- i. Eco-contact guidelines from Stantec (2012)
- j. Eco-contact guidelines from Stantec (2008)
- k. Boron must be measured in a saturated paste extract prepared in accordance with Method 15.2.1 (Carter and Gregorich, 2008)
- l. Guideline for protection of aquatic life (fine soil) is based on a groundwater guideline of 0.10 g/L. See Appendix B for more information.

BDL - Below detection limit

NGR - no guideline required, calculated value >1,000,000 mg/kg; or for PAH groundwater protection, calculated value results in groundwater concentration greater than solubility

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit						
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
General and Inorganic Parameters																								
pH (in 0.01M CaCl ₂)	6.0-8.5	6.0-8.5	-	-	-	-	-	-	-	6.0-8.5	6.0-8.5	-	-	-	-	-	-	-	-	-	-	-	-	
Cyanide (free)	0.90	0.90	29	-	-	-	-	-	-	0.90	0.90	-	11	-	-	-	-	-	-	-	-	-	-	
Fluoride	200	200	-	-	-	-	-	-	-	200	200	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphur (elemental) ^a	500	500	-	-	-	-	-	-	-	500	500	-	-	-	-	-	-	-	-	-	-	-	-	
Metals																								
Antimony	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic (inorganic)	17	17	27	-	-	-	-	-	-	17	17	-	380	-	-	-	-	-	-	-	-	-	-	
Barium (non-barite)	750	750	6,800	-	-	-	-	-	-	750	750	-	-	-	-	-	-	-	-	-	-	-	-	
Barite-barium ^b	10,000	10,000	10,000	-	-	-	-	-	-	200,000	200,000	-	30,000	10,000	-	-	-	-	-	-	-	-	-	
Beryllium	5.0	5.0	-	-	-	-	-	-	-	5.0	5.0	-	-	-	-	-	-	-	-	-	-	-	-	
Boron (mg/L in saturated paste extract) ^m	3.3	3.3	7,500	-	-	-	-	65	120	3.3	3.3	-	-	-	5.0	5.0	17	17	17	17	3.4	3.4	-	-
Cadmium	1.4	1.4	1.4	-	-	-	-	-	-	10	10	54	3.8	-	-	-	-	-	-	-	-	-	-	
Chromium (hexavalent)	0.40	0.40	-	-	-	-	-	-	-	0.40	0.40	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (total)	64	64	220	-	-	-	-	-	-	64	64	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-	-	-	-	-	-	-	-	
Copper	63	63	1,100	-	-	-	-	-	-	63	63	350	300	-	-	-	-	-	-	-	-	-	-	
Lead	70	70	140	-	-	-	-	-	-	300	300	720	70	-	-	-	-	-	-	-	-	-	-	
Mercury (inorganic)	6.6	6.6	6.6	-	-	-	-	-	-	12	12	20	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum	4.0	4.0	-	-	-	-	-	-	-	4.0	4.0	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	45	45	200	-	-	-	-	-	-	45	45	170	530	-	-	-	-	-	-	-	-	-	-	

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other				
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit							
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse		
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
Selenium	1.0	1.0	80	-	-	-	-	-	-	1.0	1.0	-	4.5	-	-	-	-	-	-	-	-	-	-		
Silver	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-	-	-	-	-	-	-	-		
Thallium	1.0	1.0	1.0	-	-	-	-	-	-	1.4	1.4	-	1.0	-	-	-	-	-	-	-	-	-	-		
Tin	5.0	5.0	-	-	-	-	-	-	-	5.0	5.0	-	-	-	-	-	-	-	-	-	-	-	-		
Uranium	23	23	23	-	-	-	-	-	-	500	500	-	33	-	-	-	-	-	-	-	-	-	-		
Vanadium	130	130	-	-	-	-	-	-	-	130	130	260	-	-	-	-	-	-	-	-	-	-	-		
Zinc	250	250	10,000	-	-	-	-	-	-	250	250	280	980	-	-	-	-	-	-	-	-	-	-		
Hydrocarbons																									
Benzene	0.046	0.015	360	0.36	0.33	0.021	0.015	0.046	0.078	60	31	-	44	18	7.9	0.17	0.20	0.21	15	0.33	-	-	-	-	
Toluene	0.52	0.12	690	1,300	1,200	80	57	0.52	0.95	110	75	-	2,500	980	63,000	0.12	26	29	NGR	1,000	-	-	-		
Ethylbenzene	0.073	0.14	1,900	2,100	1,900	120	88	0.073	0.14	120	55	-	1,600	640	NGR	540	36	42	NGR	17,000	-	-	-		
Xylenes	0.99	1.9	510	150	140	9.0	6.6	0.99	1.9	65	95	-	6,600	2,600	NGR	41	160	180	NGR	16,000	-	-	-		
Styrene	0.68	0.80	12,000	2,300	2,100	130	94	110	210	-	-	-	-	-	0.68	0.80	-	-	-	-	-	-	-		
F1	210	24	14,000	710	610	30	24	1,100	2,200	210	210	-	27,000	11,000	30,000	1,300	6,600	7,400	30,000	30,000	-	-	800	700	
F2	150	130	6,800	3,600	3,100	160	130	1,500	2,900	150	150	-	25,000	9,800	30,000	520	16,000	19,000	30,000	30,000	-	-	1,000	1,000	
F3	1,300	300	15,000	-	-	-	-	-	-	1,300	300	-	30,000	16,000	-	-	-	-	-	-	-	-	3,500	2,500	
F4	5,600	2,800	21,000	-	-	-	-	-	-	5,600	2,800	-	21,000	8,400	-	-	-	-	-	-	-	-	10,000	10,000	
Acenaphthene	0.33	0.38	5,500	120,000	99,000	4,800	3,900	NGR	NGR	-	-	-	22	22	0.33	0.38	NGR	NGR	NGR	NGR	-	-	-	-	
Anthracene	1.3	0.0056	27,000	NGR	NGR	780,000	670,000	NGR	NGR	2.5	2.5	-	62	62	1.3	0.0056	NGR	NGR	NGR	NGR	-	-	-	-	
Fluoranthene	15.4	0.055	3,700	NGR	NGR	550,000	480,000	NGR	NGR	50	50	-	15	15	NGR	0.055	NGR	NGR	NGR	NGR	-	-	-	-	
Fluorene	0.40	0.34	2,800	270,000	220,000	10,000	8,600	NGR	NGR	-	-	-	15	15	0.40	0.34	NGR	NGR	NGR	NGR	-	-	-	-	
Naphthalene	0.014	0.017	2,000	260	220	13	9.6	28	53	-	-	-	8.8	8.8	0.014	0.017	NGR	NGR	NGR	NGR	-	-	-	-	

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological								Other						
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit							
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse		
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		
Phenanthrene	0.11	0.061	-	-	-	-	-	-	-	-	-	-	43	43	0.11	0.061	NGR	NGR	NGR	NGR	-	-	-	-	
Pyrene	7.7	0.15	2,200	NGR	NGR	810,000	730,000	NGR	NGR	-	-	-	7.7	7.7	NGR	0.15	NGR	NGR	NGR	NGR	-	-	-	-	
Carcinogenic PAHs (as B(a)P TPE) ^c	IACR<1.0 ^e and TPE ≤ 5.6	IACR<1.0 ^e and TPE ≤ 5.6	5.6 ^d	NGR	NGR	NGR	NGR	IACR<1.0 ^e	IACR<1.0 ^e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Benz[a]anthracene ^f	6.2	6.2	-	-	-	-	-	6.4	12	-	-	-	6.2	6.2	NGR	NGR	NGR	NGR	NGR	NGR	-	-	-	-	
Benzo[b+j]fluoranthene ^f	6.2	6.2	-	-	-	-	-	3.0	5.8	-	-	-	6.2	6.2	-	-	NGR	NGR	NGR	NGR	-	-	-	-	
Benzo[k]fluoranthene ^f	6.2	6.2	-	-	-	-	-	0.64	1.2	-	-	-	6.2	6.2	-	-	NGR	NGR	NGR	NGR	-	-	-	-	
Benzo[g,h,i]perylene	-	-	-	-	-	-	-	130	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Benzo[a]pyrene ^f	0.60	0.60	-	-	-	-	-	7.0	14	20	20	-	0.60	0.60	NGR	NGR	NGR	NGR	NGR	NGR	-	-	-	-	
Chrysene ^f	6.2	6.2	-	-	-	-	-	40	78	-	-	-	6.2	6.2	-	-	NGR	NGR	NGR	NGR	-	-	-	-	
Dibenz[a,h]anthracene	-	-	-	-	-	-	-	4.4	8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Indeno[1,2,3-c,d]pyrene	-	-	-	-	-	-	-	51	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chlorinated Aliphatics																									
Vinyl chloride	0.0083	0.00034	63	0.0090	0.0083	0.00049	0.00034	0.014	0.020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	0.15	0.021	120	0.50	0.46	0.030	0.021	0.15	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene (Trichloroethylene, TCE)	0.0043	0.00019	37	0.0048	0.0043	0.00026	0.00019	0.054	0.093	3.0	3.0	-	-	-	0.72	0.081	0.13	0.14	-	-	-	-	-	-	-
Tetrachloroethene (Tetrachloroethylene, Perchloroethylene, PCE)	0.26	0.018	190	0.46	0.41	0.025	0.018	0.26	0.46	-	-	-	-	-	0.69	0.77	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	0.0062	0.0027	9,100	0.060	0.055	0.0038	0.0027	0.025	0.041	-	-	-	-	-	0.12	0.12	0.0062	0.0062	-	-	-	-	-	-	-

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit						
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
Dichloromethane (Methylene chloride)	0.052	0.048	340	4.8	4.4	0.28	0.19	0.21	0.32	-	-	-	-	0.10	0.095	0.052	0.048	-	-	-	-	-	-	
Trichloromethane (Chloroform) ⁿ	0.16	0.030	76	3.2	3.0	0.21	0.15	0.53	0.88	-	-	-	-	0.16	0.030	0.16	0.17	-	-	-	-	-	-	
Tetrachloromethane (Carbon tetrachloride)	0.022	0.0015	29	0.038	0.035	0.0021	0.0015	0.037	0.062	-	-	-	-	0.059	0.062	0.022	0.023	-	-	-	-	-	-	
Dibromochloromethane	0.12	0.12	800	11	7.8	0.28	0.27	0.91	1.5	-	-	-	-	-	-	0.12	0.12	-	-	-	-	-	-	
Chlorinated Aromatics																								
Chlorobenzene ^g	0.39	0.018	17,000	0.44	0.39	0.024	0.018	0.61	1.1	-	-	-	-	BDL	BDL	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene ^g	0.097	0.18	17,000	260	230	14	10	0.097	0.18	-	-	-	-	BDL	BDL	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	0.051	0.098	4,400	10	9.1	0.56	0.42	0.051	0.098	-	-	-	-	0.32	0.38	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	0.26	0.26	51	8.8	6.8	0.30	0.26	1.9	3.6	-	-	-	-	0.26	0.31	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	0.78	0.23	40	7.6	6.0	0.26	0.23	2.0	3.9	-	-	-	-	0.78	0.93	-	-	-	-	-	-	-	-	-
1,3,5-Trichlorobenzene	1.9	0.13	47	4.1	3.2	0.14	0.13	1.9	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	0.042	0.050	75	27	20	0.88	0.84	3.1	5.9	-	-	-	-	0.042	0.050	-	-	-	-	-	-	-	-	-
1,2,3,5-Tetrachlorobenzene	0.37	0.10	16	3.3	2.5	0.10	0.10	0.37	0.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4,5-Tetrachlorobenzene	0.19	0.052	4.6	1.7	1.3	0.054	0.052	0.19	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorobenzene	22	5.2	22	160	140	7.9	6.1	24	47	-	-	-	-	NGR	5.2	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	0.80	0.20	3.3	5.4	4.7	0.26	0.20	1.8	3.6	-	-	-	-	-	-	0.80	0.97	-	-	-	-	-	-	-
2,4-Dichlorophenol	0.0029	0.0034	4,000	170,000	140,000	6,300	5,400	0.018	0.034	-	-	-	-	0.0029	0.0034	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	0.19	0.37	260	11,000	8,200	360	320	0.19	0.37	-	-	-	-	0.42	0.50	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	0.039	0.047	400	15,000	11,000	480	460	0.16	0.31	-	-	-	-	0.039	0.047	-	-	-	-	-	-	-	-	-
Pentachlorophenol	0.025	0.029	130	NGR	NGR	110,000	83,000	6.0	12	11	11	-	-	0.025	0.029	-	-	-	-	-	-	-	-	-
Dioxins & Furans ^{h,i}	0.0000040	0.0000040	0.0000040	-	-	-	-	-	-	-	-	-	-	0.00025	0.00025	-	-	-	-	-	-	-	-	-

