U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

FINAL

REMEDIAL INVESTIGATION REPORT AT THE OPEN BURNING (OB) GROUNDS APPENDICES VOLUME II

SEPTEMBER 1994

APPENDIX G

ANALYTICAL RESULTS

VALIDATED DATA QUALIFIERS

U	The analyte was not detected.
UJ	The analyte was not detected; however, the associated reporting limit is approximate.
J	The analyte was positively identified; however, QC results indicate that the reported concentration may not be accurate and is therefore an estimate.
R	The analyte was rejected due to laboratory QC deficiencies, sample preservation problems, or holding time exceedance. The presence or absence of the analyte cannot be determined.

SOIL

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-01	GB-01	GB-02	GB-02	GB-02	GB-2	GB-03
	DEPTH	0-6"	2-4'	0-6"	0-2'	4-6'	0-2'	0-6"
	DATE	12/03/91	12/03/91	12/04/91	12/04/91	12/04/91	12/04/91	12/05/91
	ES ID	GB01-1	GB01-3	GB02-1	GB02-2	GB02-4	GB02-4RE	GB03-1
	LAB ID	150047	150049	150184	150051	150185	150185	150382
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Bromomethane	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Vinyl Chloride	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Chloroethane	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Methylene Chloride	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Acetone	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Carbon Disulfide	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,1-Dichloroethene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,1-Dichloroethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,2-Dichloroethene (total)	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Chloroform	ug/kg	7 U	6 U	6 U	6 U	10		6 U
1,2-Dichloroethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
2-Butanone	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
1,1,1-Trichloroethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Carbon Tetrachloride	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Vinyl Acetate	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Bromodichloromethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,2-Dichloropropane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
cis-1,3-Dichloropropene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Trichloroethene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Dibromochloromethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,1,2-Trichloroethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Benzene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
trans-1,3-Dichloropropene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Bromoform	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
4-Methyl-2-Pentanone	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
2-Hexanone	ug/kg	13 U	11 U	13 U	12 U	11 U		11 U
Tetrachloroethene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
1,1,2,2-Tetrachloroethane	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Toluene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Chlorobenzene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Ethylbenzene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Styrene	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U
Xylene (total)	ug/kg	7 U	6 U	6 U	6 U	6 U		6 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-01	GB-01	GB-02	GB-02	GB-02	GB-2	GB-03
	DEPTH	0-6"	2-4'	0-6"	0-2'	4-6'	0-2'	0-6"
	DATE	12/03/91	12/03/91	12/04/91	12/04/91	12/04/91	12/04/91	12/05/91
	ES ID	GB01-1	GB01-3	GB02-1	GB02-2	GB02-4	GB02-4RE	GB03-1
	LAB ID	150047	150049	150184	150051	150185	150185	150382
	UNITS							
Semivolatiles								
Phenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
bis(2-Chloroethyl) ether	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2-Chlorophenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
1,3-Dichlorobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
1,4-Dichlorobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzyl Alcohol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
1,2-Dichlorobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2-Methylphenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,2'-oxybis(1-Chloropropane)	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
4-Methylphenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
N-Nitroso-di-n-propylamine	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Hexachloroethane	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Nitrobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Isophorone	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2-Nitrophenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4-Dimethylphenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzoic acid	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
bis(2-Chloroethoxy) methane	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4-Dichlorophenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
1,2,4-Trichlorobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Naphthalene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
4-Chloroaniline	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Hexachlorobutadiene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
4-Chloro-3-methylphenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2-Methylnaphthalene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Hexachlorocyclopentadiene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4,6-Trichlorophenol	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4,5-Trichlorophenol	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
2-Chloronaphthalene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2-Nitroaniline	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
Dimethylphthalate	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Acenaphthylene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,6-Dinitrotoluene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	200 J	340 J
3-Nitroaniline	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
Acenaphthene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4-Dinitrophenol	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
4-Nitrophenol	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
Dibenzofuran	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
2,4-Dinitrotoluene	ug/kg	780 U	730 U	2000 J	790 U	770 U R	4200 J	7000
Diethylphthalate	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
4-Chlorophenyl-phenylether	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Fluorene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
4-Nitroaniline	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
4,6-Dinitro-2-methylphenol	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
N-Nitrosodiphenylamine	ug/kg	780 U	730 U	340 J	790 U	770 U R	1000 J	1000
4-Bromophenyl-phenylether	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Hexachlorobenzene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Pentachlorophenol	ug/kg	3800 U	3500 U	3900 U J	3800 U	3700 U R	3700 U J	3700 U
Phenanthrene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Anthracene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	780 U	730 U	1100 J	790 U	770 U R	1400 J	840
Fluoranthene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Pyrene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Butylbenzylphthalate	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
3,3'-Dichlorobenzidine	ug/kg	1600 U	1500 U	1600 U J	1600 U	1500 U R	1500 U J	1500 U
Benzo(a)anthracene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Chrysene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
bis(2-Ethylhexyl)phthalate	ug/kg	780 U	780	790 U J	790 U	770 U R	770 U J	760 U
Di-n-octylphthalate	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzo(b)fluoranthene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzo(k)fluoranthene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzo(a)pyrene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Indeno(1,2,3-cd)pyrene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Dibenz(a,h)anthracene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U
Benzo(g,h,i)perylene	ug/kg	780 U	730 U	790 U J	790 U	770 U R	770 U J	760 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-01	GB-01	GB-02	GB-02	GB-02	GB-2	GB-03
	DEPTH	0-6"	2-4'	0-6"	0-2'	4-6'	0-2'	0-6"
	DATE	12/03/91	12/03/91	12/04/91	12/04/91	12/04/91	12/04/91	12/05/91
	ES ID	GB01-1	GB01-3	GB02-1	GB02-2	GB02-4	GB02-4RE	GB03-1
	LAB ID	150047	150049	150184	150051	150185	150185	150382
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
beta-BHC	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
delta-BHC	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
gamma-BHC (Lindane)	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
Heptachlor	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
Aldrin	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
Heptachlor epoxide	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
Endosulfan I	ug/kg	19 U	18 U	19 U	19 U	19 U		19 U
Dieldrin	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
4,4'-DDE	ug/kg	38 U	35 U	39 U	38 U	37 U		32 J
Endrin	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
Endosulfan II	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
4,4'-DDD	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
Endosulfan sulfate	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
4,4'-DDT	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
Methoxychlor	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Endrin ketone	ug/kg	38 U	35 U	39 U	38 U	37 U		37 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
gamma-Chlordane	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Toxaphene	ug/kg	380 U	350 U	390 U	380 U	370 U		370 U
Aroclor-1016	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Aroclor-1221	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Aroclor-1232	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Aroclor-1242	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Aroclor-1248	ug/kg	190 U	180 U	190 U	190 U	190 U		190 U
Aroclor-1254	ug/kg	380 U	350 U	390 U	380 U	370 U		370 U
Aroclor-1260	ug/kg	380 U	350 U	390 U	380 U	370 U		370 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-01	GB-01	GB-02	GB-02	GB-02	GB-2	GB-03
	DEPTH	0-6"	2-4'	0-6"	0-2'	4-6'	0-2'	0-6"
	DATE	12/03/91	12/03/91	12/04/91	12/04/91	12/04/91	12/04/91	12/05/91
	ES ID	GB01-1	GB01-3	GB02-1	GB02-2	GB02-4	GB02-4RE	GB03-1
	LAB ID	150047	150049	150184	150051	150185	150185	150382
	UNITS							
Explosives								
HMX	ug/kg	1000 U	1000 U	1000 U	1000 U	1200 U J	950 U J	1000 U
RDX	ug/kg	120 U	120 U	120 U	120 U	150 U J	120 U J	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	82 J	120 U	150 U J	120 U J	184
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	150 U J	120 U J	120 U
Tetryl	ug/kg	400 U	400 U	400 U	400 U	470 U J	380 U J	400 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	150 U J	120 U J	150
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	150 U J	120 U J	370
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	85 J	73 J	150 U J	120 U J	370
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	150 U J	120 U J	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	270	120 U	150 U J	120 U J	940
Metals								
Aluminum	mg/kg	12900	17500	20900	19000	16600		18600
Antimony	mg/kg	12.7 U R	11.4 U R	19.6 R	13.4 U R	10.4 U R		8.8 U R
Arsenic	mg/kg	6.6	4.7	18.5	5.3	3.8		4.9
Barium	mg/kg	226	365	2290	906	72.8		924
Beryllium	mg/kg	0.9 R	1.1 R	0.88 R	1.2 R	1.1 R		0.83 R
Cadmium	mg/kg	2.2	2.4	5.9	2.3	2.5		3.7
Calcium	mg/kg	11200	10000	8270	6250	5050		17500
Chromium	mg/kg	21.6	28.3	34.9	27.7	29.5		33.3
Cobalt	mg/kg	10.4 J	9.2 J	12.8	9.5 J	19.3		13.4
Copper	mg/kg	1010	256	1060	399	42.8		109
Iron	mg/kg	26700	32100	37700	28800	35800		30100
Lead	mg/kg	630	481	5310	3400	27.9		194
Magnesium	mg/kg	5150	6060	7190	5870	7200		6620
Manganese	mg/kg	360	449	597	380	456		611
Mercury	mg/kg	0.13	0.04 J	0.15	0.14	0.04 U		0.09 J
Nickel	mg/kg	33.8	39.6	45.4	34.6	62.4		40.1
Potassium	mg/kg	1280	2010	2340	2030	1590		2360
Selenium	mg/kg	0.16 U J	0.16 U J	0.91 J	1 U J	0.13 U J		0.16 U J
Silver	mg/kg	2.1 U	1.9 U	1.8 U	2.2 U	1.7 U		1.1 U
Sodium	mg/kg	73.5 U	66.2 U	160 J	130 J	72.3 J		82.2 J
Thallium	mg/kg	0.5 U	0.5 U	0.44 U	0.67 U	0.42 U		0.5 U
Vanadium	mg/kg	20.4	28.1	26.7	29.7	24.2		25.8
Zinc	mg/kg	383	163	780	210	94.9		676
Cyanide	mg/kg	0.67 U	0.61 U	0.7 U	0.62 U	0.51 U		0.65 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL GB-03 0-2' 12/04/91 GB03-2 150186	SOIL GB-3 0-2' 12/04/91 GB03-2RE 150188	SOIL GB-04 0-6" 12/06/91 GB04-1 150383	SOIL GB-04 6' + 12/05/91 GB04-5 150387	SOIL GB-05 0-6" 12/06/91 GB05-1 150388	SOIL GB-05 0-2' 12/05/91 GB05-2 150389	SOIL GB-05 2-4' 12/05/91 GB-5-3 150390
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U		12 U	12 U	12 U	12 U	
Bromomethane	ug/kg	12 U		12 U	12 U	12 U	12 U	
Vinyl Chloride	ug/kg	12 U		12 U	12 U	12 U	12 U	
Chloroethane	ug/kg	12 U		12 U	12 U	12 U	12 U	
Methylene Chloride	ug/kg	6 U		6 U	6 U	6 U	6 U	
Acetone	ug/kg	12 U		12 U	12 U	12 U	12 U	
Carbon Disulfide	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,1-Dichloroethene	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,1-Dichloroethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,2-Dichloroethene (total)	ug/kg	6 U		6 U	6 U	6 U	6 U	
Chloroform	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,2-Dichloroethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
2-Butanone	ug/kg	12 U		12 U	12 U	12 U	12 U	
1,1,1-Trichloroethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
Carbon Tetrachloride	ug/kg	6 U		6 U	6 U	6 U	6 U	
Vinyl Acetate	ug/kg	12 U		12 U	12 U	12 U	12 U	
Bromodichloromethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,2-Dichloropropane	ug/kg	6 U		6 U	6 U	6 U	6 U	
cis-1,3-Dichloropropene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Trichloroethene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Dibromochloromethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,1,2-Trichloroethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
Benzene	ug/kg	6 U		6 U	6 U	6 U	6 U	
trans-1,3-Dichloropropene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Bromoform	ug/kg	6 U		6 U	6 U	6 U	6 U	
4-Methyl-2-Pentanone	ug/kg	12 U		12 U	12 U	12 U	12 U	
2-Hexanone	ug/kg	12 U		12 U	12 U	12 U	12 U	
Tetrachloroethene	ug/kg	6 U		6 U	6 U	6 U	6 U	
1,1,2,2-Tetrachloroethane	ug/kg	6 U		6 U	6 U	6 U	6 U	
Toluene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Chlorobenzene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Ethylbenzene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Styrene	ug/kg	6 U		6 U	6 U	6 U	6 U	
Xylene (total)	ug/kg	6 U		6 U	6 U	6 U	6 U	

