Table 2

METHOD 1 GROUNDWATER STANDARDS

NHDES Risk Characterization and Management Policy (Section 7.4(4))

CHEMICAL NAME	CAS No.	NH GW-1① µg/l (ppb)	NH GW-2② µg/l (ppb)
Acenaphthene	83-32-9	420	NA
Acenaphthylene	208-96-8	420	NA
Acetone	67-64-1	6,000	†
Acrylonitrile	107-13-1	5	†
Alachor	15972-60-8	2	NA
Aldicarb	116-06-3	7	NA
Aldicarb sulfone	1646-88-4	7	NA
Aldicarb sulfoxide	1646-87-3	7	NA
Aldrin	309-00-2	0.1	†
Allyl chloride	107-05-1	7.4	†
Anthracene	120-12-7	2,100	NA
Antimony	7440-36-0	6	NA
Arsenic	7440-38-2	10	NA
Atrazine	1912-24-9	3	†
Barium	7440-39-3	2,000	NA
Benzene	71-43-2	5	2,900
Benzidine	92-87-5	0.8	†
Benzo(a)anthracene	56-55-3	0.1	NA
Benzo(a)pyrene	50-32-8	0.2	NA
Benzo(b)fluoranthene	205-99-2	0.1	NA
Benzo(g,h,i)perylene	191-24-2	210	NA
Benzoic Acid	65-85-0	28,000	†
Benzo(k)fluoranthene	207-08-9	0.5	NA
Beryllium	7440-41-7	4	NA
Biphenyl, 1,1-	92-52-4	350	NA
bis-(2-chloroethyl)ether	111-44-4	10	†
bis-(2-chloroisopropyl)ether	39638-32-9	300	†
bis-(chloromethyl)ether	542-88-1	10	†
Bisphenol A	80-05-7	120	†
Boron	7440-42-8	620	†
Bromodichloromethane③	75-27-4	0.6	NA
Bromoform③	75-25-2	4	2,800
Bromomethane	74-83-9	10	10
Butylbenzene, n-	104-51-8	260	†
Butylbenzene, sec-	135-98-8	260	†
Butylbenzene, tert-	98-06-6	260	†
Cadmium	7440-43-9	5	NA
Camphor	76-22-2	200	†
Carbofuran	1563-66-2	40	†
Carbon disulfide	75-15-0	70	†
Carbon tetrachloride	56-23-5	5	10
Chlordane	57-74-9	2	NA

Table 2

METHOD 1 GROUNDWATER STANDARDS

NHDES Risk Characterization and Management Policy (Section 7.4(4))

CHEMICAL NAME	CAS No.	NH GW-1① µg/l (ppb)	NH GW-2② µg/l (ppb)
Chloroaniline, p-	106-47-8	28	NA
Chloromethane	74-87-3	30	†
Chlorophenol, 2-	95-57-8	35	NA
Chlorotoluene, o-	95-49-8	100	†
Chlorotrifluoroethylene (CFC-1113)	79-38-9	5	†
Chromium (Total)	7440-47-3	100	NA
Chrysene	218-01-9	5	NA
Clopyralid (Stinger 3SC)	1702-17-6	3,500	†
Copper	7440-50-8	1,300	†
Cyanazine (Bladex 4L/90DF)	21725-46-2	1	†
Cyanide	57-12-5	200	NA
2,4-D (Dichlorophenoxy acetic acid, 2,4-)	94-75-7	70	†
Dalapon	75-99-0	200	†
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	0.1	NA
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	0.1	NA
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	0.1	NA
Dibenzo(a,h)anthracene	53-70-3	0.1	NA
Dibromochloromethane③	124-48-1	60	NA
Dibromochloropropane	96-12-8	0.2	†
Dibutylphthalate	84-74-2	800	†
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	600	14,000
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	600	†
Dichlorobenzene, 1,4- (p-DCB)	106-46-7	75	80
Dichlorobenzidine, 3,3'-	91-94-1	1.3	NA
Dichlorodifluoromethane (Freon 12)	75-71-8	1,000	†
Dichloroethane, 1,1-	75-34-3	81	130
Dichloroethane, 1,2-	107-06-2	5	50
Dichloroethylene, 1,1-	75-35-4	7	630
Dichloroethylene, cis-1,2-	156-59-2	70	NA
Dichloroethylene, trans-1,2-	156-60-5	100	560
Dichloromethane (Methylene chloride)	75-09-2	5	24,000
Dichlorophenol, 2,4-	120-83-2	21	NA
Dichloropropane, 1,2-	78-87-5	5	50
Dichloropropene, 1,3-	542-75-6	0.5	†
Dieldrin	60-57-1	0.1	NA
Diethyl ether (ethyl ether)	60-29-7	1,400	†
Di (ethylhexyl)adipate	103-23-1	400	†
Di (2-ethylhexyl)phthalate	117-81-7	6	†
Diisopropyl ether (DIPE)	108-20-3	120	†
Dimethyl phthalate	131-11-3	50,000	NA
Dimethylphenol, 2,4-	105-67-9	140	NA
Dinitrophenol, 2,4-	51-28-5	14	NA

Table 2

METHOD 1 GROUNDWATER STANDARDS

NHDES Risk Characterization and Management Policy (Section 7.4(4))

CHEMICAL NAME	CAS No.	NH GW-1① µg/l (ppb)	NH GW-2② µg/l (ppb)
Dinitrotoluene, 2,4-	121-14-2	10	NA
Dinoseb	88-85-7	7	†
1,4-Dioxane	123-91-1	3	†
1,2-Diphenylhydrazine	122-66-7	10	†
Diquat	85-00-7	20	†
Endosulfan	115-29-7	42	NA
Endothall	145-73-3	100	†
Endrin	72-20-8	2	NA
Ethylbenzene	100-41-4	700	1,500
Ethylene dibromide	106-93-4	0.05	35
Ethylene glycol	107-21-1	7,000	†
Ethyl tert butyl ether (ETBE)	637-92-3	40	†
Fluoranthene	206-44-0	280	NA
Fluorene	86-73-7	280	NA
Fluoride	16984-48-8	4,000	†
Formaldehyde	50-00-0	100	†
Glyphosate	1071-83-6	700	†
Gross alpha radionuclides		15 Pci/L	†
Heptachlor	76-44-8	0.4	NA
Heptachlor epoxide	1024-57-3	0.2	NA
Hexachlorobenzene	118-74-1	1	NA
Hexachlorobutadiene	87-68-3	0.5	†
Hexachlorocyclohexane, alpha	319-84-6	0.1	†
Hexachlorocyclohexane, beta	319-85-7	0.1	†
Hexachlorocyclohexane, gamma	58-89-9	0.2	NA
Hexachlorocyclopentadiene	77-47-4	50	†
Hexachloroethane	67-72-1	1.0	†
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	NA
Isophorone	78-59-1	100	†
Isopropyl benzene (Cumene)	98-82-8	800	NA
Isopropyltoluene, p	99-87-6	260	†
Lead	7439-92-1	15	NA
Manganese	7439-96-5	840	NA
Mercury	7439-97-6	2	NA
Methanol	67-56-1	4000	†
Methoxychlor	72-43-5	40	NA
Methyl ethyl ketone (MEK)	78-93-3	4,000	50,000
Methyl isobutyl ketone (MIBK)	108-10-1	2,000	50,000
Methylnaphthalene, 2-	91-57-6	280	†
Methyl phenol, 2-	95-48-7	40	†
Methyl phenol, 4-	106-44-5	40	†
Methyl tert butyl ether (MtBE)	1634-04-4	13	2,600

Table 2

METHOD 1 GROUNDWATER STANDARDS

NHDES Risk Characterization and Management Policy (Section 7.4(4))

CHEMICAL NAME	CAS No.	NH GW-1① µg/l (ppb)	NH GW-2② µg/l (ppb)
Metolachlor	51218-45-2	70	†
Metribuzin	21087-64-9	100	†
Monochlorobenzene (Chlorobenzene)	108-90-7	100	1,500
Naphthalene	91-20-3	20	1,700
Nickel	7440-02-0	100	NA
Nitrate	14797-55-8	10,000	†
Nitrite	14797-65-0	1,000	†
Oxamyl	23135-22-0	200	†
Pentachlorophenol	87-86-5	1	NA
Phenanthrene	85-01-8	210	NA
Phenol	108-95-2	4,000	†
Picloram	1918-02-1	500	†
Polychlorinated biphenyls (PCBs)	1336-36-3	0.5	NA
Potassium	7440-09-7	35,000	†
n-Propylbenzene	103-65-1	260	†
Pyrene	129-00-0	210	NA
Radium 226 and 228	7740-14-4	5 Pci/L	†
Selenium	7782-49-2	50	NA
Silver	7440-22-4	100	NA
Simazine	122-34-9	4	†
Strontium 90	10098-97-2	8 Pci/L	†
Styrene	100-42-5	100	43,000
Sulfate	14808-79-8	500,000	†
TCDD, 2,3,7,8- (Dioxin)	1746-01-6	0.00003	NA
Tertiary amyl methyl ether (TAME)	994-05-8	140	†
Tertiary butyl alcohol (TBA)	75-65-0	40	†
Tetrachloroethane, 1,1,1,2-	630-20-6	70	†
Tetrachloroethane, 1,1,2,2,-	79-34-5	2	120
Tetrachloroethylene (PCE)	127-18-4	5	240
Tetrachlorophenol, 2,3,4,6	58-90-2	200	†
Tetrahydrofuran	109-99-9	154	†
Thallium (Total)	7440-28-0	2	NA
Toluene	108-88-3	1,000	50,000
Total Coliform		CTS/100ml	†
Toxaphene	8001-35-2	3	†
2,4,5-TP (Silvex)	93-72-1	50	†
Trichlorobenzene, 1,2,4-	120-82-1	70	150
Trichlorobenzene, 1,3,5-	108-70-3	40	†
Trichloroethane, 1,1,1-	71-55-6	200	27,000
Trichloroethane, 1,1,2-	79-00-5	5	20
Trichloroethylene (TCE)	79-01-6	5	20
Trichlorofluoromethane (Freon 11)	75-69-4	2,000	†

Table 2

METHOD 1 GROUNDWATER STANDARDS

NHDES Risk Characterization and Management Policy (Section 7.4(4))

CHEMICAL NAME	CAS No.	NH GW-1① µg/l (ppb)	NH GW-2② µg/l (ppb)
Trichloromethane (Chloroform)③	67-66-3	70	70
Trichlorophenol, 2,4,5-	95-95-4	700	NA
Trichlorophenol, 2,4,6-	88-06-2	5	†
Trichloropropane, 1,2,3-	96-18-4	40	†
Trimethylbenzene, 1,2,4-	95-63-6	330	1,300
Trimethylbenzene, 1,3,5-	108-67-8	330	
Tritium	10028-17-8	20,000 Pci/L	†
Vinyl chloride	75-01-4	2	4
Xylenes (mixed isomers)	1330-20-7	10,000	17,000

Endnotes:

① The NH GW-1 values are equivalent to the Ambient Ground Water Quality Standards which can be found in rule Env-Or 600 Contaminated Site Management.

② Category GW-2 groundwater is considered to be a potential source of vapors of contaminants to indoor air. The GW-2 values are intended to provide guidelines on when it may be appropriate to examine the indoor air exposure pathway. The GW-2 groundwater category is intended to be used where VOCs (non-petroleum) are detected in groundwater within 100 feet (vertically or horizontally) of an occupied building. At petroleum hydrocarbon sites, the GW-2 screening values are intended to be applied where petroleum VOCs are detected in groundwater within 30 feet (vertically or horizontally) of an occupied building.

