

Appendix A

Soil Cleanup Criteria

Soil Cleanup Criteria (mg/kg)

(Last Revised — 7/11/96)

This listing represents the combination of Tables 3-1 and 7-1 from the Department of Environmental Protection's February 3, 1992, proposed rule entitled *Cleanup Standards for Contaminated Sites*, N.J.A.C. 7:26D. It includes noted corrections based upon errors identified by the department during or subsequent to the comment period as well as new toxicological information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This, along with other site specific factors including background conditions, may result in site-specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the department's opinion that a site requires remediation.

Note: Material bracketed [~~thus~~] is deleted and material underlined thus is added.

<u>Contaminant</u>	<u>CASRN</u>	<u>Residential Direct Contact Soil Cleanup Criteria(a)(b)</u>	<u>Non Residential Direct Contact Soil Cleanup Criteria(a)(b)</u>	<u>Impact to Ground water Soil Cleanup Criteria(b)</u>
Acenaphthene	83-32-9	3400	10000 (c)	100
Acetone	67-64-1	1000 (d)	1000 (d)	[50] <u>100</u> (i)
Acrylonitrile	107-13-1	1	5	[100] <u>1</u> (i)
Aldrin	309-00-2	0.040	0.17	50
Anthracene	120-12-7	10000 (c)	10000 (c)	[500] <u>100</u> (i)
Antimony	7440-36-0	14	340	(h)
Arsenic	7440-38-2	[2 (f)] <u>20</u> (e)	[2 (f)] <u>20</u> (e)	(h)
Barium	7440-39-3	700	47000 (n)	(h)
Benzene	71-43-2	3	13	1
3,4-Benzofluoranthene (Benzo(b)fluoranthene)	205-99-2	0.9	4	[500] <u>50</u> (i)
Benzo(a)anthracene	56-55-3	0.9	4	500
Benzo(a)pyrene (BaP)	50-32-8	0.66 (f)	0.66 (f)	100
Benzo(k)fluoranthene	207-08-9	0.9	4	500
Benzyl Alcohol	100-51-6	10000 (c)	10000 (c)	50
Beryllium	7440-41-7	1 (f)	1 (f)	(h)
Bis(2-chloroethyl) ether	111-44-4	0.66 (f)	3	[1] <u>10</u> (j)
Bis(2-chloroisopropyl) ether	39638-32-9	2300	10000 (c)	10
Bis(2-ethylhexyl) phthalate	117-81-7	49	210	100
Bromodichloromethane (Dichlorobromomethane)	75-27-4	[5] <u>11</u> (g)	[22] <u>46</u> (g)	1
Bromoform	75-25-2	86	370	1
Bromomethane	74-83-9	79	1000 (d)	1
2-Butanone (MEK)	78-93-3	1000 (d)	1000 (d)	50
Butylbenzyl phthalate	85-68-7	1100	10000 (c)	100
Cadmium	7440-43-9	1	100	(h)
Carbon tetrachloride	56-23-5	2 (k)	4 (k)	1
4-Chloroaniline	106-47-8	230	4200	(r)
Chlorobenzene	108-90-7	37	680	1
Chloroform	67-66-3	19 (k)	28 (k)	1
4-Chloro-3-methyl phenol (p-Chloro-m-cresol)	59-50-7	10000 (c)	10000 (c)	100
Chloromethane	74-87-3	520	1000 (d)	10
2-Chlorophenol	95-57-8	280	5200	[50] <u>10</u> (j)
Chrysene	218-01-9	9	40	500
Copper	7440-50-8	600 (m)	600 (m)	(h)
Cyanide	57-12-5	1100	21000 (o)	(h)
4,4'-DDD (p,p'-TDE)	72-54-8	3	12	[100] <u>50</u> (i)
4,4'-DDE	72-55-9	2	9	[100] <u>50</u> (i)
4,4'-DDT	50-29-3	2	9	[100] <u>500</u> (i)

