APPENDIX B

Methodology To Develop Leaching-Based Soil Values

PURPOSE

This appendix describes the methodology in which NHDES established leaching-based soil values that should be protective of groundwater quality. The goal is to determine the allowable concentration of contaminants in soil such that soil contaminated at, or remediated to, these concentrations should not leach a sufficient mass of contaminant to result in a violation of a NHDES ambient groundwater quality standard (AGQS).

GENERAL APPROACH

NHDES leaching-based soil values were developed using a combination of two contaminant transport models contained in SEVIEW[1]. SEVIEW was introduced in 1993 by Environmental Software Consultants Inc., LLC and links the Seasonal Soil Compartment Model (SESOIL) and the Analytical Model of Transient 1, 2, and 3-Dimensional Simulation of Waste Transport in the Aquifer System (AT123D) model. SESOIL models contaminant transport in the vadose zone and AT123D models the fate and transport in the saturated zone. Arthur D. Little, Inc. of Cambridge, MA developed SESOIL for the USEPA Office of Toxic Substances in 1984 and AT123D was developed by Oak Ridge National Laboratory in 1981. SEVIEW 7.1 is the current version available and was used in developing leaching-based soil concentrations.

GENERIC SITE CONDITIONS

The generalized conceptual model for the standard contaminated site scenario to develop the leaching-based soil values assumes the water table is static at 3 meters (approx. 10 ft.) below the ground surface. The area of contaminated soil is 10 square meters and the first meter (layer) below the ground surface is not contaminated. The top of the second meter (layer) is contaminated at a concentration of 10 ppm, with the remainder of the second layer not contaminated. The entire third meter consisting of two layers is not contaminated. A drinking water well is located 10 meters from the downgradient edge of the contaminated soil area. SESOIL is used to determine the maximum concentration of contaminant at the water table interface and AT123D is used to determine the concentration of contaminant in the downgradient well. The various model input parameters used in the development of the leaching-based soil concentrations are provided below:

SESOIL MODEL

SESOIL Soil Parameters

• Intrinsic permeability	$1x10^{-8}cm^2$
• Source area	1,000,000 cm^2 (10m x 10m)
• Porosity	0.3
• Disconnectness index	3.7
• Soil Bulk Density	1.3 gm/cm^3
• Soil Organic Carbon	0.1%
• Volatile Fractions	0.2
• Clay Content	0%
• Layer 1 Thickness (10 sub-layers)	100 cm
• Layer 2 Thickness (10 sub-layers)	100 cm
• Layer 3 Thickness (10 sub-layers)	50 cm
• Layer 4 Thickness (10 sub-layers)	50 cm

SESOIL Climate Parameters

The SESOIL model is preloaded with climate data from 42 weather stations throughout New Hampshire. Climate data used in this model includes monthly air temperature, cloud cover fraction, relative humidity, short wave albedo, rainfall depth, mean storm duration, number of storms per month, and length of rainy season within a month. To determine the "representative" climate in New Hampshire an average total precipitation was calculated, excluding the data from New Hampshire's highest and lowest precipitation stations. From this calculation, the state average yearly precipitation is 99.9 cm/yr (39.3 in/yr) and the station that came closest to this value was Massabesic Lake in Manchester, New Hampshire at 99.7 cm/yr. Climate data from Massabesic Lake was therefore used in the model.

SESOIL Chemical Parameters

Chemical parameters include:

- Molecular Weight
- Organic Carbon partition coefficient (K_{oc})
- Solubility
- Henry's Law constant (H)
- Diffusion coefficient in air

Table B-1 provides a summary of the chemical properties for each compound modeled in SESOIL.

AT123D Model

AT123D parameters include:

- Soil Bulk Density 1.3 gm/cc
- Porosity (n) 0.3
- Hydraulic Conductivity (K) 0.36 m/hr
- Hydraulic Gradient (i) 0.005
- Longitudinal Dispersivity 20.0 m
- Transverse Dispersivity 2.0 m
- Vertical Dispersivity 2.0 m
- Degradation Rates 0.0

LEACHING-BASED SOIL STANDARD

NHDES has adopted AGQS for numerous contaminants and the AGQS are used to determine the leaching-based soil values. The leaching potential of contaminants is modeled using SESOIL and AT123D. Please note that biological and radiological contaminants were not modeled for leaching; and if parametric values were not obtainable for certain contaminants, they were not modeled.

For each contaminant that is modeled, the maximum groundwater concentration is used to determine the dilution and attenuation factor (DAF), from which a leaching-based soil value is calculated.

The DAF is the ratio of the initial soil concentration (10 ppm) to the maximum modeled groundwater concentration predicted to exist at the well by SESOIL and AT123D.

DAF = Input Soil Concentration/Maximum Modeled Groundwater Concentration

DAF = 10 ppm/Maximum Modeled Groundwater Concentration at Well (ppm)

$$\text{Soil Value}_{\text{(leaching-based)}} = \text{DAF} \times \text{AGQS}_{\text{(ppm)}}$$

Table B-2 provides a summary of the maximum groundwater concentration, DAF, time to reach the maximum groundwater concentration, AGQS and the leaching-based soil value for each of the contaminants modeled.

REFERENCES

1. www.seview.com

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
CAS No.	**Chemical**	**Organic carbon partition coefficient, K_{oc} (ml/g)**	**Diffusivity in air, D_a (cm^2/s)**	**Pure Component Water solubility, S (mg/L)**	**Henry's law constant at 25°C H (atm-m^3/mol)**	**Molecular weight, MW (g/mol)**
83329	Acenaphthene	7.08E+03	4.21E-02	3.57E+00	1.55E-04	154
208968	Acenaphthylene	7.24E+03	6.30E-02	3.93E+00	1.45E-03	152
67641	Acetone	5.75E-01	1.24E-01	1.00E+06	3.87E-05	58.1
107131	Acrylonitrile	5.90E+00	1.22E-01	7.40E+04	1.03E-04	53.1
15972608	Alachor	7.34E+02	8.00E-02	1.83E+02	8.32E-09	269.77
116063	Aldicarb	9.61E+00	5.64E-02	6.00E+03	4.20E-09	190.25
1646884	Aldicarb sulfone	9.61E+00	5.22E-02	7.80E+03	4.20E-09	222.3
1646873	Aldicarb sulfoxide	9.61E+00	5.41E-02	2.80E+04	4.20E-09	206
309002	Aldrin	2.45E+06	1.32E-02	1.70E-02	1.70E-04	364.91
107051	Allyl chloride	4.38E+01	1.17E-01	3.37E+03	1.10E-02	76.5
319846	alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	2.00E+00	1.06E-05	290.83
120127	Anthracene	2.35E+04	3.24E-02	5.37E-02	1.11E-04	178
1912249	Atrazine	1.54E+02	2.80E-02	3.00E+01	2.63E-09	215.68
71432	Benzene	5.89E+01	8.80E-02	1.79E+03	5.54E-03	78.1
92875	Benzidine	4.29E+01	8.00E-02	5.20E+02	3.90E-11	184.24
56553	Benzo(a)anthracene	2.60E+05	2.47E-02	1.28E-02	3.62E-06	228
50328	Benzo(a)pyrene	9.69E+05	2.18E-02	1.94E-03	8.36E-07	252
205992	Benzo(b)fluoranthene	1.23E+06	2.26E-02	1.50E-03	1.11E-04	252
191242	Benzo(g,h,i)perylene	1.95E+06	4.68E-02	2.60E-04	1.44E-07	276
207089	Benzo(k)fluoranthene	8.32E+05	2.28E-02	8.04E-04	4.15E-07	252
65850	Benzoic Acid	6.00E-01	5.36E-02	3.50E+03	1.54E-06	122.12
319857	Beta-HCH (beta-BHC)	1.26E+03	1.42E-02	2.40E-01	7.43E-07	290.83
92524	Biphenyl, 1,1	4.38E+03	4.04E-02	7.45E+00	2.99E-04	154.2
111444	Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	1.72E+04	1.80E-05	143.01
39638329	Bis(2-chloroisopropyl)ether	6.10E+01	6.00E+02	1.70E+03	1.13E-04	171
80057	Bisphenol A	7.52E+04	2.64E-02	1.20E+02	1.00E-10	228.09
7440428	Boron	1.43E+01	0.0E-00	4.37E+04	2.44E-02	13.84
75274	Bromodichloromethane	5.50E+01	2.98E-02	6.74E+03	1.60E-03	163.83
75252	Bromoform	8.71E+01	1.49E-02	3.10E+03	5.88E-04	252.73
74839	Bromomethane	1.05E+01	7.28E-02	1.52E+04	6.22E-03	94.94
1563662	Carbofuran	3.74E+01	6.00E-02	7.00E+02	3.90E-09	221