③ The Ambient Ground Water Quality Standard for total trihalomethanes, namely bromoform, bromodichloromethane, dibromochloromethane and trichloromethane (chloroform), shall be 80 micrograms per liter (ug/L) if the groundwater is contaminated by chlorinated water supplies.

† GW-2 groundwater guidelines are not currently available for these chemicals.

NA Not Applicable.

Appendix A

Methodology for Calculating Direct Contact Risk-Based Soil Concentrations

Contents

Abbreviations and Acronyms:

AF - Adherence Factor
BW - Body Weight
CASRN - Chemical Abstracts Service Registration Number
cm^2 - Centimeter Squared
CSF - Cancer Slope Factor
DCRB - Direct Contact Risk Based
DES - Department of Environmental Services
DRV - Dose Response Value
ED - Exposure Duration
kg -Kilogram
mg - Milligram
RAFo - Relative Absorption Factor oral
RAFd - Relative Absorption Factor dermal
RAGS – Risk Assessment Guidance for Superfund
RfD - Reference Dose
RSC - Relative Source Contribution
SA – Surface Area
TBSA - Total Body Surface Area
USEPA – United States Environmental Protection Agency

A. 1 Introduction to Methodology

A.1.1 Purpose

This appendix provides the rationale for the methodology used by the New Hampshire Department of Environmental Services (DES) to derive direct contact risk based (DCRB) soil concentrations considered to be protective of certain land uses that correspond to the different levels of human exposure potential described in Chapter 3 of this policy. The DCRB soil concentrations are the concentrations of chemicals in soil that are not anticipated to present an appreciable increase health risk to people who are exposed through contact with the soils.

The three different soil categories (S-1, S-2, and S-3) are intended to describe the range of potential human exposure situations found at different types of sites in terms of accessibility, frequency and intensity of usage. The DCRB concentrations for each soil exposure category are derived using methodology that incorporates standard risk assessment principles and United States Environmental Protection Agency (USEPA) guidance as described in this appendix.

A.1.2 General Approach

The DCRB soil concentrations account for exposures that may result from incidental ingestion and dermal exposure to soils. The DCRB concentrations do not take into account potential exposure via inhalation, or potential indirect-exposure pathways such as through migration via runoff to nearby surface water bodies or bioaccumulation in the food chain.

For non-carcinogenic effects, the DCRB concentration is 20% of the allowable daily intake derived using a toxicity reference dose (RfD). For carcinogenic chemicals that have an available cancer slope factor (CSF), the DCRB concentration is set at a level protective of an excess lifetime cancer risk of one-in-one million. For chemicals that have both a RfD and a CSF, the DCRB concentration is calculated for both carcinogenic and non-carcinogenic hazards and the lower of these two values is adopted as the DCRB concentration.

Section 8.4 of this policy provides simplified equations that can be used to derive additional Method 1 soil standards for use in Method 2.

A.2 Direct Contact Risk Based Concentration Calculation

A.2.1 Equations

The DCRB concentration protective of non-carcinogenic risks associated with direct contact with contaminated soils is calculated using the equation:

$$\text{Conc.}_{soil}\ (\text{mg/kg}) = \frac{\text{RSCFi} * \text{RfD} * \text{CF}}{[(\text{IRi} * \text{RAFo}) + (\text{SAi} * \text{AF} * \text{RAFd})] * [(\text{EF} * \text{ED})/(\text{AT} * \text{Bwi})]}$$

The DCRB concentration protective against a predetermined *de minimus* carcinogenic risk posed by direct contact with contaminated soils is calculated using the equation:

$$\text{Conc.}_{soil} = \frac{\text{ELCR} * \text{CF}}{\text{CSF} * [\ \{\sum (\text{IRi} * \text{EF} * \text{EDi} * \text{RAFo} / \text{AT} * \text{BWi})\} + \{\sum (\text{SAi} * \text{EF} * \text{ED} * \text{AF} * \text{RAFd} / \text{AT} * \text{BWi})\}\ ]}$$

Where:

Conc._{soil} = Risk-based concentration in soil for the chemical (mg/kg).

RSCFi = Relative Source Contribution Factor. DES recommends using a value of 0.2.

RfD = Oral Reference Dose (or substitute toxicity value) for the chemical being evaluated (mg/kg-day).

CF = Units Conversion Factor: 10^{6} (mg/kg).

IRi = Daily soil ingestion rate that applies to the i^{th} age category and specific intensity of land use (mg/day).

RAF = Relative Absorption Factors for soil ingestion or dermal contact (unitless).

SAi = Skin surface area available for soil contact for the i^{th} age and exposure category ($cm^{2)}$).

AF = Soil-to-Skin Adherence Factor (mg/cm^{2}).

EF = Exposure Frequency applicable to exposure category (days/year).

EDi = Exposure Duration for the i^{th} age and exposure category (years).

AT = Period of exposure for non-carcinogenic effects (ED * 365 days), and 70-year lifetime for carcinogenic effects (70 years * 365 days/year) (days).

BWi = Body Weight that applies to the i^{th} age category (kg).

ELCR = Target Excess Lifetime Cancer Risk: 1×10^{-6} (unitless).

CSF = Oral Cancer Slope Factor for the chemical being evaluated $(\text{mg/kg-day})^{-1}$.

Subscript "i": For age specific exposure assumptions (body weight, soil ingestion rate, surface area available for soil contact, and exposure duration) "i" represents the age groups as follows: i = 1 is a child aged 2 - 6 years, i = 2 is a child aged 7 - 16 years, and i = 3 is representative of an adult.

A.2.2 Chemical Specific Parameters

A.2.2.1 Dose-Response Information

Dose-response information provides a quantitative evaluation of toxicity and describes the relationship between the dose of a chemical and the potential for adverse health effects in the exposed population. USEPA has performed toxicity assessments and derived dose-response values (DRVs) such as reference doses (RfDs) and cancer slope factors (CSFs), for numerous chemicals that are commonly detected at hazardous waste sites.

DES has adopted the USEPA recommended hierarchy of toxicity sources as identified in the December 5, 2003 Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7-53 (USEPA 2003). The preferred source of DRVs is the USEPA Integrated Risk Information System (IRIS), (USEPA 2007a), followed by USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) (USEPA 2007b), and then the most conservative values available from alternative sources including New Hampshire derived DRVs, DRVs from the Agency to Toxic Substances and Disease Control (ATSDR 2007), the California Environmental Protection Agency, and the USEPA Health Effects Summary Tables (HEAST) (USEPA 1997b). USEPA has provided a summary of the preferred toxicity values according to the hierarchy in the Regional Screening Level (RSL) summary table (RSL 2011). All DRVs used to derive DCRB concentrations in this policy are provided in Table 1.

Non-Cancer Threshold Effects
For many non-carcinogenic chemicals, it is assumed that a range of doses from zero to some finite value can be tolerated with essentially no chance of expression of an adverse effect. The RfD represents the human exposure dose at or below which deleterious non-carcinogenic effects are not anticipated to occur. A more detailed description of the RfD may be found in Part A of the USEPA Risk Assessment Guidance for Superfund (Volume 1) Human Health Evaluation Manual (USEPA 1989).

Carcinogenic Effects
As opposed to non-carcinogenic effects, it is generally assumed that there is no threshold dose for carcinogenicity, and that there is no dose of a carcinogenic substance (other than zero exposure) that is zero risk. For carcinogenic chemicals the CSF quantitatively defines the relationship between dose and response. CSF values are typically derived from animal studies, however for certain chemicals these were derived from human epidemiology studies. Using data derived from animal studies, the CSF is an estimate of the upper 95% confidence limit of the slope of the dose-response curve extrapolated to low doses. The CSF is expressed in units of $(mg/kg\text{-}day)^{-1}$.

Oral CSFs were used to evaluate both oral and dermal exposure to carcinogens. For chemicals with both a CSF and RfD, separate DCRB concentrations were calculated based on protection against both non-cancer effects and carcinogenic effects. The lower (more protective) of these two values is used.

Table 1- Human Health Dose Response Values used to Develop Direct Contact Risk Based Concentrations

Compound	CAS No.	Chronic RfD mg/kg-d	Source for RfD	CSF $(mg/kg\text{-}day)^{-1}$	Source for CSF
Acetone	67-64-1	9.0E-01	RSL 11/2012	-	-
Acrylonitrile	107-13-1	4.0E-2	RSL 11/2012	5.4E-01	RSL 11/2012
Aldicarb	116-06-3	1.0E-03	RSL 11/2012	-	-
Aldicarb sulfone	1646-88-4	1.0E-03	RSL 11/2012	-	-
Aldicarb sulfoxide	1646-87-3			-	-
Aldrin	309-00-2	3.0E-05	RSL 11/2012	1.7E+01	RSL 11/2012
Allyl chloride	107-05-1			2.1E-02	RSL 11/2012
Alachlor	15972-60-8	1.0E-02	RSL 11/2012	5.6E-02	RSL 11/2012
Antimony	7440-36-0	4.0E-04	RSL 11/2012	-	-
Arsenic	7440-38-2	3.0E-04	RSL 11/2012	1.5E+00	RSL 11/2012
Atrazine	1912-24-9	3.5E-02	RSL 11/2012	2.3E-01	RSL 11/2012
Barium	7440-39-3	2.0E-01	RSL 11/2012	-	-
Benzene	71-43-2	4.0E-03	RSL 11/2012	5.5E-02	RSL 11/2012
Benzidine	92-87-5	3.0E-03	RSL 11/2012	2.3E+02	RSL 11/2012
Benzoic acid	65-85-0	4.0E+00	RSL 11/2012	-	-
Beryllium	7440-41-7	2.0E-03	RSL 11/2012	-	-
Biphenyl, 1,1-	92-52-4	5.0E-02	RSL 11/2012	8.0E-03	RSL 11/2012
Bisphenol A	80-05-7	5.0E-02	RSL 11/2012	-	-
Boron	7440-42-8	2.0E-01	RSL 11/2012	-	-
Bromobenzene	108-86-1	8.0E-03	RSL 11/2012		
Bromodichloromethane	75-27-4	2.0E-02	RSL 11/2012	6.2E-02	RSL 11/2012
Bromoform	75-25-2	2.0E-02	RSL 11/2012	7.9E-03	RSL 11/2012
Bromomethane	74-83-9	1.4E-03	RSL 11/2012	-	-
n- Butylbenzene	104-51-8	5.0E-02	RSL 11/2012	-	-
sec-Butylbenzene	135-98-8	-	-	-	-
tert-Butylbenzene	98-06-6	-	-	-	-
Cadmium	7440-43-9	1.0E-03	RSL 11/2012	-	-
Camphor	76-22-2	-	-	-	-
Carbofuran	1563-66-2	5.0E-03	RSL 11/2012	-	-
Carbon disulfide	75-15-0	1.0E-01	RSL 11/2012	-	-
Carbon tetrachloride	56-23-5	4.0E-03	RSL 11/2012	7.0E-02	RSL 11/2012
Chlordane	57-74-9	5.0E-04	RSL 11/2012	3.5E-01	RSL 11/2012
Chloroaniline,p-	106-47-8	4.0E-03	RSL 11/2012	2.0E-01	RSL 11/2012
bis-(Chloroethyl)ether	111-44-4	-	-	1.1E+00	RSL 11/2012
bis-(2-Chloroisopropyl) ether	39638-32-9	-	-	-	-
Chlorophenol, 2-	95-57-8	5.0E-03	RSL 11/2012	-	-
Chlorotoluene, 2 (o)	95-49-8	2.0E-02	RSL 11/2012	-	-
Chlorotoluene, 4 (p)	106-43-4	2.0E-02	RSL 11/2012	-	-
Chromium (III)	16065-83-1	1.5E+00	RSL 11/2012	-	-
Chromium (VI)	18540-29-9	3.0E-03	RSL 11/2012	5.0E-01	RSL 11/2012
Clopyralid	170-17-6	-	-	-	-
Cyanide (CN^-)	57-12-5	6.0E-04	RSL 11/2012	-	-
Cyanazine	21725-46-2	2.0E-03	RSL 11/2012	8.4E-01	RSL 11/2012
2,4-D(Dichlorophenooxyacetic acid, 2, 4-)	94-75-7	1.0E-02	RSL 11/2012	-	-
Dalapon	75-99-0	3.0E-02	RSL 11/2012	-	-
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	-	-	2.4E-01	RSL 11/2012
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	-	-	3.4E-01	RSL 11/2012
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	5.0E-04	RSL 11/2012	3.4E-01	RSL 11/2012
Dibromochloromethane	124-48-1	2.0E-02	RSL 11/2012	8.4E-02	RSL 11/2012
Dibromochloropropane	96-12-8	2.0E-04	RSL 11/2012	8.0E-01	RSL 11/2012
Dibutylphthalate	84-74-2	1.0E-01	RSL 11/2012	-	-
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	9.0E-02	RSL 11/2012	-	-
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	-	-	-	-
Dichlorobenzene, 1,4- (p-DCB)	106-46-7	7.0E-02	RSL 11/2012	5.4E-03	RSL 11/2012
Dichlorobenzidine, 3,3'-	91-94-1	-	-	4.5E-01	RSL 11/2012
Dichlorodifluoromethane	75-71-8	2.0E-01	RSL 11/2012	-	-
Dichloroethane, 1,1-	75-34-3	2.0E-01	RSL 11/2012	5.7E-03	RSL 11/2012
Dichloroethane, 1,2-	107-06-2	6.0E-03	RSL 11/2012	9.1E-02	RSL 11/2012
Dichloroethene, 1,1-	75-35-4	5.0E-02	RSL 11/2012	-	-
Dichloroethylene, cis-1,2-	156-59-2	2.0E-03	RSL 11/2012	-	-
Dichloroethylene, trans-1,2-	156-60-5	2.0E-02	RSL 11/2012	-	-
Dichloromethane (Methylene chloride)	75-09-2	6.0E-02	RSL 11/2012	7.5E-03	RSL 11/2012
Dichlorophenol, 2,4-	120-83-2	3.0E-03	RSL 11/2012	-	-
Dichloropropane, 1,2-	78-87-5	9.0E-02	RSL 11/2012	3.6E-02	RSL 11/2012