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-03	GB-3	GB-04	GB-04	GB-05	GB-05	GB-05
	DEPTH	0-2'	0-2'	0-6"	6' +	0-6"	0-2'	2-4'
	DATE	12/04/91	12/04/91	12/06/91	12/05/91	12/06/91	12/05/91	12/05/91
	ES ID	GB03-2	GB03-2RE	GB04-1	GB04-5	GB05-1	GB05-2	GB-5-3
	LAB ID	150186	150186	150383	150387	150388	150389	150390
	UNITS							
Semivolatiles								
Phenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
bis(2-Chloroethyl) ether	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2-Chlorophenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
1,3-Dichlorobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
1,4-Dichlorobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Benzyl Alcohol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
1,2-Dichlorobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2-Methylphenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,2'-oxybis(1-Chloropropane)	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
4-Methylphenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
N-Nitroso-di-n-propylamine	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Hexachloroethane	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Nitrobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Isophorone	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2-Nitrophenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,4-Dimethylphenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Benzoic acid	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
bis(2-Chloroethoxy) methane	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,4-Dichlorophenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
1,2,4-Trichlorobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Naphthalene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
4-Chloroaniline	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Hexachlorobutadiene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
4-Chloro-3-methylphenol	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2-Methylnaphthalene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Hexachlorocyclopentadiene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,4,6-Trichlorophenol	ug/kg	730 U R	360 U J	780 U	760 U	800 U	760 U	
2,4,5-Trichlorophenol	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
2-Chloronaphthalene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2-Nitroaniline	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
Dimethylphthalate	ug/kg	730 U R	360 U J	780 U	760 U	800 U	760 U	
Acenaphthylene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,6-Dinitrotoluene	ug/kg	730 U R	110 J	780 U	750 U	800 U	760 U	
3-Nitroaniline	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
Acenaphthene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,4-Dinitrophenol	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
4-Nitrophenol	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
Dibenzofuran	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
2,4-Dinitrotoluene	ug/kg	730 U R	2200 J	780 U	750 U	800 U	760 U	
Diethylphthalate	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
4-Chlorophenyl-phenylether	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Fluorene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
4-Nitroaniline	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
4,6-Dinitro-2-methylphenol	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
N-Nitrosodiphenylamine	ug/kg	730 U R	510 J	780 U	750 U	800 U	760 U	
4-Bromophenyl-phenylether	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Hexachlorobenzene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Pentachlorophenol	ug/kg	3500 U R	1700 U J	3800 U	3600 U	3900 U	3700 U	
Phenanthrene	ug/kg	730 U R	360 U J	780 U	750 U	290 J	760 U	
Anthracene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	730 U R	1400 J	780 U	750 U	800 U	760 U	
Fluoranthene	ug/kg	730 U R	360 U J	780 U	750 U	480 J	760 U	
Pyrene	ug/kg	730 U R	360 U J	780 U	750 U	300 J	760 U	
Butylbenzylphthalate	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
3,3'-Dichlorobenzidine	ug/kg	1500 U R	720 U J	1600 U	1500 U	1600 U	1500 U	
Benzo(a)anthracene	ug/kg	730 U R	360 U J	780 U	750 U	200 J	760 U	
Chrysene	ug/kg	730 U R	360 U J	780 U	750 U	250 J	760 U	
bis(2-Ethylhexyl)phthalate	ug/kg	730 U R	360 U J	780 U	750 U	800 U	300 J	
Di-n-octylphthalate	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Benzo(b)fluoranthene	ug/kg	730 U R	360 U J	780 U	750 U	180 J	760 U	
Benzo(k)fluoranthene	ug/kg	730 U R	360 U J	780 U	750 U	190 J	760 U	
Benzo(a)pyrene	ug/kg	730 U R	360 U J	780 U	750 U	150 J	760 U	
Indeno(1,2,3-cd)pyrene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Dibenz(a,h)anthracene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	
Benzo(g,h,i)perylene	ug/kg	730 U R	360 U J	780 U	750 U	800 U	760 U	

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-03	GB-3	GB-04	GB-04	GB-05	GB-05	GB-05
	DEPTH	0-2'	0-2'	0-6"	6' +	0-6"	0-2'	2-4'
	DATE	12/04/91	12/04/91	12/06/91	12/05/91	12/06/91	12/05/91	12/05/91
	ES ID	GB03-2	GB03-2RE	GB04-1	GB04-5	GB05-1	GB05-2	GB-5-3
	LAB ID	150186	150186	150383	150387	150388	150389	150390
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U		19 U	18 U	19 U	18 U	
beta-BHC	ug/kg	18 U		19 U	18 U	19 U	18 U	
delta-BHC	ug/kg	18 U		19 U	18 U	19 U	18 U	
gamma-BHC (Lindane)	ug/kg	18 U		19 U	18 U	19 U	18 U	
Heptachlor	ug/kg	18 U		19 U	18 U	19 U	18 U	
Aldrin	ug/kg	18 U		19 U	18 U	19 U	18 U	
Heptachlor epoxide	ug/kg	18 U		19 U	18 U	19 U	18 U	
Endosulfan I	ug/kg	18 U		19 U	18 U	19 U	18 U	
Dieldrin	ug/kg	35 U		38 U	36 U	39 U	37 U	
4,4'-DDE	ug/kg	35 U		38 U	36 U	39 U	37 U	
Endrin	ug/kg	35 U		38 U	36 U	39 U	37 U	
Endosulfan II	ug/kg	35 U		38 U	36 U	39 U	37 U	
4,4'-DDD	ug/kg	35 U		38 U	36 U	39 U	37 U	
Endosulfan sulfate	ug/kg	35 U		38 U	36 U	39 U	37 U	
4,4'-DDT	ug/kg	35 U		38 U	36 U	39 U	37 U	
Methoxychlor	ug/kg	180 U		190 U	180 U	190 U	180 U	
Endrin ketone	ug/kg	35 U		38 U	36 U	39 U	37 U	
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	180 U		190 U	180 U	190 U	180 U	
gamma-Chlordane	ug/kg	180 U		190 U	180 U	190 U	180 U	
Toxaphene	ug/kg	350 U		380 U	360 U	390 U	370 U	
Aroclor-1016	ug/kg	180 U		190 U	180 U	190 U	180 U	
Aroclor-1221	ug/kg	180 U		190 U	180 U	190 U	180 U	
Aroclor-1232	ug/kg	180 U		190 U	180 U	190 U	180 U	
Aroclor-1242	ug/kg	180 U		190 U	180 U	190 U	180 U	
Aroclor-1248	ug/kg	180 U		190 U	180 U	190 U	180 U	
Aroclor-1254	ug/kg	350 U		380 U	360 U	390 U	370 U	
Aroclor-1260	ug/kg	350 U		380 U	360 U	390 U	370 U	