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
CAS No.	**Chemical**	**Organic carbon partition coefficient, K_{oc} (ml/g)**	**Diffusivity in air, D_a (cm^2/s)**	**Pure Component Water solubility, S (mg/L)**	**Henry's law constant at 25°C H (atm-m^3/mol)**	**Molecular weight, MW (g/mol)**
75150	Carbon disulfide	4.57E+01	1.04E-01	1.19E+03	3.02E-02	76.13
56235	Carbon tetrachloride	1.74E+02	7.80E-02	7.93E+02	3.03E-02	344
57749	Chlordane	1.20E+05	1.18E-02	5.60E-02	4.85E-05	409.8
106478	Chloroaniline, p	6.61E+01	4.83E-02	5.30E+03	3.31E-07	128
95578	Chlorophenol, 2-	3.88E+02	5.0E-02	2.20E+04	3.91E-04	129.0
95498	Chlorotoluene, 2- (o)	6.12E+02	8.00E-02	3.73E+02	3.57E-03	126.58
218019	Chrysene	3.98E+05	2.48E-02	6.30E-03	9.44E-05	228
156592	cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	3.50E+03	4.07E-03	96.94
98828	Cumene (isopropylbenzene)	4.89E+02	6.50E-02	6.13E+01	1.16E+00	120
21725462	Cyanizine(Bladex 4L/90DF)	1.46E+02	8.00E-02	1.70E+02	1.00E-10	240.7
75990	Dalapon	5.72E+00	8.00E-02	5.02E+05	6.43E-08	142.97
72548	DDD	8.11E+04	1.69E-02	9.00E-02	4.00E-06	320.05
72559	DDE	2.70E+05	1.44E-02	1.20E-04	2.10E-05	518.03
50293	DDT	1.78E+05	1.37E-02	2.50E-02	8.10E-06	354.39
124481	Dibromochloromethane	6.31E+01	1.96E-02	2.60E+03	7.81E-04	208.28
103231	Di(ethylhexyl)adipate	1.01E+06	8.00E-02	4.71E-01	4.34E-07	370
53703	Dibenzo(a,h)anthracene	1.79E+06	1.80E-02	6.70E-04	1.12E-08	278
96128	Dibromochloropropane	9.47E+01	1.79E-02	1.20E+03	1.97E-04	236.36
106934	Dibromoethane,1,2- (ethylene dibromide)	2.50E+01	2.17E-02	4.18E+03	7.41E-04	188
84742	Dibutylphthalate	3.39E+04	4.38E-02	1.12E+01	9.38E-10	278.35
95501	Dichlorobenzene, 1,2-	6.17E+02	6.90E-02	1.56E+02	1.90E-03	147.01
541731	Dichlorobenzene, 1,3-	1.98E+03	6.92E-02	1.34E+02	3.09E-03	147
106467	Dichlorobenzene. 1,4-	6.17E+02	6.90E-02	7.90E+01	2.39E-03	147
91941	Dichlorobenzidine, 3,3’	7.24E+02	1.94E-02	3.11E+00	4.00E-09	253
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	2.80E+02	3.42E-01	120.9
75343	Dichloroethane, 1,1-	3.16E+01	7.42E-02	5.06E+03	5.61E-03	98.96
107062	Dichloroethane, 1,2-	1.74E+01	1.04E-01	8.52E+03	9.77E-04	99
75354	Dichloroethylene, 1,1-	5.89E+01	9.00E-02	2.25E+03	2.60E-02	96.94
120832	Dichlorophenol, 2,4	1.475E+2	3.5E-02	4.50E+03	3.16E-06	163
94757	Dichlorophenoxyacetic acid, 2,4 (2,4D)	4.51E+02	2.31E-02	6.80E+02	1.02E-08	221.04
78875	Dichloropropane, 1,2-	4.37E+01	7.82E-02	2.80E+03	2.79E-03	112.99

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
CAS No.	**Chemical**	**Organic carbon partition coefficient, K_{oc} (ml/g)**	**Diffusivity in air, D_a (cm^2/s)**	**Pure Component Water solubility, S (mg/L)**	**Henry's law constant at 25°C H (atm-m^3/mol)**	**Molecular weight, MW (g/mol)**
542756	Dichloropropene, 1,3-	4.57E+01	6.26E-02	2.80E+03	1.77E-02	111
60571	Dieldrin	2.14E+04	1.25E-02	1.95E-01	1.51E-05	380.91
60297	Diethyl ether	5.73E+00	7.82E-02	5.68E+04	3.29E-02	74.12
117817	Di(2-ethylhexyl)phthalate (DEHP)	1.11E+05	3.51E-02	3.40E-01	1.02E-07	391
108203	Diisopropyl ether (DIPE)	2.52E+01	8.00E-02	8.04E+00	1.30E-03	102.18
131113	Dimethyl phthalate	3.63E+01	5.68E-02	5.00E+03	1.05E-07	194
105679	Dimethylphenol, 2,4	2.09E+02	5.84E-02	7.87E+03	2.00E-06	122
51285	Dinitrophenol, 2,4	1.00E-02	2.73E-02	2.79E+03	4.43E-07	184
121142	Dinitrotoluene, 2,4	9.55E+01	2.03E-01	2.70E+02	9.26E-08	182
88857	Dinoseb	1.25E+03	8.00E-02	5.20E+01	4.60E-07	240.2
123911	Dioxane, 1,4	1.7E+01	9.20E-02	1.00E+06	4.80E-06	88.1
122667	Diphenylhydrazine, 1,2-	3.48E+03	3.17E-02	2.21E+02	1.50E-06	184.24
85007	Diquat	1.69E-03	8.00E-02	7.00E+05	1.42E-13	344.08
115297	Endosulfan	2.14E+03	1.15E-02	5.10E-01	1.12E-05	406.96
145733	Endothall	2.88E-01	8.00E-02	1.00E+05	2.60E-10	186.18
72208	Endrin	1.08E+04	1.25E-02	2.50E-01	7.52E-06	381
637923	Ethyl tert butyl ether (ETBE)	3.97E+00	8.00E-02	5.63E+03	1.39E-03	102.18
100414	Ethylbenzene	3.63E+02	7.50E-02	1.69E+02	7.86E-03	106
107211	Ethylene glycol	4.00E+00	1.48E-01	1.00E+06	6.00E-08	62.07
206440	Fluoranthene	4.91E+04	2.75E-02	2.32E-01	9.33E-06	202
86737	Fluorene	1.38E+04	3.63E-02	1.98E+00	6.34E-05	166
50000	Formaldehyde	1.09E+00	1.80E-01	5.50E+05	3.70E-07	30.03
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.30E+00	1.40E-05	290.83
76448	Heptachlor	1.41E+06	1.12E-02	1.80E-01	1.48E+00	373.32
1024573	Heptachlor epoxide	8.32E+04	1.32E-02	2.00E-01	9.50E-06	389
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	3.20E+00	8.13E-03	260.76
118741	Hexachlorobenzene	5.50E+04	5.42E-02	5.00E-03	1.32E-03	284.78
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	1.80E+00	2.69E-02	272.77
34465468	Hexachlorodibenzodioxin	3.00E+07	1.00E+00	4.00E-06	1.10E-05	133.4
67721	Hexachloroethane	1.78E+03	2.50E-03	5.00E+01	3.88E-03	236.74
193395	Indeno(1,2,3cd)pyrene	4.11E+06	1.90E-02	1.07E-02	4.86E-09	276.34
78591	Isophorone	2.99E+01	5.22E-02	1.20E+04	8.15E-09	138.21