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Dibenz(a,h)anthracene	53-70-3	0.66 (f)	0.66 (f)	[500] 100 (j)
Dibromochloromethane (Chlorodibromomethane)	124-48-1	110	1000 (d)	1
Di-n-butyl phthalate	84-74-2	5700	10000 (c)	100
Di-n-octyl phthalate	117-84-0	1100	10000 (c)	100
1,2-Dichlorobenzene	95-50-1	5100	10000 (c)	50
1,3-Dichlorobenzene	541-73-1	5100	10000 (c)	100
1,4-Dichlorobenzene	106-46-7	570	10000 (c)	100
3,3'-Dichlorobenzidine	91-94-1	2	6	100
1,1-Dichloroethane	75-34-3	570	1000 (d)	[1] 10 (i)
1,2-Dichloroethane	107-06-2	6	24	1
1,1-Dichloroethene	75-35-4	8	150	10
1,2-Dichloroethene (trans)	156-60-5	1000 (d)	1000 (d)	50
1,2-Dichloroethene (cis)	156-59-2	79	1000 (d)	[50] 1 (i)
2,4-Dichlorophenol	120-83-2	170	3100	10
1,2-Dichloropropane	78-87-5	10	43	(r)
1,3-Dichloropropene (cis and trans)	542-75-6	4	5 (k)	1
Dieldrin	60-57-1	0.042	0.18	50
Diethyl phthalate	84-66-2	10000 (c)	10000 (c)	50
2,4-Dimethyl phenol	105-67-9	1100	10000 (c)	10
Dimethyl phthalate	131-11-3	10000 (c)	10000 (c)	50
2,4-Dinitrophenol	51-28-5	110	2100	10
<u>Dinitrotoluene (2,4-/2,6- mixture)</u>	<u>25321-14-6</u>	<u>1</u> (l)	<u>4</u> (l)	<u>10</u> (l)
Endosulfan	115-29-7	[3] 340 (g)	[52] 6200 (g)	50
Endrin	72-20-8	17	310	50
Ethylbenzene	100-41-4	1000 (d)	1000 (d)	100
Fluoranthene	206-44-0	2300	10000 (c)	[500] 100 (i)
Fluorene	86-73-7	2300	10000 (c)	100
Heptachlor	76-44-8	0.15	0.65	[500] 50 (j)
Hexachlorobenzene	118-74-1	0.66 (f)	2	[50] 100 (i)
Hexachlorobutadiene	87-68-3	[11] 1 (g)	[210] 21 (g)	[50] 100 (g)
Hexachlorocyclopentadiene	77-47-4	400	7300	100
Hexachloroethane	67-72-1	6	100	100
Indeno(1,2,3-cd)pyrene	193-39-5	0.9	4	500
Isophorone	78-59-1	1100	10000 (c)	[10] 50 (j)
Lead	7439-92-1	[100] 400 (p)	600 (q)	(h)
Lindane	58-89-9	0.52	2.2	[1] 50 (j)
2-Methylphenol	95-48-7	2800	10000 (c)	(r)
4-Methylphenol	106-44-5	2800	10000 (c)	(r)
Methoxychlor	72-43-5	280	5200	[500] 50 (i)
Mercury	7439-97-6	14	270	(h)
4-Methyl-2-pentanone(MIBK)	108-10-1	1000 (d)	1000 (d)	50
Methylene chloride	75-09-2	49	210	[10] 1 (j)
Naphthalene	91-20-3	230	4200	100
Nickel	7440-02-0	250	2400 (k) (n)	(h)
Nitrobenzene	98-95-3	28	520	[50] 10 (i)
N-Nitrosodiphenylamine	86-30-6	140	600	100
N-Nitrosodi-n-propylamine	621-64-7	0.66 (f)	0.66 (f)	[1] 10 (j)
PCBs (Polychlorinated biphenyls)	1336-36-3	0.49	2	[100] 50 (i)
Pentachlorophenol	87-86-5	6	24	100
Phenol	108-95-2	10000 (c)	10000 (c)	50
Pyrene	129-00-0	1700	10000 (c)	[500] 100 (j)
Selenium	7782-49-2	63	3100 (n)	(h)

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Silver	7440-22-4	110	4100 (n)	(h)
Styrene	100-42-5	23	97	100
1,1,1,2-Tetrachloroethane	630-20-6	170	310	1
1,1,2,2-Tetrachloroethane	79-34-5	34	70 (k)	1
Tetrachloroethylene	127-18-4	4 (k)	6 (k)	1
Thallium	7440-28-0	2 (f)	2 (f)	(h)
Toluene	108-88-3	1000 (d)	1000 (d)	500
Toxaphene	8001-35-2	0.10 (k)	0.2 (k)	[100] 50 (i)
1,2,4-Trichlorobenzene	120-82-1	68	1200	100
1,1,1-Trichloroethane	71-55-6	210	1000 (d)	50
1,1,2-Trichloroethane	79-00-5	22	420	1
Trichloroethene (TCE)	79-01-6	23	54 (k)	1
2,4,5-Trichlorophenol	95-95-4	5600	10000 (c)	50
2,4,6-Trichlorophenol	88-06-2	62	270	[50] 10 (i)
Vanadium	7440-62-2	370	7100 (n)	(h)
Vinyl chloride	75-01-4	2	7	[1] 10 (i)
Xylenes (Total)	1330-20-7	410	1000 (d)	10
Zinc	7440-66-6	1500 (m)	1500 (m)	(h)

Footnotes

- (a) criteria are health based using an incidental ingestion exposure pathway except where noted below
- (b) criteria are subject to change based on site specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.)
- (c) health based criterion exceeds the 10000 mg/kg maximum for total organic contaminants
- (d) health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants
- (e) cleanup standard proposal was based on natural background
- (f) health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level
- (g) criterion has been recalculated based on new toxicological data
- (h) the impact to ground water values for inorganics will be developed based upon site specific chemical and physical parameters
- (i) original criterion was incorrectly calculated and has been recalculated
- (j) typographical error
- (k) criterion based on inhalation exposure pathway which yielded a more stringent criterion than the incidental ingestion exposure pathway
- (l) new criterion derived using methodology in the basis and background document
- (m) criterion based on ecological (phytotoxicity) effects
- (n) level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended
- (o) level of the criterion is such that evaluation for potential acute exposure hazard is recommended
- (p) criterion based on the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) model utilizing the default parameters. The concentration is considered to protect 95% of target population (children) at a blood lead level of 10 ug/dl.
- (q) criteria was derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and was designed to be protective for adults in the workplace
- (r) Insufficient information available to calculate impact to ground water criteria

Appendix B

Contaminants

A. Contaminant Groups

(Environmental Protection Agency. Remediation Technologies Screening Matrix and Reference Guide. EPA 542/B-94-013. October 1994)

Major contaminant groups used in the Matrix are:

- (1) Halogenated volatiles
- (2) Halogenated semivolatiles
- (3) Non-halogenated volatiles
- (4) Non-halogenated semivolatiles
- (5) Fuel Hydrocarbons
- (6) Pesticides
- (7) Inorganics

These major groups include the contaminants listed below. These are not comprehensive lists, but they contain examples of contaminants encountered at many sites.