Compound	CAS No.	Chronic RfD mg/kg-d	Source for RfD	CSF $(mg/kg\text{-}day)^{-1}$	Source for CSF
Dichloropropene, 1,3-	542-75-6	3.0E-02	RSL 11/2012	1.0E-01	RSL 11/2012
Dieldrin	60-57-1	5.0E-05	RSL 11/2012	1.6E+01	RSL 11/2012
Diethyl ether (ethyl ether)	60-29-7	2.0E-01	RSL 11/2012	-	-
Diethyl phthalate	84-66-2	8.0E-01	RSL 11/2012	-	-
Di(ethylhexyl)phthalate (DEHP)	117-81-7	2.0E-02	RSL 11/2012	1.4E-02	RSL 11/2012
Diisopropyl ether (DIPE)	108-20-3	1.7E-02	NHDES	-	-
Dimethyl phthalate	131-11-3	-	-	-	-
Dimethylphenol, 2,4-	105-67-9	2.0E-02	RSL 11/2012	-	-
Dinitrophenol, 2,4-	51-28-5	2.0E-03	RSL 11/2012	-	-
Dinitrotoluene, 2,4-	121-14-2	2.0E-03	RSL 11/2012	3.1E-01	RSL 11/2012
Dinoseb	88-85-7	1.0E-03	RSL 11/2012	-	-
1,4-Dioxane	123-91-1	3.0E-02	RSL 11/2012	1.0E-01	RSL 11/2012
Diphenylhydrazine, 1,2-	122-66-7	-	-	8.0E-01	RSL 11/2012
Diquat (dibromide)	85-00-7	2.2E-03	RSL 11/2012	-	-
Endosulfan	115-29-7	6.0E-03	RSL 11/2012	-	-
Endothall	145-73-3	2.0E-02	RSL 11/2012	-	-
Endrin	72-20-8	3.0E-04	RSL 11/2012	-	-
Ethylbenzene	100-41-4	1.0E-01	RSL 11/2012	1.1E-02	RSL 11/2012
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	9.0E-03	RSL 11/2012	2.0E+00	RSL 11/2012
Ethylene glycol	107-21-1	2.0E+00	RSL 11/2012	-	-
Ethyl tert butyl ether (ETBE)	637-92-3	5.3E-02	NHDES	-	-
Fluoride	7782-41-4	6.0E-02	RSL 11/2012	-	-
Formaldehyde	50-00-0	2.0E-01	RSL 11/2012	-	-
Heptachlor	76-44-8	5.0E-04	RSL 11/2012	4.5E+00	RSL 11/2012
Heptachlor epoxide	1024-57-3	1.3E-05	RSL 11/2012	9.1E+00	RSL 11/2012
Hexachlorobenzene	118-74-1	8.0E-04	RSL 11/2012	1.6E+00	RSL 11/2012
Hexachlorobutadiene	87-68-3	1.0E-03	RSL 11/2012	7.8E-02	RSL 11/2012
Hexachlorocyclohexane, alpha	319-84-6	8.0E-03	RSL 11/2012	6.3E+00	RSL 11/2012
Hexachlorocyclohexane, beta	319-85-7	-	-	1.8E+00	RSL 11/2012
Hexachlorocyclohexane, gamma (Lindane)	58-89-9	3.0E-04	RSL 11/2012	1.1E+00	RSL 11/2012
Hexachlorocyclopentadiene	77-47-4	6.0E-03	RSL 11/2012	-	-
Hexachlorodibenzodioxin, 2,3,7,8-	34465-46-8	-	-	-	-
Hexachloroethane	67-72-1	7.0E-04	RSL 11/2012	4.0E-02	RSL 11/2012
Isophorone	78-59-1	2.0E-01	RSL 11/2012	9.5E-04	RSL 11/2012
Isopropyl benzene (Cumene)	98-82-8	1.0E-01	RSL 11/2012	-	-
p-Isopropyl toluene	99-87-6	-	-	-	-
Lead	7439-92-1	-	-	-	-
Manganese	7439-96-5	1.4E-01	RSL 11/2012	-	-
Mercury (inorganic salts)		3.0E-04	RSL 11/2012	-	-
Methanol	67-56-1	5.0E-01	RSL 11/2012	-	-
Methoxychlor	72-43-5	5.0E-03	RSL 11/2012	-	-
Methyl chloride (chloromethane)	74-87-3	-	-	-	-
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	94-74-6	5.0E-04	RSL 11/2012	-	-
2-(2-Methyl-4-chlorophenoxy) propionic acid (MC	93-65-2	1.0E-03	RSL 11/2012	-	-
Methyl ethyl ketone (2-butanone)	78-93-3	6.0E-01	RSL 11/2012	-	-
Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	8.0E-02	RSL 11/2012	-	-
Methyl mercury	22967-92-6	1.0E-04	RSL 11/2012	-	-
Methyl phenol, 2- (o-cresol)	95-48-7	5.0E-02	RSL 11/2012	-	-
Methyl phenol, 4- (p-cresol)	106-44-5	1.0E-01	RSL 11/2012	-	-
Methyl tert butyl ether (MtBE)	1634-04-4	-	-	2.8E-03	NHDES
Metolachlor	51218-45-2	1.5E-01	RSL 11/2012	-	-
Metribuzin	21087-64-9	2.5E-02	RSL 11/2012	-	-
Monochlorobenzene	108-90-7	2.0E-02	RSL 11/2012	-	-
Nickel	7440-02-0	2.0E-02	RSL 11/2012	-	-
Oxamyl	23135-22-0	2.5E-02	RSL 11/2012	-	-
Pentachlorophenol	87-86-5	5.0E-03	RSL 11/2012	4.0E-01	RSL 11/2012
Perchlorate	7790-98-9	7.0E-04	RSL 11/2012	-	-
Phenol	108-95-2	3.0E-01	RSL 11/2012	-	-
Picloram	1918-02-1	7.0E-02	RSL 11/2012	-	-
Polychlorinated Biphenyls (PCBs) (high risk)	1336-36-3	-	RSL 11/2012	2.0E+00	RSL 11/2012
n-Propyl benzene	103-65-1	1.0E-01	RSL 11/2012	-	-
Selenium	7782-49-2	5.0E-03	RSL 11/2012	-	-
Silver	7440-22-4	5.0E-03	RSL 11/2012	-	-
Simazine	122-34-9	5.0E-03	RSL 11/2012	1.2E-01	RSL 11/2012
Styrene	100-42-5	2.0E-01	RSL 11/2012	-	-