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-03	GB-3	GB-04	GB-04	GB-05	GB-05	GB-05
	DEPTH	0-2'	0-2'	0-6"	6' +	0-6"	0-2'	2-4'
	DATE	12/04/91	12/04/91	12/06/91	12/05/91	12/06/91	12/05/91	12/05/91
	ES ID	GB03-2	GB03-2RE	GB04-1	GB04-5	GB05-1	GB05-2	GB-5-3
	LAB ID	150186	150188	150393	150387	150388	150389	150390
	UNITS							
Explosives								
HMX	ug/kg	1100 U J	980 U J	1000 U	980 U	1000 U	970 U	
RDX	ug/kg	140 U J	120 U J	120 U	120 U	120 U	120 U	
1,3,5-Trinitrobenzene	ug/kg	260 J	150 J	120 U	120 U	120 U	120 U	
1,3-Dinitrobenzene	ug/kg	140 U J	120 U J	120 U	120 U	120 U	120 U	
Tetryl	ug/kg	440 U J	390 U J	400 U	390 U	400 U	390 U	
2,4,6-Trinitrotoluene	ug/kg	69 J	120 U J	120 U	120 U	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/kg	280 J	200 J	120 U	120 U	120 U	120 U	
2-amino-4,6-Dinitrotoluene	ug/kg	300 J	200 J	120 U	120 U	120 U	120 U	
2,6-Dinitrotoluene	ug/kg	140 U J	120 U J	67 J	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/kg	850 J	630 J	120 U	120 U	120 U	120 U	
Metals								
Aluminum	mg/kg	14700		18500	15400	16100		10100
Antimony	mg/kg	9.8 U R		8 U R	11.5 U R	8.2 U R		12.6 U R
Arsenic	mg/kg	6.1		5.1	3.8	5.8		3.1
Barium	mg/kg	819		131	63.6	227		73.9
Beryllium	mg/kg	0.9 R		0.91 R	1 R	0.7 R		0.81 R
Cadmium	mg/kg	3.5		2.4	2.6	3.7		1.8
Calcium	mg/kg	22200		17700	2160	61600		90400
Chromium	mg/kg	29.7		27.9	28.6	31.6		18.1
Cobalt	mg/kg	10.6		15.1	15.9	11.8		6.1 J
Copper	mg/kg	108		34.1	34.5	730		16
Iron	mg/kg	27600		32200	34100	26700		19700
Lead	mg/kg	252		36.1	18.1	167		12.4
Magnesium	mg/kg	6070		7290	7010	11200		9360
Manganese	mg/kg	499		516	336	503		263
Mercury	mg/kg	0.14		0.04 U	0.04 U	0.04 U		0.04 U
Nickel	mg/kg	39.1		47	55.5	36.6		28.3
Potassium	mg/kg	1760		2540	1580	2150		1450
Selenium	mg/kg	0.42 J		0.12 U J	0.22 U J	0.24 U J		0.2 J
Silver	mg/kg	1.6 J		1.3 U	1.9 U	1.3 U		2 U
Sodium	mg/kg	98.8 J		78.9 J	66.7 U	160 J		142 J
Thallium	mg/kg	0.63 U		0.38 U	0.71 U	0.75 U		0.52 U
Vanadium	mg/kg	18.1		27.3	19.8	25.7		18.8
Zinc	mg/kg	445		141	51	332		56
Cyanide	mg/kg	0.58 U		0.65 U	0.6 U	0.62 U		0.69 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-06	GB-06	GB-07	GB-7	GB-07	GB-08	GB-08
	DEPTH	0-6"	6'+	0-6"	0-6"	0-2'	0-6"	0-6"
	DATE	12/06/91	12/06/91	12/09/91	12/09/91	12/09/91	12/09/91	12/09/91
	ES ID	GB06-1	GB06-5	GB-07-1	GB-07-1RE	GB-07-2	GB-08-1	GB-08-1RE
	LAB ID	150391	150395	150573	150573	150574	150577	150577
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Bromomethane	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Vinyl Chloride	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Chloroethane	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Methylene Chloride	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Acetone	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Carbon Disulfide	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
1,1-Dichloroethene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
1,1-Dichloroethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
1,2-Dichloroethene (total)	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Chloroform	ug/kg	6 U	6 U	6 U		6 U	13 J	6 U J
1,2-Dichloroethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
2-Butanone	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
1,1,1-Trichloroethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Carbon Tetrachloride	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Vinyl Acetate	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Bromodichloromethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
1,2-Dichloropropane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
cis-1,3-Dichloropropene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Trichloroethene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Dibromochloromethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
1,1,2-Trichloroethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Benzene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
trans-1,3-Dichloropropene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Bromoform	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
4-Methyl-2-Pentanone	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
2-Hexanone	ug/kg	12 U	13 U	11 U		12 U	12 U J	12 U J
Tetrachloroethene	ug/kg	6 U	6 U	6 U		6 U	2 J	13 J
1,1,2,2-Tetrachloroethane	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Toluene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Chlorobenzene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Ethylbenzene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Styrene	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J
Xylene (total)	ug/kg	6 U	6 U	6 U		6 U	6 U J	6 U J

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-06	GB-06	GB-07	GB-7	GB-07	GB-08	GB-08
	DEPTH	0-6"	6'+	0-6"	0-6"	0-2'	0-6"	0-6"
	DATE	12/06/91	12/06/91	12/09/91	12/09/91	12/09/91	12/09/91	12/09/91
	ES ID	GB06-1	GB06-5	GB-07-1	GB-07-1RE	GB-07-2	GB-08-1	GB-08-1RE
	LAB ID	150391	150395	150573	150573	150574	150577	150577
	UNITS							
Semivolatiles								
Phenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
bis(2-Chloroethyl) ether	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2-Chlorophenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
1,3-Dichlorobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
1,4-Dichlorobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzyl Alcohol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
1,2-Dichlorobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2-Methylphenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,2'-oxybis(1-Chloropropane)	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
4-Methylphenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
N-Nitroso-di-n-propylamine	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Hexachloroethane	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Nitrobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Isophorone	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2-Nitrophenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4-Dimethylphenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzoic acid	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
bis(2-Chloroethoxy) methane	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4-Dichlorophenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
1,2,4-Trichlorobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Naphthalene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
4-Chloroaniline	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Hexachlorobutadiene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
4-Chloro-3-methylphenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2-Methylnaphthalene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Hexachlorocyclopentadiene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4,6-Trichlorophenol	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4,5-Trichlorophenol	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
2-Chloronaphthalene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2-Nitroaniline	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
Dimethylphthalate	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Acenaphthylene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,6-Dinitrotoluene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
3-Nitroaniline	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
Acenaphthene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4-Dinitrophenol	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
4-Nitrophenol	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
Dibenzofuran	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
2,4-Dinitrotoluene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	780 J
Diethylphthalate	ug/kg	780 U	800 U	830 U R	410 U J	94 J	840 U R	410 U J
4-Chlorophenyl-phenylether	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Fluorene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
4-Nitroaniline	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
4,6-Dinitro-2-methylphenol	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
N-Nitrosodiphenylamine	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	260 J
4-Bromophenyl-phenylether	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Hexachlorobenzene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	90 J
Pentachlorophenol	ug/kg	3800 U	3900 U	4000 U R	2000 U J	3700 U	4100 U R	2000 U J
Phenanthrene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Anthracene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	73 J
Fluoranthene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Pyrene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Butylbenzylphthalate	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
3,3'-Dichlorobenzidine	ug/kg	1600 U	1600 U	1700 U R	820 U J	1500 U	1700 U R	830 U J
Benzo(a)anthracene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Chrysene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
bis(2-Ethylhexyl)phthalate	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Di-n-octylphthalate	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzo(b)fluoranthene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzo(k)fluoranthene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzo(a)pyrene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Indeno(1,2,3-cd)pyrene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Dibenz(a,h)anthracene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J
Benzo(g,h,i)perylene	ug/kg	780 U	800 U	830 U R	410 U J	770 U	840 U R	410 U J

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-06	GB-06	GB-07	GB-7	GB-07	GB-08	GB-08
	DEPTH	0-6"	6'+	0-6"	0-6"	0-2'	0-6"	0-6"
	DATE	12/06/91	12/06/91	12/09/91	12/09/91	12/09/91	12/09/91	12/09/91
	ES ID	GB06-1	GB06-5	GB-07-1	GB-07-1RE	GB-07-2	GB-08-1	GB-08-1RE
COMPOUND	LAB ID	150391	150395	150573	150573	150574	150577	150577
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	19 U	19 U	20 U		19 U	20 U	
beta-BHC	ug/kg	19 U	19 U	20 U		19 U	20 U	
delta-BHC	ug/kg	19 U	19 U	20 U		19 U	20 U	
gamma-BHC (Lindane)	ug/kg	19 U	19 U	20 U		19 U	20 U	
Heptachlor	ug/kg	19 U	19 U	20 U		19 U	20 U	
Aldrin	ug/kg	19 U	19 U	20 U		19 U	20 U	
Heptachlor epoxide	ug/kg	19 U	19 U	20 U		19 U	20 U	
Endosulfan I	ug/kg	19 U	19 U	20 U		19 U	20 U	
Dieldrin	ug/kg	38 U	39 U	40 U		37 U	41 U	
4,4'-DDE	ug/kg	38 U	39 U	40 U		37 U	41 U	
Endrin	ug/kg	38 U	39 U	40 U		37 U	41 U	
Endosulfan II	ug/kg	38 U	39 U	40 U		37 U	41 U	
4,4'-DDD	ug/kg	38 U	39 U	40 U		37 U	41 U	
Endosulfan sulfate	ug/kg	38 U	39 U	40 U		37 U	41 U	
4,4'-DDT	ug/kg	38 U	39 U	40 U		37 U	41 U	
Methoxychlor	ug/kg	190 U	190 U	200 U		190 U	200 U	
Endrin ketone	ug/kg	38 U	39 U	40 U		37 U	41 U	
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	190 U	190 U	200 U		190 U	200 U	
gamma-Chlordane	ug/kg	190 U	190 U	200 U		190 U	200 U	
Toxaphene	ug/kg	380 U	390 U	400 U		370 U	410 U	
Aroclor-1016	ug/kg	190 U	190 U	200 U		190 U	200 U	
Aroclor-1221	ug/kg	190 U	190 U	200 U		190 U	200 U	
Aroclor-1232	ug/kg	190 U	190 U	200 U		190 U	200 U	
Aroclor-1242	ug/kg	190 U	190 U	200 U		190 U	200 U	
Aroclor-1248	ug/kg	190 U	190 U	200 U		190 U	200 U	
Aroclor-1254	ug/kg	380 U	390 U	400 U		370 U	410 U	
Aroclor-1260	ug/kg	380 U	390 U	400 U		370 U	240 J	