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit						
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	
PCBs	0.085	0.085	0.085	-	-	-	-	-	-	33	33	-	1.3	1.3	-	-	-	-	-	-	-	-	-	
Pesticides																								
Aldicarb ⁹	0.012	0.012	22	-	-	-	-	0.041	0.065	-	-	-	-	-	BDL	BDL	0.012	0.012	-	-	0.079	0.078	-	-
Aldrin	0.24	0.31	0.31	44	30	1.4	1.5	0.24	0.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atrazine and metabolites	0.0088	0.010	11	-	-	-	-	0.10	0.19	-	-	-	-	-	0.0088	0.010	0.025	0.028	-	-	0.049	0.057	-	-
Azinphos-methyl (Guthion)	0.41	0.75	55	-	-	-	-	0.41	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromacil ^{9,k}	0.0090	0.0090	2,000	-	-	-	-	7.0	10	0.20	0.12	-	-	-	0.0090	0.0090	2.0	2.0	-	-	BDL	BDL	-	-
Bromoxynil ⁹	0.044	0.052	11	-	-	-	-	0.18	0.35	-	-	-	-	-	0.044	0.052	0.097	0.11	-	-	BDL	BDL	-	-
Carbaryl ⁹	1.9	3.6	220	-	-	-	-	1.9	3.6	-	-	-	-	-	BDL	BDL	5.7	6.5	-	-	-	-	-	-
Carbofuran ⁹	0.082	0.089	220	-	-	-	-	0.68	1.2	-	-	-	-	-	BDL	BDL	0.082	0.089	-	-	-	-	-	-
Chlorothalonil	0.0085	0.010	330	-	-	-	-	27	53	-	-	-	-	-	0.0085	0.010	7.9	9.5	-	-	0.43	0.52	-	-
Chlorpyrifos ⁹	3.2	3.8	220	-	-	-	-	49	95	-	-	-	-	-	BDL	BDL	3.2	3.8	-	-	-	-	-	-
2,4-D ⁹	0.10	0.10	400	-	-	-	-	0.43	0.67	-	-	-	-	-	BDL	BDL	0.10	0.10	-	-	-	-	-	-
DDT	0.70	0.70	11	87,000	59,000	2,700	3,000	89	170	12	12	547	0.70	0.70	-	-	1500	1800	-	-	-	-	-	-
Diazinon ⁹	2.2	4.2	44	-	-	-	-	2.2	4.2	-	-	-	-	-	BDL	BDL	-	-	-	-	-	-	-	-
Dicamba ⁹	0.12	0.12	280	-	-	-	-	0.50	0.79	-	-	-	-	-	BDL	BDL	0.12	0.12	-	-	BDL	BDL	-	-
Diclofop-methyl	0.079	0.095	40	-	-	-	-	NGR	NGR	-	-	-	-	-	NGR	2.4	3.0	3.6	-	-	0.079	0.095	-	-
Dieldrin	0.025	0.048	0.33	21	14	0.67	0.74	0.025	0.048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	0.0028	0.0027	80	-	-	-	-	0.077	0.12	-	-	-	-	-	0.0058	0.0055	0.0028	0.0027	-	-	-	-	-	-
Dinoseb ⁹	1.4	1.7	22	-	-	-	-	2.8	5.5	-	-	-	-	-	BDL	BDL	10	12	-	-	1.4	1.7	-	-
Diquat	11	21	180	-	-	-	-	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diuron	1.9	3.5	350	-	-	-	-	1.9	3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other					
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit								
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse			
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)			
Endosulfan	0.80	0.0016	240	-	-	-	-	99	190	-	-	-	-	0.80	0.0016	-	-	-	-	-	-	-	-			
Endrin	2.4	4.7	6.7	-	-	-	-	2.4	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-				
Glyphosate	0.054	0.049	670	-	-	-	-	0.95	1.4	-	-	-	-	0.054	0.049	0.23	0.21	-	-	-	-	-				
Heptachlor epoxide	0.039	0.010	0.29	0.31	0.21	0.010	0.012	0.039	0.076	-	-	-	-	-	-	-	-	-	-	-	-	-				
Lindane ^g	0.11	0.13	6.7	-	-	-	-	0.31	0.6	-	-	-	-	BDL	BDL	0.11	0.13	-	-	-	-	-				
Linuron ^g	0.051	0.059	44	-	-	-	-	0.56	1.1	-	-	-	-	0.051	0.059	-	-	-	-	-	BDL	BDL				
Malathion ^g	0.82	1.3	440	-	-	-	-	0.82	1.3	-	-	-	-	BDL	BDL	-	-	-	-	-	-	-				
MCPA ^g	0.026	0.025	460	-	-	-	-	0.42	0.66	-	-	-	-	BDL	BDL	0.026	0.025	-	-	-	BDL	BDL				
Methoxychlor	110	0.32	110	-	-	-	-	NGR	NGR	-	-	-	-	NGR	0.32	-	-	-	-	-	-	-				
Metolachlor	0.048	0.055	110	-	-	-	-	1.3	2.4	-	-	-	-	0.048	0.055	0.30	0.35	-	-	0.17	0.20	-				
Metribuzin	0.012	0.014	180	-	-	-	-	7.8	15	-	-	-	-	0.024	0.028	1.9	2.2	-	-	0.012	0.014	-				
Paraquat (as dichloride)	1.1	2.2	22	-	-	-	-	1.1	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-				
Phorate	0.075	0.14	4.4	-	-	-	-	0.075	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-				
Picloram	0.024	0.022	440	-	-	-	-	0.64	0.94	-	-	-	-	0.024	0.022	0.15	0.14	-	-	-	-	-				
Simazine ^g	0.033	0.038	29	-	-	-	-	0.14	0.25	-	-	-	-	0.033	0.038	0.033	0.038	-	-	BDL	BDL	-				
Tebuthiuron ^{g,j}	0.046	0.046	1600	-	-	-	-	2.5	3.7	0.046	0.046	-	-	BDL	BDL	0.12	0.11	-	-	BDL	BDL	-				
Terbufos	0.080	0.15	1.1	-	-	-	-	0.080	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-				
Toxaphene	3.3	4.8	4.8	4,600	3,100	150	170	3.3	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-				
Triallate	0.0077	0.0092	520	-	-	-	-	16	31	-	-	-	-	0.0077	0.0092	7.4	8.8	-	-	-	-	-				
Trifluralin	0.22	0.045	190	-	-	-	-	NGR	NGR	-	-	-	-	0.22	0.045	8.4	10	-	-	-	-	-				
Other Organics																										
Aniline ^g	0.36	0.60	280	23	20	1.1	0.82	0.36	0.60	-	-	-	-	BDL	BDL	-	-	-	-	-	-	-	-			

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other		
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life	Protection of Livestock Water	Protection of Wildlife Water	Protection of Irrigation Water	Management Limit					
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Di- <i>n</i> -butyl phthalate	0.54	0.65	1,300	220,000	180,000	9,200	7,400	70	130	-	-	-	-	0.54	0.65	-	-	-	-	-	-	-	-
Dichlorobenzidine	0.60	1.2	12	NGR	NGR	NGR	NGR	0.60	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethanolamine ^j	2.0	3.5	150	-	-	-	-	2.0	3.5	1,000	1,000	-	-	500,000	45	-	-	-	-	-	-	-	-
Diethylene glycol	10	15	15,000	-	-	-	-	10	15	1,000	1,000	-	-	2,000	65	-	-	-	-	-	-	-	-
Diisopropanolamine	14	17	26,000	-	-	-	-	130	250	360	360	-	-	14	17	-	-	-	-	29	34	-	-
Ethylene glycol	60	62	130,000	NGR	NGR	120,000	86,000	60	68	1,100	1,100	1,700	-	89	62	-	-	-	-	-	-	-	-
Hexachlorobutadiene	0.026	0.0067	390	0.18	0.16	0.0087	0.0067	0.5	0.95	-	-	-	-	0.026	0.031	-	-	-	-	-	-	-	-
Methanol	37	11	16,000	34,000	33,000	2,100	1,400	37	42	1,200	1,200	-	-	300	11	-	-	-	-	-	-	750	750
Methylmethacrylate	36	1.4	56,000	45	40	1.9	1.4	36	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monoethanolamine ^j	20	10	1,500	-	-	-	-	20	40	1,500	1,500	-	-	300,000	10	-	-	-	-	-	-	-	-
MTBE	0.044	0.046	400	1.2	1.1	0.065	0.046	0.044	0.062	-	-	-	-	7.1	6.1	-	-	-	-	-	-	-	-
Nonylphenol + ethoxylates	5.7	5.7	-	-	-	-	-	-	-	5.7	5.7	-	-	NGR	2,000	-	-	-	-	-	-	-	-
Perfluorooctane sulfonate (PFOS)	0.010	0.010	2.1	-	-	-	-	0.070	0.14	10	10	-	0.010	0.010	0.19	0.23	1.7	2.0	1.5	1.8	-	-	-
Phenol	0.0014	0.0012	2,400	14,000	13,000	660	480	1.6	2.3	20	20	-	-	0.0028	0.0024	0.0014	0.0012	-	-	-	-	-	-
Sulfolane	0.18	0.21	350	-	-	-	-	0.18	0.21	210	210	-	-	24	18	-	-	-	-	-	0.39	0.28	-
Triethylene glycol	100	150	150,000	-	-	-	-	100	150	5,000	5,000	-	-	10,000	200	-	-	-	-	-	-	-	-

Notes:

- a. For more information see Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils (AENV, 2011)
- b. True total barium as measured by fusion-XRF or fusion-ICP. For more information see Soil Remediation Guidelines for Barite: Environmental Health and Human Health (AENV, 2009)
- c. Human health direct soil contact guidelines for carcinogenic PAHs are based on B[a]P Total Potency Equivalents (TPE). TPEs are calculated by multiplying the soil concentration of individual carcinogenic PAHs by a standardized Benzo[a]pyrene Potency Equivalence Factor (PEF) to produce a Benzo[a]pyrene relative potency concentration, and by subsequently summing the relative potency concentrations for the entire PAH mixture. B[a]P PEFs are order of magnitude estimates of carcinogenic potential and are based on the World Health Organization (WHO/IPCS, 1998) scheme, as follows:

TABLE A-2. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see sections on Land Use and Land Use and Sensitivity Factors). Tier 1 soil guidelines are found in Table 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Carcinogenic PAH	PEF
Benz[a]anthracene	0.1
Benzo(b+j)fluoranthene	0.1
Benzo[k]fluoranthene	0.1
Benzo[ghi]perylene	0.01
Benzo[a]pyrene	1
Chrysene	0.01
Dibenz[a,h]anthracene	1
Indeno[1,2,3-c,d]pyrene	0.1

d. The B[a]P Total Potency Equivalents (TPEs) calculated for specific soil samples using Potency Equivalency Factors (PEFs) should be multiplied by an Uncertainty Factor of 3 when evaluating PAH mixtures associated with creosote or coal tar-type environmental releases, prior to evaluating against the human health direct contact soil remediation guideline.

e. The Index of Additive Cancer Risk (IACR) is calculated by dividing the soil concentration of each carcinogenic PAH by its Protection of Domestic Use Aquifer guideline value to calculate a hazard index for each PAH and subsequently summing the hazard indexes for the entire PAH mixture, as follows:

Fine Soil:

$$IACR = \frac{[Benz(a)anthracene]}{6.4} + \frac{[Benzo(b + j)fluoranthene]}{3.0} + \frac{[Benzo(k)fluoranthene]}{0.64} + \frac{[Benzo(g, h, i)perylene]}{130} + \frac{[Benzo(a)pyrene]}{7.0} + \frac{[Chrysene]}{40} + \frac{[Dibenz(a, h)anthracene]}{4.4} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{51}$$

Coarse Soil:

$$IACR = \frac{[Benz(a)anthracene]}{12} + \frac{[Benzo(b + j)fluoranthene]}{5.8} + \frac{[Benzo(k)fluoranthene]}{1.2} + \frac{[Benzo(g, h, i)perylene]}{250} + \frac{[Benzo(a)pyrene]}{14} + \frac{[Chrysene]}{78} + \frac{[Dibenz(a, h)anthracene]}{8.5} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{98}$$

- f. Overall guideline value for ecological receptors only.
- g. Guideline for protection of aquatic life or irrigation water is below detection limit, groundwater monitoring is required.
- h. Expressed as toxic equivalents (TEQs) based on 2,3,7,8-PCDD (See CCME, 1999 and updates)
- i. Guideline values adopted directly from CCME (1999 and updates) without change.
- j. Analytical methodology specified in the Soil and Groundwater Remediation Guidelines for Monoethanolamine and Diethanolamine (AENV, 2010), or equivalent, must be used. See AENV (2010) for further details.
- k. Eco-contact guidelines from Stantec (2012)
- l. Eco-contact guidelines from Stantec (2008)
- m. Boron must be measured in a saturated paste extract prepared in accordance with Method 15.2.1 (Carter and Gregorich, 2008)
- n. Guideline for protection of aquatic life (fine soil) is based on a groundwater guideline of 0.10 g/L. See Appendix B for more information

BDL - Below detection limit

NGR - no guideline required, calculated value >1,000,000 mg/kg; or for PAH groundwater protection, calculated value results in groundwater concentration greater than solubility.