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
CAS No.	**Chemical**	**Organic carbon partition coefficient, K_{oc} (ml/g)**	**Diffusivity in air, D_a (cm^2/s)**	**Pure Component Water solubility, S (mg/L)**	**Henry's law constant at 25°C H (atm-m^3/mol)**	**Molecular weight, MW (g/mol)**
67561	Methanol	1.00E+00	1.50E-01	1.00E+06	6.90E-06	32.04
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	5.33E+03	8.80E-03	50.5
95487	Methyl phenol, 2-	9.12E+01	7.40E-02	2.60E+04	1.20E-06	108.14
106445	Methyl phenol, 4-	4.90E+01	7.48E-02	2.50E+04	9.60E-07	108.14
75092	Methylene chloride (dichloromethane)	1.17E+01	1.01E-01	1.30E+04	2.18E-03	84.93
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	2.23E+05	5.58E-05	72.1
108101	Methylisobutylketone (4-methyl-2-pentanone)	9.06E+00	7.50E-02	1.90E+04	1.38E-04	100
91576	Methylnaphthalene, 2-	2.81E+03	5.22E-02	2.46E+01	5.17E-04	142
51218452	Metolachlor (Dual 8E/25G)	3.61E+02	8.00E-02	5.30E+02	9.90E-09	283.83
21087649	Metribuzin (Sencor 75DF)	1.196E+03	0.0E+00	1.05E+03	1.16E-10	214.29
108907	Monochlorobenzene	2.19E+02	7.30E-02	4.72E+02	3.69E-03	112.56
1634044	MTBE	7.26E+00	1.02E-01	5.10E+04	6.23E-04	88.15
91203	Naphthalene	2.00E+03	5.90E-02	3.10E+01	4.83E-04	128
104518	n-Butylbenzene	1.11E+03	5.70E-02	2.00E+00	1.31E-02	134
103651	n-Propylbenzene	5.62E+02	6.01E-02	6.00E+01	1.07E-02	120
23135220	Oxamyl	5.08E-01	8.00E-02	2.80E+05	2.37E-10	219.29
87865	Pentachlorophenol	4.10E+02	5.60E-02	1.95E+03	2.44E-08	266
85018	Phenanthrene	5.01E+04	3.33E-02	1.28E+00	1.88E-01	178
108952	Phenol	2.88E+01	8.20E-02	8.28E+04	3.97E-07	94
1918021	Picloram	1.97E+00	8.00E-02	4.30E+02	4.05E-11	241.48
1336363	Polychlorinated biphenyls (PCBs)	3.09E+05	1.38E-02	5.70E-02	2.00E-03	328
129000	Pyrene	1.05E+05	2.72E-02	1.35E+00	1.10E-05	202
135988	sec-Butylbenzene	9.66E+02	5.70E-02	3.94E+00	1.39E-02	134
122349	Simazine	7.90E+01	8.00E-02	4.47E+00	3.37E-09	201.67
7440246	Strontium, non-radioactive	1.43E+01	0.00E+00	8.04E+04	2.44e-2	87.62
100425	Styrene	7.76E+02	7.10E-02	3.10E+02	2.74E-03	104.15
1746016	TCDD, 2,3,7,8 (Dioxin)	3.30E+06	4.70E+02	1.93E-05	2.10E-03	322
98066	tert-Butylbenzene	7.71E+02	5.65E-02	2.95E+01	1.19E-02	134
9940508	Tertiary amyl methyl ether (TAME)	2.81E+01	8.00E-02	2.64E+03	2.68E-03	102.18
75650	Tertiary butyl alcohol (TBA)	2.27E+00	8.00E-02	1.00E+06	1.17E-05	74.12

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
CAS No.	**Chemical**	**Organic carbon partition coefficient, K_{oc} (ml/g)**	**Diffusivity in air, D_a (cm^2/s)**	**Pure Component Water solubility, S (mg/L)**	**Henry's law constant at 25°C H (atm-m^3/mol)**	**Molecular weight, MW (g/mol)**
630206	Tetrachloroethane, 1,1,1,2-	5.4E+01	7.10E+02	2.90E+03	1.10E-02	168
79345	Tetrachloroethane, 1,1,2,2-	9.33E+01	7.10E-02	2.96E+03	3.44E-04	165.83
127184	Tetrachloroethylene	1.55E+02	7.20E-02	2.00E+02	1.84E-02	166
58902	Tetrachlorophenol, 2,3,4,6-	6.00E+03	2.55E-02	1.00E+02	1.53E-05	231.89
108883	Toluene	1.82E+02	8.70E-02	5.26E+02	6.62E-03	92.1
8001352	Toxaphene	2.55E+05	1.16E-02	7.40E-01	6.00E-06	414
156605	trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	6.30E+03	9.36E-03	96.94
120821	Trichlorobenzene, 1,2,4-	1.78E+03	3.00E-02	4.88E+01	1.42E-03	181.46
71556	Trichloroethane, 1,1,1-	1.10E+02	7.80E-02	1.33E+03	1.72E-02	133.4
79005	Trichloroethane, 1,1,2-	5.01E+01	7.80E-02	4.42E+03	9.11E-04	133.4
79016	Trichloroethylene	1.66E+02	7.90E-02	1.47E+03	1.03E-02	131
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	1.10E+03	9.68E-02	137.4
67663	Trichloromethane (Chloroform)	3.98E+01	1.04E-01	7.92E+03	3.66E-03	119.38
95954	Trichlorophenol, 2,4,5	2.98E+02	2.91E-02	1.20E+03	4.33E-06	197
88062	Trichlorophenol, 2,4,6-	3.81E+02	3.18E-02	8.00E+02	7.79E-06	197.45
93721	2-(2,4,5-Trichlorophenoxy) propionic acid; 2,4,5-TP	2.60E+03	1.94E-02	2.00E+02	4.00E-06	269.51
96184	Trichloropropane, 1,2,3-	2.20E+01	7.10E-02	1.75E+03	4.08E-04	145.42
95636	Trimethylbenzene, 1,2,4-	1.35E+03	6.06E-02	5.70E+01	6.14E-03	120
108678	Trimethylbenzene, 1,3,5-	1.35E+03	6.02E-02	2.00E+00	5.87E-03	120
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	8.80E+03	2.69E-02	62.5
1330207	Xylenes	2.50E+02	7.69E-02	1.75E+02	6.73E-03	106