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-06	GB-06	GB-07	GB-7	GB-07	GB-08	GB-08
	DEPTH	0-6"	6'+	0-6"	0-6"	0-2'	0-6"	0-6"
	DATE	12/06/91	12/06/91	12/09/91	12/09/91	12/09/91	12/09/91	12/09/91
	ES ID	GB06-1	GB06-5	GB-07-1	GB-07-1RE	GB-07-2	GB-08-1	GB-08-1RE
	LAB ID	150391	150395	150573	150573	150574	150577	150577
	UNITS							
Explosives								
HMX	ug/kg	1000 U	960 U	1000 U			1000 U	
RDX	ug/kg	120 U	120 U	120 U			120 U	
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U			120 U	
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U			120 U	
Tetryl	ug/kg	400 U	380 U	400 U			400 U	
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U			120 U	
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U			86 J	
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U			94 J	
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U			120 U	
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U			120 U	
Metals								
Aluminum	mg/kg	21200	18300	17100		12800	16800	
Antimony	mg/kg	6.7 U R	12 U R	13.1 U R		11.4 U R	13.1 U R	
Arsenic	mg/kg	5.2	4.6	5.9		2.8	4.8	
Barium	mg/kg	103	94.1	199		69.2	348	
Beryllium	mg/kg	0.75 R	1.2 R	1.4 R		0.9 R	1.2 R	
Cadmium	mg/kg	1.8	2.8	2.7		1.8	3.2	
Calcium	mg/kg	2580	22700	11100		83500	5490	
Chromium	mg/kg	23.2	31.6	26.1		21.9	26.1	
Cobalt	mg/kg	10.2	25.9	21.7		10.9	11 J	
Copper	mg/kg	15.7	37.3	74.5		26.5	91.3	
Iron	mg/kg	26900	39700	36800		25100	32200	
Lead	mg/kg	12.4	22	110		18.1	184	
Magnesium	mg/kg	4360	7720	6270		13300	5380	
Manganese	mg/kg	242	1110	1650		404	533	
Mercury	mg/kg	0.05 U	0.05 U	0.07 J		0.05 U	0.32	
Nickel	mg/kg	49.6	69.3	47.3		36.2	37.4	
Potassium	mg/kg	1510	1560	1540		1460	1900	
Selenium	mg/kg	0.15 U J	0.13 U J	0.15 U J		0.12 U J	0.38 J	
Silver	mg/kg	1.1 U	2 U	2.1 U		1.8 U	2.1 U	
Sodium	mg/kg	54.5 J	69.5 U	76 U		99.4 J	75.7 U	
Thallium	mg/kg	0.46 U	0.41 U	0.49 U		0.37 U	0.68 U	
Vanadium	mg/kg	32.3	19.3	26.2		21	28.4	
Zinc	mg/kg	69.9	90.8	99.4		71.2	404	
Cyanide	mg/kg	0.63 U	0.7 U	0.7 U		0.65 U	0.67 U	

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS--PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-08	GB-09	GB-9	GB-09	GB-10	GB-10	GB-11
	DEPTH	4-6'	0-6"	0-6"	2-4'	0-6"	2-4'	0-6"
	DATE	12/09/91	12/10/91	12/10/91	12/10/91	12/11/91	12/11/91	12/10/91
	ES ID	GB-08-4	GB-09-1	GB-09-1RE	GB-09-3	GB-10-1	GB-10-3	GB-11-1
	LAB ID	150580	150582	150582	150584	150780	150782	150682
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Bromomethane	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Vinyl Chloride	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Chloroethane	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Methylene Chloride	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Acetone	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Carbon Disulfide	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,1-Dichloroethene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,1-Dichloroethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Chloroform	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,2-Dichloroethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
2-Butanone	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
1,1,1-Trichloroethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Carbon Tetrachloride	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Vinyl Acetate	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Bromodichloromethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,2-Dichloropropane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
cis-1,3-Dichloropropene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Trichloroethene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Dibromochloromethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,1,2-Trichloroethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Benzene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
trans-1,3-Dichloropropene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Bromoform	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
4-Methyl-2-Pentanone	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
2-Hexanone	ug/kg	11 U	12 U		11 U	12 U	12 U	13 U
Tetrachloroethene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Toluene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Chlorobenzene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Ethylbenzene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Styrene	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U
Xylene (total)	ug/kg	6 U	6 U		6 U	6 U	6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-08	GB-09	GB-9	GB-09	GB-10	GB-10	GB-11
	DEPTH	4-6'	0-6"	0-6"	2-4'	0-6"	2-4'	0-6"
	DATE	12/09/91	12/10/91	12/10/91	12/10/91	12/11/91	12/11/91	12/10/91
	ES ID	GB-08-4	GB-09-1	GB-09-1RE	GB-09-3	GB-10-1	GB-10-3	GB-11-1
	LAB ID	150580	150582	150582	150584	150780	150782	150682
	UNITS							
Semivolatiles								
Phenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
bis(2-Chloroethyl) ether	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2-Chlorophenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
1,3-Dichlorobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
1,4-Dichlorobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzyl Alcohol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
1,2-Dichlorobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2-Methylphenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,2'-oxybis(1-Chloropropane)	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Methylphenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
N-Nitroso-di-n-propylamine	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Hexachloroethane	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Nitrobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Isophorone	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2-Nitrophenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4-Dimethylphenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzoic acid	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
bis(2-Chloroethoxy) methane	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4-Dichlorophenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
1,2,4-Trichlorobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Naphthalene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Chloroaniline	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Hexachlorobutadiene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Chloro-3-methylphenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2-Methylnaphthalene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Hexachlorocyclopentadiene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4,6-Trichlorophenol	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4,5-Trichlorophenol	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
2-Chloronaphthalene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2-Nitroaniline	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
Dimethylphthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Acenaphthylene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,6-Dinitrotoluene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
3-Nitroaniline	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
Acenaphthene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4-Dinitrophenol	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
4-Nitrophenol	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
Dibenzofuran	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
2,4-Dinitrotoluene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Diethylphthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Chlorophenyl-phenylether	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Fluorene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Nitroaniline	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
4,6-Dinitro-2-methylphenol	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
N-Nitrosodiphenylamine	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
4-Bromophenyl-phenylether	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Hexachlorobenzene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Pentachlorophenol	ug/kg	3700 U	4000 U R	2000 U J	3600 U	3800 U	3500 U	4100 U J
Phenanthrene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Anthracene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Fluoranthene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Pyrene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Butylbenzylphthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
3,3'-Dichlorobenzidine	ug/kg	1500 U	1600 U R	820 U J	1500 U	1600 U	1500 U	1700 U J
Benzo(a)anthracene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Chrysene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
bis(2-Ethylhexyl)phthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Di-n-octylphthalate	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzo(b)fluoranthene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzo(k)fluoranthene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzo(a)pyrene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Indeno(1,2,3-cd)pyrene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Dibenz(a,h)anthracene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J
Benzo(g,h,i)perylene	ug/kg	760 U	820 U R	410 U J	730 U	790 U	730 U	850 U J