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit		
Pathway	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Soil Type	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
General and Inorganic Parameters																
pH (in 0.01M CaCl ₂)	6.0-8.5	6.0-8.5	-	-	-	-	-	-	-	6.0-8.5	6.0-8.5	-	-	-	-	-
Cyanide (free)	0.90	0.90	29	-	-	-	-	-	-	0.90	0.90	-	-	-	-	-
Fluoride	200	200	-	-	-	-	-	-	-	200	200	-	-	-	-	-
Sulphur (elemental) ^a	500	500	-	-	-	-	-	-	-	500	500	-	-	-	-	-
Metals																
Antimony	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-
Arsenic (inorganic)	17	17	27	-	-	-	-	-	-	17	17	-	-	-	-	-
Barium (non-barite)	500	500	6,800	-	-	-	-	-	-	500	500	-	-	-	-	-
Barite-barium ^b	10,000	10,000	10,000	-	-	-	-	-	-	200,000	200,000	-	-	-	-	-
Beryllium	5.0	5.0	-	-	-	-	-	-	-	5.0	5.0	-	-	-	-	-
Boron (mg/L in saturated paste extract) ^m	3.3	3.3	7,500	-	-	-	-	65	120	3.3	3.3	-	5.0	5.0	-	-
Cadmium	10	10	14	-	-	-	-	-	-	10	10	54	-	-	-	-
Chromium (hexavalent)	0.40	0.40	-	-	-	-	-	-	-	0.40	0.40	-	-	-	-	-
Chromium (total)	64	64	220	-	-	-	-	-	-	64	64	-	-	-	-	-
Cobalt	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-
Copper	63	63	1,100	-	-	-	-	-	-	63	63	350	-	-	-	-
Lead	140	140	140	-	-	-	-	-	-	300	300	720	-	-	-	-
Mercury (inorganic)	6.6	6.6	6.6	-	-	-	-	-	-	12	12	20	-	-	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit		
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Molybdenum	4.0	4.0	-	-	-	-	-	-	-	4.0	4.0	-	-	-	-	-
Nickel	45	45	200	-	-	-	-	-	-	45	45	170	-	-	-	-
Selenium	1.0	1.0	80	-	-	-	-	-	-	1.0	1.0	-	-	-	-	-
Silver	20	20	-	-	-	-	-	-	-	20	20	-	-	-	-	-
Thallium	1.0	1.0	1.0	-	-	-	-	-	-	1.4	1.4	-	-	-	-	-
Tin	5.0	5.0	-	-	-	-	-	-	-	5.0	5.0	-	-	-	-	-
Uranium	23	23	23	-	-	-	-	-	-	500	500	-	-	-	-	-
Vanadium	130	130	-	-	-	-	-	-	-	130	130	260	-	-	-	-
Zinc	250	250	10,000	-	-	-	-	-	-	250	250	280	-	-	-	-
Hydrocarbons																
Benzene	0.046	0.015	360	0.36	0.33	0.021	0.015	0.046	0.078	60	31	-	7.9	0.17	-	-
Toluene	0.52	0.12	690	1,300	1,200	80	57	0.52	0.95	110	75	-	63,000	0.12	-	-
Ethylbenzene	0.073	0.14	1,900	2,100	1,900	120	88	0.073	0.14	120	55	-	NGR	540	-	-
Xylenes	0.99	1.9	510	150	140	9.0	6.6	0.99	1.9	65	95	-	NGR	41	-	-
Styrene	0.68	0.80	12,000	2,300	2,100	130	94	110	210	-	-	-	0.68	0.80	-	-
F1	210	24	14,000	710	610	30	24	1,100	2,200	210	210	-	30,000	1,300	800	700
F2	150	130	6,800	3,600	3,100	160	130	1,500	2,900	150	150	-	30,000	520	1,000	1,000
F3	1,300	300	15,000	-	-	-	-	-	-	1,300	300	-	-	-	3,500	2,500
F4	5,600	2,800	21,000	-	-	-	-	-	-	5,600	2,800	-	-	-	10,000	10,000
Acenaphthene	0.33	0.38	5,500	120,000	99,000	4,800	3,900	NGR	NGR	-	-	-	0.33	0.38	-	-
Anthracene	1.3	0.0056	27,000	NGR	NGR	780,000	670,000	NGR	NGR	2.5	2.5	-	1.3	0.0056	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit		
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Fluoranthene	50	0.055	3,700	NGR	NGR	550,000	480,000	NGR	NGR	50	50	-	NGR	0.055	-	-
Fluorene	0.40	0.34	2,800	270,000	220,000	10,000	8,600	NGR	NGR	-	-	-	0.40	0.34	-	-
Naphthalene	0.014	0.017	2,000	260	220	13	9.6	28	53	-	-	-	0.014	0.017	-	-
Phenanthrene	0.11	0.061	-	-	-	-	-	-	-	-	-	-	0.11	0.061	-	-
Pyrene	2,100	0.15	2,200	NGR	NGR	810,000	730,000	NGR	NGR	-	-	-	NGR	0.15	-	-
Carcinogenic PAHs (as B(a)P TPE) ^c	IACR<1.0 ^e and TPE ≤ 5.6	IACR<1.0 ^e and TPE ≤ 5.6	5.6 ^d	NGR	NGR	NGR	NGR	IACR<1.0 ^e	IACR<1.0 ^e	-	-	-	-	-	-	-
Benz[a]anthracene	-	-	-	-	-	-	-	6.4	12	-	-	-	NGR	NGR	-	-
Benzo[b+j]fluoranthene	-	-	-	-	-	-	-	3.0	5.8	-	-	-	-	-	-	-
Benzo[k]fluoranthene	-	-	-	-	-	-	-	0.64	1.2	-	-	-	-	-	-	-
Benzo[g,h,i]perylene	-	-	-	-	-	-	-	130	250	-	-	-	-	-	-	-
Benzo[a]pyrene ^f	20	20	-	-	-	-	-	7.0	14	20	20	-	NGR	NGR	-	-
Chrysene	-	-	-	-	-	-	-	40	78	-	-	-	-	-	-	-
Dibenz[a,h]anthracene	-	-	-	-	-	-	-	4.4	8.5	-	-	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene	-	-	-	-	-	-	-	51	98	-	-	-	-	-	-	-
Chlorinated Aliphatics																
Vinyl chloride	0.0083	0.00034	63	0.0090	0.0083	0.00049	0.00034	0.014	0.020	-	-	-	-	-	-	-
1,1-Dichloroethene	0.15	0.021	120	0.50	0.46	0.030	0.021	0.15	0.24	-	-	-	-	-	-	-
Trichloroethene (Trichloroethylene, TCE)	0.0043	0.00019	37	0.0048	0.0043	0.00026	0.00019	0.054	0.093	3.0	3.0	-	0.72	0.081	-	-
Tetrachloroethene (Tetrachloroethylene, Perchloroethylene, PCE)	0.26	0.018	190	0.46	0.41	0.025	0.018	0.26	0.46	-	-	-	0.69	0.77	-	-
1,2-Dichloroethane	0.025	0.0027	9,100	0.060	0.055	0.0038	0.0027	0.025	0.041	-	-	-	0.12	0.12	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human					Ecological				Other				
			Direct Soil Contact		Vapour Inhalation			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit	
Pathway	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichloromethane (Methylene chloride)	0.10	0.095	340	4.8	4.4	0.28	0.19	0.21	0.32	-	-	-	0.10	0.095	-	-
Trichloromethane (Chloroform) ⁿ	0.16	0.030	76	3.2	3.0	0.21	0.15	0.53	0.88	-	-	-	0.16	0.030	-	-
Tetrachloromethane (Carbon tetrachloride)	0.035	0.0015	29	0.038	0.035	0.0021	0.0015	0.037	0.062	-	-	-	0.059	0.062	-	-
Dibromochloromethane	0.91	0.27	800	11	7.8	0.28	0.27	0.91	1.5	-	-	-	-	-	-	-
Chlorinated Aromatics																
Chlorobenzene ^g	0.39	0.018	17,000	0.44	0.39	0.024	0.018	0.61	1.1	-	-	-	BDL	BDL	-	-
1,2-Dichlorobenzene ^g	0.097	0.18	17,000	260	230	14	10	0.097	0.18	-	-	-	BDL	BDL	-	-
1,4-Dichlorobenzene	0.051	0.098	4,400	10	9.1	0.56	0.42	0.051	0.098	-	-	-	0.32	0.38	-	-
1,2,3-Trichlorobenzene	0.26	0.26	51	8.8	6.8	0.30	0.26	1.9	3.6	-	-	-	0.26	0.31	-	-
1,2,4-Trichlorobenzene	0.78	0.23	40	7.6	6.0	0.26	0.23	2.0	3.9	-	-	-	0.78	0.93	-	-
1,3,5-Trichlorobenzene	1.9	0.13	47	4.1	3.2	0.14	0.13	1.9	3.6	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	0.042	0.050	75	27	20	0.88	0.84	3.1	5.9	-	-	-	0.042	0.050	-	-
1,2,3,5-Tetrachlorobenzene	0.37	0.10	16	3.3	2.5	0.10	0.10	0.37	0.70	-	-	-	-	-	-	-
1,2,4,5-Tetrachlorobenzene	0.19	0.052	4.6	1.7	1.3	0.054	0.052	0.19	0.37	-	-	-	-	-	-	-
Pentachlorobenzene	22	5.2	22	160	140	7.9	6.1	24	47	-	-	-	NGR	5.2	-	-
Hexachlorobenzene	1.8	0.20	3.3	5.4	4.7	0.26	0.20	1.8	3.6	-	-	-	-	-	-	-
2,4-Dichlorophenol	0.0029	0.0034	4,000	170,000	140,000	6,300	5,400	0.018	0.034	-	-	-	0.0029	0.0034	-	-
2,4,6-Trichlorophenol	0.19	0.37	260	11,000	8,200	360	320	0.19	0.37	-	-	-	0.42	0.50	-	-
2,3,4,6-Tetrachlorophenol	0.039	0.047	400	15,000	11,000	480	460	0.16	0.31	-	-	-	0.039	0.047	-	-
Pentachlorophenol	0.025	0.029	130	NGR	NGR	110,000	83,000	6.0	12	11	11	-	0.025	0.029	-	-
Dioxins & Furans ^{h,i}	0.0000040	0.0000040	0.0000040	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human					Ecological					Other				
			Direct Soil Contact		Vapour Inhalation			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit		
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
PCBs	0.085	0.085	0.085	-	-	-	-	-	-	33	33	-	-	-	-	-	-
Pesticides																	
Aldicarb ^g	0.041	0.065	22	-	-	-	-	0.041	0.065	-	-	-	-	BDL	BDL	-	-
Aldrin	0.24	0.31	0.31	44	30	1.4	1.5	0.24	0.46	-	-	-	-	-	-	-	-
Atrazine and metabolites	0.0088	0.010	11	-	-	-	-	0.10	0.19	-	-	-	-	0.0088	0.010	-	-
Azniphos-methyl (Guthion)	0.41	0.75	55	-	-	-	-	0.41	0.75	-	-	-	-	-	-	-	-
Bromacil ^k	0.0090	0.0090	2,000	-	-	-	-	7.0	10	0.20	0.12	-	-	0.0090	0.0090	-	-
Bromoxynil	0.044	0.052	11	-	-	-	-	0.18	0.35	-	-	-	-	0.044	0.052	-	-
Carbaryl ^g	1.9	3.6	220	-	-	-	-	1.9	3.6	-	-	-	-	BDL	BDL	-	-
Carbofuran ^g	0.68	1.2	220	-	-	-	-	0.68	1.2	-	-	-	-	BDL	BDL	-	-
Chlorothalonil	0.0085	0.010	330	-	-	-	-	27	53	-	-	-	-	0.0085	0.010	-	-
Chlorpyrifos ^g	49	95	220	-	-	-	-	49	95	-	-	-	-	BDL	BDL	-	-
2,4-D ^g	0.43	0.67	400	-	-	-	-	0.43	0.67	-	-	-	-	BDL	BDL	-	-
DDT	11	11	11	87,000	59,000	2,700	3,000	89	170	12	12	547	-	-	-	-	-
Diazinon ^g	2.2	4.2	44	-	-	-	-	2.2	4.2	-	-	-	-	BDL	BDL	-	-
Dicamba ^g	0.50	0.79	280	-	-	-	-	0.50	0.79	-	-	-	-	BDL	BDL	-	-
Diclofop-methyl	40	2.4	40	-	-	-	-	NGR	NGR	-	-	-	-	NGR	2.4	-	-
Dieldrin	0.025	0.048	0.33	21	14	0.67	0.74	0.025	0.048	-	-	-	-	-	-	-	-
Dimethoate	0.0058	0.0055	80	-	-	-	-	0.077	0.12	-	-	-	-	0.0058	0.0055	-	-
Dinoseb ^g	2.8	5.5	22	-	-	-	-	2.8	5.5	-	-	-	-	BDL	BDL	-	-
Diquat	11	21	180	-	-	-	-	11	21	-	-	-	-	-	-	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human					Ecological				Other				
			Direct Soil Contact		Vapour Inhalation			Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit	
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Diuron	1.9	3.5	350	-	-	-	-	1.9	3.5	-	-	-	-	-	-	-
Endosulfan	0.80	0.0016	240	-	-	-	-	99	190	-	-	-	0.80	0.0016	-	-
Endrin	2.4	4.7	6.7	-	-	-	-	2.4	4.7	-	-	-	-	-	-	-
Glyphosate	0.054	0.049	670	-	-	-	-	0.95	1.4	-	-	-	0.054	0.049	-	-
Heptachlor epoxide	0.039	0.010	0.29	0.31	0.21	0.010	0.012	0.039	0.076	-	-	-	-	-	-	-
Lindane ^g	0.31	0.60	6.7	-	-	-	-	0.31	0.60	-	-	-	BDL	BDL	-	-
Linuron	0.051	0.059	44	-	-	-	-	0.56	1.1	-	-	-	0.051	0.059	-	-
Malathion ^g	0.82	1.3	440	-	-	-	-	0.82	1.3	-	-	-	BDL	BDL	-	-
MCPA ^g	0.42	0.66	460	-	-	-	-	0.42	0.66	-	-	-	BDL	BDL	-	-
Methoxychlor	110	0.32	110	-	-	-	-	NGR	NGR	-	-	-	NGR	0.32	-	-
Metolachlor	0.048	0.055	110	-	-	-	-	1.3	2.4	-	-	-	0.048	0.055	-	-
Metribuzin	0.024	0.028	180	-	-	-	-	7.8	15	-	-	-	0.024	0.028	-	-
Paraquat (as dichloride)	1.1	2.2	22	-	-	-	-	1.1	2.2	-	-	-	-	-	-	-
Phorate	0.075	0.14	4.4	-	-	-	-	0.075	0.14	-	-	-	-	-	-	-
Picloram	0.024	0.022	440	-	-	-	-	0.64	0.94	-	-	-	0.024	0.022	-	-
Simazine	0.033	0.038	29	-	-	-	-	0.14	0.25	-	-	-	0.033	0.038	-	-
Tebuthiuron ^{g,l}	0.046	0.046	1,600	-	-	-	-	2.5	3.7	0.046	0.046	-	BDL	BDL	-	-
Terbufos	0.080	0.15	1.1	-	-	-	-	0.080	0.15	-	-	-	-	-	-	-
Toxaphene	3.3	4.8	4.8	4,600	3,100	150	170	3.3	6.3	-	-	-	-	-	-	-
Triallate	0.0077	0.0092	520	-	-	-	-	16	31	-	-	-	0.0077	0.0092	-	-
Trifluralin	0.22	0.045	190	-	-	-	-	NGR	NGR	-	-	-	0.22	0.045	-	-