Compound	CAS No.	Chronic RfD mg/kg-d	Source for RfD	CSF $(mg/kg\text{-}day)^{-1}$	Source for CSF
Sulfate	14808-79-8	-	-	-	
TCDD, 2,3,7,8- (Dioxin)	1746-01-6	7.0E-10	RSL 11/2012	1.3E+05	RSL 11/2012
Tertiary amyl methyl ether (TAME)	994-05-8	2.0E-02	NHDES	-	-
Tertiary butyl alcohol (TBA)	75-65-0	6.0E-02	NHDES	-	-
Tetrachloroethane 1,1,1,2-	630-20-6	3.0E-02	RSL 11/2012	2.6E-02	RSL 11/2012
Tetrachloroethane 1,1,2,2-	79-34-5	2.0E-02	RSL 11/2012	2.0E-01	RSL 11/2012
Tetrachloroethylene	127-18-4	1.0E-02	RSL 11/2012	5.4E-01	RSL 11/2012
Tetrachlorophenol 2,3,4,6-	58-90-2	3.0E-02	RSL 11/2012	-	-
Tetrahydrofuran	109-99-9	-	-	-	-
Total Thallium	7440-28-0	1.0E-05	RSL 11/2012	-	-
Toluene	108-88-3	8.0E-02	RSL 11/2012	-	-
Toxaphene	8001-35-2	-	-	1.1E+00	RSL 11/2012
2(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	8.0E-03	RSL 11/2012	-	-
Trichlorobenzene, 1,3,5-	108-70-3	-	-	-	-
Trichlorobenzene, 1,2,4-	120-82-1	1.0E-02	RSL 11/2012	2.9E-02	RSL 11/2012
Trichloroethane, 1,1,1-	71-55-6	2.0E+00	RSL 11/2012	-	-
Trichloroethane, 1,1,2-	79-00-5	4.0E-03	RSL 11/2012	5.7E-02	RSL 11/2012
Trichloroethylene	79-01-6	6.0E-03	RSL 11/2012	2.1E-03	RSL 11/2012
Trichlorofluoromethane	75-69-4	3.0E-01	RSL 11/2012	-	-
Trichloromethane (Chloroform)	67-66-3	1.0E-02	RSL 11/2012	3.1E-02	RSL 11/2012
Trichlorophenol, 2,4,5-	95-95-4	1.0E-01	RSL 11/2012	-	-
Trichlorophenol 2,4,6-	88-06-2	1.0E-03	RSL 11/2012	1.1E-02	RSL 11/2012
Trichloropropane, 1,2,3-	96-18-4	4.0E-03	RSL 11/2012	3.0E+01	RSL 11/2012
Trimethylbenzene, 1,2,4	95-63-6	-	-	-	-
Trimethylbenzene, 1,3,5	108-67-8	1.0E-02	RSL 11/2012	-	-
Vinyl chloride (Continuous lifetime exp. from birth)	75-01-4	3.0E-03	RSL 11/2012	1.5E+00	RSL 11/2012
Vinyl chloride (Continuous lifetime exp. During adulthood)	75-01-4	3.0E-03	RSL 11/2012	7.2E-01	RSL 11/2012
Xylenes (mixed isomers)	1330-20-7	2.0E-01	RSL 11/2012	-	-
m-Xylene	108-38-3	2.0E-01	RSL 11/2012	-	-
o-Xylene	95-47-6	2.0E-01	RSL 11/2012	-	-
p-Xylene	106-42-3	2.0E-01	RSL 11/2012	-	-
Zinc	7440-66-6	3.0E-01	RSL 11/2012	-	-
Polynuclear Aromatic Hydrocarbons	- Carcinogenic				
Benzo(a)anthracene	56-55-3	-	-	7.3E-01	RSL 11/2012
Benzo(a)pyrene	50-32-8	-	-	7.3E+00	RSL 11/2012
Benzo(b)fluoranthene	205-99-2	-	-	7.3E-01	RSL 11/2012
Benzo(k)fluoranthene	207-08-9	-	-	7.3E-02	RSL 11/2012
Chrysene	218-01-9	-	-	7.3E-03	RSL 11/2012
Dibenzo(a,h)anthracene	53-70-3	-	-	7.3E+00	RSL 11/2012
Indeno(1,2,3-cd)pyrene	193-39-5	-	-	7.3E-01	RSL 11/2012
Polynuclear Aromatic Hydrocarbons - Noncarcinogenic					
Acenaphthene	83-32-9	6.0E-02	RSL 11/2012	-	-
Acenaphthylene	208-96-8	-	-	-	-
Anthracene	120-12-7	3.0E-01	RSL 11/2012	-	-
Fluoranthene	206-44-0	4.0E-02	RSL 11/2012	-	-
Fluorene	86-73-7	4.0E-02	RSL 11/2012	-	-
Methylnaphthalene, 2-	91-57-6	4.0E-03	RSL 11/2012	-	-
Naphthalene	91-20-3	2.0E-02	RSL 11/2012	-	-
Benzo(g,h,i)perylene	191-24-2	-	-	-	-
Phenanthrene	85-01-8	-	-	-	-
Pyrene	129-00-0	3.0E-02	RSL 11/2012	-	-

Notes:
Please refer to text for sources of exposure parameters and chemcial specific numbers.

Abbreviations:
CASRN - Chemical Abstracts Service Registration Number
RfD - Reference Dose
CSF - Cancer Slope Factor
mg/kg-d - milligram per kilogram day
RSL= USEPA's Regional Screening Level table

A.2.2.2 Relative Source Contribution Factors

To determine the DCRB concentrations for non-carcinogens, the contribution from other potential sources of exposure, including drinking water, food and air must also be taken into account. If sufficient information is available for estimation of the typical contribution from each source to total exposure for a chemical, it may be used to calculate the DCRB concentration. In the absence of data that allows estimation of chemical-specific exposure intakes from various media, the USEPA drinking water guideline default relative source contribution (RSC) factor of 20% was used.

A.2.2.3 Relative Absorption Factors

A Relative Absorption Factor (RAF) is used to adjust for the different absorption efficiency of a chemical in an actual exposure, as opposed to the absorption efficiency in the experimental study which provided the basis for the DRV. Since each DCRB concentration is derived using a combined exposure from incidental ingestion and dermal exposure, it is necessary to derive RAFs for each of these routes of exposure. Estimating the dermal RAF (RAFd) is particularly important since most dose-response values are derived based on studies where animals are exposed via the oral route. In other words, because the absorption of most chemicals via dermal route will often be substantially different than absorption via the oral route, it is important to correct for this route-to-route discrepancy in absorption efficiency.
The RAF is calculated as follows:

$$\text{RAF} = \frac{\text{Absorption Efficiency}_{\textbf{site}}\ \text{route/medium of exposure}}{\text{Absorption Efficiency}_{\textbf{study}}\ \text{route/medium of exposure}}$$

Oral-Soil RAF

The process of evaluating individual RAFs for each chemical can be resource intensive. Other states have devoted substantial resources to estimate oral RAF (RAFo) values for a large number of chemicals (MADEP 2006). Results of their research indicate that, except for a small number of chemicals, nearly all organic and inorganic chemicals have estimated RAFo's either equal to or slightly less than one (1.0). For example, when an estimated RAFo differed from one (1.0)[1], rarely was the value less than 0.9. Therefore, for simplification, DES recommends employing a RAFo equal to one (1.0). However, when calculating DCRB concentrations under Method 2, if appropriate studies are found to justify computing a compound specific RAFo, use of a value other than one will be acceptable so long as: 1) all studies used to derive the RAFo are referenced and, 2) the findings of such studies are clearly and accurately summarized. Chemical specific RAFo values used to calculate DCRB concentrations under this policy are listed in Table 2.

[1] For arsenic 60% is recommended. Ref: Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil. OSWER 9200.1-113, December 2012.

Dermal-Soil RAF

The DRVs for most of the chemicals evaluated in this policy are based on experimental dosing of laboratory animals via the oral route. Therefore, the equation used to estimate the RAF_D will most often be the ratio of a chemical's estimated human dermal absorption (ABS) efficiency from soils at a site to the estimated oral ABS efficiency in the animal test species.

$$RAF_D = \frac{\text{Absorption Efficiency}_{\text{site dermal route/soil medium}}}{\text{Absorption Efficiency study}_{\text{route/medium of exposure}}}$$

Chemical-specific dermal-soil ABS values are reported in Risk Assessment Guidance for Superfund (RAGS) Part E (USEPA 2004). If no chemical-specific data is available, chemical class specific default dermal ABS values are used as defined in the USEPA Mid-Atlantic Risk Assessment Technical Guidance Manual for Assessing Dermal Contact with Soil (USEPA 1995). Because absorption of VOCs is influenced by vapor pressure, the default ABS for VOCs is specific for high or low vapor pressure compounds. All chemical-specific RAF_D values used to estimate DCRB concentrations for this policy are provided in Table 2.

Table 2 Oral and Dermal Absorbtion Factors

Compound	CAS No.	Chemical Class	Dermal Absorption Efficiency (ABSd)	Source of ABSd	Vapor Pressure (mm Hg) (1)	NH Oral Absorption Efficiency	Dermal Relative Absorption Factor	Oral Relative Absorption Factor
Acetone	67-64-1	VOC	0.0005	EPA Rg 3 - high VP VOC	2.31E+02	1.0	0.0005	1.0
Acrylonitrile	107-13-1	VOC	0.0005	EPA Rg 3 - high VP VOC	1.09E+02	1.0	0.0005	1.0
Aldicarb	116-06-3	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Aldicarb sulfone	1646-88-4	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Aldicarb sulfoxide	1646-87-3	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Aldrin	309-00-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Allyl chloride	107-05-1	VOC	0.0005	EPA Rg 3 - high VP VOC	3.68E+02	1.0	0.0005	1.0
Alachlor	159-72-608	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Antimony	7440-36-0	Inorganic	0.01	EPA Rg 3 - default inorganic		0.07	0.14	1.0
Arsenic	7440-38-2	Inorganic	0.030	RAGS E		0.98	0.031	0.6
Atrazine	1912-24-9	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Barium	7440-39-3	Inorganic	0.01	EPA Rg 3 - default inorganic		0.05	0.20	1.0
Benzene	71-43-2	VOC	0.0005	EPA Rg 3 - high VP VOC	9.48E+01	1.0	0.0005	1.0
Benzidine	92-87-5	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Benzoic acid	65-85-0	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Beryllium	7440-41-7	Inorganic	0.01	EPA Rg 3 - default inorganic		0.01	1.11	1.0
Biphenyl, 1,1-	92-52-4	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Bisphenol A	80-05-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Boron	7440-42-8	Inorganic	0.01	EPA Rg 3 - default inorganic		0.94	0.01	1.0
Bromobenzene	108-86-1							
Bromodichloromethane	75-27-4	VOC	0.030	EPA Rg 3 - low VP VOC	5.74E+01	1.0	0.030	1.0
Bromoform	75-25-2	VOC	0.030	EPA Rg 3 - low VP VOC	5.40E+00	1.0	0.030	1.0
Bromomethane	74-83-9	VOC	0.0005	EPA Rg 3 - high VP VOC	1.62E+03	1.0	0.0005	1.0
n- Butylbenzene	104-51-8	VOC	0.030	EPA Rg 3 - low VP VOC	1.06E+00	1.0	0.030	1.0
sec-Butylbenzene	135-98-8	VOC	0.030	EPA Rg 3 - low VP VOC	1.75E+00	1.0	0.030	1.0
tert-Butylbenzene	98-06-6	VOC	0.030	EPA Rg 3 - low VP VOC	2.20E+00	1.0	0.030	1.0
Cadmium	7440-43-9	Inorganic	0.0010	RAGS E		0.03	0.0400	1.0
Camphor	76-22-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Carbofuran	1563-66-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Carbon disulfide	75-15-0	VOC	0.0005	EPA Rg 3 - high VP VOC	3.59E+02	1.0	0.0005	1.0
Carbon tetrachloride	56-23-5	VOC	0.0005	EPA Rg 3 - high VP VOC	1.15E+02	1.0	0.0005	1.0
Chlordane	57-74-9	SVOC	0.040	RAGS E		1.0	0.040	1.0
Chloroaniline,p-	106-47-8	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
bis-(Chloroethyl)ether	111-44-4	VOC	0.030	EPA Rg 3 - low VP VOC	1.55E+00	1.0	0.030	1.0
bis-(2-Chloroisopropyl) ether	39638-32-9	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Chlorophenol, 2-	95-57-8	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Chlorotoluene, 2 (o)	95-49-8	VOC	0.030	EPA Rg 3 - low VP VOC	3.43E+00	1.0	0.030	1.0
Chlorotoluene, 4 (p)	106-43-4	VOC	0.030	EPA Rg 3 - low VP VOC	2.69E+00	1.0	0.030	1.0
Chromium (III)	16065-83-1	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Chromium (VI)	18540-29-9	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Clopyralid	170-17-6							
Cyanide (CN^-)	57-12-5	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Cyanazine	21725-46-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
2,4-D(Dichlorophenooxyacetic acid, 2, 4-)	94-75-7	SVOC	0.050	RAGS E		1.0	0.050	1.0
Dalapon	75-99-0	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	SVOC	0.030	RAGS E (DDT surrogate)		1.0	0.030	1.0
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	SVOC	0.030	RAGS E (DDT surrogate)		1.0	0.030	1.0
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	SVOC	0.030	RAGS E		1.0	0.030	1.0
Dibromochloromethane	124-48-1	VOC	0.030	EPA Rg 3 - low VP VOC	1.56E+01	1.0	0.030	1.0
Dibromochloropropane	96-12-8	VOC	0.030	EPA Rg 3 - low VP VOC	5.80E-01	1.0	0.030	1.0
Dibutylphthalate	84-74-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	VOC	0.030	EPA Rg 3 - low VP VOC	1.47E+00	1.0	0.030	1.0
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	VOC	0.030	EPA Rg 3 - low VP VOC	2.15E+00	1.0	0.030	1.0
Dichlorobenzene, 1,4- (p-DCB)	106-46-7	VOC	0.030	EPA Rg 3 - low VP VOC	1.74E+00	1.0	0.030	1.0
Dichlorobenzidine, 3,3'-	91-94-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dichlorodifluoromethane	75-71-8	VOC	0.0005	EPA Rg 3 - high VP VOC	4.85E+03	1.0	0.0005	1.0
Dichloroethane, 1,1-	75-34-3	VOC	0.0005	EPA Rg 3 - high VP VOC	2.27E+02	1.0	0.0005	1.0
Dichloroethane, 1,2-	107-06-2	VOC	0.030	EPA Rg 3 - low VP VOC	7.89E+01	1.0	0.030	1.0
Dichloroethene, 1,1-	75-35-4	VOC	0.0005	EPA Rg 3 - high VP VOC	6.34E+02	1.0	0.0005	1.0
Dichloroethylene, cis-1,2-	156-59-2	VOC	0.0005	EPA Rg 3 - high VP VOC	2.01E+02	1.0	0.0005	1.0
Dichloroethylene, trans-1,2-	156-60-5	VOC	0.0005	EPA Rg 3 - high VP VOC	2.01E+02	1.0	0.0005	1.0
Dichloromethane (Methylene chloride)	75-09-2	VOC	0.0005	EPA Rg 3 - high VP VOC	4.35E+02	1.0	0.0005	1.0
Dichlorophenol, 2,4-	120-83-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dichloropropane, 1,2-	78-87-5	VOC	0.030	EPA Rg 3 - low VP VOC	5.33E+01	1.0	0.030	1.0
Dichloropropene, 1,3-	542-75-6	VOC	0.030	EPA Rg 3 - low VP VOC	3.40E+01	1.0	0.030	1.0
Dieldrin	60-57-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Diethyl ether (ethyl ether)	60-29-7	VOC	0.0005	EPA Rg 3 - high VP VOC	5.38E+02	1.0	0.0005	1.0
Diethyl phthalate	84-66-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0