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-08	GB-09	GB-9	GB-09	GB-10	GB-10	GB-11
	DEPTH	4-6'	0-6"	0-6"	2-4'	0-6"	2-4'	0-6"
	DATE	12/09/91	12/10/91	12/10/91	12/10/91	12/11/91	12/11/91	12/10/91
	ES ID	GB-08-4	GB-09-1	GB-09-1RE	GB-09-3	GB-10-1	GB-10-3	GB-11-1
	LAB ID	150580	150582	150582	150584	150780	150782	150682
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
beta-BHC	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
delta-BHC	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
gamma-BHC (Lindane)	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
Heptachlor	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
Aldrin	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
Heptachlor epoxide	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
Endosulfan I	ug/kg	18 U	20 U		18 U	19 U	18 U	21 U
Dieldrin	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
4,4'-DDE	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
Endrin	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
Endosulfan II	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
4,4'-DDD	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
Endosulfan sulfate	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
4,4'-DDT	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
Methoxychlor	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Endrin ketone	ug/kg	37 U	40 U		36 U	38 U	35 U	41 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
gamma-Chlordane	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Toxaphene	ug/kg	370 U	400 U		360 U	380 U	350 U	410 U
Aroclor-1016	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Aroclor-1221	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Aroclor-1232	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Aroclor-1242	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Aroclor-1248	ug/kg	180 U	200 U		180 U	190 U	180 U	210 U
Aroclor-1254	ug/kg	370 U	400 U		360 U	380 U	350 U	410 U
Aroclor-1260	ug/kg	370 U	400 U		360 U	380 U	350 U	410 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-08	GB-09	GB-9	GB-09	GB-10	GB-10	GB-11
	DEPTH	4-6'	0-6"	0-6"	2-4'	0-6"	2-4'	0-6"
	DATE	12/09/91	12/10/91	12/10/91	12/10/91	12/11/91	12/11/91	12/10/91
	ES ID	GB-08-4	GB-09-1	GB-09-1RE	GB-09-3	GB-10-1	GB-10-3	GB-11-1
	LAB ID	150580	150582	150582	150584	150780	150782	150682
	UNITS							
Explosives								
HMX	ug/kg		1000 U			1000 U	1000 U	1000 U
RDX	ug/kg		120 U			120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg		120 U			120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg		120 U			120 U	120 U	120 U
Tetryl	ug/kg		400 U			400 U	400 U	400 U
2,4,6-Trinitrotoluene	ug/kg		120 U			120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg		120 U			120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg		120 U			120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg		120 U			120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg		120 U			120 U	120 U	120 U
Metals								
Aluminum	mg/kg	16500	17700		14000	25300	16700	24600
Antimony	mg/kg	11.3 U R	13.3 U R		11.6 U R	12.2 U R	5.4 U R	10.8 U R
Arsenic	mg/kg	4.1	4.6		3.7	6.8 J	3.5 J	5.5 J
Barium	mg/kg	169	131		166	208 J	81.3 J	154 J
Beryllium	mg/kg	1.1 R	1.2 R		0.94 R	1.1 R	0.79 R	1.3 R
Cadmium	mg/kg	2	3.2		2.3	3.4	3.4	3.8
Calcium	mg/kg	31700	6040		74700	4480 J	60300 J	3630 J
Chromium	mg/kg	24.5	25.2		23.7	30.2	25.6	32.3
Cobalt	mg/kg	8.8 J	11.9 J		26.6	10.3 J	16.1	17.4
Copper	mg/kg	37.8	77.8		30.9	29.6 J	23 J	24.8
Iron	mg/kg	27900	32000		30000	30800 J	31600 J	36900 J
Lead	mg/kg	182	31.7		14.4	35.2	18	14.1
Magnesium	mg/kg	6950	5500		9370	6870	8660	5730
Manganese	mg/kg	471	663		1550	561	545	841
Mercury	mg/kg	0.11 J	0.96		0.04 U	0.05 J	0.04 U	0.05 U
Nickel	mg/kg	37.2	37.9		58.7	34.8	46.1	46.6
Potassium	mg/kg	2400	2050		1880	3140	1470	2480
Selenium	mg/kg	0.1 U J	0.2 J		0.11 U J	0.16 U J	0.11 U J	0.2 U J
Silver	mg/kg	1.8 U	2.2 U		1.9 U	2 U	0.88 U	1.8 U
Sodium	mg/kg	92 J	77.1 U		133 J	101 J	110 J	62.6 U
Thallium	mg/kg	0.32 U	0.43 U		0.34 U	0.5 U	0.34 U	0.64 U
Vanadium	mg/kg	25	26.8		21.6	38.6	20.3	36.3
Zinc	mg/kg	123	397		120	79.2 J	65.6 J	96.1 J
Cyanide	mg/kg	0.66 U	0.74 U		0.63 U	0.73 U	0.63 U	0.7 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-11	GB-11	GB-12	GB-12	GB-12	GB-12	GB-12
	DEPTH	0-6"	2-4'	0-6"	0-6"	0-2'	0-2'	0-2'
	DATE	12/10/91	12/10/91	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91
	ES ID	GB-11-1RE	GB-11-3	GB-12-1	GB-12-1A	GB-12-2	GB-12-2RE	GB-12-2A
	LAB ID	150682	150684	151121	151122	151123	151123	151124
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg		11 U	12 U	12 U	12 U		13 U
Bromomethane	ug/kg		11 U	12 U	12 U	12 U		13 U
Vinyl Chloride	ug/kg		11 U	12 U	12 U	12 U		13 U
Chloroethane	ug/kg		11 U	12 U	12 U	12 U		13 U
Methylene Chloride	ug/kg		5 U	6 U	6 U	6 U		6 U
Acetone	ug/kg		11 U	12 U	12 U	12 U		13 U
Carbon Disulfide	ug/kg		5 U	6 U	6 U	6 U		6 U
1,1-Dichloroethene	ug/kg		5 U	6 U	6 U	6 U		6 U
1,1-Dichloroethane	ug/kg		5 U	6 U	6 U	6 U		6 U
1,2-Dichloroethene (total)	ug/kg		5 U	6 U	6 U	6 U		6 U
Chloroform	ug/kg		5 U	6 U	8	6 U		6 U
1,2-Dichloroethane	ug/kg		5 U	6 U	6 U	6 U		6 U
2-Butanone	ug/kg		11 U	12 U	12 U	12 U		13 U
1,1,1-Trichloroethane	ug/kg		5 U	6 U	6 U	6 U		6 U
Carbon Tetrachloride	ug/kg		5 U	6 U	6 U	6 U		6 U
Vinyl Acetate	ug/kg		11 U	12 U	12 U	12 U		13 U
Bromodichloromethane	ug/kg		5 U	6 U	6 U	6 U		6 U
1,2-Dichloropropane	ug/kg		5 U	6 U	6 U	6 U		6 U
cis-1,3-Dichloropropene	ug/kg		5 U	6 U	6 U	6 U		6 U
Trichloroethene	ug/kg		5 U	6 U	3 J	6 U		6 U
Dibromochloromethane	ug/kg		5 U	6 U	6 U	6 U		6 U
1,1,2-Trichloroethane	ug/kg		5 U	6 U	6 U	6 U		6 U
Benzene	ug/kg		5 U	6 U	6 U	6 U		6 U
trans-1,3-Dichloropropene	ug/kg		5 U	6 U	6 U	6 U		6 U
Bromoform	ug/kg		5 U	6 U	6 U	6 U		6 U
4-Methyl-2-Pentanone	ug/kg		11 U	12 U	12 U	12 U		13 U
2-Hexanone	ug/kg		11 U	12 U	12 U	12 U		13 U
Tetrachloroethene	ug/kg		5 U	6 U	3 J	6 U		6 U
1,1,2,2-Tetrachloroethane	ug/kg		5 U	6 U	6 U	6 U		6 U
Toluene	ug/kg		5 U	6 U	6 U	6 U		6 U
Chlorobenzene	ug/kg		5 U	6 U	6 U	6 U		6 U
Ethylbenzene	ug/kg		5 U	6 U	6 U	6 U		6 U
Styrene	ug/kg		5 U	6 U	6 U	6 U		6 U
Xylene (total)	ug/kg		5 U	6 U	6 U	6 U		6 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-11	GB-11	GB-12	GB-12	GB-12	GB-12	GB-12
	DEPTH	0-6"	2-4'	0-6"	0-6"	0-2'	0-2'	0-2'
	DATE	12/10/91	12/10/91	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91
	ES ID	GB-11-1RE	GB-11-3	GB-12-1	GB-12-1A	GB-12-2	GB-12-2RE	GB-12-2A
	LAB ID	150682	150684	151121	151122	151123	151123	151124
	UNITS							
Semivolatiles								
Phenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
bis(2-Chloroethyl) ether	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2-Chlorophenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
1,3-Dichlorobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
1,4-Dichlorobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzyl Alcohol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
1,2-Dichlorobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2-Methylphenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,2'-oxybis(1-Chloropropane)	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Methylphenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
N-Nitroso-di-n-propylamine	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Hexachloroethane	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Nitrobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Isophorone	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2-Nitrophenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4-Dimethylphenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzoic acid	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
bis(2-Chloroethoxy) methane	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4-Dichlorophenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
1,2,4-Trichlorobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Naphthalene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Chloroaniline	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Hexachlorobutadiene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Chloro-3-methylphenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2-Methylnaphthalene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Hexachlorocyclopentadiene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4,6-Trichlorophenol	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4,5-Trichlorophenol	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
2-Chloronaphthalene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2-Nitroaniline	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
Dimethylphthalate	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Acenaphthylene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,6-Dinitrotoluene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
3-Nitroaniline	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
Acenaphthene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4-Dinitrophenol	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
4-Nitrophenol	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
Dibenzofuran	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
2,4-Dinitrotoluene	ug/kg	420 U R	700 U	130 J	820 U	810 U J	810 U R	790 U
Diethylphthalate	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Chlorophenyl-phenylether	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Fluorene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Nitroaniline	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
4,6-Dinitro-2-methylphenol	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
N-Nitrosodiphenylamine	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
4-Bromophenyl-phenylether	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Hexachlorobenzene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Pentachlorophenol	ug/kg	2000 U R	3400 U	3800 U	4000 U	3900 U J	3900 U R	3900 U
Phenanthrene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Anthracene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	420 U R	700 U	490 J	460 J	86 J	810 U R	160 J
Fluoranthene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Pyrene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Butylbenzylphthalate	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
3,3'-Dichlorobenzidine	ug/kg	840 U R	1400 U	1600 U	1600 U	1600 U J	1600 U R	1600 U
Benzo(a)anthracene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Chrysene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
bis(2-Ethylhexyl)phthalate	ug/kg	420 U R	700 U	260 J	820 U	810 U J	810 U R	790 U
Di-n-octylphthalate	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzo(b)fluoranthene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzo(k)fluoranthene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzo(a)pyrene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Indeno(1,2,3-cd)pyrene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Dibenz(a,h)anthracene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U
Benzo(g,h,i)perylene	ug/kg	420 U R	700 U	790 U	820 U	810 U J	810 U R	790 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-11	GB-11	GB-12	GB-12	GB-12	GB-12	GB-12
	DEPTH	0-6"	2-4'	0-6"	0-6"	0-2'	0-2'	0-2'
	DATE	12/10/91	12/10/91	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91
	ES ID	GB-11-1RE	GB-11-3	GB-12-1	GB-12-1A	GB-12-2	GB-12-2RE	GB-12-2A
	LAB ID	150682	150684	151121	151122	151123	151123	151124
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg		17 U	19 U	20 U	20 U		19 U
beta-BHC	ug/kg		17 U	19 U	20 U	20 U		19 U
delta-BHC	ug/kg		17 U	19 U	20 U	20 U		19 U
gamma-BHC (Lindane)	ug/kg		17 U	19 U	20 U	20 U		19 U
Heptachlor	ug/kg		17 U	19 U	20 U	20 U		19 U
Aldrin	ug/kg		17 U	19 U	20 U	20 U		19 U
Heptachlor epoxide	ug/kg		17 U	19 U	20 U	20 U		19 U
Endosulfan I	ug/kg		17 U	19 U	20 U	20 U		19 U
Dieldrin	ug/kg		34 U	38 U	40 U	39 U		39 U
4,4'-DDE	ug/kg		34 U	38 U	40 U	39 U		39 U
Endrin	ug/kg		34 U	38 U	40 U	39 U		39 U
Endosulfan II	ug/kg		34 U	38 U	40 U	39 U		39 U
4,4'-DDD	ug/kg		34 U	38 U	40 U	39 U		39 U
Endosulfan sulfate	ug/kg		34 U	38 U	40 U	39 U		39 U
4,4'-DDT	ug/kg		34 U	38 U	40 U	39 U		39 U
Methoxychlor	ug/kg		170 U	190 U	200 U	200 U		190 U
Endrin ketone	ug/kg		34 U	38 U	40 U	39 U		39 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg		170 U	190 U	200 U	200 U		190 U
gamma-Chlordane	ug/kg		170 U	190 U	200 U	200 U		190 U
Toxaphene	ug/kg		340 U	380 U	400 U	390 U		390 U
Aroclor-1016	ug/kg		170 U	190 U	200 U	200 U		190 U
Aroclor-1221	ug/kg		170 U	190 U	200 U	200 U		190 U
Aroclor-1232	ug/kg		170 U	190 U	200 U	200 U		190 U
Aroclor-1242	ug/kg		170 U	190 U	200 U	200 U		190 U
Aroclor-1248	ug/kg		170 U	190 U	200 U	200 U		190 U
Aroclor-1254	ug/kg		340 U	380 U	400 U	390 U		390 U
Aroclor-1260	ug/kg		340 U	380 U	400 U	390 U		390 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-11	GB-11	GB-12	GB-12	GB-12	GB-12	GB-12
	DEPTH	0-6'	2-4'	0-6'	0-6'	0-2'	0-2'	0-2'