(1) Halogenated Volatiles

Bromodichloromethane
Bromoform
Bromomethane
Carbon tetrachloride
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
Chloropropane
Cis- 1,2-dichloroethylene
Cis- 1,3-dichloropropene
Dibromomethane
1,1-Dichloroethane
1,2-Dichloroethane
1,2-Dichloroethene
1,1-Dichloroethylene
Dichloromethane
1,2-Dichloropropane
Ethylene dibromide
Fluorotrichloromethane (Freon 11)
Hexachloroethane
Monochlorobenzene
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Perchloroethylene)
1,2-Trans-dichloroethylene
Trans-1,3-dichloropropene
1,1,1-Trichloroethane

1,1,2-Trichloroethane
Trichloroethylene
1,1,2-Trichloro- 1,2,2-trifluoroethane (Freon 113)
Vinyl chloride

(2) Halogenated Semivolatiles

Bis(2-chloroethoxy)ether
1,2-Bis(2-chloroethoxy)ethane
Bis(2-chloroethoxy)methane
Bis(2-chloroethoxy)phthalate
Bis(2-chloroethyl)ether
Bis(2-chloroisopropyl)ether
4-Bromophenyl phenyl ether
4-Chloroaniline
p-Chloro-m-cresol
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenylether
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3-Dichlorobenzidine

Halogenated Semivolatiles (Continued)

2,4-Dichlorophenol
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Pentachlorophenol
Polychlorinated biphenyls (PCBs)
Tetrachlorophenol
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

(3) Non-Halogenated Volatiles

Acetone
Acrolein
Acrylonitrile
n-Butyl alcohol
Carbon disulfide
Cyclohexanone
Ethyl acetate
Ethyl ether
2-Hexanone
Isobutanol
Methanol
Methyl ethyl ketone
Methyl isobutyl ketone
4-Methyl-2-pentanone
Styrene
Tetrahydrofuran
Vinyl acetate

(4) Non-Halogenated Semivolatiles

Benzidine
Benzoic acid
Benzyl alcohol
Bis(2-ethylhexyl)phthalate
Bis phthalate
Butyl benzyl phthalate
Dibenzofuran
Di-n-butyl phthalate
Diethyl phthalate

Dimethyl phthalate
4,6-Dinitro-2-methylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
1,2-Diphenylhydrazine
Isophorone
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
2-Nitrophenol
4-Nitrophenol
n-Nitrosodimethylamine
n-Nitrosodiphenylamine
n-Nitrosodi-n-propylamine
Phenyl naphthalene

(5) Fuel Hydrocarbons

Acenaphthene
Anthracene
Benz(a)anthracene
Benzene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(ghi)perylene
Benzo(a)pyrene
Chrysene
Cis-2-butene
Cresols
Cyclohexane
Cyclopentane
Dibenzo(a,h)anthracene
2,3-Dimethylbutane
3,3-Dimethyl-1-butene
Dimethylethylbenzene
2,2-Dimethylheptane
2,2-Dimethylhexane
2,2-Dimethylpentane
2,3-Dimethylpentane
2,4-Dimethylphenol
Ethylbenzene
3-Ethylpentane
Fluoranthene
Fluorene

Indeno(1,2,3-c,d)pyrene
Isobutane
Isopentane
2-Methyl-1,3-butadiene
3-Methyl-1,2-butadiene
2-Methyl-butene
2-Methyl-2-butene
3-Methyl-1-butene
Methylcyclohexane
Methylcyclopentane
2-Methylheptane
3-Methylheptane
3-Methylhexane
Methylnaphthalene
2-Methylnaphthalene
2-Methylpentane
3-Methylpentane
3-Methyl-1-pentene
2-Methylphenol
4-Methylphenol
Methylpropylbenzene
M-Xylene
Naphthalene
N-Butane
N-Decane
N-Dodecane
N-Heptane
N-Hexane
N-Hexylbenzene
Nitrobenzene
N-Nonane
N-Octane
N-Pentane
N-Propylbenzene
N-Undecane
O-Xylene
1-Pentene
Phenanthrene
Phenol
Propane
P-Xylene
Pyrene
Pyridine
1,2,3,4-Tetramethylbenzene
1,2,4,5-Tetramethylbenzene
Toluene
1,2,4-Trimethylbenzene

1,3,5-Trimethylbenzene
1,2,4-Trimethyl-5-ethylbenzene
2,2,4-Trimethylheptane
2,3,4-Trimethylheptane
3,3,5-Trimethylheptane
2,4,4-Trimethylhexane
3,3,4-Trimethylhexane
2,2,4-Trimethylpentane
2,3,4-Trimethylpentane
Trans-2-butene
Trans-2-pentene

(6) Pesticides

Aldrin
Bhc-alpha
Bhc-beta
Bhc-delta
Bhc-gamma
Chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethion
Ethyl parathion
Heptachlor
Heptachlor epoxide
Malathion
Methylparathion
Parathion
Toxaphene

(7) Inorganics

Aluminum
Antimony
Arsenic
Asbestos
Barium
Beryllium

Bismuth
Cadmium
Calcium
Chromium
Cobalt
Copper
Cyanide
Fluorine
Iron
Lead
Magnesium
Manganese
Mercury
Metallic cyanides
Nickel
Potassium
Selenium
Sodium
Tin
Vanadium
Zinc

B. Alphabetical Listing of Contaminants

(Environmental Protection Agency. Remediation Technologies Screening Matrix and Reference Guide. EPA 542/B-94-013. October 1994)