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
83329	Acenaphthene	1.22E-02	8.20E+02	28.0	420	**344.26**
208968	Acenaphthylene	8.60E-03	1.16E+02	30.0	420	**488.37**
67641	Acetone	7.97E-01	1.26E+01	0.3	6.00E+03	**75.28**
107131	Acrylonitrile	3.16E-01	3.16E+01	0.6	5	**0.158**
15972608	Alachor	1.22E-01	8.20E+01	3.4	2	**0.16**
116063	Aldicarb	7.09E-01	1.41E+01	0.3	7	**0.10**
1646884	Aldicarb sulfone	7.09E-01	1.41E+01	0.3	7	**0.10**
1646873	Aldicarb sulfoxide	7.09E-01	1.41E+01	0.3	7	**0.10**
309002	Aldrin	NCM	NA	NA	0.04	**NCM**
107051	Allyl chloride	5.25E-02	1.90E+02	0.5	7.4	**1.41**
319846	alpha-HCH (alpha-BHC)	3.74E-02	2.67E+02	12.5	0.006	**0.0016**
120127	Anthracene	NCM	NA	NA	2,100	**NCM**
1912249	Atrazine	3.48E-01	2.87E+01	1.2	3	**0.086**
71432	Benzene	1.71E-01	5.85E+01	0.5	5	**0.29**
92875	Benzidine	6.95E-01	1.44E+01	0.3	0.8	**0.012**
56553	Benzo(a)anthracene	NCM	NA	NA	0.05	**NCM**
50328	Benzo(a)pyrene	NCM	NA	NA	0.2	**NCM**
205992	Benzo(b)fluoranthene	NCM	NA	NA	0.05	**NCM**
191242	Benzo(g,h,i)perylene	NCM	NA	NA	210	**NCM**
207089	Benzo(k)fluoranthene	NCM	NA	NA	0.5	**NCM**
65850	Benzoic Acid	8.10E-01	1.23E+01	0.3	28,000	**345.68**
319857	beta-HCH (beta-BHC)	4.65E-03	2.15E+03	27.6	0.02	**0.043**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
92524	Biphenyl, 1,1	2.01E-02	4.98E+02	17.5	350	**174.13**
111444	Bis(2-chloroethyl)ether	7.09E-01	1.41E+01	0.3	10	**0.14**
39638329	Bis(2-chloroisopropyl)ether	5.94E-01	1.68E+01	0.3	300	**5.05**
80057	Bisphenol A	NCM	NA	NA	120	**NCM**
7440428	Boron	4.38E-01	2.28E+01	0.83	6000	**137**
75274	Bromodichloromethane	4.69E-01	2.13E+01	0.4	0.6	**0.013**
75252	Bromoform	4.26E-01	2.35E+01	0.5	4	**0.09**
74839	Bromomethane	2.94E-01	3.40E+01	0.3	10	**0.34**
1563662	Carbofuran	7.09E-01	1.41E+01	0.3	40	**0.56**
75150	Carbon disulfide	1.53E-03	6.54E+03	1.2	70	**457.52**
56235	Carbon tetrachloride	4.11E-03	2.43E+03	1.5	5	**12.17**
57749	Chlordane	NCM	NA	NA	2	**NCM**
106478	Chloroaniline, p	5.51E-01	1.81E+01	0.3	28	**0.51**
95578	Chlorophenol, 2-	2.04E-01	4.9E+01	1.3	40	**1.96**
95498	Chlorotoluene, 2- (o)	6.49E-02	1.54E+02	2.5	100	**15.41**
218019	Chrysene	NCM	NA	NA	5	**NCM**
156592	cis-1,2-Dichloroethylene	3.12E-01	3.21E+01	0.3	70	**2.24**
98828	Cumene (isopropylbenzene)	2.40E-02	4.17E+02	3.4	800	**333.34**
21725462	Cyanizine(Bladex 4L/90DF)	3.09E-01	3.24E+01	1.2	1	**0.03**
75990	Dalapon	7.61E-01	1.31E+01	0.3	200	**2.63**
72548	DDD	NCM	NA	NA	0.1	**NCM**
72559	DDE	NCM	NA	NA	0.1	**NCM**
50293	DDT	NCM	NA	NA	0.1	**NCM**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
103231	Di(ethylhexyl)adipate	NCM	NA	NA	400	**NCM**
53703	Dibenzo(a,h)anthracene	NCM	NA	NA	0.005	**NCM**
124481	Dibromochloromethane	5.01E-01	2.00E+01	0.5	60	**1.20**
96128	Dibromochloropropane	3.42E-01	2.92E+01	0.7	0.2	**0.006**
106934	Dibromoethane,1,2- (ethylene dibromide)	6.94E-01	1.44E+01	0.3	0.05	**0.0007**
84742	Dibutylphthalate	NCM	NA	NA	800	**NCM**
95501	Dichlorobenzene, 1,2-	6.79E-02	1.47E+02	2.0	600	**88.37**
541731	Dichlorobenzene, 1,3-	3.92E-02	2.55E+02	8.6	600	**153.06**
106467	Dichlorobenzene. 1,4-	1.01E-01	9.90E+01	3.4	75	**7.43**
91941	Dichlorobenzidine, 3,3’	6.11E-02	1.64E+02	7.4	1.3	**0.21**
75718	Dichlorodifluoromethane	1.68E-12	5.95E+12	9.6	1,000	**5.95E+12**
75343	Dichloroethane, 1,1-	2.41E-01	4.15E+01	0.5	81	**3.36**
107062	Dichloroethane, 1,2-	5.91E-01	1.69E+01	0.3	5	**0.080**
75354	Dichloroethylene, 1,1-	5.13E-03	1.95E+03	1.2	7	**13.65**
120832	Dichlorophenol, 2,4	4.63E-01	2.16+01	0.5	20	**0.43**
94757	Dichlorophenoxyacetic acid, 2,4 (2,4D)	2.33E-03	4.29E+03	2.3	70	**300.43**
78875	Dichloropropane, 1,2-	3.64E-01	2.75E+01	0.3	5	**0.14**
542756	Dichloropropene, 1,3-	3.53E-02	2.83E+02	1.2	4.00E-01	**0.11**
60571	Dieldrin	NCM	NA	NA	0.002	**NCM**
60297	Diethyl ether	3.62E-03	2.76E+03	1.2	1400	**3867.40**
117817	Di(2-ethylhexyl)phthalate (DEHP)	NCM	NA	NA	6	**NCM**
108203	Diisopropyl ether (DIPE)	1.18E-01	8.47E+01	0.5	120	**10.17**
131113	Dimethyl phthalate	7.10E-01	1.41E+01	0.3	50,000	**704.23**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
105679	Dimethylphenol, 2,4	3.34E-01	2.99E+01	1.2	140	**4.19**