	DATE	12/10/91	12/10/91	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91
	ES ID	GB-11-1RE	GB-11-3	GB-12-1	GB-12-1A	GB-12-2	GB-12-2RE	GB-12-2A
	LAB ID	150682	150684	151121	151122	151123	151123	151124
	UNITS							
Explosives								
HMX	ug/kg		1000 U	1000 U	1000 U	1000 U		1000 U
RDX	ug/kg		120 U	120 U	120 U	120 U		120 U
1,3,5-Trinitrobenzene	ug/kg		120 U	120 U	120 U	120 U		120 U
1,3-Dinitrobenzene	ug/kg		120 U	120 U	120 U	120 U		120 U
Tetryl	ug/kg		400 U	400 U	400 U	400 U		400 U
2,4,6-Trinitrotoluene	ug/kg		120 U	120 U	120 U	120 U		120 U
4-amino-2,6-Dinitrotoluene	ug/kg		120 U	120 U	120 U	120 U		120 U
2-amino-4,6-Dinitrotoluene	ug/kg		120 U	120 U	120 U	120 U		120 U
2,6-Dinitrotoluene	ug/kg		120 U	120 U	120 U	120 U		120 U
2,4-Dinitrotoluene	ug/kg		120 J	120 U	64 J	120 U		120 U
Metals								
Aluminum	mg/kg		18000	13200	15200	19100		19700
Antimony	mg/kg		5.4 U R	40 R	6.4 R	6 U R		6 U R
Arsenic	mg/kg		7.1 J	4.8 J	4.7 J	4.6 J		4.2 J
Barium	mg/kg		77.1 J	397 J	365 J	249 J		168 J
Beryllium	mg/kg		0.97 R	0.74 R	0.87 R	0.79 R		0.84 R
Cadmium	mg/kg		4	3	2.5	2.9		3.5
Calcium	mg/kg		37800 J	3990 J	4450 J	2840 J		2850 J
Chromium	mg/kg		29.1	23.1	23.4	23.3		26.5
Cobalt	mg/kg		23.4	12.9	11.5	14.1		12.4
Copper	mg/kg		26.5	345	233	79.9		89.6
Iron	mg/kg		35400 J	30700 J	25600 J	26900 J		29900 J
Lead	mg/kg		13.5	6230 J	672 J	171 J		185 J
Magnesium	mg/kg		7830	4420	5230	4700		5540
Manganese	mg/kg		674	562	585	359		423
Mercury	mg/kg		0.04 U	0.06 J	0.08	0.05 J		0.05 J
Nickel	mg/kg		55.3	30.1	36.1	26.6		33.9
Potassium	mg/kg		1410	1000	1200	1580		1750
Selenium	mg/kg		0.11 U J	0.19 J	0.13 J	0.22 J		0.16 J
Silver	mg/kg		0.88 U	0.95 U	1 U	0.97 U		0.98 U
Sodium	mg/kg		82.1 J	34 U	37.1 U	48.2 J		43.1 J
Thallium	mg/kg		0.36 U	0.37 U	0.37 U	0.36 U		0.34 U
Vanadium	mg/kg		21.4	19.7	22.6	29.5		27.4
Zinc	mg/kg		102 J	264 J	232 J	112 J		138 J
Cyanide	mg/kg		0.53 U	0.67 U	0.68 U	0.53 U		0.67 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-13	GB-13	GB-13	GB-14	GB-14	GB-14	GB-14
	DEPTH	0-6'	0-6'	0-2'	0-6'	0-6'	0-6'	0-2'
	DATE	01/23/92	01/23/92	01/23/92	12/16/91	12/16/91	12/17/91	12/16/91
	ES ID	GB-13-1	GB-13-1RE	GB-13-2	GB-14-1	GB-14-1A	GB-14-1ARE	GB-14-2
	LAB ID	152902	152902	152903	151131	151132	151132	151133
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	18 U		12 U	11 U	12 U		12 U
Bromomethane	ug/kg	18 U		12 U	11 U	12 U		12 U
Vinyl Chloride	ug/kg	18 U		12 U	11 U	12 U		12 U
Chloroethane	ug/kg	18 U		12 U	11 U	12 U		12 U
Methylene Chloride	ug/kg	9 U		7 U	6 U	6 U		6 U
Acetone	ug/kg	18 U		12 U	14 U	12 U		12 U
Carbon Disulfide	ug/kg	9 U		6 U	6 U	6 U		6 U
1,1-Dichloroethene	ug/kg	9 U		6 U	6 U	6 U		6 U
1,1-Dichloroethane	ug/kg	9 U		6 U	6 U	6 U		6 U
1,2-Dichloroethene (total)	ug/kg	9 U		6 U	6 U	6 U		6 U
Chloroform	ug/kg	9 U		6 U	6 U	6 U		6 U
1,2-Dichloroethane	ug/kg	9 U		6 U	6 U	6 U		6 U
2-Butanone	ug/kg	18 U		12 U	11 U	12 U		12 U
1,1,1-Trichloroethane	ug/kg	9 U		6 U	6 U	6 U		6 U
Carbon Tetrachloride	ug/kg	9 U		6 U	6 U	6 U		6 U
Vinyl Acetate	ug/kg	18 U		12 U	11 U	12 U		12 U
Bromodichloromethane	ug/kg	9 U		6 U	6 U	6 U		6 U
1,2-Dichloropropane	ug/kg	9 U		6 U	6 U	6 U		6 U
cis-1,3-Dichloropropene	ug/kg	9 U		6 U	6 U	6 U		6 U
Trichloroethene	ug/kg	9 U		6 U	6 U	6 U		6 U
Dibromochloromethane	ug/kg	9 U		6 U	6 U	6 U		6 U
1,1,2-Trichloroethane	ug/kg	9 U		6 U	6 U	6 U		6 U
Benzene	ug/kg	9 U		6 U	6 U	6 U		6 U
trans-1,3-Dichloropropene	ug/kg	9 U		6 U	6 U	6 U		6 U
Bromoform	ug/kg	9 U		6 U	6 U	6 U		6 U
4-Methyl-2-Pentanone	ug/kg	18 U		12 U	11 U	12 U		12 U
2-Hexanone	ug/kg	18 U		12 U	11 U	12 U		12 U
Tetrachloroethene	ug/kg	9 U		6 U	6 U	6 U		6 U
1,1,2,2-Tetrachloroethane	ug/kg	9 U		6 U	6 U	6 U		6 U
Toluene	ug/kg	9 U		6 U	6 U	6 U		6 U
Chlorobenzene	ug/kg	9 U		6 U	6 U	6 U		6 U
Ethylbenzene	ug/kg	9 U		6 U	6 U	6 U		6 U
Styrene	ug/kg	9 U		6 U	6 U	6 U		6 U
Xylene (total)	ug/kg	9 U		6 U	6 U	6 U		6 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-13	GB-13	GB-13	GB-14	GB-14	GB-14	GB-14
	DEPTH	0-6"	0-6"	0-2'	0-6"	0-6"	0-6"	0-2'
	DATE	01/23/92	01/23/92	01/23/92	12/16/91	12/16/91	12/17/91	12/16/91
	ES ID	GB-13-1	GB-13-1RE	GB-13-2	GB-14-1	GB-14-1A	GB-14-1ARE	GB-14-2
	LAB ID	152902	152902	152903	151131	151132	151132	151133
	UNITS							
Semivolatiles								
Phenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
bis(2-Chloroethyl) ether	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2-Chlorophenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
1,3-Dichlorobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
1,4-Dichlorobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Benzyl Alcohol	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
1,2-Dichlorobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2-Methylphenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
2,2'-oxybis(1-Chloropropane)	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
4-Methylphenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
N-Nitroso-di-n-propylamine	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Hexachloroethane	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Nitrobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Isophorone	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2-Nitrophenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
2,4-Dimethylphenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
Benzoic acid	ug/kg	5000 U		3900 U	3600 U	3500 U J	3500 U R	3800 U
bis(2-Chloroethoxy) methane	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2,4-Dichlorophenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
1,2,4-Trichlorobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Naphthalene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
4-Chloroaniline	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Hexachlorobutadiene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
4-Chloro-3-methylphenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
2-Methylnaphthalene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Hexachlorocyclopentadiene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2,4,6-Trichlorophenol	ug/kg	1000 U		810 U	740 U	730 U	730 U R	770 U
2,4,5-Trichlorophenol	ug/kg	5000 U		3900 U	3600 U	3500 U	3500 U R	3800 U
2-Chloronaphthalene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2-Nitroaniline	ug/kg	5000 U		3900 U	3600 U	3500 U J	3500 U R	3800 U
Dimethylphthalate	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Acenaphthylene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2,6-Dinitrotoluene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
3-Nitroaniline	ug/kg	5000 U		3900 U	3600 U	3500 U J	3500 U R	3800 U
Acenaphthene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2,4-Dinitrophenol	ug/kg	5000 U		3900 U	3600 U	3500 U	3500 U R	3800 U
4-Nitrophenol	ug/kg	5000 U		3900 U	3600 U	3500 U	3500 U R	3800 U
Dibenzofuran	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
2,4-Dinitrotoluene	ug/kg	260 J		810 U	150 J	730 U J	260 R	770 U
Diethylphthalate	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
4-Chlorophenyl-phenylether	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Fluorene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
4-Nitroaniline	ug/kg	5000 U		3900 U	3600 U	3500 U J	3500 U R	3800 U
4,6-Dinitro-2-methylphenol	ug/kg	5000 U		3900 U	3600 U	3500 U	3500 U R	3800 U
N-Nitrosodiphenylamine	ug/kg	130 J		810 U	740 U	730 U J	730 U R	770 U
4-Bromophenyl-phenylether	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Hexachlorobenzene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Pentachlorophenol	ug/kg	5000 U		3900 U	3600 U	3500 U	3500 U R	3800 U
Phenanthrene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Anthracene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	1000 U		110 J	740 U	730 U J	730 U R	770 U
Fluoranthene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Pyrene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Butylbenzylphthalate	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
3,3'-Dichlorobenzidine	ug/kg	2100 U		1600 U	1500 U	1500 U J	1500 U R	1500 U
Benzo(a)anthracene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Chrysene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
bis(2-Ethylhexyl)phthalate	ug/kg	520 J		290 J	740 U	730 U J	730 U R	770 U
Di-n-octylphthalate	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Benzo(b)fluoranthene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Benzo(k)fluoranthene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Benzo(a)pyrene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Indeno(1,2,3-cd)pyrene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Dibenz(a,h)anthracene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U
Benzo(g,h,i)perylene	ug/kg	1000 U		810 U	740 U	730 U J	730 U R	770 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-13	GB-13	GB-13	GB-14	GB-14	GB-14	GB-14
	DEPTH	0-6'	0-6'	0-2'	0-6'	0-6'	0-6'	0-2'
	DATE	01/23/92	01/23/92	01/23/92	12/16/91	12/16/91	12/17/91	12/16/91
	ES ID	GB-13-1	GB-13-1RE	GB-13-2	GB-14-1	GB-14-1A	GB-14-1ARE	GB-14-2
	LAB ID	152902	152902	152903	151131	151132	151132	151133
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
beta-BHC	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
delta-BHC	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
gamma-BHC (Lindane)	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
Heptachlor	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
Aldrin	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
Heptachlor epoxide	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
Endosulfan I	ug/kg	25 U J	25 U J	20 U	18 U	18 U		19 U
Dieldrin	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
4,4'-DDE	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
Endrin	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
Endosulfan II	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
4,4'-DDD	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
Endosulfan sulfate	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
4,4'-DDT	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
Methoxychlor	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Endrin ketone	ug/kg	50 U J	51 U J	39 U	36 U	35 U		38 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
gamma-Chlordane	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Toxaphene	ug/kg	500 U J	510 U J	390 U	360 U	350 U		380 U
Aroclor-1016	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Aroclor-1221	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Aroclor-1232	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Aroclor-1242	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Aroclor-1248	ug/kg	250 U J	250 U J	200 U	180 U	180 U		190 U
Aroclor-1254	ug/kg	500 U J	510 U J	390 U	360 U	350 U		380 U
Aroclor-1260	ug/kg	500 U J	510 U J	390 U	360 U	350 U		380 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-13	GB-13	GB-13	GB-14	GB-14	GB-14	GB-14
	DEPTH	0-6'	0-6'	0-2'	0-6'	0-6'	0-6'	0-2'
	DATE	01/23/92	01/23/92	01/23/92	12/16/91	12/16/91	12/17/91	12/16/91
	ES ID	GB-13-1	GB-13-1RE	GB-13-2	GB-14-1	GB-14-1A	GB-14-1ARE	GB-14-2
	LAB ID	152902	152902	152903	151131	151132	151132	151133
	UNITS							
Explosives								
HMX	ug/kg	1000 U J		1000 U	1000 U	1000 U		1000 U
RDX	ug/kg	120 U J		120 U	120 U	120 U		120 U
1,3,5-Trinitrobenzene	ug/kg	120 U J		120 U	120 U	120 U		120 U
1,3-Dinitrobenzene	ug/kg	120 U J		120 U	120 U	120 U		120 U
Tetryl	ug/kg	400 U J		400 U	400 U	400 U		400 U
2,4,6-Trinitrotoluene	ug/kg	120 U J		120 U	120 U	120 U		120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U J		120 U	120 U	120 U		120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U J		120 U	120 U	120 U		120 U
2,6-Dinitrotoluene	ug/kg	120 U J		120 U	120 U	120 U		120 U
2,4-Dinitrotoluene	ug/kg	100 J		120 U	120 U	120 U		120 U
Metals								
Aluminum	mg/kg	20300 J		18600 J	13000	10800		21000
Antimony	mg/kg	8.3 U J		6.8 U J	6 U R	5.9 U R		5.7 U R
Arsenic	mg/kg	5.8		5.8	3.9 J	3.9 J		4.3 J
Barium	mg/kg	622 R		325 R	78.5 J	51.5 J		148 J
Beryllium	mg/kg	0.97		0.93	0.78 R	0.68 R		0.97 R
Cadmium	mg/kg	7		3.8	2.5	2.2		3.4
Calcium	mg/kg	8000 J		6130 J	12300 J	12100 J		5790 J
Chromium	mg/kg	29.9 J		27.9 J	23.5	19.8		27.6
Cobalt	mg/kg	14.1		14.7	13.3	10.9		12.9
Copper	mg/kg	883		234	65.3	49.8		57.8
Iron	mg/kg	35600		32600	25200 J	22000 J		29900 J
Lead	mg/kg	2440		1060	48.8	68.5		137
Magnesium	mg/kg	6140 J		6210 J	5990	5270		5510
Manganese	mg/kg	745		620	349	317		419
Mercury	mg/kg	0.15		0.11	0.06 J	0.08 J		0.07 J
Nickel	mg/kg	82.1		40.7	43.4	37.5		40.2
Potassium	mg/kg	1980		1710	1110	872		2130
Selenium	mg/kg	0.33 J		0.28 J	0.46 J	0.39 J		0.14 J
Silver	mg/kg	1.4 U		1.1 U	0.98 U	0.96 U		0.92 U
Sodium	mg/kg	48.2 U		39.4 U	34.8 U	34.3 U		43.1 J
Thallium	mg/kg	0.65 J		0.5 J	0.37	0.39		0.33 U
Vanadium	mg/kg	28.2		27.7	21.8	16.2		30.7
Zinc	mg/kg	900 J		491 J	251 J	173 J		113 J
Cyanide	mg/kg	0.95 U		0.73 U	0.66 U	0.66 U		0.55 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS–PHASE 1