Compound	CAS No.	Chemical Class	Dermal Absorption Efficiency (ABSd)	Source of ABSd	Vapor Pressure (mm Hg) (1)	NH Oral Absorption Efficiency	Dermal Relative Absorption Factor	Oral Relative Absorption Factor
Di(ethylhexyl)phthalate (DEHP)	117-81-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Diisopropyl ether (DIPE)	108-20-3	VOC	0.0005	EPA Rg 3 - high VP VOC	1.49E+02	1.0	0.0005	1.0
Dimethyl phthalate	131-11-3	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dimethylphenol, 2,4-	105-67-9	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dinitrophenol, 2,4-	51-28-5	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Dinitrotoluene, 2,4-	121-14-2	SVOC	0.102	RAGS E 2004 update		1.0	0.102	1.0
Dinoseb	88-85-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
1,4-Dioxane	123-91-1	VOC	0.030	EPA Rg 3 - low VP VOC	3.81E+01	1.0	0.030	1.0
Diphenylhydrazine, 1,2-	122-66-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Diquat (dibromide)	85-00-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Endosulfan	115-29-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Endothall	145-73-3	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Endrin	72-20-8	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Ethylbenzene	100-41-4	VOC	0.030	EPA Rg 3 - low VP VOC	9.60E+00	1.0	0.030	1.0
Ethylene dibromide	106-93-4	VOC	0.030	EPA Rg 3 - low VP VOC	1.12E+01	1.0	0.030	1.0
Ethylene glycol	107-21-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Ethyl tert butyl ether (ETBE)	637-92-3	VOC	0.0005	EPA Rg 3 - high VP VOC	1.52E+02	1.0	0.0005	1.0
Fluoride	7782-41-4	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Formaldehyde	50-00-0	VOC	0.0005	EPA Rg 3 - high VP VOC	3.89E+03	1.0	0.0005	1.0
Heptachlor	76-44-8	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Heptachlor epoxide	1024-57-3	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Hexachlorobenzene	118-74-1	VOC	0.030	EPA Rg 3 - low VP VOC	1.80E-05	1.0	0.030	1.0
Hexachlorobutadiene	87-68-3	VOC	0.030	EPA Rg 3 - low VP VOC	2.20E-01	1.0	0.030	1.0
Hexachlorocyclohexane, alpha	319-84-6	SVOC	0.040	RAGS E (lindane surrogate)		1.0	0.040	1.0
Hexachlorocyclohexane, beta	319-85-7	SVOC	0.040	RAGS E (lindane surrogate)		1.0	0.040	1.0
Hexachlorocyclohexane, gamma (Lindane)	58-89-9	SVOC	0.040	RAGS E		1.0	0.040	1.0
Hexachlorocyclopentadiene	77-47-4	VOC	0.030	EPA Rg 3 - low VP VOC	6.00E-02	1.0	0.030	1.0
Hexachlorodibenzodioxin, 2,3,7,8-	34465-46-8	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Hexachloroethane	67-72-1	VOC	0.030	EPA Rg 3 - low VP VOC	2.10E-01	1.0	0.030	1.0
Isophorone	78-59-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Isopropyl benzene (Cumene)	98-82-8	VOC	0.030	EPA Rg 3 - low VP VOC	4.50E+00	1.0	0.030	1.0
p-Isopropyl toluene	99-87-6							
Lead	7439-92-1	Inorganic	0.01	EPA Rg 3 - default inorganic		NA	NA	NA
Manganese	7439-96-5	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Mercury (inorganic salts)	7439-97-6	Inorganic	0.01	EPA Rg 3 - default inorganic		0.06	0.17	1.0
Methanol	67-56-1	VOC	0.0005	EPA Rg 3 - high VP VOC	1.27E+02	1.0	0.0005	1.0
Methoxychlor	72-43-5	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Methyl chloride (chloromethane)	74-87-3	VOC	0.0005	EPA Rg 3 - high VP VOC	4.30E+03	1.0	0.0005	1.0
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	94-74-6	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
2-(2-Methyl-4-chlorophenoxy) propionic acid (MCPP)	93-65-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Methyl ethyl ketone (2-butanone)	78-93-3	VOC	0.030	EPA Rg 3 - low VP VOC	9.06E+01	1.0	0.030	1.0
Methyl isobutyl ketone (4-methyl-2-pentanone)	108-10-1	VOC	0.030	EPA Rg 3 - low VP VOC	1.99E+01	1.0	0.030	1.0
Methyl mercury	22967-92-6	SVOC	0.10	RAGS E default SVOC		1.0	0.01	1.0
Methyl phenol, 2- (o-cresol)	95-48-7	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Methyl phenol, 4- (p-cresol)	106-44-5	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Methyl tert butyl ether (MtBE)	1634-04-4	VOC	0.0005	EPA Rg 3 - high VP VOC	2.50E+02	1.0	0.0005	1.0
Metolachlor	51218-45-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Metribuzin	21087-64-9	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Monochlorobenzene (chlorobenzene)	108-90-7	VOC	0.030	EPA Rg 3 - low VP VOC	1.20E+01	1.0	0.030	1.0
Nickel	7440-02-0	Inorganic	0.01	EPA Rg 3 - default inorganic		0.05	0.20	1.0
Oxamyl	23135-22-0	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Pentachlorophenol	87-86-5	SVOC	0.250	RAGS E		1.0	0.250	1.0
Perchlorate	7790-98-9	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Phenol	108-95-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Picloram	1918-02-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Polychlorinated Biphenyls (PCBs) (high risk)	1336-36-3	SVOC	0.140	RAGS E		0.89	0.157	1.0
n-Propyl benzene	103-65-1	VOC	0.030	EPA Rg 3 - low VP VOC	3.42E+00	1.0	0.030	1.0
Selenium	7782-49-2	Inorganic	0.01	EPA Rg 3 - default inorganic		0.80	0.01	1.0
Silver	7440-22-4	Inorganic	0.01	EPA Rg 3 - default inorganic		0.04	0.25	1.0
Simazine	122-34-9	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Styrene	100-42-5	VOC	0.030	EPA Rg 3 - low VP VOC	6.40E+00	1.0	0.030	1.0
Sulfate	14808-79-8	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
TCDD, 2,3,7,8- (Dioxin)	1746-01-6	SVOC	0.030	RAGS E		1.0	0.030	1.0
Tertiary amyl methyl ether (TAME)	994-05-8	VOC	0.030	EPA Rg 3 - low VP VOC	6.83E+01	1.0	0.030	1.0

Compound	CAS No.	Chemical Class	Dermal Absorption Efficiency (ABSd)	Source of ABSd	Vapor Pressure (mm Hg) (1)	NH Oral Absorption Efficiency	Dermal Relative Absorption Factor	Oral Relative Absorption Factor
Tertiary butyl alcohol (TBA)	75-65-0	VOC	0.030	EPA Rg 3 - low VP VOC	4.07E+01	1.0	0.030	1.0
Tetrachloroethane 1,1,1,2-	630-20-6	VOC	0.030	EPA Rg 3 - low VP VOC	1.20E+01	1.0	0.030	1.0
Tetrachloroethane 1,1,2,2-	79-34-5	VOC	0.030	EPA Rg 3 - low VP VOC	1.33E+01	1.0	0.030	1.0
Tetrachloroethylene	127-18-4	VOC	0.030	EPA Rg 3 - low VP VOC	1.85E+01	1.0	0.030	1.0
Tetrachlorophenol 2,3,4,6-	58-90-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Tetrahydrofuran	109-99-9	VOC	0.0005	EPA Rg 3 - high VP VOC	1.62E+02	1.0	0.0005	1.0
Total Thallium	7440-28-0	Inorganic	0.01	EPA Rg 3 - default inorganic		1.0	0.01	1.0
Toluene	108-88-3	VOC	0.030	EPA Rg 3 - low VP VOC	2.84E+01	1.0	0.030	1.0
Toxaphene	8001-35-2	VOC	0.030	EPA Rg 3 - low VP VOC	6.69E-06	1.0	0.030	1.0
2(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Trichlorobenzene, 1,3,5-	108-70-3	VOC	0.030	EPA Rg 3 - low VP VOC	2.40E-01	1.0	0.030	1.0
Trichlorobenzene, 1,2,4-	120-82-1	VOC	0.030	EPA Rg 3 - low VP VOC	4.60E-01	1.0	0.030	1.0
Trichloroethane, 1,1,1-	71-55-6	VOC	0.0005	EPA Rg 3 - high VP VOC	1.24E+02	1.0	0.0005	1.0
Trichloroethane, 1,1,2-	79-00-5	VOC	0.030	EPA Rg 3 - low VP VOC	2.30E+01	1.0	0.030	1.0
Trichloroethylene	79-01-6	VOC	0.030	EPA Rg 3 - low VP VOC	6.90E+01	1.0	0.030	1.0
Trichlorofluoromethane	75-69-4	VOC	0.0005	EPA Rg 3 - high VP VOC	8.03E+02	1.0	0.0005	1.0
Trichloromethane (Chloroform)	67-66-3	VOC	0.0005	EPA Rg 3 - high VP VOC	1.97E+02	1.0	0.0005	1.0
Trichlorophenol, 2,4,5-	95-95-4	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Trichlorophenol 2,4,6-	88-06-2	SVOC	0.10	RAGS E default SVOC		1.0	0.10	1.0
Trichloropropane, 1,2,3-	96-18-4	VOC	0.030	EPA Rg 3 - low VP VOC	3.69E+00	1.0	0.030	1.0
Trimethylbenzene, 1,2,4	95-63-6	VOC	0.030	EPA Rg 3 - low VP VOC	2.10E+00	1.0	0.030	1.0
Trimethylbenzene, 1,3,5	108-67-8	VOC	0.030	EPA Rg 3 - low VP VOC	2.10E+00	1.0	0.030	1.0
Vinyl chloride	75-01-4	VOC	0.0005	EPA Rg 3 - high VP VOC	2.98E+03	1.0	0.0005	1.0
Xylenes (mixed isomers)	1330-20-7	VOC	0.030	EPA Rg 3 - low VP VOC	7.99E+00	1.0	0.030	1.0
m-Xylene	108-38-3	VOC	0.030	EPA Rg 3 - low VP VOC	7.99E+00	1.0	0.030	1.0
o-Xylene	95-47-6	VOC	0.030	EPA Rg 3 - low VP VOC	7.99E+00	1.0	0.030	1.0
p-Xylene	106-42-3	VOC	0.030	EPA Rg 3 - low VP VOC	7.99E+00	1.0	0.030	1.0
Zinc	7440-66-6	Inorganic	0.01	EPA Rg 3 - default inorganic		0.50	0.02	1.0
Polynuclear Aromatic Hydrocarbons - Carcinogenic								
Benzo(a)anthracene	56-55-3	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Benzo(a)pyrene	50-32-8	SVOC	0.130	RAGS E		0.91	0.143	1.0
Benzo(b)fluoranthene	205-99-2	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Benzo(k)fluoranthene	207-08-9	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Chrysene	218-01-9	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Dibenzo(a,h)anthracene	53-70-3	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Indeno(1,2,3-cd)pyrene	193-39-5	SVOC	0.130	RAGS E (BaP surrogate)		0.91	0.143	1.0
Polynuclear Aromatic Hydrocarbons - Noncarcinogenic								
Acenaphthene	83-32-9	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Acenaphthylene	208-96-8	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Anthracene	120-12-7	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Fluoranthene	206-44-0	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Fluorene	86-73-7	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Methylnaphthalene, 2-	91-57-6	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Naphthalene	91-20-3	VOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Benzo(g,h,i)perylene	191-24-2	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Phenanthrene	85-01-8	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0
Pyrene	129-00-0	SVOC	0.130	RAGS E (BaP surrogate)		1.0	0.130	1.0