51285	Dinitrophenol, 2,4	8.15E-01	1.23E+01	0.3	14	**0.17**
121142	Dinitrotoluene, 2,4	4.21E-01	2.38E+01	0.5	10	**0.24**
88857	Dinoseb	7.20E-02	1.39E+02	5.5	7	**0.97**
123911	Dioxane, 1,4	1.04E+00	9.6E+00	0.17	0.32	**0.003**
122667	Diphenylhydrazine, 1,2-	2.57E-02	3.89E+02	13.7	10	**3.89**
85007	Diquat	6.01E-01	1.66E+01	0.3	20	**0.33**
115297	Endosulfan	9.33E-03	1.07E+03	27.6	42	**45.02**
145733	Endothall	8.13E-01	1.23E+01	0.3	100	**1.23**
72208	Endrin	NCM	NA	NA	2	**NCM**
637923	Ethyl tert butyl ether (ETBE)	5.99E-01	1.67E+01	0.3	40	**0.67**
100414	Ethylbenzene	4.98E-02	2.01E+02	1.5	700	**140.56**
107211	Ethylene glycol	1.51E+00	6.62E+00	0.17	14,000	**92.72**
206440	Fluoranthene	NCM	NA	NA	280	**NCM**
86737	Fluorene	3.62E-02	2.76E+02	11.6	280	**77.35**
50000	Formaldehyde	8.06E-01	1.24E+01	0.3	100	**1.24**
58899	gamma-HCH (Lindane)	8.49E-02	1.18E+02	4.5	0.02	**0.0024**
76448	Heptachlor	NCM	NA	NA	0.4	**NCM**
1024573	Heptachlor epoxide	NCM	NA	NA	0.2	**NCM**
87683	Hexachloro-1,3-butadiene	NCM	NA	NA	0.5	**NCM**
118741	Hexachlorobenzene	NCM	NA	NA	1	**NCM**
77474	Hexachlorocyclopentadiene	NCM	NA	NA	50	**NCM**
34465468	Hexachlorodibenzodioxin	NCM	NA	NA	0.02	**NCM**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
67721	Hexachloroethane	5.04E-02	1.98E+02	7.6	1	**0.20**
193395	Indeno(1,2,3cd)pyrene	NCM	NA	NA	0.05	**NCM**
78591	Isophorone	7.22E-01	1.39E+01	0.3	100	**1.39**
67561	Methanol	8.04E-01	1.24E+01	0.0	4,000	**49.75**
74873	Methyl chloride (chloromethane)	1.06E-01	9.43E+01	0.3	30	**2.83**
95487	Methyl phenol, 2-	4.39E-01	2.28E+01	0.5	40	**0.91**
106445	Methyl phenol, 4-	6.72E-01	1.49E+01	0.3	40	**0.60**
75092	Methylene chloride (dichloromethane)	4.80E-01	2.08E+01	0.3	5	**0.104**
78933	Methylethylketone (2-butanone)	7.81E-01	1.28E+01	0.2	4.00E+03	**51.22**
108101	Methylisobutylketone (4-methyl-2-pentanone)	6.91E-01	1.45E+01	0.3	2.00E+03	**28.94**
91576	Methylnaphthalene, 2-	2.75E-02	3.64E+02	12.6	280	**101.82**
51218452	Metolachlor (Dual 8E/25G)	2.17E-01	4.61E+01	1.5	70	**3.23**
21087649	Metribuzin (Sencor 75DF)	1.11E-01	9.00E+01	3.58	70	**6.31**
108907	Monochlorobenzene	1.71E-01	5.85E+01	1.3	100	**5.85**
1634044	MTBE	6.48E-01	1.54E+01	0.3	13	**0.2**
91203	Naphthalene	3.57-02	2.80E+02	6.58	100	**28.0**
104518	n-Butylbenzene	2.36E-02	4.24E+02	4.7	260	**110.17**
103651	n-Propylbenzene	3.06E-02	3.27E+02	3.3	260	**84.97**
23135220	Oxamyl	8.11E-01	1.23E+01	0.3	200	**2.47**
87865	Pentachlorophenol	1.70E-01	5.88E+01	1.5	1	**0.06**
85018	Phenanthrene	NCM	NA	NA	210	**NCM**
108952	Phenol	9.3E-01	1.75E+01	0.25	2,000	**21.51**
1918021	Picloram	7.99E-01	1.25E+01	0.3	500	**6.26**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
1336363	Polychlorinated biphenyls (PCBs)	NCM	NA	NA	0.5	**NCM**
129000	Pyrene	NCM	NA	NA	210	**NCM**
135988	sec-Butylbenzene	1.96E-02	5.10E+02	4.4	260	**132.65**
122349	Simazine	9.56E-02	1.05E+02	1.3	4	**0.42**
7440246	Strontium, non-radioactive	4.38E-01	2.28E+01	0.83	4,000	**91.32**
100425	Styrene	5.95E-02	1.68E+02	4.4	100	**16.81**
1746016	TCDD, 2,3,7,8 (Dioxin)	NCM	NA	NA	0.00003	**NCM**
98066	tert-Butylbenzene	2.53E-02	3.95E+02	3.4	260	**102.77**
9940508	Tertiary amyl methyl ether (TAME)	4.32E-01	2.31E+01	0.3	140	**3.24**
75650	Tertiary butyl alcohol (TBA)	7.93E-01	1.26E+01	0.3	40	**0.50**
630206	Tetrachloroethane, 1,1,1,2-	8.69E-01	1.15E+01	0.5	70	**0.81**
79345	Tetrachloroethane, 1,1,2,2-	4.63E-03	2.16E+03	1.3	2	**4.32**
127184	Tetrachloroethylene	2.76E-02	3.62E+02	1.3	5	**1.81**
58902	Tetrachlorophenol, 2,3,4,6-	1.49E-02	6.71E+02	23.8	200	**134.23**
108883	Toluene	9.89E-02	1.01E+02	1.3	1000	**101.11**
8001352	Toxaphene	NCM	NA	NA	3	**NCM**
156605	trans-1,2-Dichloroethylene	1.14E-01	8.77E+01	0.5	100	**8.77**
120821	Trichlorobenzene, 1,2,4-	3.62E-02	2.76E+02	9.5	70	**19.34**
71556	Trichloroethane, 1,1,1-	2.57E-02	3.89E+02	1.2	200	**77.82**
79005	Trichloroethane, 1,1,2-	5.21E-01	1.92E+01	0.3	5	**0.096**
79016	Trichloroethylene	6.51E-02	1.54E+02	1.3	5	**0.77**
75694	Trichlorofluoromethane	2.81E-05	3.56E+05	5.4	2000	**7.12E+05**
67663	Trichloromethane (Chloroform)	2.57E-01	3.89E+01	0.3	70	**2.72**