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL GB-14 0-2' 12/16/91 GB-14-2A 151134	SOIL GB-15 0-6" 01/23/92 GB-15-1 152906	SOIL GB-15 0-2' 01/23/92 GB-15-2 152907	SOIL GB-16 0-6" 01/23/92 GB-16-1 152910	SOIL GB-16 0-2' 01/23/92 GB-16-2 152911	SOIL GB-17/MW21 0-6" 01/14/92 GB-17-1 152459	SOIL GB-17/MW21 0-2' 11/01/91 S110105 147955
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Bromomethane	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Vinyl Chloride	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Chloroethane	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Methylene Chloride	ug/kg	6 U	7 U	6 U	7 U	10 U	6 U	6 U
Acetone	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Carbon Disulfide	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Chloroform	ug/kg	6 U	2 J	6 U	6 U	6 U	6 U	6 U
1,2-Dichloroethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
2-Butanone	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
1,1,1-Trichloroethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Carbon Tetrachloride	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Vinyl Acetate	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Bromodichloromethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-Dichloropropane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
cis-1,3-Dichloropropene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Trichloroethene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Dibromochloromethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1,2-Trichloroethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Benzene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
trans-1,3-Dichloropropene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Bromoform	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-Pentanone	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
2-Hexanone	ug/kg	12 U	14 U	12 U	12 U	12 U	12 U	11 U
Tetrachloroethene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Toluene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	2 J
Chlorobenzene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Ethylbenzene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Styrene	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U
Xylene (total)	ug/kg	6 U	7 U	6 U	6 U	6 U	6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-14	GB-15	GB-15	GB-16	GB-16	GB-17/MW21	GB-17/MW21
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	0-6"	0-2'
	DATE	12/18/91	01/23/92	01/23/92	01/23/92	01/23/92	01/14/92	11/01/91
	ES ID	GB-14-2A	GB-15-1	GB-15-2	GB-16-1	GB-16-2	GB-17-1	S110105
	LAB ID	151134	152906	152907	152910	152911	152459	147955
	UNITS							
Semivolatiles								
Phenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
bis(2-Chloroethyl) ether	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2-Chlorophenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
1,3-Dichlorobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
1,4-Dichlorobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzyl Alcohol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
1,2-Dichlorobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2-Methylphenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,2'-oxybis(1-Chloropropane)	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Methylphenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
N-Nitroso-di-n-propylamine	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Hexachloroethane	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Nitrobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Isophorone	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2-Nitrophenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4-Dimethylphenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzoic acid	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
bis(2-Chloroethoxy) methane	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4-Dichlorophenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
1,2,4-Trichlorobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Naphthalene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Chloroaniline	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Hexachlorobutadiene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Chloro-3-methylphenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2-Methylnaphthalene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Hexachlorocyclopentadiene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4,6-Trichlorophenol	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4,5-Trichlorophenol	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
2-Chloronaphthalene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2-Nitroaniline	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
Dimethylphthalate	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Acenaphthylene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,6-Dinitrotoluene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
3-Nitroaniline	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
Acenaphthene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4-Dinitrophenol	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
4-Nitrophenol	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
Dibenzofuran	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
2,4-Dinitrotoluene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Diethylphthalate	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Chlorophenyl-phenylether	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Fluorene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Nitroaniline	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
4,6-Dinitro-2-methylphenol	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
N-Nitrosodiphenylamine	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
4-Bromophenyl-phenylether	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Hexachlorobenzene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Pentachlorophenol	ug/kg	3700 U	4300 U	3700 U	4200 U	3800 U	3900 U	3600 U
Phenanthrene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Anthracene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Fluoranthene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Pyrene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Butylbenzylphthalate	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
3,3'-Dichlorobenzidine	ug/kg	1500 U	1800 U	1500 U	1700 U	1600 U	1600 U	1500 U
Benzo(a)anthracene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Chrysene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
bis(2-Ethylhexyl)phthalate	ug/kg	760 U	620 J	970	430 J	860	810 U	730 U
Di-n-octylphthalate	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzo(b)fluoranthene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzo(k)fluoranthene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzo(a)pyrene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Indeno(1,2,3-cd)pyrene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Dibenz(a,h)anthracene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U
Benzo(g,h,i)perylene	ug/kg	760 U	880 U	770 U	870 U	790 U	810 U	730 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS–PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-14	GB-15	GB-15	GB-16	GB-16	GB-17/MW21	GB-17/MW21
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	0-6"	0-2'
	DATE	12/16/91	01/23/92	01/23/92	01/23/92	01/23/92	01/14/92	11/01/91
	ES ID	GB-14-2A	GB-15-1	GB-15-2	GB-16-1	GB-16-2	GB-17-1	S110105
	LAB ID	151134	152906	152907	152910	152911	152459	147955
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
beta-BHC	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
delta-BHC	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
gamma-BHC (Lindane)	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
Heptachlor	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
Aldrin	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
Heptachlor epoxide	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
Endosulfan I	ug/kg	18 U	21 U	19 U	21 U	19 U	20 U	18 U
Dieldrin	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
4,4'-DDE	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
Endrin	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
Endosulfan II	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
4,4'-DDD	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
Endosulfan sulfate	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
4,4'-DDT	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
Methoxychlor	ug/kg	190 U	210 U	190 U	210 U	190 U	200 U	180 U
Endrin ketone	ug/kg	37 U	43 U	37 U	42 U	38 U	39 U	36 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
gamma-Chlordane	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Toxaphene	ug/kg	370 U	430 U	370 U	420 U	380 U	390 U	360 U
Aroclor-1016	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Aroclor-1221	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Aroclor-1232	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Aroclor-1242	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Aroclor-1248	ug/kg	180 U	210 U	190 U	210 U	190 U	200 U	180 U
Aroclor-1254	ug/kg	370 U	430 U	370 U	420 U	380 U	390 U	360 U
Aroclor-1260	ug/kg	370 U	430 U	370 U	420 U	380 U	390 U	360 U