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other				
			Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Management Limit			
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Other Organics																	
Aniline ^a	0.36	0.60	280	23	20	1.1	0.82	0.36	0.60	-	-	-	-	BDL	BDL	-	-
Di-n-butyl phthalate	0.54	0.65	1,300	220,000	180,000	9,200	7,400	70	130	-	-	-	-	0.54	0.65	-	-
Dichlorobenzidine	0.60	1.2	12	NGR	NGR	NGR	NGR	0.6	1.2	-	-	-	-	-	-	-	-
Diethanolamine ⁱ	2.0	3.5	150	-	-	-	-	2.0	3.5	1,000	1,000	-	-	500,000	45	-	-
Diethylene glycol	10	15	15,000	-	-	-	-	10	15	1,000	1,000	-	-	2,000	65	-	-
Diisopropanolamine	14	17	26,000	-	-	-	-	130	250	360	360	-	-	14	17	-	-
Ethylene glycol	60	62	130,000	NGR	NGR	120,000	86,000	60	68	1,100	1,100	1,700	-	89	62	-	-
Hexachlorobutadiene	0.026	0.0067	390	0.18	0.16	0.0087	0.0067	0.5	0.95	-	-	-	-	0.026	0.031	-	-
Methanol	37	11	16,000	34,000	33,000	2,100	1,400	37	42	1,200	1,200	-	-	300	11	750	750
Methylmethacrylate	36	1.4	56,000	45	40	1.9	1.4	36	49	-	-	-	-	-	-	-	-
Monoethanolamine ⁱ	20	10	1,500	-	-	-	-	20	40	1,500	1,500	-	-	300,000	10	-	-
MTBE	0.044	0.046	400	1.2	1.1	0.065	0.046	0.044	0.062	-	-	-	-	7.1	6.1	-	-
Nonylphenol + ethoxylates	5.7	5.7	-	-	-	-	-	-	-	5.7	5.7	-	-	NGR	2,000	-	-
Perfluorooctane sulfonate (PFOS)	0.070	0.14	2.1	-	-	-	-	0.070	0.14	10	10	-	-	0.19	0.23	-	-
Phenol	0.0028	0.0024	2,400	14,000	13,000	660	480	1.6	2.3	20	20	-	-	0.0028	0.0024	-	-
Sulfolane	0.18	0.21	350	-	-	-	-	0.18	0.21	210	210	-	-	24	18	-	-
Triethylene glycol	100	150	150,000	-	-	-	-	100	150	5,000	5,000	-	-	10,000	200	-	-

Notes:

- a. For more information see Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils (AENV, 2011)
- b. True total barium as measured by fusion-XRF or fusion-ICP. For more information see Soil Remediation Guidelines for Barite: Environmental Health and Human Health (AENV, 2009)

TABLE A-3. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

- c. Human health direct soil contact guidelines for carcinogenic PAHs are based on B[a]P Total Potency Equivalents (TPE). TPEs are calculated by multiplying the soil concentration of individual carcinogenic PAHs by a standardized Benzo[a]pyrene Potency Equivalence Factor (PEF) to produce a Benzo[a]pyrene relative potency concentration, and by subsequently summing the relative potency concentrations for the entire PAH mixture. B[a]P PEFs are order of magnitude estimates of carcinogenic potential and are based on the World Health Organization (WHO/IPCS, 1998) scheme, as follows:

Carcinogenic PAH Compound	PEF
Benz[a]anthracene	0.1
Benzo(b+j)fluoranthene	0.1
Benzo[k]fluoranthene	0.1
Benzo[ghi]perylene	0.01
Benzo[a]pyrene	1
Chrysene	0.01
Dibenz[a,h]anthracene	1
Indeno[1,2,3-c,d]pyrene	0.1

- d. The B[a]P Total Potency Equivalents (TPEs) calculated for specific soil samples using Potency Equivalency Factors (PEFs) should be multiplied by an Uncertainty Factor of 3 when evaluating PAH mixtures associated with creosote or coal tar-type environmental releases, prior to evaluating against the human health direct contact soil remediation guideline.
- e. The Index of Additive Cancer Risk (IACR) is calculated by dividing the soil concentration of each carcinogenic PAH by its Protection of Domestic Use Aquifer guideline value to calculate a hazard index for each PAH and subsequently summing the hazard indexes for the entire PAH mixture. For example, the IACR for coarse textured soil would be calculated as follows:

Fine Soil:

$$IACR = \frac{[Benz(a)anthracene]}{6.4} + \frac{[Benzo(b+j)fluoranthene]}{3.0} + \frac{[Benzo(k)fluoranthene]}{0.64} + \frac{[Benzo(g,h,i)perylene]}{130} + \frac{[Benzo(a)pyrene]}{7.0} + \frac{[Chrysene]}{40} + \frac{[Dibenz(a,h)anthracene]}{4.4} + \frac{[Indeno(1,2,3-c,d)pyrene]}{51}$$

Coarse Soil:

$$IACR = \frac{[Benz(a)anthracene]}{12} + \frac{[Benzo(b+j)fluoranthene]}{5.8} + \frac{[Benzo(k)fluoranthene]}{1.2} + \frac{[Benzo(g,h,i)perylene]}{250} + \frac{[Benzo(a)pyrene]}{14} + \frac{[Chrysene]}{78} + \frac{[Dibenz(a,h)anthracene]}{8.5} + \frac{[Indeno(1,2,3-c,d)pyrene]}{98}$$

- f. Overall guideline value for ecological receptors only.
- g. Guideline for protection of aquatic life is below detection limit, groundwater monitoring is required.
- h. Expressed as toxic equivalents (TEQs) based on 2,3,7,8-PCDD (See CCME, 1999 and updates)
- i. Guideline values adopted directly from CCME (1999 and updates) without change.
- j. Analytical methodology specified in the Soil and Groundwater Remediation Guidelines for Monoethanolamine and Diethanolamine (AENV, 2010), or equivalent, must be used. See AENV (2010) for further details.
- k. Eco-contact guidelines from Stantec (2012)
- l. Eco-contact guidelines from Stantec (2008)
- m. Boron must be measured in a saturated paste extract prepared in accordance with Method 15.2.1 (Carter and Gregorich, 2008)
- n. Guideline for protection of aquatic life (fine soil) is based on a groundwater guideline of 0.10 g/L. See Appendix B for more information

BDL - Below detection limit

NGR - no guideline required, calculated value >1,000,000 mg/kg; or for PAH groundwater protection, calculated value results in groundwater concentration greater than solubility