Acenaphthene (see Fuel Hydrocarbons)
Acetone (see Non-Halogenated Volatiles)
Acrolein (see Non-Halogenated Volatiles)
Acrylonitrile (see Non-Halogenated Volatiles)
Aldrin (see Pesticides)
Aluminum (see Inorganics)
Anthracene (see Fuel Hydrocarbons)
Antimony (see Inorganics)
Arsenic (see Inorganics)
Asbestos (see Inorganics)
Barium (see Inorganics)
Benz(a)anthracene (see Fuel Hydrocarbons)
Benzene (see Fuel Hydrocarbons)
Benzidine (see Non-Halogenated Semivolatiles)
Benzo(a)pyrene (see Fuel Hydrocarbons)
Benzo(b)fluoranthene (see Fuel Hydrocarbons)
Benzo(ghi)perylene (see Fuel Hydrocarbons)
Benzo(k)fluoranthene (see Fuel Hydrocarbons)
Benzoic acid (see Non-Halogenated Semivolatiles)
Benzyl alcohol (see Non-Halogenated Semivolatiles)
Beryllium (see Inorganics)
Bhc-alpha (see Pesticides)
Bhc-beta (see Pesticides)
Bhc-delta (see Pesticides)
Bhc-gamma (see Pesticides)
Bis phthalate (see Non-Halogenated Semivolatiles)
1,2-Bis(2-chloroethoxy)ethane (see Halogenated Semivolatiles)
Bis(2-chloroethoxy)ether (see Halogenated Semivolatiles)
Bis(2-chloroethoxy)methane (see Halogenated Semivolatiles)
Bis(2-chloroethoxy)phthalate (see Halogenated Semivolatiles)
Bis(2-chloroethyl)ether (see Halogenated Semivolatiles)
Bis(2-chloroisopropyl)ether (see Halogenated Semivolatiles)
Bis(2-ethylhexyl)phthalate (see Non-Halogenated Semivolatiles)
Bismuth (see Inorganics)
Bromodichlommethane (see Halogenated Volatiles)
Bromoform (see Halogenated Volatiles)
Bromomethane (see Halogenated Volatiles)
4-Bromophenyl phenyl ether (see Halogenated Semivolatiles)
Butyl benzyl phthalate (see Non-Halogenated Semivolatiles)
Cadmium (see Inorganics)
Calcium (see Inorganics)
Carbon disulfide (see Non-Halogenated Volatiles)
Carbon tetrachloride (see Halogenated Volatiles)
Chlordane (see Pesticides)
4-Chloroaniline (see Halogenated Semivolatiles)
Chlorodibromomethane (see Halogenated Volatiles)
Chloroethane (see Halogenated Volatiles)

Alphabetical Listing of Contaminants (continued)

Chloroform (see Halogenated Volatiles)
Chloromethane (see Halogenated Volatiles)
2-Chloronaphthalene (see Halogenated Semivolatiles)
2-Chlorophenol (see Halogenated Semivolatiles)
4-Chlorophenyl phenylether (see Halogenated Semivolatiles)
Chloropropane (see Halogenated Volatiles)
Chromium (see Inorganics)
Chrysene (see Fuel Hydrocarbons)
Cis-1,2-dichloroethylen (see Halogenated Volatiles)
Cis-1,3-dichloropropene (see Halogenated Volatiles)
Cis-2-butene (see Fuel Hydrocarbons)
Cobalt (see Inorganics)
Copper (see Inorganics)
Cresols (see Fuel Hydrocarbons)
Cyanide (see Inorganics)
Cyclohexane (see Fuel Hydrocarbons)
Cyclohexanone (see Non-Halogenated Volatiles)
Cyclopentane (see Fuel Hydrocarbons)
4,4'-DDD (see Pesticides)
4,4'-DDE (see Pesticides)
4,4'-DDT (see Pesticides)
Di-n-butyl phthalate (see Non-Halogenated Semivolatiles)
Di-n-octyl phthalate (see Non-Halogenated Semivolatiles)
Dibenzo(a,h)anthracene (see Fuel Hydrocarbons)
Dibenzofuran (see Non-Halogenated Semivolatiles)
Dibromomethane (see Halogenated Volatiles)
1,2-Dichlorobenzene (see Halogenated Semivolatiles)
1,3-Dichlorobenzene (see Halogenated Semivolatiles)
1,4-Dichlorobenzene (see Halogenated Semivolatiles)
3,3-Dichlorobenzidine (see Halogenated Semivolatiles)
1,1-Dichloroethane (see Halogenated Volatiles)
1,2-Dichloroethane (see Halogenated Volatiles)
1,2-Dichloroethene (see Halogenated Volatiles)
1,1-Dichloroethylene (see Halogenated Volatiles)
Dichloromethane (see Halogenated Volatiles)
2,4-Dichlorophenol (see Halogenated Semivolatiles)
1,2-Dichloropropane (see Halogenated Volatiles)
Dieldrin (see Pesticides)
Diethyl phthalate (see Non-Halogenated Semivolatiles)
Dimethyl phthalate (see Non-Halogenated Semivolatiles)
3,3-Dimethyl-1-butene (see Fuel Hydrocarbons)
2,3-Dimethylbutane (see Fuel Hydrocarbons)
Dimethylethylbenzene (see Fuel Hydrocarbons)
2,2-Dimethylheptane (see Fuel Hydrocarbons)
2,2-Dimethylhexane (see Fuel Hydrocarbons)
2,2-Dimethylpentane (see Fuel Hydrocarbons)
2,3-Dimethylpentane (see Fuel Hydrocarbons)
2,4-Dimethylphenol (see Fuel Hydrocarbons)
4,6-Dinitro-2-methylphenol (see Non-Halogenated Semivolatiles)
2,4-Dinitrophenol (see Non-Halogenated Semivolatiles)

Alphabetical Listing of Contaminants (continued)