Notes:
Please refer to text for sources of exposure parameters and chemcial specific numbers.
EPA Region III VOC Vapor pressure >95 mm Hg ABSd =0.0005, <95 mmg Hg
ABSd=0.03
Abbreviations:
CASRN - Chemical Abstracts Service Registration Number
RAGS E - Risk Assessment Guidance for Superfund (RAGS), Volume I:
Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim http://www.epa.gov/oswer/riskassessment/ragse/pdf/chapter3.pdf
EPA Rg 3 - EPA Region 3 Technical Guidance Manual http://www.epa.gov/reg3hwmd/risk/human/info/dermalag.htm

A.3 Derivation of DCRB Concentrations for Specific Soil Categories

A.3.1 Soil Category S-1

Soil Category S-1 standards are derived based on a residential exposure scenario whereby potential receptors of all ages may be exposed as the result of normal everyday activities. A high-end estimate of 30 years was used to represent the duration for the residential exposure scenario. For non-cancer effects, DCRB concentrations were derived to be protective of the most sensitive receptor, a young child (aged 2 to 6 years old) who may come into contact with the soil through playing in their yard. For carcinogenic effects, the receptor of concern is the resident (age 2 to 31 years old) who may come into contact with the soil as described above for the younger child and by working or gardening in the yard as an adult.

Exposure Frequency
The young child (2 to 6 years) is assumed to be in contact with the outdoor soil for a total of 160 days per year, based on NH-specific climatological data (NHDPHS 1990). The older child (7 to 16 years) and adult (17 to 31 years) are assumed to be in contact with the outdoor soil for a total of 160 days per year.

Exposure Duration (EDi)

ED_1 = child aged 2 through 6 years old = 5 years
ED_2 = child aged 7 through old 16 years old = 10 years
ED_3 = adult aged 17 through 31 years old = 15 years

Dermal Soil Adherence Factor
Receptor specific soil adherence factors (AF) are calculated based on the body part specific surface areas, as reported in Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final (USEPA 2004) hereafter referred to as RAGS Part E, and the experimentally measured soil to skin adherence rates reported in RAGS Part E Appendix C Exhibit C-2, as described below. The activity specific adherence factors are weighted according to the skin surface area assumed to be exposed to soil.

Child Resident
For the child resident, the average soil adherence value for "children playing in wet soil" is used as a high-end activity that best represents soil contact. It is assumed that soil could adhere to the face, hands, forearms, lower legs and feet of children. Because soil adherence was not measured on the feet of "children playing in wet soil," the soil adherence measured on feet of "gardeners" was used to represent the soil adherence on feet. The age-specific skin surface areas for males ages 2 through 6 years was used to calculate the weighted AF for the young child of 0.36. The age-specific skin surface areas for males ages 7 through 16 years was used to calculate the weighted AF for the older child of 0.14.

Adult Resident

For the adult resident the average soil adherence value for "gardeners" is used as a high-end activity that best represent soil contact for an adult. The age-specific skin surface area for males aged 17 through 30 was used to calculate the weighted adult AF of 0.13.

The following equation was used to calculate the skin surface area weighted adherence factors.

$$AF(receptor) = \frac{(AF_{face}) \times (SA_{face}) + (AF_{hands}) \times (SA_{hands}) + (AF_{forearms}) \times (SA_{forearms}) + (AF_{lowerlegs}) \times (SA_{lowerlegs}) + (AF_{feet}) \times (SA_{feet})}{SA_{face} + SA_{hands} + SA_{forearms} + SA_{lowerlegs} + SA_{feet}}$$

Ingestion Rate

The young child (2 to 6 years old) is assumed to ingest 200 mg of soil per day of exposure. Older children and adults are assumed to ingest 100 mg of soil per day of exposure (USEPA 1991).

Age-Specific Exposed Body Surface Areas (SAi)

All surface area values were derived using data presented in the USEPA Exposure Factors Handbook (USEPA 1997a). Values for age groups i = 1 and i = 2 were derived by computing the average total body surface area (TBSA) reported for male children. For adults the TBSA was taken as the 50th percentile value for adult males. The average male TBSA is larger than the female TBSA and therefore provides a conservative estimate of dermal exposure. It is assumed that the surface area of skin exposed includes the hands, arms, one third of the legs (due to shorts and socks), plus the face and neck. This represents approximately 36% of the TBSA for young children and 26% of the TBSA for older children and adults.

The age-specific value for exposed skin surface area (SA_i) is calculated as follows:

SA_i = $TBSA_i$ x percent of skin surface area exposed

SA_1 (young child ages 2 - 6 years) = 7,310 cm^2 x 36% = 2,632 cm^2

SA_2 (SA older child ages 7 - 16 years) = 10,320 cm^2 x 26% = 3,432 cm^2

SA_3 (SA adult aged 17 and older) = 19,400 cm^2 x 26% = 5,044 cm^2

Age-Specific Body Weights (BWi)

Age specific body weights are as reported in the USEPA Exposure Factors Handbook (USEPA 1997a):

BW_1 (child aged 2 through 6 years old)	= 17 kg
BW_2 (child aged 7 through old 16 years old)	= 40 kg
BW_3 (adult aged 17 through 31 years old)	= 70 kg

Appropriately derived S-1 DCRB concentrations for each of the various chemicals are listed in the Appendix E summary table.

A.3.2 Soil Category S-2

Soil Category S-2 DCRB concentrations are derived assuming exposure may occur to a receptor that comes in contact with the contaminated soils in a work environment or in a passive recreational setting. For both cancer and non-cancer effects, the receptor of concern is a worker (age 18 to 42 years of age) who comes into contact with the soil as part of their employment which is assumed to span a duration of 25 years.

Exposure Frequency
The adult worker is assumed to be exposed to outdoor soils a total of 146 days per year. This figure was obtained assuming the maintenance worker is exposed to outdoor soils during the seven warmest months out of the year (April through October) and that a worker normally works 250 days over the course of the work year. The latter value is based on a five day work week and two weeks vacation per year (USEPA 1989).

(7 months / 12 months) * 250 days / year = 146 days / year.

Ingestion Rate
Adults are assumed to ingest 100 mg of soil per day of exposure (USEPA 1991).

Dermal Soil Adherence Factor
A soil adherence factor equal to 0.2 mg/cm^2 is assumed based on the 50th percentile weighted AF for utility workers (assumed to be a high-end contact activity) as recommended for commercial/industrial workers in RAGS Part E.

Exposed Surface Area
It is assumed that the surface area of skin exposed includes the hands, forearms, the face and neck. This scenario assumes a worker will wear long pants. This equates to 16% of the total body surface area. The total body surface area representative of a male provides a conservative estimate of dermal exposure.

$$SA = 19{,}400 \text{ cm}^2 \times 16\% = 3{,}104 \text{ cm}^2$$

Body Weight
A body weight of 70 kilograms is the average of the 50th percentile adult male and female body weights reported in the USEPA Exposure Factors Handbook (USEPA 1997a).

Appropriately derived S-2 DCRB concentrations for each of the various chemicals are listed in the Appendix E summary table.

A.3.3 Soil Category S-3

Soil Category S-3 DCRB concentrations are derived assuming exposure may occur to an adult receptor that comes in contact with the contaminated soils during a short but intense exposure, such as during excavation work. This exposure scenario assumes exposure duration of four months out of the year for one year. While it is acknowledged that it may not be entirely appropriate to estimate cancer risk-based concentrations for less than chronic exposure durations, it was nevertheless decided not to change the high end exposure duration estimate to accommodate the evaluation of different toxic endpoints (i.e., either cancer or non-cancer effects).

Exposure Frequency
The adult worker is assumed to be exposed to outdoor soils a total of 83 days out of the four warmest months of the year. This figure was derived assuming the excavation worker is exposed to outdoor soils during the four warmest months (122 days) out of the year (May through August). Assuming a person takes two weeks vacation per year and works five days per week, the estimated exposure frequency is equal to 83 days out of the four months total duration.

(4 months / 12 months) * (5 days/7 days) * (350 days/year) = 83 days per year.

Ingestion Rate
Adult excavation workers are assumed to ingest 480 mg of soil per day of intense excavation work (USEPA 1991).

Dermal Soil Adherence Factor
A soil adherence factor equal to 0.2 mg/cm^2 is assumed based on the 50th percentile weighted AF for utility workers (assumed to be a high-end contact activity) as recommended for commercial/industrial workers in RAGS Part E.

Exposed Surface Area
It is assumed that the surface area of skin exposed includes the hands, forearms, the face and neck. This scenario assumes a worker will wear pants (as opposed to shorts) and the legs will be covered. This equates to 16% of the total body surface area. The total body surface area representative of a male provides a conservative estimate of dermal exposure.

SA = TBSA for an adult worker (17 and older) =19,400 cm^2 x 16% = 3,104 cm^2

Body Weight
A body weight of 70 kilograms is the average of the 50th percentile adult male and female body weights reported in the USEPA Exposure Factors Handbook (USEPA 1997a).