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
General and Inorganic Parameters																
pH (in 0.01M CaCl ₂)	6.0-8.5	6.0-8.5	-	-	-	-	-	-	6.0-8.5	6.0-8.5	-	-	-	-	-	-
Cyanide (free)	8.0	8.0	110	-	-	-	-	-	8.0	8.0	-	-	-	-	-	-
Fluoride	2,000	2,000	-	-	-	-	-	-	2,000	2,000	-	-	-	-	-	-
Sulphur (elemental) ^a	500	500	-	-	-	-	-	-	500	500	-	-	-	-	-	-
Metals																
Antimony	40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-
Arsenic (inorganic)	26	26	35	-	-	-	-	-	26	26	-	-	-	-	-	-
Barium (non-barite)	2,000	2,000	10,000	-	-	-	-	96,000	2,000	2,000	-	-	-	-	-	-
Barite-barium ^b	15,000	15,000	15,000	-	-	-	-	140,000	200,000	200,000	-	-	-	140,000	-	-
Beryllium	8.0	8.0	-	-	-	-	-	-	8.0	8.0	-	-	-	-	-	-
Boron (mg/L in saturated paste extract) ^m	5.0	5.0	11,000	-	-	65	120	110,000	7.9	7.9	-	5.0	5.0	46	-	-
Cadmium	22	22	49	-	-	-	-	-	22	22	200	-	-	-	-	-
Chromium (hexavalent)	1.4	1.4	-	-	-	-	-	-	1.4	1.4	-	-	-	-	-	-
Chromium (total)	87	87	630	-	-	-	-	-	87	87	-	-	-	-	-	-
Cobalt	300	300	-	-	-	-	-	-	300	300	-	-	-	-	-	-
Copper	91	91	4,000	-	-	-	-	-	91	91	350	-	-	-	-	-
Lead	260	260	260	-	-	-	-	-	600	600	830	-	-	-	-	-
Mercury (inorganic)	24	24	24	-	-	-	-	-	50	50	52	-	-	-	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor		Overall Guideline		Human					Ecological					Other					
Pathway	Soil Type	Fine	Coarse	Direct Soil Contact		Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration		Direct Soil Contact		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit	
				-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse		
Building Type				-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)		(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Molybdenum		40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-	-	-
Nickel		89	89	310	-	-	-	-	2,500	89	89	240	-	-	290	-	-	-	-
Selenium		2.9	2.9	130	-	-	-	-	1,100	2.9	2.9	-	-	-	5.0	-	-	-	-
Silver		40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-	-	-
Thallium		1.0	1.0	1.0	-	-	-	-	-	3.6	3.6	-	-	-	-	-	-	-	-
Tin		300	300	-	-	-	-	-	-	300	300	-	-	-	-	-	-	-	-
Uranium		33	33	33	-	-	-	-	-	2000	2000	-	-	-	-	-	-	-	-
Vanadium		130	130	-	-	-	-	-	-	130	130	260	-	-	-	-	-	-	-
Zinc		410	410	16,000	-	-	-	-	140,000	450	450	410	-	-	2,900	-	-	-	-
Hydrocarbons																			
Benzene		0.046	0.078	550	2.2	0.19	0.046	0.078	5,100	310	180	-	7.9	0.17	440	-	-	-	-
Toluene		0.52	0.12	1,100	7,900	700	0.52	0.95	9,900	330	250	-	63,000	0.12	1,100	-	-	-	-
Ethylbenzene		0.073	0.14	2,900	13,000	1,100	0.073	0.14	27,000	430	300	-	NGR	540	790	-	-	-	-
Xylenes		0.99	1.9	780	950	80	0.99	1.9	7,300	230	350	-	NGR	41	930	-	-	-	-
Styrene		0.68	0.80	18,000	14,000	1,100	110	210	170,000	-	-	-	0.68	0.80	-	-	-	-	-
F1		320	270	22,000	4,500	270	1,100	2,200	30,000	320	320	-	30,000	1,300	3,000	800	700	-	-
F2		260	260	10,000	23,000	1,500	1,500	2,900	30,000	260	260	-	30,000	520	2,100	1,000	1,000	-	-
F3		2,500	1,700	23,000	-	-	-	-	30,000	2,500	1,700	-	-	-	4,300	5,000	3,500	-	-
F4		6,600	3,300	30,000	-	-	-	-	30,000	6,600	3,300	-	-	-	30,000	10,000	10,000	-	-
Acenaphthene		0.33	0.38	8,300	770,000	43,000	NGR	NGR	79,000	-	-	-	0.33	0.38	-	-	-	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Anthracene	1.3	0.0056	41,000	NGR	NGR	NGR	NGR	390,000	32	32	-	1.3	0.0056	36	-	-
Fluoranthene	180	0.055	5,600	NGR	NGR	NGR	NGR	53,000	180	180	-	NGR	0.055	720	-	-
Fluorene	0.40	0.34	4,300	NGR	91,000	NGR	NGR	40,000	-	-	-	0.40	0.34	-	-	-
Naphthalene	0.014	0.017	3,000	1,600	110	28	53	29,000	-	-	-	0.014	0.017	-	-	-
Phenanthrene	0.11	0.061	-	-	-	-	-	-	-	-	-	0.11	0.061	-	-	-
Pyrene	3,200	0.15	3,300	NGR	NGR	NGR	NGR	31,000	-	-	-	NGR	0.15	-	-	-
Carcinogenic PAHs (as B(a)P TPE) ^c	IACR<1.0 ^e and TPE ≤ 8.5	IACR<1.0 ^e and TPE ≤ 8.5	8.5 ^d	NGR	NGR	IACR<1.0 ^e	IACR<1.0 ^e	80	-	-	-	-	-	-	-	-
Benz[a]anthracene	-	-	-	-	-	6.4	12	-	-	-	-	NGR	NGR	-	-	-
Benzo[b+]fluoranthene	-	-	-	-	-	3.0	5.8	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	-	-	-	-	-	0.64	1.2	-	-	-	-	-	-	-	-	-
Benzo[g,h,i]perylene	-	-	-	-	-	130	250	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene ^f	72	72	-	-	-	7.0	14	-	72	72	-	NGR	NGR	290	-	-
Chrysene	-	-	-	-	-	40	78	-	-	-	-	-	-	-	-	-
Dibenz[a,h]anthracene	-	-	-	-	-	4.4	8.5	-	-	-	-	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene	-	-	-	-	-	51	98	-	-	-	-	-	-	-	-	-
Chlorinated Aliphatics																
Vinyl chloride	0.014	0.0043	95	0.055	0.0043	0.014	0.020	900	-	-	-	-	-	-	-	-
1,1-Dichloroethene	0.15	0.24	180	3.1	0.27	0.15	0.24	1,700	-	-	-	-	-	-	-	-
Trichloroethene (Trichloroethylene, TCE)	0.030	0.0023	56	0.030	0.0023	0.054	0.093	530	50	50	-	0.72	0.081	43	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human					Ecological					Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life	Off-Site Migration	Management Limit			
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Tetrachloroethene (Tetrachloroethylene, Perchloroethylene, PCE)	0.26	0.22	290	2.9	0.22	0.26	0.46	2,700	-	-	-	0.69	0.77	-	-	-
1,2-Dichloroethane	0.025	0.033	14,000	0.37	0.033	0.025	0.041	130,000	-	-	-	0.12	0.12	-	-	-
Dichloromethane (Methylene chloride)	0.10	0.095	510	30	2.4	0.21	0.32	4,900	-	-	-	0.10	0.095	-	-	-
Trichloromethane (Chloroform) ¹	0.16	0.030	110	20	1.8	0.53	0.88	1,100	-	-	-	0.16	0.030	-	-	-
Tetrachloromethane (Carbon tetrachloride)	0.037	0.018	43	0.24	0.018	0.037	0.062	410	-	-	-	0.059	0.062	-	-	-
Dibromochloromethane	0.91	1.5	1,200	76	2.5	0.91	1.5	11,000	-	-	-	-	-	-	-	-
Chlorinated Aromatics																
Chlorobenzene ⁹	0.61	0.22	26,000	2.7	0.22	0.61	1.1	240,000	-	-	-	BDL	BDL	-	-	-
1,2-Dichlorobenzene ⁹	0.097	0.18	26,000	1,700	130	0.097	0.18	240,000	-	-	-	BDL	BDL	-	-	-
1,4-Dichlorobenzene	0.051	0.098	6,600	65	5.0	0.051	0.098	63,000	-	-	-	0.32	0.38	-	-	-
1,2,3-Trichlorobenzene	0.26	0.31	77	58	2.7	1.9	3.6	730	-	-	-	0.26	0.31	-	-	-
1,2,4-Trichlorobenzene	0.78	0.93	61	51	2.4	2.0	3.9	570	-	-	-	0.78	0.93	-	-	-
1,3,5-Trichlorobenzene	1.9	1.3	72	27	1.3	1.9	3.6	670	-	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	0.042	0.050	110	190	7.9	3.1	5.9	1,100	-	-	-	0.042	0.050	-	-	-
1,2,3,5-Tetrachlorobenzene	0.37	0.70	25	23	1.0	0.37	0.70	230	-	-	-	-	-	-	-	-
1,2,4,5-Tetrachlorobenzene	0.19	0.37	7.0	12	0.49	0.19	0.37	66	-	-	-	-	-	-	-	-
Pentachlorobenzene	24	5.2	34	1000	70	24	47	320	-	-	-	NGR	5.2	-	-	-
Hexachlorobenzene	1.8	2.3	5.0	34	2.3	1.8	3.6	47	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	0.0029	0.0034	6,100	NGR	57,000	0.018	0.034	57,000	-	-	-	0.0029	0.0034	-	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human					Ecological					Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life	Off-Site Migration	Management Limit			
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
2,4,6-Trichlorophenol	0.19	0.37	400	71,000	3,300	0.19	0.37	3,700	-	-	-	0.42	0.50	-	-	-
2,3,4,6-Tetrachlorophenol	0.039	0.047	610	110,000	4,400	0.16	0.31	5,700	-	-	-	0.039	0.047	-	-	-
Pentachlorophenol	0.025	0.029	200	NGR	950,000	6.0	12	1,900	28	28	-	0.025	0.029	160	-	-
Dioxins & Furans ^{h,i}	0.0000040	0.0000040	0.0000040	-	-	-	-	0.0000040	-	-	-	-	-	-	-	-
PCBs	0.13	0.13	0.13	-	-	-	-	1.2	33	33	-	-	-	470	-	-
Pesticides																
Aldicarb ^g	0.041	0.065	34	-	-	0.041	0.065	320	-	-	-	BDL	BDL	-	-	-
Aldrin	0.24	0.46	0.47	330	13	0.24	0.46	4.4	-	-	-	-	-	-	-	-
Atrazine and metabolites	0.0088	0.010	17	-	-	0.10	0.19	160	-	-	-	0.0088	0.010	-	-	-
Azniphos-methyl (Guthion)	0.41	0.75	84	-	-	0.41	0.75	790	-	-	-	-	-	-	-	-
Bromacil ^k	0.0090	0.0090	3,500	-	-	7.0	10	30,000	0.49	0.20	-	0.0090	0.0090	1.7	-	-
Bromoxynil	0.044	0.052	17	-	-	0.18	0.35	160	-	-	-	0.044	0.052	-	-	-
Carbaryl ^g	1.9	3.6	340	-	-	1.9	3.6	3,200	-	-	-	BDL	BDL	-	-	-
Carbofuran ^g	0.68	1.2	340	-	-	0.68	1.2	3,200	-	-	-	BDL	BDL	-	-	-
Chlorothalonil	0.0085	0.010	500	-	-	27	53	4,800	-	-	-	0.0085	0.010	-	-	-
Chlorpyrifos ^g	49	95	340	-	-	49	95	3,200	-	-	-	BDL	BDL	-	-	-
2,4-D ^g	0.43	0.67	610	-	-	0.43	0.67	5,700	-	-	-	BDL	BDL	-	-	-
DDT	12	12	17	660,000	25,000	89	170	160	12	12	547	-	-	170	-	-
Diazinon ^g	2.2	4.2	67	-	-	2.2	4.2	630	-	-	-	BDL	BDL	-	-	-
Dicamba ^g	0.50	0.79	420	-	-	0.50	0.79	4,000	-	-	-	BDL	BDL	-	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Diclofop-methyl	61	2.4	61	-	-	NGR	NGR	570	-	-	-	NGR	2.4	-	-	-
Dieldrin	0.025	0.048	0.50	160	6.1	0.025	0.048	4.7	-	-	-	-	-	-	-	-
Dimethoate	0.0058	0.0055	120	-	-	0.077	0.12	1,100	-	-	-	0.0058	0.0055	-	-	-
Dinoseb ⁹	2.8	5.5	34	-	-	2.8	5.5	320	-	-	-	BDL	BDL	-	-	-
Diquat	11	21	270	-	-	11	21	2,500	-	-	-	-	-	-	-	-
Diuron	1.9	3.5	520	-	-	1.9	3.5	4,900	-	-	-	-	-	-	-	-
Endosulfan	0.80	0.0016	370	-	-	99	190	3,400	-	-	-	0.80	0.0016	-	-	-
Endrin	2.4	4.7	10	-	-	2.4	4.7	96	-	-	-	-	-	-	-	-
Glyphosate	0.054	0.049	1,000	-	-	0.95	1.4	9,500	-	-	-	0.054	0.049	-	-	-
Heptachlor epoxide	0.039	0.076	0.44	2.4	0.094	0.039	0.076	4.1	-	-	-	-	-	-	-	-
Lindane ⁹	0.31	0.60	10	-	-	0.31	0.60	95	-	-	-	BDL	BDL	-	-	-
Linuron	0.051	0.059	67	-	-	0.56	1.1	630	-	-	-	0.051	0.059	-	-	-
Malathion ⁹	0.82	1.3	670	-	-	0.82	1.3	6,300	-	-	-	BDL	BDL	-	-	-
MCPA ⁹	0.42	0.66	690	-	-	0.42	0.66	160	-	-	-	BDL	BDL	-	-	-
Methoxychlor	170	0.32	170	-	-	NGR	NGR	1,600	-	-	-	NGR	0.32	-	-	-
Metolachlor	0.048	0.055	170	-	-	1.3	2.4	1,600	-	-	-	0.048	0.055	-	-	-
Metribuzin	0.024	0.028	280	-	-	7.8	15	2,600	-	-	-	0.024	0.028	-	-	-
Paraquat (as dichloride)	1.1	2.2	34	-	-	1.1	2.2	320	-	-	-	-	-	-	-	-
Phorate	0.075	0.14	6.7	-	-	0.075	0.14	63	-	-	-	-	-	-	-	-
Picloram	0.024	0.022	670	-	-	0.64	0.94	6,300	-	-	-	0.024	0.022	-	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Simazine	0.033	0.038	44	-	-	0.14	0.25	410	-	-	-	0.033	0.038	-	-	-
Tebuthiuron ^{g,l}	0.60	0.60	2,400	-	-	2.5	3.7	22,000	0.60	0.60	-	BDL	BDL	0.66	-	-
Terbufos	0.080	0.15	1.7	-	-	0.080	0.15	16	-	-	-	-	-	-	-	-
Toxaphene	3.3	6.3	7.3	36,000	1,400	3.3	6.3	69	-	-	-	-	-	-	-	-
Triallate	0.0077	0.0092	790	-	-	16	31	7,400	-	-	-	0.0077	0.0092	-	-	-
Trifluralin	0.22	0.045	290	-	-	NGR	NGR	2,700	-	-	-	0.22	0.045	-	-	-
Other Organics																
Aniline ^g	0.36	0.60	430	140	9.8	0.36	0.60	4,000	-	-	-	BDL	BDL	-	-	-
Di-n-butyl phthalate	0.54	0.65	1,900	NGR	82,000	70	130	19,000	-	-	-	0.54	0.65	-	-	-
Dichlorobenzidine	0.60	1.2	18	NGR	NGR	0.60	1.2	170	-	-	-	-	-	-	-	-
Diethanolamine ^l	2.0	3.5	200	-	-	2.0	3.5	2,000	2,000	2,000	-	500,000	45	15,000	-	-
Diethylene glycol	10	15	20,000	-	-	10	15	200,000	1,500	1,500	-	2,000	65	15,000	-	-
Diisopropanolamine	14	17	39,000	-	-	130	250	370,000	750	750	-	14	17	5,100	-	-
Ethylene glycol	60	62	200,000	NGR	NGR	60	68	NGR	1,800	1,800	2,000	89	62	16,000	-	-
Hexachlorobutadiene	0.026	0.031	590	1.2	0.078	0.50	0.95	5,600	-	-	-	0.026	0.031	-	-	-
Methanol	37	11	24,000	210,000	18,000	37	42	-	1,600	1,600	-	300	11	-	750	750
Methylmethacrylate	36	17	85,000	280	17	36	49	800,000	-	-	-	-	-	-	-	-
Monoethanolamine ^l	20	10	2,000	-	-	20	40	20,000	1,500	1,500	-	300,000	10	20,000	-	-
MTBE	0.044	0.062	610	7.4	0.57	0.044	0.062	5,700	-	-	-	7.1	6.1	-	-	-
Nonylphenol + ethoxylates	14	14	-	-	-	-	-	-	14	14	-	NGR	2,000	82	-	-