TABLE B-2: LEACHING-BASED SOIL VALUES						
CAS No.	**Chemical**	**Max GW Conc. (mg/L)**	**DAF**	**Time to Reach Max (years)**	**AGQS (ug/L)**	**Leaching-Based Soil Value (mg/Kg)**
95954	Trichlorophenol, 2,4,5	2.95E-01	3.39E+01	1.3	700	**23.73**
88062	Trichlorophenol, 2,4,6-	1.93E-01	5.18E+01	1.5	3	**0.16**
93721	2-(2,4,5-Trichlorophenoxy)propionic acid; 2,4,5-TP	8.36E-03	1.20E+03	11.9	50	**60**
96184	Trichloropropane, 1,2,3-	6.79E-01	1.47E+01	0.3	40	**0.59**
95636	Trimethylbenzene, 1,2,4-	2.61E-02	3.85E+02	5.6	330	**126.92**
108678	Trimethylbenzene, 1,3,5-	3.45E-02	2.90E+02	8.6	330	**95.65**
75014	Vinyl chloride (chloroethene)	2.29E-03	4.37E+03	0.8	2	**8.73**
1330207	Xylenes	6.65E-02	1.50E+02	2.3	10000	**1503.67**

NCM: Neglible Contaminant Migration

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)
Acetone	67-64-1	**75**	**75**	**75**	35,000	310,000	310,000	75		0.5	
Acrylonitrile	107-13-1	**0.5**	**0.5**	**0.5**	3	9	83	0.2		0.5	
Alachor	15972-60-8	**0.2**	**0.2**	**0.2**	18	54	700	0.2		0.05	
Aldicarb	116-06-3	**0.1**	**0.1**	**0.1**	26	220	220	0.1		0.017	
Aldicarb sulfone	1646-88-4	**0.1**	**0.1**	**0.1**	26	220	220	0.1		0.023	
Aldicarb sulfoxide	1646-87-3	**0.2**	**0.2**	**0.2**				0.1		0.15	
Aldrin	309-00-2	**0.09**	**0.2**	**2**	0.06	0.2	2	NCM		0.09	
Allyl chloride	107-05-1	**1**	**1**	**1**	72	230	2,100	1		0.1	
Antimony	7440-36-0	**9**	**74**	**74**	9	74	74	NM	2	8	
Arsenic	7440-38-2	**11**	**11**	**47**	1	4	47	NM	11	1	
Atrazine	1912-24-9	**0.09**	**0.09**	**0.09**	4	13	170	0.09		NA	
Barium	7440-39-3	**1,000**	**2,500**	**5,000**	4,000	31,000	31,000	NM		0.5	(3)
Benzene	71-43-2	**0.3**	**0.3**	**0.3**	28	89	510	0.3		0.1	
Benzidine	92-87-5	**0.01**	**0.01**	**0.01**	0.004	0.01	0.2	0.01		NA	
Benzoic acid	65-85-0	**350**	**350**	**350**	100,000	860,000	860,000	350		3.3	
Beryllium	7440-41-7	**12**	**89**	**100**	12	89	100	NM	1	0.1	
Biphenyl, 1,1	92-52-4	**125**	**174**	**174**	125	378	4,970	174		NA	
bis(2Chloroisopropyl) ether	39638-32-9	**5**	**5**	**5**				5		0.66	
bis(Chloroethyl)ether	111-44-4	**0.7**	**0.7**	**0.7**	1	4	39	0.1		0.66	
Bisphenol A	80-05-7	**1,300**	**11,000**	**11,000**	1,300	11,000	11,000	NCM		NA	
Boron	7440-42-8	**137**	**137**	**137**	7,400	66,000	66,000	137		1.5	
Bromobenzene	108-86-1				272	2,360	2,360				
Bromodichloromethane	75-27-4	**0.1**	**0.1**	**0.1**	21	67	700	0.01		0.1	
Bromoform	75-25-2	**0.1**	**0.1**	**0.1**	170	520	2,500	0.1		0.1	
Bromomethane	74-83-9	**0.3**	**0.3**	**0.3**	54	490	490	0.3		0.1	
Butylbenzene, n-	104-51-8	**110**	**110**	**110**	1,700	14,800	14,800	110		0.1	
Butylbenzene, sec-	135-98-8	**130**	**130**	**130**				130		0.1	
Butylbenzene, tert-	98-06-6	**100**	**100**	**100**				100		0.1	
Cadmium	7440-43-9	**33**	**280**	**280**	33	280	280	NM	2	1	
Camphor	76-22-2							NM		NA	
Carbofuran	1563-66-2	**0.6**	**0.6**	**0.6**	130	1,100	1,100	0.6		NA	
Carbon disulfide	75-15-0	**460**	**460**	**460**	3,900	35,000	35,000	460		0.1	
Carbon tetrachloride	56-23-5	**12**	**12**	**12**	22	70	513	12		0.1	
Chlordane	57-74-9	**4**	**11**	**61**	4	11	61	NCM		0.1	
Chloroaniline,p	106-47-8	**1.3**	**1.3**	**1.3**	5	15	200	0.5		1.3	
Chlorophenol, 2	95-57-8	**2**	**2**	**2**	130	1,100	1,100	2		1.3	
Chlorotoluene, 2 (o)	95-49-8	**15**	**15**	**15**	680	5,900	5,900	15		0.1	

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)
Chlorotoluene, 4 (p)	106-43-4	**680**	**5,900**	**5,900**	680	5,900	5,900			0.1	
Chromium (III)	16065-83-1	**1,000**	**2,500**	**5,000**	56,000	490,000	490,000	NM	33	2	(3)
Chromium (VI)	18540-29-9	**130**	**130**	**130**	3	9	89	NM	33	130	
Clopyralid	1702-17-6							NM		NA	
Cyanazine	21725-46-2	**0.03**	**0.03**	**0.03**	1	4	47	0.03		NA	
Cyanide	57-12-5	**22①**	**100①**	**200①**	22	200	200	NM		5	
Dalapon	75-99-0	**3**	**3**	**3**	790	6,500	6,500	3		0.87	
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	**6**	**17**	**180**	6	17	180	NCM		0.09	
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	**4**	**12**	**130**	4	12	130	NCM		0.07	
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	**4**	**12**	**62**	4	12	62	NCM		0.04	
Dibromochloromethane	124-48-1	**1**	**1**	**1**	16	49	510	1		0.1	
Dibromochloropropane	96-12-8	**0.1**	**0.1**	**0.1**	2	5	25	0.006		0.1	
Dibutylphthalate	84-74-2	**2,600**	**22,000**	**22,000**	2,600	22,000	22,000	NCM		0.66	
Dichlorobenzene, 1,2 (oDCB)	95-50-1	**88**	**88**	**88**	3,060	27,000	27,000	88		0.1	
Dichlorobenzene, 1,3 (mDCB)	541-73-1	**150**	**150**	**150**				150		0.1	
Dichlorobenzene, 1,4 (pDCB)	106-46-7	**7**	**7**	**7**	240	760	8,000	7		0.1	
Dichlorobenzidine, 3,3'	91-94-1	**0.7**	**0.7**	**0.7**	2	7	88	0.2		0.66	
Dichlorodifluoromethane	75-71-8	**1,000**	**2,500**	**5,000**	7,700	70,000	70,000	6.00E+12		0.1	(3)
Dichloroethane, 1,1	75-34-3	**3**	**3**	**3**	260	860	7,900	3		0.1	
Dichloroethane, 1,2	107-06-2	**0.1**	**0.1**	**0.1**	14	45	470	0.08		0.1	
Dichloroethene, 1,1	75-35-4	**14**	**14**	**14**	1,900	17,000	17,000	14		0.1	
Dichloroethylene, cis1,2	156-59-2	**2**	**2**	**2**	77	700	700	2		0.1	
Dichloroethylene, trans1,2	156-60-5	**9**	**9**	**9**	770	7,000	7,000	9		0.1	
Dichloromethane (Methylene chloride)	75-09-2	**0.1**	**0.1**	**0.1**	200	650	6,000	0.1		0.1	
Dichlorophenol, 2,4	120-83-2	**0.7**	**0.7**	**0.7**	79	650	650	0.4		0.66	
Dichlorophenooxyacetic acid, 2, 4- (2,4-D)	94-75-7	**300**	**300**	**300**	310	2,700	2,700	300		0.13	
Dichloropropane, 1,2	78-87-5	**0.1**	**0.1**	**0.1**	37	110	1200	0.1		0.1	
Dichloropropene, 1,3	542-75-6	**0.1**	**0.1**	**0.1**	13	41	430	0.1		0.1	
Dieldrin	60-57-1	**0.06**	**0.2**	**2**	0.06	0.2	2	NCM		0.06	
Diethyl ether	60-29-7	**3,900**	**3,900**	**3,900**	7,700	69,800	69,800	3,900		0.1	
Diethyl phthalate	84-66-2	**1,000**	**2,500**	**5,000**	21,000	170,000	170,000	NM		0.66	(3)
Di-(2-ethylhexyl)phthalate (DEHP)	117-81-7	**72**	**220**	**2,300**	72	220	2,300	NCM		0.66	
Diisopropyl ether (DIPE)	108-20-3	**10**	**10**	**10**	660	5,900	5,900	10		0.1	
Dimethyl phthalate	131-11-3	**700**	**700**	**700**				700		0.66	
Dimethylphenol, 2,4	105-67-9	**4**	**4**	**4**	530	4,300	4,300	4.00		0.66	