Appropriately derived S-3 DCRB concentrations for each of the various chemicals are listed in the Appendix E summary table.

A.4 References

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APPENDIX B

Methodology Used To Develop Leaching-Based Soil Values

PURPOSE

This appendix describes the manner in which NHDES established leaching-based soil values that will 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 could not leach a sufficient mass of contaminant to result in a violation of NHDES ambient groundwater quality standards (AGQS).

GENERAL APPROACH

The NHDES leaching-based soil values were developed, in part, by using a combination of two contaminant transport models. The Seasonal SOIL Compartment Model (SESOIL) was used to model contaminant transport in the vadose zone and the Analytical Model of Transient 1, 2, and 3-Dimensional Waste Transport in Aquifers (AT123D) was used to model 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. AT123D was developed by Oak Ridge National Laboratory in 1981.

GENERIC SITE CONDITIONS

The generalized conceptual model for the standard contaminated site scenario used 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. The first meter (layer) below the ground surface is uncontaminated. The very top of the second meter (layer) is contaminated at a concentration of 10 ppm. The remainder of the second meter (layer) and the entire third layer is uncontaminated. 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 values are provided herein.

SESOIL MODEL

SESOIL Soil Parameters

Soil input data include:

- 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 100 cm
- Layer 2 Thickness 100 cm
- Layer 3 Thickness (5 sub-layers) 100 cm

SESOIL Climate Parameters

The SESOIL model is preloaded with climate data from 23 weather stations in New Hampshire. Climate data used in this model include 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. Data from New Hampshire's high and low precipitation stations were not used. From this calculation, the state average yearly precipitation is 101.6 cm/yr (40.0 in/yr). The station that came the closest to this value was Winchester, NH at 102.35 cm/yr. Climate data from Winchester was therefore used in the model.

SESOIL Chemical Data

Chemical parameters of interest include:

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

EPA, NHDES, Massachusetts DEP, and Michigan DEQ publications were used to determine contaminant properties required for SESOIL modeling[1,2,3,4,5]. Table B-1 presents the specific values of these properties for each chemical evaluated

SESOIL Application Parameters

Application parameters of interest include:

- Application Month — October
- Application Layer — Full depth of second layer is at 10ppm
- Application rate — 1500 microgram/cm
- Application year — 1 (or time to reach max. concentration)

AT123D MODEL

AT123D parameters of interest 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. These AGQS are used to determine the leaching-based soil values. The leaching potential of contaminants has been modeled using SESOIL and AT123D. The leaching of inorganics depends on speciation, and therefore inorganics were not modeled (NM). Similarly, biological and radiological contaminants were not modeled for leaching. Furthermore, parametric values were not obtainable for certain contaminants, which were thus not modeled.

For each contaminant that is modeled, the peak groundwater concentration is then used to determine the dilution and attenuation factor (DAF), from which a leaching-based soil value is calculated. A contaminant leaching period of two years was used in the models. However, when the groundwater peak was not reached within two years, the model simulation time was

incrementally extended to a maximum of 30 years. If SESOIL modeling resulted in a release rate into the groundwater from the vadose zone that was not measurable to the gram per hour level within the 30 years, then leaching in groundwater was considered to be negligible. For each contaminant with negligible leaching, the peak groundwater concentration at the 15-meter distance is zero, and the leaching value is listed as "NCM" for Negligible Contaminant Migration.

The DAF is simply the ratio of initial soil concentration to the groundwater concentration predicted to exist at the well.

$$DAF = \text{Input Soil Concentration/Modeled Groundwater Concentration}$$

$$DAF = 10 \text{ ppm/Concentration Modeled at Well (ppm)}$$

Multiplying the chemical's DAF by its AGQS yields a leaching-based soil value.

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

Table B-2 summarizes the leaching potential for the contaminants considered.

REFERENCES

1. EPA Johnson and Ettinger. 1991. Model for Subsurface Vapor Intrusion into Buildings.
2. EPA 530-R-99-004, Industrial Waste Air Model Technical Background Document. December 1998.
3. The Risk Assessment Information System, Chemical-Specific Factors, The toxicity and chemical-specific values are current as of October 2005, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf.
4. Michigan Department of Environmental Quality (DEQ) RRD Op Memo No. 1, Attachment 1, Table 4. December 10, 2004.
5. New Hampshire Department of Environmental Services (NH DES) Risk Characterization and Management Policy (RCMP), Appendix B, Table B-1. January 1998.

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
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	

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)**
1563662	Carbofuran	3.74E+01	6.00E-02	7.00E+02	3.90E-09	221
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	5.01E-02	2.20E+04	3.90E-04	128.56
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	7.20E+01	3.46E-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

TABLE B-1: CHEMICAL PROPERTIES FOR SESOIL INPUT						
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78875	Dichloropropane, 1,2-	4.37E+01	7.82E-02	2.80E+03	2.79E-03	112.99
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	3.47E+00	1.00E-05	9.00E+05	4.91E-06	88
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	4.40E+00	1.08E-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

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)**
78591	Isophorone	2.99E+01	5.22E-02	1.20E+04	8.15E-09	138.21
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)	4.69E+01	8.00E-02	1.20E+03	8.80E-09	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	4.82E-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
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

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)**
75650	Tertiary butyl alcohol (TBA)	2.27E+00	8.00E-02	1.00E+06	1.17E-05	74.12
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	2.5E+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**
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-	1.68E-01	5.95E+01	1.5	35	**2.08**
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**
103231	Di(ethylhexyl)adipate	NCM	NA	NA	400	**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)**
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	5.11E-01	1.96E+01	0.6	21	**0.41**
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**
105679	Dimethylphenol, 2,4	3.34E-01	2.99E+01	1.2	140	**4.19**

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)**
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	7.80E-01	1.28E+01	0.3	3	**0.04**
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	7.73E-01	1.29E+01	0.3	7000	**90.56**
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**
67721	Hexachloroethane	5.04E-02	1.98E+02	7.6	1	**0.20**

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)**
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	0.804	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)	1.84E-01	5.43E+01	2.3	100	**5.43**
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	3.95E-02	2.53E+02	8.6	20	**5.06**
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	7.20E-01	1.39E+01	0.3	4,000	**55.56**
1918021	Picloram	7.99E-01	1.25E+01	0.3	500	**6.26**
1336363	Polychlorinated biphenyls (PCBs)	NCM	NA	NA	0.5	**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)**
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**
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**
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**

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)**
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 C

Selection of Estimated Quantitation Limits For Method 1 Chemicals

The majority of the Estimated Quantitation Limits (PQL) for the RCMP Method 1 chemicals are taken from one of two references on USEPA-approved laboratory methods. The references are:

- USEPA Test Methods for Evaluating Solid Waste, SW-846, Third Edition (Revision 3), January 1995 (Reference 1)

- USEPA Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88/039, December, 1988 (Revised July 1991) (Reference 2)

The references provide a method number. Below is a description of the various methods that appear in the references. From USEPA Test Methods for Evaluating Solid Waste (often referred to as SW-846), EQLs were excerpted from the following methods:

a) USEPA Method 8260B: Volatile Organics by Gas Chromatography/Mass Spectrometry (GC/MS)

b) USEPA Method 8270C: Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique

c) USEPA Method 8081A: Organochlorine Pesticides by Gas Spectrometry

d) USEPA Method 8290: The Analysis of Polychlorinated Dibenzo-p-Dioxin and Polychlorinated Dibenzofurans
Appendix A: Signal-to-noise Determination Methods
Appendix B: Recommended Safety and Handling Procedures for PCDDs/PCDFs

e) USEPA Method 6010B: Inductively Coupled Plasma-Atomic Emission Spectroscopy

f) USEPA Method 9012B: Total and Amenable Cyanide (Colorimetric, Manual)

g) USEPA Method 7196A: Chromium, Hexavalent (Colorimetric)

h) USEPA Method 7060A: Arsenic (AA, Furnace Technique)

i) USEPA Method 7471A: Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)

j) USEPA Method 8318:N-Methylcarbamates by High Performance Liquid Chromatography (HPLC)

k) USEPA Method 8141A: Organophosphorus Compounds by Gas Chromatography: Capillary Column Technique

l) USEPA Method 8150B: Chlorinated Herbicides by Gas Chromatography

m) USEPA Method 8151A: Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzylation Derivitization: Capillary Column Technique

n) USEPA Method 8321A: Solvent Extractable Non-Volatile Compounds by High Performance Liquid Chromatography/Thermospray/Mass Spectrometry (HPLC/TS/MS) or Ultraviolet (UV) Detection

o) USEPA Method 8082: Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Acetone	67-64-1	0.5	8260B
Acrylonitrile	107-13-1	0.5	8260B
Alachor	15972-60-8	0.05	8081A
Aldicarb	116-06-3	0.017	8318
Aldicarb sulfone	1646-87-3	0.023	8321A
Aldicarb sulfoxide	1646-88-4	0.15	8321A
Aldrin	309-00-2	0.09	8081A
Allyl Chloride	107-05-1	0.1	8260B
Antimony	7440-36-0	8	6010B
Arsenic	7440-38-2	1.0	7060A
Atrazine	1912-24-9	NA*	8141A
Barium	7440-39-3	0.5	6010B
Benzene	71-43-2	0.1	8260B
Benzidene	92-87-5	NA*	8270C
Benzoic Acid	65-85-0	3.30	8270C
Beryllium	7440-41-7	0.1	6010B
Biphenyl, 1,1-	92-52-4	NA*	
Bisphenol A	80-05-7	NA*	
Boron	7440-42-8	1.5	6010B
Bromodichloromethane	75-27-4	0.1	8260B
Bromoform	75-25-2	0.1	8260B
Bromomethane	74-83-9	0.1	8260B
Butylbenzene, n-	104-51-8	0.1	8260B
Butylbenzene, sec-	135-98-8	0.1	8260B
Butylbenzene, tert-	98-06-6	0.1	8260B
Cadmium	7440-4309	1	6010B
Camphor	76-22-2	NA*	8260B
Carbofuran	1563-66-2	NA*	8270C
Carbon disulfide	75-15-0	0.1	8260B

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Carbon tetrachloride	56-23-5	0.1	8260B
Chloroaniline, p-	106-47-8	1.3	8270C
bis-(2-chloroethyl)ether	111-44-4	0.66	8270C
bis-(2-chloroisopropyl)ether	39638-32-9	0.66	8270C
Chloromethane (Methyl chloride)	74-87-3	0.1	8260B
Chlorophenol, 2-	95-57-8	1.3	8270C
Chlorotoluene, 2 (o)	95-49-8	0.1	8260B
Chlorotoluene, 4 (p)	106-43-4	0.1	8260B
Chlorotrifluoroethylene (CFC1113)	79-38-9	0.1	
Chromium (III)	16065-83-1	2	6010B
Chromium (VI)	18540-29-9	130	7196A
Clopyralid	1702-17-6	NA*	
Cyanazine	21725-46-2	NA*	
Cyanide	57-12-5	5	9012B
2,4-D (Dichlorophenooxyacetic acid, 2,4-)	94-75-7	0.13	8150B
Dalapon	75-99-0	.87	8150B
DDD (Dichlorodiphenyl dichloroethane, p,p')	72-54-8	0.09	8081A
DDE (Dichlorodiphenyl dichloroethylene, p,p')	72-55-9	0.07	8081A
DDT (Dichlorodiphenyl trichloroethane, p,p')	50-29-3	0.04	8081A
Dibromochloromethane	124-48-1	0.1	8260B
Dibromochloropropane	96-12-8	0.1	8260B
Dibutylphthalate	84-74-2	0.66	8270C
Dichlorobenzene, 1,2- (o-DCB)	95-50-1	0.1	8260B
Dichlorobenzene, 1,3- (m-DCB)	541-73-1	0.1	8260B
Dichlorobenzene, 1,4- (p-DCB)	106-46-7	0.1	8260B
Dichlorobenzidine, 3,3'-	91-94-1	0.66	8270C