2,4-Dinitrotoluene (see Non-Halogenated Semivolatiles)
2,6-Dinitrotoluene (see Non-Halogenated Semivolatiles)
1,2-Diphenylhydrazine (see Non-Halogenated Semivolatiles)
Endosulfan sulfate (see Pesticides)
Endosulfan I (see Pesticides)
Endosulfan II (see Pesticides)
Endrin (see Pesticides)
Endrin aldehyde (see Pesticides)
Ethion (see Pesticides)
Ethyl acetate (see Non-Halogenated Volatiles)
Ethyl ether (see Non-Halogenated Volatiles)
Ethyl parathion (see Pesticides)
Ethylbenzene (see Fuel Hydrocarbons)
Ethylene dibromide (see Halogenated Volatiles)
3-Ethylpentane (see Fuel Hydrocarbons)
Fluoranthene (see Fuel Hydrocarbons)
Fluorene (see Fuel Hydrocarbons)
Fluorine (see Inorganics)
Fluorotrichloromethane (Freon 11) (see Halogenated Volatiles)
Fuel Hydrocarbons
Halogenated Semivolatiles
Halogenated Volatiles
Heptachlor (see Pesticides)
Heptachlor epoxide (see Pesticides)
Hexachlorobenzene (see Halogenated Semivolatiles)
Hexachlorobutadiene (see Halogenated Semivolatiles)
Hexachlorocyclopentadiene (see Halogenated Semivolatiles)
Hexachloroethane (see Halogenated Volatiles)
2-Hexanone (see Non-Halogenated Volatiles)
Indeno(1,2,3-c,d)pyrene (see Fuel Hydrocarbons)
Inorganics
Iron (see Inorganics)
Isobutane (see Fuel Hydrocarbons)
Isobutanol (see Non-Halogenated Volatiles)
Isopentane (see Fuel Hydrocarbons)
Isophorone (see Non-Halogenated Semivolatiles)
Lead (see Inorganics)
M-Xylene (see Fuel Hydrocarbons)
Magnesium (see Inorganics)
Malathion (see Pesticides)
Manganese (see Inorganics)
Mercury (see Inorganics)
Metallic cyanides (see Inorganics)
Methanol (see Non-Halogenated Volatiles)
Methyl isobutyl ketone (see Non-Halogenated Volatiles)
Methyl ethyl ketone (see Non-Halogenated Volatiles)
2-Methyl-1,3-butadiene (see Fuel Hydrocarbons)
3-Methyl-1,2-butadiene (see Fuel Hydrocarbons)
2-Methyl-2-butene (see Fuel Hydrocarbons)
4-Methyl-2-pentanone (see Non-Halogenated Volatiles)

Alphabetical Listing of Contaminants (continued)

2-Methyl-butene (see Fuel Hydrocarbons)
3-Methyl-1-butene (see Fuel Hydrocarbons)
3-Methyl-1-pentene (see Fuel Hydrocarbons)
Methylcyclohexane (see Fuel Hydrocarbons)
Methylcyclopentane (see Fuel Hydrocarbons)
2-Methylheptane (see Fuel Hydrocarbons)
3-Methylheptane (see Fuel Hydrocarbons)
3-Methylhexane (see Fuel Hydrocarbons)
Methylnaphthalene (see Fuel Hydrocarbons)
2-Methylnaphthalene (see Fuel Hydrocarbons)
Methylparathion (see Pesticides)
2-Methylpentane (see Fuel Hydrocarbons)
3-Methylpentane (see Fuel Hydrocarbons)
2-Methylphenol (see Fuel Hydrocarbons)
4-Methylphenol (see Fuel Hydrocarbons)
Methylpropylbenzene (see Fuel Hydrocarbons)
Monochlorobenzene (see Halogenated Volatiles)
N-Butane (see Fuel Hydrocarbons)
n-Butyl alcohol (see Non-Halogenated Volatiles)
N-Decane (see Fuel Hydrocarbons)
N-Dodecane (see Fuel Hydrocarbons)
N-Heptane (see Fuel Hydrocarbons)
N-Hexane (see Fuel Hydrocarbons)
N-Hexylbenzene (see Fuel Hydrocarbons)
n-Nitrosodi-n-propylamine (see Non-Halogenated Semivolatiles)
n-Nitrosodimethylamine (see Non-Halogenated Semivolatiles)
n-Nitrosodiphenylamine (see Non-Halogenated Semivolatiles)
N-Nonane (see Fuel Hydrocarbons)
N-Octane (see Fuel Hydrocarbons)
N-Pentane (see Fuel Hydrocarbons)
N-Propylbenzene (see Fuel Hydrocarbons)
N-Undecane (see Fuel Hydrocarbons)
Naphthalene (see Fuel Hydrocarbons)
Nickel (see Inorganics)
2-Nitroaniline (see Non-Halogenated Semivolatiles)
3-Nitroaniline (see Non-Halogenated Semivolatiles)
4-Nitroaniline (see Non-Halogenated Semivolatiles)
Nitrobenzene (see Fuel Hydrocarbons)
2-Nitrophenol (see Non-Halogenated Semivolatiles)
4-Nitrophenol (see Non-Halogenated Semivolatiles)
Non-Halogenated Semivolatiles
Non-Halogenated Volatiles
O-Xylene (see Fuel Hydrocarbons)
p-Chloro-m-cresol (see Halogenated Semivolatiles)
P-Xylene (see Fuel Hydrocarbons)
Parathion (see Pesticides)
Pentachlorophenol (see Halogenated Semivolatiles)
1-Pentene (see Fuel Hydrocarbons)
Pesticides
Phenanthrene (see Fuel Hydrocarbons)

Alphabetical Listing of Contaminants (continued)