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Perfluorooctane sulfonate (PFOS)	0.070	0.14	3.2	-	-	0.070	0.14	30	60	60	-	0.19	0.23	140	-	-
Phenol	0.0028	0.0024	3,700	90,000	5,800	1.6	2.3	34,000	130	130	-	0.0028	0.0024	290	-	-
Sulfolane	0.18	0.21	540	-	-	0.18	0.21	5,000	430	430	-	24	18	3,000	-	-
Triethylene glycol	100	150	200,000	-	-	100	150	NGR	7,000	7,000	-	10,000	200	70,000	-	-

Notes:

- For more information see Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils (AENV, 2011)
- True total barium as measured by fusion-XRF or fusion-ICP. For more information see Soil Remediation Guidelines for Barite: Environmental Health and Human Health (AENV, 2009)
- Human health direct soil contact guidelines for carcinogenic PAHs are based on B[a]P Total Potency Equivalents (TPE). TPEs are calculated by multiplying the soil concentration of individual carcinogenic PAHs by a the standardized Benzo[a]pyrene Potency Equivalence Factor (PEF) to produce a Benzo[a]pyrene relative potency concentration, and by subsequently summing the relative potency concentrations for entire PAH mixture. B[a]P PEFs are order of magnitude estimates of carcinogenic potential and are based on the World Health Organization (WHO/IPCS, 1998) scheme, as follows:

Carcinogenic PAH Compound	PEF
Benz[a]anthracene	0.1
Benzo(b+j)fluoranthene	0.1
Benzo[k]fluoranthene	0.1
Benzo[ghi]perylene	0.01
Benzo[a]pyrene	1
Chrysene	0.01
Dibenz[a,h]anthracene	1

TABLE A-4. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation, required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Indeno[1,2,3-c,d]pyrene	0.1
-------------------------	-----

- d. The B[a]P Total Potency Equivalents (TPEs) calculated for specific soil samples using Potency Equivalency Factors (PEFs) should be multiplied by an Uncertainty Factor of 3 when evaluating PAH mixtures associated with creosote or coal tar-type environmental releases, prior to evaluating against the human health direct contact soil remediation guideline.
- e. The Index of Additive Cancer Risk (IACR) is calculated by dividing the soil concentration of each carcinogenic PAH by its Protection of Domestic Use Aquifer guideline value to calculate a hazard a hazard index for each PAH and subsequently summing the hazard indexes for the entire PAH mixture, as follows:

Fine Soils:

$$IACR = \frac{[Benz(a)anthracene]}{6,4} + \frac{[Benzo(b + j)fluoranthene]}{3,0} + \frac{[Benzo(k)fluoranthene]}{0,64} + \frac{[Benzo(g, h, i)perylene]}{130} + \frac{[Benzo(a)pyrene]}{7,0} + \frac{[Chrysene]}{40} + \frac{[Dibenz(a, h)anthracene]}{4,4} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{51}$$

Coarse Soils:

$$IACR = \frac{[Benz(a)anthracene]}{12} + \frac{[Benzo(b + j)fluoranthene]}{5,8} + \frac{[Benzo(k)fluoranthene]}{1,2} + \frac{[Benzo(g, h, i)perylene]}{250} + \frac{[Benzo(a)pyrene]}{14} + \frac{[Chrysene]}{78} + \frac{[Dibenz(a, h)anthracene]}{8,5} + \frac{[Indeno(1,2,3 - c, d)pyrene]}{98}$$

- f. Overall guideline value for ecological receptors only.
- g. Guideline for protection of aquatic life is below detection limit, groundwater monitoring is required.
- h. Expressed as toxic equivalents (TEQs) based on 2,3,7,8-PCDD (See CCME, 1999 and updates)
- i. Guideline values adopted directly from CCME (1999 and updates) without change.
- j. Analytical methodology specified in the Soil and Groundwater Remediation Guidelines for Monoethanolamine and Diethanolamine (AENV, 2010), or equivalent, must be used. See AENV (2010) for further details.
- k. Eco-contact guidelines from Stantec (2012).
- l. Eco-contact guidelines from Stantec (2008.)
- m. Boron must be measured in a saturated paste extract prepared in accordance with Method 15.2.1 (Carter and Gregorich, 2008).
- n. Guideline for protection of aquatic life (fine soil) is based on a groundwater guideline of 0.10 g/L. See Appendix B for more information

BDL - Below detection limit

NGR - no guideline required, calculated value >1,000,000 mg/kg; or for PAH groundwater protection, calculated value results in groundwater concentration greater than solubility

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
General and Inorganic Parameters																
pH (in 0.01M CaCl ₂)	6.0-8.5	6.0-8.5	-	-	-	-	-	-	6.0-8.5	6.0-8.5	-	-	-	-	-	-
Cyanide (free)	8.0	8.0	420	-	-	-	-	-	8.0	8.0	-	-	-	-	-	-
Fluoride	2,000	2,000	-	-	-	-	-	-	2,000	2,000	-	-	-	-	-	-
Sulphur (elemental) ^a	500	500	-	-	-	-	-	-	500	500	-	-	-	-	-	-
Metals																
Antimony	40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-
Arsenic (inorganic)	26	26	35	-	-	-	-	-	26	26	-	-	-	-	-	-
Barium (non-barite)	2,000	2,000	130,000	-	-	-	-	96,000	2,000	2,000	-	-	-	-	-	-
Barite-barium ^b	140,000	140,000	140,000	-	-	-	-	140,000	200,000	200,000	-	-	-	140,000	-	-
Beryllium	8.0	8.0	-	-	-	-	-	-	8.0	8.0	-	-	-	-	-	-
Boron (mg/L in saturated paste extract) ^m	5.0	5.0	230,000	-	-	65	120	110,000	7.9	7.9	-	5.0	5.0	46	-	-
Cadmium	22	22	2,100	-	-	-	-	-	22	22	200	-	-	-	-	-
Chromium (hexavalent)	1.4	1.4	-	-	-	-	-	-	1.4	1.4	-	-	-	-	-	-
Chromium (total)	87	87	2,300	-	-	-	-	-	87	87	-	-	-	-	-	-
Cobalt	300	300	-	-	-	-	-	-	300	300	-	-	-	-	-	-
Copper	91	91	16,000	-	-	-	-	-	91	91	350	-	-	-	-	-
Lead	600	600	8,200	-	-	-	-	-	600	600	830	-	-	-	-	-
Mercury (inorganic)	50	50	99	-	-	-	-	-	50	50	52	-	-	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Molybdenum	40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-
Nickel	89	89	5,100	-	-	-	-	2,500	89	89	240	-	-	290	-	-
Selenium	2.9	2.9	4,050	-	-	-	-	1,100	2.9	2.9	-	-	-	5.0	-	-
Silver	40	40	-	-	-	-	-	-	40	40	-	-	-	-	-	-
Thallium	1.0	1.0	1.0	-	-	-	-	-	3.6	3.6	-	-	-	-	-	-
Tin	300	300	-	-	-	-	-	-	300	300	-	-	-	-	-	-
Uranium	300	300	510	-	-	-	-	300	2,000	2,000	-	-	-	7,100	-	-
Vanadium	130	130	-	-	-	-	-	-	130	130	260	-	-	-	-	-
Zinc	410	410	270,000	-	-	-	-	140,000	450	450	410	-	-	2,900	-	-
Hydrocarbons																
Benzene	0.046	0.078	550	2.2	0.19	0.046	0.078	5,100	310	180	-	7.9	0.17	440	-	-
Toluene	0.52	0.12	16,000	7,900	700	0.52	0.95	9,900	330	250	-	63,000	0.12	1,100	-	-
Ethylbenzene	0.073	0.14	44,000	13,000	1,100	0.073	0.14	27,000	430	300	-	NGR	540	790	-	-
Xylenes	0.99	1.9	12,000	950	80	0.99	1.9	7,300	230	350	-	NGR	41	930	-	-
Styrene	0.68	0.80	270,000	14,000	1,100	110	210	170,000	-	-	-	0.68	0.80	-	-	-
F1	320	270	30,000	4,500	270	1,100	2,200	30,000	320	320	-	30,000	1,300	3,000	800	700
F2	260	260	30,000	23,000	1,500	1,500	2,900	30,000	260	260	-	30,000	520	2,100	1,000	1,000
F3	2,500	1,700	30,000	-	-	-	-	30,000	2,500	1,700	-	-	-	4,300	5,000	3,500
F4	6,600	3,300	30,000	-	-	-	-	30,000	6,600	3,300	-	-	-	30,000	10,000	10,000