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)
Dinitrophenol, 2,4	51-28-5	**0.7**	**0.7**	**0.7**	53	430	430	0.2		0.66	
Dinitrotoluene, 2,4	121-14-2	**0.7**	**0.7**	**0.7**	3	10	130	0.2		0.66	
Dinoseb	88-85-7	**1**	**1**	**1**	26	220	220	1		0.13	
Dioxane, 1,4-	123-91-1	**5**	**5**	**5**	13	41	432	0.003		5	
Diphenylhydrazine, 1,2	122-66-7	**1**	**4**	**4**	1	4	50	4		NA	
Diquat (dibromide)	85-00-7	**0.3**	**0.3**	**0.3**	58	470	470	0.3		NA	
Endosulfan	115-29-7	**45**	**45**	**45**	160	1,300	1,300	45		0.09	
Endothall	145-73-3	**1**	**1**	**1**	530	4,300	4,300	1		NA	
Endrin	72-20-8	**8**	**65**	**65**	8	65	65	NCM		0.1	
Ethyl tert butyl ether (ETBE)	637-92-3	**0.7**	**0.7**	**0.7**	2,050	18,000	18,000	0.7		0.1	
Ethylbenzene	100-41-4	**120**	**140**	**140**	120	380	3,900	140		0.1	
Ethylene dibromide	106-93-4	**0.1**	**0.1**	**0.1**	0.7	2	22	0.0007		0.1	
Ethylene glycol	107-21-1	**93**	**93**	**93**	53,000	430,000	430,000	93		50	
Fluoride	7782-41-4	**2,200**	**20,000**	**20,000**	2,200	19,800	19,800	NM		NA	
Formaldehyde	50-00-0	**1**	**1**	**1**	7,700	70,000	70,000	1		NA	
Heptachlor	76-44-8	**0.2**	**0.7**	**9**	0.2	0.7	9	NCM		0.01	
Heptachlor epoxide	1024-57-3	**0.1**	**0.3**	**2**	0.1	0.3	2	NCM		0.1	
Hexachlorobenzene	118-74-1	**0.8**	**3**	**27**	0.8	3	27	NCM		0.66	
Hexachlorobutadiene	87-68-3	**17**	**53**	**120**	17	53	120	NCM		0.1	
Hexachlorocyclohexane, alpha	319-84-6	**0.06**	**0.06**	**0.06**	0.2	0.6	7	0.002		0.06	
Hexachlorocyclohexane, beta	319-85-7	**0.06**	**0.06**	**0.06**	0.7	2	24	0.04		0.06	
Hexachlorocyclohexane, gamma	58-89-9	**0.09**	**0.09**	**0.09**	1	4	37	0.002		0.09	
Hexachlorocyclopentadiene	77-47-4	**200**	**1,800**	**1,800**	200	1,800	1,800	NCM		0.66	
Hexachlorodibenzodioxin, 2,3,7,8-	34465-46-8							NCM		0.00001	
Hexachloroethane	67-72-1	**0.7**	**0.7**	**0.7**	24	103	103	0.2		0.66	
Isophorone	78-59-1	**1**	**1**	**1**	1,060	3,200	23,000	1		0.66	
Isopropyl benzene (Cumene)	98-82-8	**330**	**330**	**330**	3,400	30,000	30,000	330		0.1	
Isopropyl toluene, p-	99-87-6							NCM		0.1	
Lead	7439-92-1	**400②**	**400②**	**400②**	NA	NA	NA	NM	51	11	
Manganese	7439-96-5	**1,000**	**2,500**	**5,000**	5,200	46,000	46,000	NM		0.25	
Mercury (inorganic salts)	7439-97-6	**7**	**52**	**52**	7	52	52	NM	0.3	0.2	
Methanol	67-56-1	**50**	**50**	**50**	19,000	170,000	170,000	50		1	
Methoxychlor	72-43-5	**130**	**1,100**	**1,100**	130	1,100	1,100	NCM		NA	
Methyl chloride (chloromethane)	74-87-3	**3**	**3**	**3**				3		0.1	
Methyl ethyl ketone (2butanone)	78-93-3	**51**	**51**	**51**	20,000	180,000	180,000	51		0.5	

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)
Methyl isobutyl ketone (4methyl2pentanone)	108-10-1	**29**	**29**	**29**	2,700	24,000	24,000	29		0.5	
Methyl mercury	22967-92-6	**3**	**22**	**22**	3	22	22	NM		0.001	
Methyl phenol, 2	95-48-7	**0.9**	**0.9**	**0.9**	1,300	11,000	11,000	0.9		0.66	
Methyl phenol, 4	106-44-5	**0.7**	**0.7**	**0.7**	2600	21,600	21,600	0.6		0.66	
Methyl tert butyl ether	1634-04-4	**0.2**	**0.2**	**0.2**	540	1,700	16,000	0.2		0.1	
Methyl-4-chlorophenoxy, 2-, 2-propionic acid (MCPP)	93-65-2	**26**	**220**	**220**	26	220	220	NM		0.066	
Methyl-4-chlorophenoxyacetic acid, 2- (MCPA)	94-74-6	**13**	**110**	**110**	13	110	110	NM		0.043	
Metolachlor	51218-45-2	**3**	**3**	**3**	3,900	32,000	32,000	3		0.66	
Metribuzin	21087-64-9	**6**	**6**	**6**	660	5,400	5,400	6		0.66	
Monochlorobenzene	108-90-7	**6**	**6**	**6**	680	5,900	5,900	6		0.1	
Nickel	7440-02-0	**400**	**2,500**	**3,100**	400	3,100	3,100	NM	23	4	(3)
Oxamyl	23135-22-0	**2**	**2**	**2**	660	5,400	5,400	2		0.015	
Pentachlorophenol	87-86-5	**3**	**3**	**3**	1.7	5	85	0.06		3.3	
Phenol	108-95-2	**22**	**22**	**22**	7,900	65,000	65,000	22		0.66	
Picloram	1918-02-1	**6**	**6**	**6**	1,800	15,000	15,000	6		0.09	
Polychlorinated Biphenyls (PCBs)	1336-36-3	**1③**	**10③**	**25③**	0.4	1	19	NCM		0.3	
Propyl benzene, n-	103-65-1	**85**	**85**	**85**	3,400	30,000	30,000	85		0.1	
Selenium	7782-49-2	**180**	**1,600**	**1,600**	180	1,600	1,600	NM	5	20	
Silver	7440-22-4	**89**	**690**	**690**	89	690	690	NM		2.5	
Simazine	122-34-9	**0.4**	**0.4**	**0.4**	8	25	330	0.4		NA	
Strontium, non-radioactive	7440-24-6	**91**	**91**	**91**	22,000	198,000	76000	91			
Styrene	100-42-5	**17**	**17**	**17**	6,800	59,000	59,000	17		0.1	
Sulfate	14808-79-8										
TCDD, 2,3,7,8 (Dioxin)	1746-01-6	**0.001④**	**0.005④**	**0.02④**	1.00E-05	3.20E-05	1.24E-04	NCM		5.00E-06	
Tertiary amyl methyl ether (TAME)	994-05-8	**3**	**3**	**3**	680	5,900	5,900	3		0.1	
Tertiary butyl alcohol (TBA)	75-65-0	**2**	**2**	**2**	2,000	18,000	18,000	0.5		2.5	
Tetrachloroethane 1,1,1,2	630-20-6	**0.8**	**0.8**	**0.8**	51	160	1,700	0.8		0.1	
Tetrachloroethane 1,1,2,2	79-34-5	**4**	**4**	**4**	7	21	220	4		0.1	
Tetrachloroethylene	127-18-4	**2**	**2**	**2**	204	1,770	1,770	2		0.1	
Tetrachlorophenol 2,3,4,6	58-90-2	**130**	**130**	**130**	790	6,500	6,500	130		0.66	
Tetrahydrofuran	109-99-9							NM		0.5	
Thallium (Total)	7440-28-0	**10**	**10**	**10**	0.4	3.3	3.3	NM		10	
Toluene	108-88-3	**100**	**100**	**100**	2,700	24,000	24,000	100		0.1	
Total Petroleum Hydrocarbons		**10,000**	**10,000**	**10,000**	10,000	10,000	10,000	NM			
Toxaphene	8001-35-2	**1**	**4**	**39**	1	4	39	NCM		0.8	
2,4,5-TP (Silvex)	93-72-1	**60**	**60**	**60**	210	1,700	1,700	60		0.05	