Phenol (see Fuel Hydrocarbons)
Phenyl naphthalene (see Non-Halogenated Semivolatiles)
Polychlorinated biphenyls (PCBS) (see Halogenated Semivolatiles)
Potassium (see Inorganics)
Propane (see Fuel Hydrocarbons)
Pyrene (see Fuel Hydrocarbons)
Pyridine (see Fuel Hydrocarbons)
Selenium (see Inorganics)
Sodium (see Inorganics)
Styrene (see Non-Halogenated Volatiles)
1,1,2,2-Tetrachloroethane (see Halogenated Volatiles)
Tetrachloroethylene (Perchloroethylene) (see Halogenated Volatiles)
Tetrachlorophenol (see Halogenated Semivolatiles)
Tetrahydrofuran (see Non-Halogenated Volatiles)
1,2,3,4-Tetramethylbenzene (see Fuel Hydrocarbons)
1,2,4,5-Tetramethylbenzene (see Fuel Hydrocarbons)
Tin (see Inorganics)
Toluene (see Fuel Hydrocarbons)
Toxaphene (see Pesticides)
Trans-1,3-dichloropropene (see Halogenated Volatiles)
Trans-2-butene (see Fuel Hydrocarbons)
Trans-2-pentene (see Fuel Hydrocarbons)
1,2-Trans-dichloroethylene (see Halogenated Volatiles)
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon I 1 3) (see Halogenated Volatiles)
1,2,4-Trichlorobenzene (see Halogenated Semivolatiles)
1,1,1-Trichloroethane (see Halogenated Volatiles)
1,1,2-Trichloroethane (see Halogenated Volatiles)
Trichloroethylene (see Halogenated Volatiles)
2,4,5-Trichlorophenol (see Halogenated Semivolatiles)
2,4,6-Trichlorophenol (see Halogenated Semivolatiles)
1,2,4-Trimethyl-5-ethylbenzene (see Fuel Hydrocarbons)
1,2,4-Trimethylbenzene (see Fuel Hydrocarbons)
1,3,5-Trimethylbenzene (see Fuel Hydrocarbons)
2,2,4-Trimethylheptane (see Fuel Hydrocarbons)
2,3,4-Trimethylheptane (see Fuel Hydrocarbons)
3,3,5-Trimethylheptane (see Fuel Hydrocarbons)
2,4,4-Trimethylhexane (see Fuel Hydrocarbons)
3,3,4-Trimethylhexane (see Fuel Hydrocarbons)
2,2,4-Trimethylpentane (see Fuel Hydrocarbons)
2,3,4-Trimethylpentane (see Fuel Hydrocarbons)
Vanadium (see Inorganics)
Vinyl chloride (see Halogenated Volatiles)
Vinyl acetate (see Non-Halogenated Volatiles)
Zinc (see Inorganics)

Appendix C

Hazardous Waste Levels

Hazardous Waste Levels

Below are the analytical parameters and their regulatory levels for waste classification purposes. The different testing parameters do not apply to all waste types. Parameters represented by EPA waste numbers D004 through D043 are determined by TCLP methods. Please contact our unit at the above telephone number for hazardous waste classification information.

EPA Waste Number	Parameters/Contaminant	Hazardous Level
D001	Ignitibility	≤140° F
D002	Corrosivity	≤2 and ≥12.5 pH
D003	Reactive Sulfide	500 mg/kg
D003	Reactive Cyanide	250 mg/kg
D004	Arsenic	5.0 mg/l
D005	Barium	100.0 mg/l
D006	Cadmium	1.0 mg/l
D007	Chromium	5.0 mg/l
D008	Lead	5.0 mg/l
D009	Mercury	0.2 mg/l
D010	Selenium	1.0 mg/l
D011	Silver	5.0 mg/l
D012	Endrin	0.02 mg/l
D013	Lindane	0.4 mg/l
D014	Methoxychlor	10.0 mg/l
D015	Toxaphene	0.5 mg/l
D016	2,4-D	10.0 mg/l
D017	2,4,5-TP Silvex	1.0 mg/l
D018	Benzene	0.5 mg/l
D019	Carbon tetrachloride	0.5 mg/l
D020	Chlordane	0.03 mg/l
D021	Chlorobenzene	100.0 mg/l
D022	Chloroform	6.0 mg/l
D023	o-Cresol	200.0 mg/l
D024	m-Cresol	200.0 mg/l
D025	p-Cresol	200.0 mg/l
D026	Cresol	200.0 mg/l
D027	1,4-Dichlorobenzene	7.5 mg/l
D028	1,2-Dichloroethane	0.5 mg/l
D029	1,1-Dichloroethylene	0.7 mg/l
D030	2,4-Dinitrotoluene	0.13 mg/l
D031	Heptachlor	0.008 mg/l
D032	Hexachlorobenzene	0.13 mg/l
D033	Hexachlorobutadiene	0.5 mg/l
D034	Hexachloroethane	3.0 mg/l
D035	Methyl ethyl ketone	200.0 mg/l
D036	Nitrobenzene	2.0 mg/l
D037	Pentachlorophenol	100.0 mg/l
D038	Pyridine	5.0 mg/l
D039	Tetrachloroethylene	0.7 mg/l
D040	Trichloroethylene	0.5 mg/l
D041	2,4,5-Trichlorophenol	400.0 mg/l
D042	2,4,6-Trichlorophenol	2.0 mg/l
D043	Vinyl chloride	0.2 mg/l

Appendix D
District Solid Waste Management Officials

New Jersey Department of Environmental Protection
Division of Solid And Hazardous Waste

District Solid Waste Management Officials – February 1998

Atlantic

Mr. Brian Lefke
Solid Waste Coordinator
Atlantic County Utilities Authority
6700 Delilah Road
Egg Harbor Township, NJ 08234
609/646-5500 Fax 272-6941

Bergen

Mr. Richard Wierer, Director
Solid Waste Management Division
Bergen County Utilities Authority
Foot of Mehrhof Road Box 9
Little Ferry, NJ 07643
201/807-5823 Fax 641-3509

Burlington

Mr. Robert Simkins
Solid Waste Coordinator
Burlington County Waste Management
PO Box 429
Columbus, NJ 08022
609/499-1001 Fax 499-5212