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Acenaphthene	0.33	0.38	87,000	770,000	43,000	NGR	NGR	79,000	-	-	-	0.33	0.38	-	-	-
Anthracene	1.3	0.0056	430,000	NGR	NGR	NGR	NGR	390,000	32	32	-	1.3	0.0056	36	-	-
Fluoranthene	180	0.055	58,000	NGR	NGR	NGR	NGR	53,000	180	180	-	NGR	0.055	720	-	-
Fluorene	0.40	0.34	53,000	NGR	91,000	NGR	NGR	40,000	-	-	-	0.40	0.34	-	-	-
Naphthalene	0.014	0.017	45,000	1,600	110	28	53	29,000	-	-	-	0.014	0.017	-	-	-
Phenanthrene	0.11	0.061	-	-	-	-	-	-	-	-	-	0.11	0.061	-	-	-
Pyrene	30,000	0.15	40,000	NGR	NGR	NGR	NGR	31,000	-	-	-	NGR	0.15	-	-	-
Carcinogenic PAHs (as B(a)P TPE) ^c	IACR<1.0 ^e and TPE ≤ 23	IACR<1.0 ^e and TPE ≤ 23	23 ^d	NGR	NGR	IACR<1.0 ^e	IACR<1.0 ^e	80	-	-	-	-	-	-	-	-
Benz[a]anthracene	-	-	-	-	-	6.4	12	-	-	-	-	NGR	NGR	-	-	-
Benzo[b+j]fluoranthene	-	-	-	-	-	3.0	5.8	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	-	-	-	-	-	0.64	1.2	-	-	-	-	-	-	-	-	-
Benzo[g,h,i]perylene	-	-	-	-	-	130	250	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene ^f	72	72	-	-	-	7.0	14	-	72	72	-	NGR	NGR	290	-	-
Chrysene	-	-	-	-	-	40	78	-	-	-	-	-	-	-	-	-
Dibenz[a,h]anthracene	-	-	-	-	-	4.4	8.5	-	-	-	-	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene	-	-	-	-	-	51	98	-	-	-	-	-	-	-	-	-
Chlorinated Aliphatics																
Vinyl chloride	0.014	0.0043	95	0.055	0.0043	0.014	0.020	900	-	-	-	-	-	-	-	-
1,1-Dichloroethene	0.15	0.24	2,700	3.1	0.27	0.15	0.24	1,700	-	-	-	-	-	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological					Other		
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Trichloroethene (Trichloroethylene, TCE)	0.030	0.0023	960	0.030	0.0023	0.054	0.093	530	50	50	-	0.72	0.081	43	-	-
Tetrachloroethene (Tetrachloroethylene, Perchloroethylene, PCE)	0.26	0.22	4,300	2.9	0.22	0.26	0.46	2,700	-	-	-	0.69	0.77	-	-	-
1,2-Dichloroethane	0.025	0.033	14,000	0.37	0.033	0.025	0.041	130,000	-	-	-	0.12	0.12	-	-	-
Dichloromethane (Methylene chloride)	0.10	0.095	8,500	30	2.4	0.21	0.32	4,900	-	-	-	0.10	0.095	-	-	-
Trichloromethane (Chloroform) ¹	0.16	0.030	2,400	20	1.8	0.53	0.88	1,100	-	-	-	0.16	0.030	-	-	-
Tetrachloromethane (Carbon tetrachloride)	0.037	0.018	650	0.24	0.018	0.037	0.062	400	-	-	-	0.059	0.062	-	-	-
Dibromochloromethane	0.91	1.5	18,000	76	2.5	0.91	1.5	11,000	-	-	-	-	-	-	-	-
Chlorinated Aromatics																
Chlorobenzene ⁹	0.61	0.22	390,000	2.7	0.22	0.61	1.1	240,000	-	-	-	BDL	BDL	-	-	-
1,2-Dichlorobenzene ⁹	0.097	0.18	390,000	1700	130	0.097	0.18	240,000	-	-	-	BDL	BDL	-	-	-
1,4-Dichlorobenzene	0.051	0.098	100,000	65	5.0	0.051	0.098	63,000	-	-	-	0.32	0.38	-	-	-
1,2,3-Trichlorobenzene	0.26	0.31	1,200	58	2.7	1.9	3.6	730	-	-	-	0.26	0.31	-	-	-
1,2,4-Trichlorobenzene	0.78	0.93	1,100	51	2.4	2.0	3.9	570	-	-	-	0.78	0.93	-	-	-
1,3,5-Trichlorobenzene	1.9	1.3	1,100	27	1.3	1.9	3.6	670	-	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	0.042	0.05	540	190	7.9	3.1	5.9	1,100	-	-	-	0.042	0.05	-	-	-
1,2,3,5-Tetrachlorobenzene	0.37	0.70	380	23	0.96	0.37	0.70	230	-	-	-	-	-	-	-	-
1,2,4,5-Tetrachlorobenzene	0.19	0.37	34	12	0.49	0.19	0.37	66	-	-	-	-	-	-	-	-
Pentachlorobenzene	24	5.2	160	1000	70	24	47	320	-	-	-	NGR	5.2	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Hexachlorobenzene	1.8	2.3	5.0	34	2.3	1.8	3.6	47	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	0.0029	0.0034	92,000	NGR	57,000	0.018	0.034	57,000	-	-	-	0.0029	0.0034	-	-	-
2,4,6-Trichlorophenol	0.19	0.37	400	71,000	3,300	0.19	0.37	3,700	-	-	-	0.42	0.50	-	-	-
2,3,4,6-Tetrachlorophenol	0.039	0.047	9,200	110,000	4,400	0.16	0.31	5,700	-	-	-	0.039	0.047	-	-	-
Pentachlorophenol	0.025	0.029	960	NGR	950,000	6.0	12	1,900	28	28	-	0.025	0.029	160	-	-
Dioxins & Furans ^{h,i}	0.0000040	0.0000040	-	-	-	-	-	0.0000040	-	-	-	-	-	-	-	-
PCBs	1.2	1.2	4.4	-	-	-	-	1.2	33	33	-	-	-	470	-	-
Pesticides																
Aldicarb ^g	0.041	0.065	160	-	-	0.041	0.065	320	-	-	-	BDL	BDL	-	-	-
Aldrin	0.24	0.46	0.47	330	13	0.24	0.46	4.4	-	-	-	-	-	-	-	-
Atrazine and metabolites	0.0088	0.010	80	-	-	0.10	0.19	160	-	-	-	0.0088	0.010	-	-	-
Azniphos-methyl (Guthion)	0.41	0.75	400	-	-	0.41	0.75	790	-	-	-	-	-	-	-	-
Bromacil ^k	0.009	0.009	15,000	-	-	7.0	10	30,000	0.49	0.20	-	0.009	0.009	1.7	-	-
Bromoxynil	0.044	0.052	80	-	-	0.18	0.35	160	-	-	-	0.044	0.052	-	-	-
Carbaryl ^g	1.9	3.6	1,600	-	-	1.9	3.6	3,200	-	-	-	BDL	BDL	-	-	-
Carbofuran ^g	0.68	1.2	1,600	-	-	0.68	1.2	3,200	-	-	-	BDL	BDL	-	-	-
Chlorothalonil	0.0085	0.010	2,400	-	-	27	53	4,800	-	-	-	0.0085	0.010	-	-	-
Chlorpyrifos ^g	49	95	1,600	-	-	49	95	3,200	-	-	-	BDL	BDL	-	-	-
2,4-D ^g	0.43	0.67	9,200	-	-	0.43	0.67	5,700	-	-	-	BDL	BDL	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
DDT	12	12	24	660,000	25,000	89	170	160	12	12	550	-	-	170	-	-
Diazinon ⁹	2.2	4.2	320	-	-	2.2	4.2	630	-	-	-	BDL	BDL	-	-	-
Dicamba ⁹	0.50	0.79	2,000	-	-	0.50	0.79	4,000	-	-	-	BDL	BDL	-	-	-
Diclofop-methyl	570	2.4	920	-	-	NGR	NGR	570	-	-	-	NGR	2.4	-	-	-
Dieldrin	0.025	0.048	0.50	160	6.1	0.025	0.048	4.7	-	-	-	-	-	-	-	-
Dimethoate	0.0058	0.0055	1,800	-	-	0.077	0.12	1,100	-	-	-	0.0058	0.0055	-	-	-
Dinoseb ⁹	2.8	5.5	160	-	-	2.8	5.5	320	-	-	-	BDL	BDL	-	-	-
Diquat	11	21	1,300	-	-	11	21	2,500	-	-	-	-	-	-	-	-
Diuron	1.9	3.5	2,500	-	-	1.9	3.5	4,900	-	-	-	-	-	-	-	-
Endosulfan	0.80	0.0016	5,500	-	-	99	190	3,400	-	-	-	0.80	0.0016	-	-	-
Endrin	2.4	4.7	48	-	-	2.4	4.7	96	-	-	-	-	-	-	-	-
Glyphosate	0.054	0.049	4,800	-	-	0.95	1.4	9,500	-	-	-	0.054	0.049	-	-	-
Heptachlor epoxide	0.039	0.076	0.88	2.4	0.094	0.039	0.076	4.1	-	-	-	-	-	-	-	-
Lindane ⁹	0.31	0.60	48	-	-	0.31	0.60	95	-	-	-	BDL	BDL	-	-	-
Linuron	0.051	0.059	320	-	-	0.56	1.1	630	-	-	-	0.051	0.059	-	-	-
Malathion ⁹	0.82	1.3	3,200	-	-	0.82	1.3	6,300	-	-	-	BDL	BDL	-	-	-
MCPA ⁹	0.42	0.66	8,200	-	-	0.42	0.66	160	-	-	-	BDL	BDL	-	-	-
Methoxychlor	800	0.32	800	-	-	NGR	NGR	1,600	-	-	-	NGR	0.32	-	-	-
Metolachlor	0.048	0.055	800	-	-	1.3	2.4	1,600	-	-	-	0.048	0.055	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must **not** be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metribuzin	0.024	0.028	1,300	-	-	7.8	15	2,600	-	-	-	0.024	0.028	-	-	-
Paraquat (as dichloride)	1.1	2.2	160	-	-	1.1	2.2	320	-	-	-	-	-	-	-	-
Phorate	0.075	0.14	32	-	-	0.075	0.14	63	-	-	-	-	-	-	-	-
Picloram	0.024	0.022	3,200	-	-	0.64	0.94	6,300	-	-	-	0.024	0.022	-	-	-
Simazine	0.033	0.038	210	-	-	0.14	0.25	410	-	-	-	0.033	0.038	-	-	-
Tebuthiuron ^{g,l}	0.60	0.60	11,000	-	-	2.5	3.7	22,000	0.60	0.60	-	BDL	BDL	0.66	-	-
Terbufos	0.080	0.15	8.0	-	-	0.080	0.15	16	-	-	-	-	-	-	-	-
Toxaphene	3.3	6.3	7.3	36,000	1,400	3.3	6.3	69	-	-	-	-	-	-	-	-
Triallate	0.0077	0.0092	12,000	-	-	16	31	7,400	-	-	-	0.0077	0.0092	-	-	-
Trifluralin	0.22	0.045	4,400	-	-	NGR	NGR	2,700	-	-	-	0.22	0.045	-	-	-
Other Organics																
Aniline ^g	0.36	0.60	6,400	140	9.8	0.36	0.60	4,000	-	-	-	BDL	BDL	-	-	-
Di- <i>n</i> -butyl phthalate	0.54	0.65	9,600	NGR	82,000	70	130	19,000	-	-	-	0.54	0.65	-	-	-
Dichlorobenzidine	0.60	1.2	18	NGR	NGR	0.60	1.2	170	-	-	-	-	-	-	-	-
Diethanolamine ^j	2.0	3.5	1,000	-	-	2.0	3.5	2,000	2,000	2,000	-	500,000	45	15,000	-	-
Diethylene glycol	10	15	100,000	-	-	10	15	200,000	1,500	1,500	-	2,000	65	15,000	-	-
Diisopropanolamine	14	17	590,000	-	-	130	250	370,000	750	750	-	14	17	5,100	-	-
Ethylene glycol	60	62	NGR	NGR	NGR	60	68	NGR	1,800	1,800	2,000	89	62	16,000	-	-
Hexachlorobutadiene	0.026	0.031	590	1.2	0.078	0.50	0.95	5,600	-	-	-	0.026	0.031	-	-	-

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Pathway																
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit (unless otherwise indicated)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Methanol	37	11	370,000	210,000	18,000	37	42	-	1,600	1,600	-	300	11	-	750	750
Methylmethacrylate	36	17	NGR	280	17	36	49	800,000	-	-	-	-	-	-	-	-
Monoethanolamine ^j	20	10	10,000	-	-	20	40	20,000	1,500	1,500	-	300,000	10	20,000	-	-
MTBE	0.044	0.062	9,200	7.4	0.57	0.044	0.062	5,700	-	-	-	7.1	6.1	-	-	-
Nonylphenol + ethoxylates	14	14	-	-	-	-	-	-	14	14	-	NGR	2,000	82	-	-
Perfluorooctane sulfonate (PFOS)	0.070	0.14	39	-	-	0.070	0.14	30	60	60	-	0.19	0.23	140	-	-
Phenol	0.0028	0.0024	55,000	90,000	5,800	1.6	2.3	34,000	130	130	-	0.0028	0.0024	290	-	-
Sulfolane	0.18	0.21	2,600	-	-	0.18	0.21	5,000	430	430	-	24	18	3,000	-	-
Triethylene glycol	100	150	NGR	-	-	100	150	NGR	7,000	7,000	-	10,000	200	70,000	-	-

Notes:

- a. For more information see Guidelines for Landfill Disposal of Sulphur Waste and Remediation of Sulphur Containing Soils (AENV, 2011)
- b. True total barium as measured by fusion-XRF or fusion-ICP. For more information see Soil Remediation Guidelines for Barite: Environmental Health and Human Health (AENV, 2009)
- c. Human health direct soil contact guidelines for carcinogenic PAHs are based on B[a]P Total Potency Equivalents (TPE). TPEs are calculated by multiplying the soil concentration of individual carcinogenic PAHs by a standardized Benzo[a]pyrene Potency Equivalence Factor (PEF) to produce a Benzo[a]pyrene relative potency concentration, and by subsequently summing the relative potency concentrations for the entire PAH mixture. B[a]P PEFs are order of magnitude estimates of carcinogenic potential and are based on the World Health Organization (WHO/IPCS, 1998) scheme, as follows:

TABLE A-5. SURFACE SOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS

This table must not be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Carcinogenic PAH Compound	PEF
Benz[a]anthracene	0.1
Benzo(b+j)fluoranthene	0.1
Benzo[k]fluoranthene	0.1
Benzo[ghi]perylene	0.01
Benzo[a]pyrene	1
Chrysene	0.01
Dibenz[a,h]anthracene	1
Indeno[1,2,3-c,d]pyrene	0.1