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Dichlorodifluoromethane	75-71-8	0.1	8260B
Dichloroethane, 1,1-	75-34-3	0.1	8260B
Dichloroethane, 1,2-	107-06-2	0.1	8260B
Dichloroethylene, 1,1-	75-35-4	0.1	8260B
Dichloroethylene, cis-1,2-	156-59-2	0.1	8260B
Dichloroethylene, trans-1,2-	156-60-5	0.1	8260B
Dichloromethane (Methylene chloride)	75-09-2	0.1	8260B
Dichlorophenol, 2,4-	120-83-2	0.66	8270C
Dichloropropane, 1,2-	78-87-5	0.1	8260B
Dichloropropene, 1,3-	542-75-6	0.1	8260B
Dieldrin	60-57-1	0.06	8081A
Diethyl ether	60-29-7	0.1	8260B
Diethyl phthalate	84-66-2	0.66	8270C
Di(2-ethylhexyl)phthalate (DEHP)	117-81-7	0.66	8270C
Diisopropyl ether (DIPE)	108-20-3	0.1	8260B
Dimethyl phthalate	131-11-3	0.66	8270C
Dimethylphenol, 2,4-	105-67-9	0.66	8270C
Dinitrophenol, 2,4-	51-28-5	0.66	8270C
Dinitrotoluene, 2,4-	121-14-2	0.66	8270C
Dinoseb	88-85-7	0.13	8150B
Dioxane, 1,4-	123-91-1	5.0	8260B
1,2-Diphenylhydrazine	122-66-7	NA*	8270C
Diquat (dibromide)	85-00-7	NA*	(H_2O only)
Endosulfan	115-29-7	0.09	8081A
Endothall	145-73-3	NA	
Endrin	72-20-8	0.1	8081A
Ethyl tert butyl ether (ETBE)	637-92-3	0.1	8260B
Ethylbenzene	100-41-4	0.1	8260B
Ethylene dibromide	106-93-4	0.1	8260B

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Ethylene glycol	107-21-1	50	8015A
Fluoride	16984-48-8	NA*	
Formaldehyde	50-00-0	NA*	
Heptachlor	76-44-8	0.01	8081A
Heptachlor epoxide	1024-57-3	0.1	8081A
Hexachlorobenzene	118-74-1	0.66	8270C
Hexachlorobutadiene	87-68-3	0.1	8260B
Hexachlorocyclohexane, alpha	319-84-6	0.06	8081A
Hexachlorocyclohexane, beta	319-85-7	0.06	8081A
Hexachlorocyclohexane, gamma (Lindane)	58-89-9	0.09	8081A
Hexachlorocyclopentadiene	77-47-4	0.66	8270C
Hexachlorodibenzodioxin	34465-46-8	$1.25x10^{-5}$	8290
Hexachloroethane	67-72-1	0.66	8270C
Isophorone	78-59-1	0.66	8270C
Isopropyl benzene	98-82-8	0.1	8260B
Isopropyl toluene, p-	99-87-6	0.1	8260B
Lead	7439-92-1	11	6010B
Manganese	7439-96-5	.25	6010B
Mercury	7439-97-6	0.2	7471A
Methanol	67-56-1	1	8015A
Methoxychlor	72-43-5	NA*	8081A
Methyl ethyl ketone	78-93-3	0.5	8260B
Methyl isobutyl ketone	108-10-1	0.5	8260B
Methyl mercury	22967-92-6	0.001	
Methyl phenol, 2-	95-48-7	0.66	8270C
Methyl phenol,4	106-44-5	0.66	8270C
Methyl tert butyl ether	1634-04-4	0.1	8260B
Methyl-4-chlorophenoxy, 2-, 2-propionic aid (MCPP)	93-65-2	0.066	8151A

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Methyl-4-chlorophenoxyacetic acid, 2- (MCPA)	94-74-6	0.043	8151A
Metolachlor	51218-45-2	0.66	8270C
Metribuzin	21087-64-9	0.66	8270C
Monochlorobenzene (Chlorobenzene)	108-90-7	0.1	8260B
Nickel	7440-02-0	4	6010B
Pentachlorophenol	87-86-5	3.30	8270C
Phenol	108-95-2	0.66	8270C
Picloram	1918-02-1	0.09	8151A
Polychlorinated biphenyls (PCBs)	1336-36-3	0.30	8082
Propyl benzene, n-	103-65-1	0.1	8260B
Selenium	7782-49-2	20	6010B
Silver	7440-22-4	2.5	6010B
Simazine	122-34-9	NA*	8141A
Styrene	100-42-5	0.1	8260B
TCDD, 2,3,7,8- (Dioxin)	1746-01-6	5E-06	8290
Tertiary amyl methyl ether (TAME)	994-05-8	0.1	8260B
Tertiary butyl alcohol (TBA)	75-65-0	2.5	8260B
Tetrachloroethane, 1,1,1,2-	630-20-6	0.1	8260B
Tetrachloroethane, 1,1,2,2,-	79-34-5	0.1	8260B
Tetrachloroethylene	127-18-4	0.1	8260B
Tetrachlorophenol 2,3,4,6	58-90-2	0.66	8270C
Tetrahydrofuran	109-99-9	0.5	8260B
Thallium	7440-28-0	10	6010B
Toluene	108-88-3	0.1	8260B
Total Petroleum Hydrocarbons †		†	†
Toxaphene	8001-35-2	0.80	8081A
2-(2,4,5-Trichlorophenoxy)propionic acid; 2,4,5-TP; Silvex	93-72-1	0.05	8151A
Trichlorobenzene, 1,3,5-	108-70-3	0.1	8270C

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Trichlorobenzene, 1,2,4-	120-82-1	0.66	8270C
Trichloroethane, 1,1,1-	71-55-6	0.1	8260B
Trichloroethane, 1,1,2-	79-00-5	0.1	8260B
Trichloroethylene	79-01-6	0.1	8260B
Trichlorofluoromethane	75-69-4	0.1	8260B
Trichloromethane (Chloroform)	67-66-3	0.1	8260B
Trichlorophenol, 2,4,5-	95-95-4	0.66	8270C
Trichlorophenol, 2,4,6-	88-06-2	0.66	8270C
Trichloropropane, 1,2,3-	96-18-4	0.1	8260B
Trimethylbenzene, 1,2,4	95-63-6	0.1	8260B
Trimethylbenzene, 1,3,5	108-67-8	0.1	8260B
Vinyl chloride	75-01-4	0.1	8260B
Xylenes (mixed isomers)	1330-20-7	0.1	8260B
Zinc	7440-66-6	1.25	6010B
Polynuclear Aromatic Hydrocarbons - Carcinogenic			
Benzo(a)anthracene	56-55-3	0.66	8270C
Benzo(a)pyrene	50-32-8	0.66	8270C
Benzo(b)fluoranthene	205-99-2	0.66	8270C
Benzo(k)fluoranthene	207-08-9	0.66	8270C
Chrysene	218-01-9	0.66	8270C
Dibenzo(a,h)anthracene	53-70-3	0.66	8270C
Indeno(1,2,3-cd)pyrene	193-39-5	0.66	8270C
Polynuclear Aromatic Hydrocarbons - Noncarcinogenic			
Acenaphthene	83-32-9	0.66	8270C
Acenaphthylene	208-96-8	0.66	8270C
Anthracene	120-12-7	0.66	8270C
Benzo(g,h,i)perylene	191-24-2	0.66	8270C
Fluoranthene	206-44-0	0.66	8270C
Fluorene	86-73-7	0.66	8270C

Table C-1

ESTIMATED QUANTIFICATION LIMITS FOR SOILS

NHDES Risk Characterization and Management Policy - Appendix C

Chemical Name	CAS No.	EQL (mg/kg)	USEPA Method No. (See Endnotes)
Methylnaphthalene, 2-	91-57-6	0.66	8270C
Naphthalene	91-20-3	0.66	8270C
Phenanthrene	85-01-8	0.66	8270C
Pyrene	129-00-0	0.66	8270C

NA* = Not Determined

APPENDIX D

Methodology for the Determination of Ceiling Concentrations

Ceiling Concentrations in Groundwater:

Except when a MCL, SMCL or AGQS exists that is higher, the ceiling concentrations in groundwater noted in the general methodologies described in Section 8.3 are set at a concentration of 50,000 µg/liter, or 0.005%. The ceiling concentration serves two main purposes. First, in areas of current or future drinking water sources, it serves to minimize potential taste and odor effects. Second, the ceiling concentration provides an upper limit on allowable groundwater contamination which may pose a risk to public welfare and the environment. Such a ceiling will act to minimize continued degradation of the groundwater as a general resource and to minimize the incremental increases to anthropogenic background.

Ceiling Concentrations in Soil:

The ceiling concentrations in soil noted in the general methodology presented in Section 8.4 were set considering the odor index of the chemical, the volatility of the chemical and the soil category. The odor index developed for a chemical is the ratio of the vapor pressure (VP) for the chemical, measured at approximately 20^o to 30^o Celsius, and the 50^{th} percentile odor recognition threshold ($ORT_{50\%}$). Chemicals with a relatively high odor index have correspondingly lower ceiling concentrations.

$$\text{Odor Index} = \frac{VP_{20^o - 30^o}}{ORT_{50\%}}$$

Volatile chemicals (i.e., those with vapor pressure greater than 1 Torr at approximately 20^o to 30^o Celsius) are also assigned relatively low ceiling concentrations.

The ceiling concentrations serve two main purposes. First, in high exposure potential areas (category S-1), the ceiling concentrations provide an upper limit for chemicals which may pose a risk to public health through an inhalation pathway. Second, the ceiling concentrations provide an upper limit on allowable soil contamination which may pose a risk to public welfare and the environment.

The following ceiling concentrations have been applied in the development of the Method 1 and Method 2 Soil Standards:

CEILING CONCENTRATIONS		
Soil Category	**Criteria**	**Ceiling Value Adopted**
Category S-1	Odor Index > 100, or Vapor Pressure > 1 Torr	100 ug/g
	1.0 < Odor Index < 100	500 ug/g
	Odor Index < 1	1,000 ug/g
Category S-2	Odor Index > 100, or Vapor Pressure > 1 Torr	500 ug/g
	1.0 < Odor Index < 100	1,000 ug/g
	Odor Index < 1	2,500 ug/g
Category S-3	Odor Index > 100, or	500 ug/g
	Vapor Pressure > 1 Torr	1,000 ug/g
	1.0 < Odor Index < 100	2,500 ug/g
	Odor Index < 1	5,000 ug/g

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	**1,000**	**2,500**	**5,000**	7,400	66,000	66,000	NM		1.5	(3)
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		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	0.04		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	**91**	**91**	**91**	53,000	430,000	430,000	91		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	**5**	**5**	**5**	660	5,400	5,400	5		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	**56**	**56**	**56**	7,900	65,000	65,000	56		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	
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	**5**	**5**	**5**	480	3,900	3,900	5		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).										