Camden

Mr. Jack Sworaski, Director
Camden County Solid Waste Mgmt.
1301 Park Boulevard
Cherry Hill, NJ 08002-3752
609/216-2113 Fax 216-2146

Cape May

Mr. Thomas Hroncich
Solid Waste Manager
Cape May Co. Municipal Util. Authority
PO Box 610
Cape May Courthouse, NJ 08210
609/465-9026 Fax 465-9025

Cumberland

Mr. Steven Wymbs, Director
Cumberland County Improvement Auth.
2 West Vine Street
Millville, NJ 08332
609/825-3700 Fax 825-8121

Essex

Mr. Martin Lund
Director of Operations
Essex County Utilities Authority
120 Fairview Avenue
Cedar Grove, NJ 07009
973/857-2350 Fax 857-9361

Gloucester

Mr. David Shields, Director
Gloucester County Improvement Auth.
109 Budd Boulevard
Woodbury, NJ 08096
609/848-4002 Fax 384-1262

H.M.D.C.

Mr. Thomas Marturano
Director of Solid Waste
Hackensack Meadowlands Development
Commission
PO Box 640
Lyndhurst, NJ 07071
201/460-1700 Fax 460-1722

Hudson

Mr. Thomas Calvanico, Director
Hudson County Improvement Authority
2 Journal Square Plaza, 8th Floor
Jersey City, NJ 07306
201/795-4555 Fax 795-0240

Hunterdon

Mr. Alan Johnson
Hunterdon County Utilities Authority
Division of Solid Waste
Victorian Plaza, 1 E. Main Street
Flemington, NJ 08822
908/788-1110 Fax 788-1662

Mercer

Mr. Al Collins
Solid Waste Supervisor
Mercer County Improvement Authority
640 South Broad Street
PO Box 8068
Trenton, NJ 08650
609/695-1200 Fax 695-1452

Middlesex

Mr. Richard Hills, Director
Middlesex County Department of
Solid Waste Management
96 Bayard Street
New Brunswick, NJ 08901
732/745-4170 Fax 745-3010

Monmouth

Mr. Lawrence Zaayenga
Solid Waste Coordinator
Monmouth County Planning Board
Hall of Records Annex
PO Box 1255
Freehold, NJ 07728-1255
732/431-7460 Fax 431-7795

Morris

Mr. Larry Gindoff
Solid Waste Coordinator
Morris County Municipal Util. Authority
PO Box 370
Mendham, NJ 07945-0370
973/285-8390 Fax 285-8397

Ocean

Mr. Alan Avery, Director
Ocean County Solid Waste Dept.
129 Hooper Avenue
Box 2191
Toms River, NJ 08754-2191
732/506-5047 Fax 244-8396

Passaic

Mr. James Rogers
Planning Director
Passaic County Planning Department
Admin. Building, 401 Grand Street
Paterson, NJ 07505-2023
201/881-4490 Fax 881-4484

Salem

Mr. Peter Dewilde, Director
Salem County Utilities Authority
PO Box 890
52 McKillip Road
Alloway, NJ 08001-0890
609/935-7900 Fax 935-7331

Somerset

Ms. Diana Vigilante
Manager
Somerset County
Solid Waste Management Division
PO Box 3000
Somerville, NJ 08876-1262
908/231-7031 Fax 707-1749

Sussex

Mr. Fred Suljic
Administrator
Sussex County Dept. of Planning
County Administration Building
Plotts Road, PO Box 709
Newton, NJ 07860
973/579-0500 Fax 579-0513

Union

Mr. Joe Spatola, Director
Union County Utilities Authority
1499 Routes 1 & 9 North
Rahway, NJ 07065
908/382-9400 Fax 382-5862

Warren

Mr. David Dech, Director
Warren County Planning Department
Dumont Administration Building
Belvidere, NJ 07823
908/475-6531 Fax 475-6555

Appendix E

Permit Identification

Permit Identification

A. Introduction

The information contained in this section is designed to provide a Responsible Party or its agent with guidance regarding the permits that may be required to implement a specific remedial action. However, this section should not be viewed as a final identification of all permits required to implement a site-specific remedial action work plan. In order to fully identify the permits required for a site-specific project, the Responsible Party or its agent should utilize the Permit Identification Form (see Appendix H) and the services of the Office of Permit Information and Assistance (609/292-3600).

Upon completion of the Permit Identification Form, the Responsible Party will initiate a process wherein it will receive assistance in identifying all applicable permits and reviews required by NJDEP. In addition, the Office of Permit Information and Assistance will schedule a preapplication meeting with all of the pertinent NJDEP review entities and continue to assist the Responsible Party when necessary throughout the permit/review process.

B. Potential Permits and Reviews

The attached Permit Identification Chart has been assembled to indicate the “Probably Needed” and “Possibly Needed” permits for each of the Soil Treatment Technologies described in Section IV of the *Guidance Document for the Remediation of Contaminated Soils*. If a particular permit is listed as “Probably Needed,” it is almost certain that this permit will be required to implement this remedial action. If a particular permit is listed as “Possibly Needed,” this permit **may be** required in certain situations and the Responsible Party will need to contact the permit program for a final determination. Listed below are descriptions of the permit categories on the attached chart.

1. **NJPDES:** When this category has been marked on the chart, it indicates that a New Jersey Pollution Discharge Elimination System (NJPDES) permit may be required, based upon the description of that particular process. However, given the varied types of NJPDES permits, the specific type will not be indicated, as this will depend on the method of discharge chosen. For example, if you have chosen to discharge to ground water, a NJPDES Discharge to Ground Water (DGW) permit would be required. However, if you are going to an existing publicly owned treatment works or you are going to pretreat the discharge prior to going to a publicly owned treatment works, then you may only be required to get an NJPDES SIU (Significant Industrial User) permit.