- d. The B[a]P Total Potency Equivalents (TPEs) calculated for specific soil samples using Potency Equivalency Factors (PEFs) should be multiplied by an Uncertainty Factor of 3 when evaluating PAH mixtures associated with creosote or coal tar-type environmental releases, prior to evaluating against the human health direct contact soil remediation guideline.
- e. The Index of Additive Cancer Risk (IACR) is calculated by dividing the soil concentration of each carcinogenic PAH by its Protection of Domestic Use Aquifer guideline value to calculate a hazard index for each PAH and subsequently summing the hazard indexes for the entire PAH mixture. For example, the IACR for coarse textured soil would be calculated as follows:

Fine Soil:

$$IACR = \frac{[Benz(a)anthracene]}{6.4} + \frac{[Benzo(b+j)fluoranthene]}{3.0} + \frac{[Benzo(k)fluoranthene]}{0.64} + \frac{[Benzo(g,h,i)perylene]}{130} + \frac{[Benzo(a)pyrene]}{7.0} + \frac{[Chrysene]}{40} + \frac{[Dibenz(a,h)anthracene]}{4.4} + \frac{[Indeno(1,2,3-c,d)pyrene]}{51}$$

Coarse Soil:

$$IACR = \frac{[Benz(a)anthracene]}{12} + \frac{[Benzo(b+j)fluoranthene]}{5.8} + \frac{[Benzo(k)fluoranthene]}{1.2} + \frac{[Benzo(g,h,i)perylene]}{250} + \frac{[Benzo(a)pyrene]}{14} + \frac{[Chrysene]}{78} + \frac{[Dibenz(a,h)anthracene]}{8.5} + \frac{[Indeno(1,2,3-c,d)pyrene]}{98}$$

- f. Overall guideline value for ecological receptors only.
- g. Guideline for protection of aquatic life is below detection limit, groundwater monitoring is required.
- h. Expressed as toxic equivalents (TEQs) based on 2,3,7,8-PCDD (See CCME, 1999 and updates)
- i. Guideline values adopted directly from CCME (1999 and updates) without change.
- j. Analytical methodology specified in the Soil and Groundwater Remediation Guidelines for Monoethanolamine and Diethanolamine (AENV, 2010), or equivalent, must be used. See AENV (2010) for further details.
- k. Eco-contact guidelines from Stantec (2012).
- l. Eco-contact guidelines from Stantec (2008).
- m. Boron must be measured in a saturated paste extract prepared in accordance with Method 15.2.1 (Carter and Gregorich, 2008).
- n. Guideline for protection of aquatic life (fine soil) is based on a groundwater guideline of 0.10 g/L. See Appendix B for more information

BDL - Below detection limit

NGR - no guideline required, calculated value >1,000,000 mg/kg; or for PAH groundwater protection, calculated value results in groundwater concentration greater than solubility.

TABLE A-6. SUBSOIL REMEDIATION GUIDELINE VALUES FOR NATURAL AREA LAND USE - ALL EXPOSURE PATHWAYS (BTEX AND PHC ONLY)

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human				Ecological						Other		
	Pathway	Protection of Domestic Use Aquifer	Direct Soil Contact ^a		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Wildlife Water		Management Limit			
Soil Type	Fine	Coarse	Fine	Coarse	Fine	Coarse			Fine	Coarse	Fine	Coarse	Fine	Coarse	
Building Type			-	-	-	-	-	-	-	-	-	-	-	-	-
Unit	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.046	0.078	0.046	0.078	120	62	-	na	na	7.9	0.17	15	0.33	-	-
Toluene	0.52	0.12	0.52	0.95	220	150	-	na	na	63,000	0.12	NGR	1,000	-	-
Ethylbenzene	0.073	0.14	0.073	0.14	240	110	-	na	na	NGR	540	NGR	17,000	-	-
Xylenes	0.99	1.9	0.99	1.9	130	190	-	na	na	NGR	41	NGR	16,000	-	-
F1	420	420	1,100	2,200	420	420	-	na	na	30,000	1,300	NGR	30,000	800	700
F2	300	300	1,500	2,900	300	300	-	na	na	30,000	520	NGR	30,000	1,000	1,000
F3	2,600	600	-	-	2,600	600	-	na	na	-	-	-	-	3,500	2,500
F4	10,000	5,600	-	-	11,200	5,600	-	na	na	-	-	-	-	10,000	10,000

Notes:

a. Exclusion of the ecological direct soil contact pathway for F1, F2, F3, and F4 is permitted below 3 metres

na = exposure pathway not applicable to subsoil

NGR - no guideline required, calculated value >1,000,000 mg/kg

TABLE A-7. SUBSOIL REMEDIATION GUIDELINE VALUES FOR AGRICULTURAL LAND USE - ALL EXPOSURE PATHWAYS (BTEX AND PHC ONLY)

This table must **not** be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human								Ecological										Other				
			Direct Soil Contact		Vapour Inhalation			Protection of Domestic Use Aquifer			Direct Soil Contact ^a		Nutrient/ Energy Cycling Check	Livestock Soil and Food Ingestion	Wildlife Soil and Food Ingestion	Protection of Freshwater Aquatic Life		Protection of Livestock Water		Protection of Wildlife Water		Protection of Irrigation Water		Management Limit	
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	-	-	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unit	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.046	0.021	360	0.36	0.34	0.021	0.028	0.046	0.078	120	62	-	na	na	7.9	0.17	0.20	0.21	15	0.33	-	-	-	-	
Toluene	0.52	0.12	690	1,300	1,200	80	110	0.52	0.95	220	150	-	na	na	63,000	0.12	26	29	NGR	1,000	-	-	-	-	
Ethylbenzene	0.073	0.14	1,900	2,100	1,900	120	170	0.073	0.14	240	110	-	na	na	NGR	540	36	42	NGR	17,000	-	-	-	-	
Xylenes	0.99	1.9	510	150	140	9.0	13	0.99	1.9	130	190	-	na	na	NGR	41	160	180	NGR	16,000	-	-	-	-	
F1	420	30	14,000	710	630	30	55	1,100	2,200	420	420	-	na	na	30,000	1,300	6,600	7,300	NGR	30,000	-	-	800	700	
F2	300	160	6,800	3,600	3,300	160	290	1,500	2,900	300	300	-	na	na	30,000	520	16,000	19,000	NGR	30,000	-	-	1,000	1,000	
F3	2,600	600	15,000	-	-	-	-	-	-	2,600	600	-	na	na	-	-	-	-	-	-	-	-	3,500	2,500	
F4	10,000	5,600	21,000	-	-	-	-	-	-	11,200	5,600	-	na	na	-	-	-	-	-	-	-	-	10,000	10,000	

Notes:

a. Exclusion of the ecological direct soil contact pathway for F1, F2, F3, and F4 is permitted below 3 metres

na = exposure pathway not applicable to subsoil

NGR - no guideline required, calculated value >1,000,000 mg/kg

TABLE A-8. SUBSOIL REMEDIATION GUIDELINE VALUES FOR RESIDENTIAL/PARKLAND LAND USE - ALL EXPOSURE PATHWAYS (BTEX AND PHC ONLY)

This table must not be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. **This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).**

Receptor		Overall Guideline		Human				Ecological				Other					
Pathway		Direct Soil Contact		Vapour Inhalation				Protection of Domestic Use Aquifer		Direct Soil Contacta		Nutrient/ Energy Cycling Check		Protection of Freshwater Aquatic Life		Management Limit	
Soil Type	Fine	Coarse	-	Fine	Fine	Coarse	Coarse	Fine	Coarse	Fine	Coarse	-	-	Fine	Coarse	Fine	Coarse
Building Type			-	Basement	Slab	Basement	Slab	-	-	-	-	-	-	-	-	-	-
Unit	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.046	0.021	360	0.36	0.34	0.021	0.028	0.046	0.078	120	62	-	-	7.9	0.17	-	-
Toluene	0.52	0.12	690	1,300	1,200	80	110	0.52	0.95	220	150	-	-	63,000	0.12	-	-
Ethylbenzene	0.073	0.14	1,900	2,100	1,900	120	170	0.073	0.14	240	110	-	-	NGR	540	-	-
Xylenes	0.99	1.9	510	150	140	9.0	13	0.99	1.9	130	190	-	-	NGR	41	-	-
F1	420	30	14,000	710	630	30	55	1,100	2,200	420	420	-	-	30,000	1300	800	700
F2	300	160	6,800	3,600	3,300	160	290	1,500	2,900	300	300	-	-	30,000	520	1,000	1,000
F3	2,600	600	15,000	-	-	-	-	-	-	2,600	600	-	-	-	-	3,500	2,500
F4	10,000	5,600	21,000	-	-	-	-	-	-	11,200	5,600	-	-	-	-	10,000	10,000

Notes:

a. Exclusion of the ecological direct soil contact pathway for F1, F2, F3, and F4 is permitted below 3 metres

na = exposure pathway not applicable to subsoil

NGR - no guideline required, calculated value >1,000,000 mg/kg

TABLE A-9. SUBSOIL REMEDIATION GUIDELINE VALUES FOR COMMERCIAL LAND USE - ALL EXPOSURE PATHWAYS (BTX AND PHC ONLY)

This table must not be used for Tier 1 assessment and remediation, unless required due to land use considerations (see Sections 3.2 and 5.1.1). Tier 1 soil guidelines are found in Tables 1, 3 and 4. This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 200 as amended 7).

Receptor	Overall Guideline		Human						Ecological					Other		
	Pathway		Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contact ^a	Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit		
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse		Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.046	0.078	550	2.3	0.26	0.046	0.078	1,100	620	360	-	7.9	0.17	890	-	-
Toluene	0.52	0.12	1,100	8,100	970	0.52	0.95	9,200	660	500	-	63,000	0.12	2,100	-	-
Ethylbenzene	0.073	0.14	2,900	13,000	1,500	0.073	0.14	24,000	860	600	-	NGR	540	1,600	-	-
Xylenes	0.99	1.9	780	970	110	0.99	1.9	6,900	460	700	-	NGR	41	930	-	-
F1	640	440	22,000	4,700	440	1,100	2,200	30,000	640	640	-	30,000	1300	3,000	800	700
F2	520	520	10,000	24,000	2,400	1,500	2,900	30,000	520	520	-	30,000	520	2,100	1,000	1,000
F3	4,300	3,400	23,000	-	-	-	-	30,000	5,000	3,400	-	-	-	4,300	5,000	3,500
F4	10,000	6,600	30,000	-	-	-	-	30,000	13,200	6,600	-	-	-	30,000	10,000	10,000

Notes:

a. Exclusion of the ecological direct soil contact pathway for F1, F2, F3, and F4 is permitted below 3 metres

na = exposure pathway not applicable to subsoil

NGR - no guideline required, calculated value >1,000,000 mg/kg

TABLE A-10. SUBSOIL REMEDIATION GUIDELINE VALUES FOR INDUSTRIAL LAND USE - ALL EXPOSURE PATHWAYS (BTEX AND PHC ONLY)

This table must not be used for Tier 1 assessment and remediation. Tier 1 soil guidelines are found in Tables 1, 3 and 4.

This table is provided to assist Tier 2 guideline development, using the procedures outlined in the companion Tier 2 document (ESRD 2007 as amended).

Receptor	Overall Guideline		Human						Ecological				Other			
			Direct Soil Contact	Vapour Inhalation		Protection of Domestic Use Aquifer		Off-Site Migration	Direct Soil Contacta		Nutrient/ Energy Cycling Check	Protection of Freshwater Aquatic Life		Off-Site Migration	Management Limit	
Pathway	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Soil Type	Fine	Coarse	-	Fine	Coarse	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse	-	Fine	Coarse
Building Type			-	Slab	Slab	-	-	-	-	-	-	-	-	-	-	-
Unit	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	mg/kg	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.046	0.078	550	2.3	0.26	0.046	0.078	1,100	620	360	-	7.9	0.17	890	-	-
Toluene	0.52	0.12	16,000	8,100	970	0.52	0.95	9,200	660	500	-	63,000	0.12	2,100	-	-
Ethylbenzene	0.073	0.14	44,000	13,000	1,500	0.073	0.14	24,000	860	600	-	NGR	540	1,600	-	-
Xylenes	0.99	1.9	12,000	970	110	0.99	1.9	6,900	460	700	-	NGR	41	930	-	-
F1	640	440	30,000	4,700	440	1,100	2,200	30,000	640	640	-	30,000	1300	3,000	800	700
F2	520	520	30,000	24,000	2,400	1,500	2,900	30,000	520	520	-	30,000	520	2,100	1,000	1,000
F3	4,300	3,400	30,000	-	-	-	-	30,000	5,000	3,400	-	-	-	4,300	5,000	3,500
F4	10,000	6,600	30,000	-	-	-	-	30,000	13,200	6,600	-	-	-	30,000	10,000	10,000

Notes:

a. Exclusion of the ecological direct soil contact pathway for F1, F2, F3, and F4 is permitted below 3 metres

na = exposure pathway not applicable to subsoil

NGR - no guideline required, calculated value >1,000,000 mg/kg