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)
Trichlorobenzene, 1,2,4	120-82-1	**19**	**19**	**19**	45	170	1,300	19		0.66	
Trichlorobenzene, 1,3,5	108-70-3							NM		0.1	
Trichloroethane, 1,1,1	71-55-6	**78**	**78**	**78**	77,000	590,000	590,000	78		0.1	
Trichloroethane, 1,1,2	79-00-5	**0.1**	**0.1**	**0.1**	23	72	490	0.1		0.1	
Trichloroethylene	79-01-6	**0.8**	**0.8**	**0.8**	17	106	106	0.8		0.1	
Trichlorofluoromethane	75-69-4	**1,000**	**2,500**	**5,000**	12,000	100,000	100,000	710,000		0.1	(3)
Trichloromethane (Chloroform)	67-66-3	**3**	**3**	**3**	49	98	1,100	3		0.1	
Trichlorophenol 2,4,6	88-6-2	**0.7**	**0.7**	**0.7**	26	290	290	0.2		0.66	
Trichlorophenol, 2,4,5	95-95-4	**24**	**24**	**24**	2,600	22,000	22,000	24		0.66	
Trichloropropane, 1,2,3	96-18-4	**0.1**	**0.1**	**0.6**	0.04	0.1	1	0.6		0.1	
Trimethylbenzene, 1,2,4	95-63-6	**130**	**130**	**130**				130		0.1	
Trimethylbenzene, 1,3,5	108-67-8	**96**	**96**	**96**	340	2,900	2,900	96		0.1	
Vinyl chloride	75-01-4	**1**	**7**	**9**	1	7	62	9		0.1	
Xylenes (mixed isomers)	1330-20-7	**500**	**1,000**	**1,500**	6,800	59,000	59,000	1500		0.1	(1)
Zinc	7440-66-6	**1,000**	**2,500**	**5,000**	10,600	93,000	93,000	NM	98	1.25	(3)
Polynuclear Aromatic Hydrocarbons - Carcinogenic											
Benzo(a)anthracene	56-55-3	**1**	**4**	**52**	1	4	52	NCM		0.66	
Benzo(a)pyrene	50-32-8	**0.7**	**0.7**	**5**	0.1	0.4	5	NCM		0.66	
Benzo(b)fluoranthene	205-99-2	**1**	**4**	**52**	1	4	52	NCM		0.66	
Benzo(k)fluoranthene	207-08-9	**12**	**36**	**520**	12	36	520	NCM		0.66	
Chrysene	218-01-9	**120**	**360**	**5,200**	120	360	5,200	NCM		0.66	
Dibenzo(a,h)anthracene	53-70-3	**0.7**	**0.7**	**5**	0.1	0.4	5	NCM		0.66	
Indeno(1,2,3cd)pyrene	193-39-5	**1**	**4**	**52**	1	4	52	NCM		0.66	
Polynuclear Aromatic Hydrocarbons - Noncarcinogenic											
Acenaphthene	83-32-9	**340**	**340**	**340**	1,400	12,000	12,000	340		0.66	
Acenaphthylene	208-96-8	**490**	**490**	**490**				490		0.66	
Anthracene	120-12-7	**1,000**	**2,500**	**5,000**	7,200	58,000	58,000	NCM		0.66	(3)
Fluoranthene	206-44-0	**960**	**2,500**	**5,000**	960	7,700	7,700	NCM		0.66	(3)
Fluorene	86-73-7	**77**	**77**	**77**	960	7,700	7,700	77		0.66	
Methylnaphthalene, 2	91-57-6	**96**	**100**	**100**	96	770	770	100		0.66	
Naphthalene	91-20-3	**28**	**28**	**28**	480	3,900	3,900	28		0.66	
Benzo(g,h,i)perylene	191-24-2							NCM		0.66	(3)
Phenanthrene	85-01-8							NCM		0.66	(1)
Pyrene	129-00-0	**720**	**2,500**	**5,000**	720	5,800	5,800	NCM		0.66	(3)

Appendix E

METHOD 1 SOIL STANDARDS SELECTION

NHDES Risk Characterization and Management Policy

(1) Chemical Name	(2) CAS No.	(3) NH S-1 (mg/kg)	(4) NH S-2 (mg/kg)	(5) NH S-3 (mg/kg)	(6) Risk S-1 (mg/kg)	(7) Risk S-2 (mg/kg)	(8) Risk S-3 (mg/kg)	(9) Leaching (GW-1) (mg/kg)	(10) Back-ground (mg/kg)	(11) EQL (mg/kg)	(12) Ceiling Conc. (mg/kg)

Endnotes:

Column (1):	Chemical Name.
Column (2):	Chemical Abstract Service (CAS) Number
Column (3):	Method 1 Category S-1 Soil Standard.
Column (4):	Method 1 Category S-2 Soil Standard.
Column (5):	Method 1 Category S-3 Soil Standard.
Column (6):	Soil Category S-1 Direct Contact Risk-based Concentrations are based upon sensitive uses of property and accessible soils, either currently or in the reasonably foreseeable future.
Column (7):	Soil Category S-2 Direct Contact Risk-based Concentrations are based upon moderate exposure and accessible soil, either currently or in the reasonably foreseeable future.
Column (8):	Soil Category S-3 Direct Contact Risk-based Concentrations are based upon restricted access property with limited potential for exposure, either currently or in the reasonably foreseeable future.
Column (9):	Leaching-based Soil Values consider the potential of chemicals to leach from soil and contaminate the underlying groundwater. The SESOIL and AT123D models were combined to calculate the concentration of a chemical in soil that would not cause a violation of NHDES Ambient Groundwater Quality Standards in groundwater. **NCM**=Negligible Contaminant Migrations; i.e., Leaching models indicate negligible contaminant migration over thirty years. **NM**=Not Modeled. (1) Metals: Due to the difference in the chemical-specific properties of the various forms of naturally occurring metals in the environment, and site-specific conditions, predicting the leaching characteristics of metals is impractical. Whereas the Standards are based on other considerations, if metals exceed groundwater standards at a site, site-specific investigations may be required to evaluate the leaching potential of site metals. (2) Non-metals: The data necessary to run the models for non-metal chemicals was not readily available. Modeling input parameters are described in Appendix B.
Column (10):	Background concentrations of metals in soil from report entitled "Background Metals Concentration Study New Hampshire Soils," prepared for NHDES by Sanborn, Head & Associates, Inc., dated November 1998
Column (11):	Estimated Quantitation Limits (EQLs) were provided by the NHDES Laboratory Services Unit. The associated analytical methods are provided in Appendix C. **NA**=Not Applicable or Not Available.
Column (12):	(1) - the soil standard ceiling concentration was identified due to the contaminant's Odor Index value. (2) - the soil standard ceiling concentration was identified due to the contaminant's Vapor Pressure value. (3) - the soil standard ceiling concentration was identified due to the insufficient information to calculate an Odor Index.
NOTES: ①	Cyanide standards were developed using free cyanide toxicity and physical characteristics. Complex cyanide or other cyanide species can be addressed via Method 2 or 3 Risk Characterization methodologies. Note that the NH S-2 standard is based on acute effects rather than chronic.
②	A screening level of 400 mg/kg has been set for lead based on EPA's "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities" (U.S. EPA, 1984).
③	The PCB numbers are based on EPA's August 1990 "Guidance on Remedial Actions for Superfund Sites with PCB Contamination".
④	The Dioxin numbers are based on EPA's April 13, 1998 OSWER Directive 9200.4-26 "Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites," using Total Dioxin Equivalents (TEQs).