If you are choosing to build and operate your own treatment facility which will discharge to a surface water body, you will need to obtain a NJPDES Discharge to Surface Water (DSW) permit. Given the various types of NJPDES permits, if the remedial action you have chosen indicates that you probably need a permit, you should contact the appropriate bureau within the Wastewater Facilities Program to determine the exact permit you will need.

2. **TWA (Treatment Works Approval):** This category, when marked on the chart, indicates that a Treatment Works Approval (TWA) may be required, based on the description of the particular process. A TWA may be issued for a variety of reasons such as: a newly approved or substantially modified treatment facility; newly approved or substantially modified pretreatment equipment; or, the construction of a new lateral, main or pump station. In fact, whenever a process involves the treatment or disposal of wastewater, the applicant should contact the Bureau of Construction and Connection for a formal determination on whether or not a TWA will be required.
3. **Air Quality Regulation Permits:** This category, when marked on the chart, indicates that some type of Air permit may be required, based upon the description of that particular process. Air permits are extremely varied. For example, the Air Quality regulations require a permit to construct new equipment, as well as a separate permit to operate newly installed equipment. Also, the permits are divided into five different levels, based on the type of pollution control a particular piece of equipment is supposed

to provide. Whenever the process you have chosen involves an air pollution control device or a basic air filtration system, you should contact the Bureau of New Source Review for a formal determination on which type of permit is required.

4. **Land Use Regulation Program (LURP), Wetlands Permits:** When this category is marked on the chart, it indicates some type of wetlands permit may be required. In fact, on the chart a wetlands permit is always marked in the “Possibly Needed” category, as a wetlands permit would be required only if wetlands are present on the specific location where a remedial action is to be taken. Absent specific site locations, each of the remedial action sections indicates a possible need for a wetlands permit. The category “wetlands permit” actually refers to the following permit or review categories:
 - 1) Letters of Exemption (LOE)
 - 2) Letters of Interpretation (LOI)
 - 3) Statewide General Permits (SGP)
 - 4) Open Water Fill Permits
 - 5) Individual Permits
 - 6) Transition Area Waivers
5. **Land Use Regulation Program (LURP), Stream Encroachment:** A Stream Encroachment permit is always marked in the “Possibly Needed” category, as a Stream Encroachment permit would be required if any construction or installation activities were to occur along, in, or across a channel or the floodplain of a stream. Also, a Stream Encroachment permit would be required for any alteration of the floodplain or the stream. If there are questions regarding a specific project or site location, contact the Land Use Regulation Program for a formal determination on whether a permit will be required.
6. **Well Drilling Permits:** When this category is marked on the chart, it indicates that a well drilling permit may be required. This permit is obtained by the well driller, whether for a potable well or a monitoring well. Should you need a well installed, contact a New Jersey licensed well driller.
7. **Bureau of Water Allocation Permits:** When this category is marked on the chart, it indicates that a Water Supply Allocation permit may be required. A water supply allocation permit is required only when you will be diverting 100,000 gallons of water per day (70 gpm) or more from surface or ground waters for non-agricultural purposes. If your activity qualifies under this criteria, or you wish an applicability determination, contact the Bureau of Water Allocation.

It is suggested that you contact the specific bureau or office should you have questions regarding the applicability of a particular permit. However, should your project require two or more permits, you are encouraged to contact the Office of Permit Information and Assistance by completing and mailing the attached Permit Identification Form or by calling 609/292-3600. The Office of Permit Information and Assistance will schedule a preapplication meeting with all of the pertinent NJDEP review entities and continue to assist the Responsible Party when necessary throughout the permit/review process. The Permit Identification Form is meant only to inform applicants of the potential permits which may be needed, but is not meant to provide the actual permits required to proceed with your project.

In addition to the Permit Identification Form, Appendix I is a list of the technical manuals that are available through the DEP’s Office of Maps and Publications. These technical manuals are produced by the permit programs, and offer technical and policy guidance to applicants to prepare submissions for permits. You may reach this office by mail at:

Map Sales and Publications Office
PO Box 438
Trenton, NJ 08625-0438

or by calling 609/777-1038.

Permit Identification Chart

Remedial Actions:	Permits Probably Needed:	Permits Possibly Needed:
1) Slurry Biodegradation	NJPDES TWA Air	Stream Encroachment Wetlands
2) Ex Situ Bioremediation and Landfarming	NJPDES TWA Air	Stream Encroachment Wetlands
3) In Situ Biological	NJPDES/DGW TWA	Air Stream Encroachment Wetlands
4) Soil Vapor Extraction	NJPDES TWA Air Well Drilling	Stream Encroachment Wetlands Water Allocation
5) Soil Washing	Air	NJPDES TWA Stream Encroachment Wetlands
6) Soil Flushing	NJPDES/DGW TWA Well Drilling	Stream Encroachment Wetlands Water Allocation
7) Solvent and Chemical Extraction	Air	NJPDES TWA Stream Encroachment Wetlands
8) Incineration	Air	NJPDES TWA Stream Encroachment Wetlands
9) Thermal	Air	NJPDES TWA Stream Encroachment Wetlands
10) Cement/Pozzolanic based Stabilization	Air	NJPDES TWA Stream Encroachment Wetlands

Permit Identification Chart (continued)

Remedial Actions:	Permits Probably Needed:	Permits Possibly Needed:
11) Vitrification Electric Process Heating	Air	NJPDES TWA Stream Encroachment Wetlands
12) Capping		NJPDES TWA Air Stream Encroachment Wetlands
13) Excavation		NJPDES TWA Air Stream Encroachment Wetlands Dewatering