SENECA ARMY DEPOT
OB GROUNDS

GRID BORINGS
SUMMARY OF VALIDATED RESULTS-PHASE 1

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-14	GB-15	GB-15	GB-16	GB-16	GB-17/MW21	GB-17/MW21
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	0-6"	0-2'
	DATE	12/18/91	01/23/92	01/23/92	01/23/92	01/23/92	01/14/92	11/01/91
	ES ID	GB-14-2A	GB-15-1	GB-15-2	GB-16-1	GB-16-2	GB-17-1	S110105
	LAB ID	151134	152906	152907	152910	152911	152459	147955
	UNITS							
Explosives								
HMX	ug/kg	1000 U	1000 U J	1000 U	1000 U J	1000 U	1000 U	120 U
RDX	ug/kg	120 U	90 J	120 U	120 U J	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U J	120 U	120 U J	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U J	120 U	120 U J	120 U	120 U	120 U
Tetryl	ug/kg	400 U	400 U J	400 U	400 U J	400 U	400 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U J	120 U	120 U J	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	99 J	120 U	120 U J	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	130 J	120 U	120 U J	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U J	120 U	120 U J	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U J	120 U	120 U J	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	17600	18900 J	16600 J	18500 J	13600 J	19000	18300
Antimony	mg/kg	6 U R	7 U J	9.2 J	6.8 U J	6.2 U J	6.4 U J	9.7 U J
Arsenic	mg/kg	5.1 J	5.9	3	4.4	4.1	5.3	6.2
Barium	mg/kg	92.7 J	384 R	255 R	929 R	127 R	551 R	77.1
Beryllium	mg/kg	0.73 R	0.97	0.84	0.91	0.72	1.6 R	0.84 J
Cadmium	mg/kg	3	2.4	2	2.7	1.8	3.9 J	2.3
Calcium	mg/kg	8130 J	3820 J	18600 J	10200 J	43600 J	4040	7540
Chromium	mg/kg	25.9	24.6 J	22.3 J	25.5 J	17.1 J	25.9 J	30
Cobalt	mg/kg	13.9	12.4	9	9.7	9.1	18.9	17.2
Copper	mg/kg	42	345	61.6 J	51.8 J	21.4 J	39.1	28.1
Iron	mg/kg	28000 J	28300	26800	27200	20800	31700	39700
Lead	mg/kg	77.5	2340	985	30.5 R	10.8 R	98.4	18.5
Magnesium	mg/kg	5620	5470 J	5890 J	6190 J	9610 J	6490	7930
Manganese	mg/kg	490	624	476	510	448	620	617
Mercury	mg/kg	0.06 J	0.1 J	0.04 J	0.35	0.02 U	0.17 R	0.06 R
Nickel	mg/kg	37.9	33.8	34.6	31.1	24.7	39.2	50.7 J
Potassium	mg/kg	1620	1900	1820	1670	1500	1430 J	1490
Selenium	mg/kg	0.19 J	0.33 J	0.15 J	1.2 U J	0.86 U J	0.19 U J	0.13 U J
Silver	mg/kg	0.97 U	1.1 U	0.98 U	1.1 U	1 U	0.41 U	1.4 U
Sodium	mg/kg	52.4 J	40.7 U	34.9 U	39.4 U	36 U	86.2 J	74 U
Thallium	mg/kg	0.32 U	0.53 U	0.31 J	0.67 J	0.41 U	0.46 U	0.35 U
Vanadium	mg/kg	24.3	28.7	23.6	28.9	22.2	26.2 J	25.7
Zinc	mg/kg	102 J	150 J	123 J	308 J	72.1 J	149	71.2
Cyanide	mg/kg	0.64 U	0.7 U	0.58 U	0.72 U	0.54 U	0.57 U	0.66 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL GB-18/MW19 0-6" 01/14/92 GB-18-1 152460	SOIL GB-18/MW19 5-5.5' 10/31/91 S103104 147937	SOIL GB-19 0-6" 01/14/92 GB-19-1 152461	SOIL GB-20/MW29 0-6" 01/14/92 GB-20-1 152462	SOIL GB20/MW29 2-4' 11/13/91 S1311106 148877	SOIL GB21/MW30 0-2' 11/14/91 S1411110MW30 149073	SOIL MW-31 0-2' 11/15/92 S1511115MW31 149078
Volatile Organic Compounds								
Chloromethane	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Bromomethane	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Vinyl Chloride	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Chloroethane	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Methylene Chloride	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Acetone	ug/kg	13 U	11 U J	13 U	13 U	11 U	18 U	17 U
Carbon Disulfide	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,1-Dichloroethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Chloroform	ug/kg	7 U	5 U J	6 U	5 J	6 U	6 U	6 U
1,2-Dichloroethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
2-Butanone	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
1,1,1-Trichloroethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Carbon Tetrachloride	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Vinyl Acetate	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Bromodichloromethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,2-Dichloropropane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
cis-1,3-Dichloropropene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Trichloroethene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Dibromochloromethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,1,2-Trichloroethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Benzene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
trans-1,3-Dichloropropene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Bromoform	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-Pentanone	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
2-Hexanone	ug/kg	13 U	11 U J	13 U	13 U	11 U	12 U	12 U
Tetrachloroethene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Toluene	ug/kg	7 U	2 J	6 U	6 U	6 U	6 U	6 U
Chlorobenzene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Ethylbenzene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Styrene	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U
Xylene (total)	ug/kg	7 U	5 U J	6 U	6 U	6 U	6 U	6 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL GB-18/MW19 0-6' 01/14/92 GB-18-1 152460	SOIL GB-18/MW19 5-5.5' 10/31/91 S103104 147937	SOIL GB-19 0-6' 01/14/92 GB-19-1 152461	SOIL GB-20/MW29 0-6' 01/14/92 GB-20-1 152462	SOIL GB20/MW29 2-4' 11/13/91 S1311106 148877	SOIL GB21/MW30 0-2' 11/14/91 S1411110MW30 149073	SOIL MW-31 0-2' 11/15/92 S1511115MW31 149078
Semivolatiles								
Phenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
bis(2-Chloroethyl) ether	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2-Chlorophenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
1,3-Dichlorobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
1,4-Dichlorobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzyl Alcohol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
1,2-Dichlorobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2-Methylphenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,2'-oxybis(1-Chloropropane)	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Methylphenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
N-Nitroso-di-n-propylamine	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Hexachloroethane	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Nitrobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Isophorone	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2-Nitrophenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4-Dimethylphenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzoic acid	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
bis(2-Chloroethoxy) methane	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4-Dichlorophenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
1,2,4-Trichlorobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Naphthalene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Chloroaniline	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Hexachlorobutadiene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Chloro-3-methylphenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2-Methylnaphthalene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Hexachlorocyclopentadiene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4,6-Trichlorophenol	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4,5-Trichlorophenol	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
2-Chloronaphthalene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2-Nitroaniline	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
Dimethylphthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Acenaphthylene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,6-Dinitrotoluene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
3-Nitroaniline	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
Acenaphthene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4-Dinitrophenol	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
4-Nitrophenol	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
Dibenzofuran	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
2,4-Dinitrotoluene	ug/kg	960 U	710 U	280 J	900 U	750 U	790 U	
Diethylphthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Chlorophenyl-phenylether	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Fluorene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Nitroaniline	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
4,6-Dinitro-2-methylphenol	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
N-Nitrosodiphenylamine	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
4-Bromophenyl-phenylether	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Hexachlorobenzene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Pentachlorophenol	ug/kg	4700 U	3400 U	4400 U	4400 U	3600 U	3900 U	
Phenanthrene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Anthracene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Carbazole	ug/kg							
Di-n-butylphthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Fluoranthene	ug/kg	960 U	710 U	900 U	900 U	750 U	78 J	
Pyrene	ug/kg	960 U	710 U	900 U	900 U	750 U	120 J	
Butylbenzylphthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
3,3'-Dichlorobenzidine	ug/kg	1900 U	1400 U	1800 U	1800 U	1500 U	1600 U	
Benzo(a)anthracene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Chrysene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
bis(2-Ethylhexyl)phthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Di-n-octylphthalate	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzo(b)fluoranthene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzo(k)fluoranthene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzo(a)pyrene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Indeno(1,2,3-cd)pyrene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Dibenz(a,h)anthracene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	
Benzo(g,h,i)perylene	ug/kg	960 U	710 U	900 U	900 U	750 U	790 U	

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-18/MW19	GB-18/MW19	GB-19	GB-20/MW29	GB20/MW29	GB21/MW30	MW-31
	DEPTH	0-6"	5-5.5'	0-6"	0-6"	2-4'	0-2'	0-2'
	DATE	01/14/92	10/31/91	01/14/92	01/14/92	11/13/91	11/14/91	11/15/92
	ES ID	GB-18-1	S103104	GB-19-1	GB-20-1	S1311106	S1411110MW30	S1511115MW31
	LAB ID	152460	147937	152461	152462	148677	149073	149078
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
beta-BHC	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
delta-BHC	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
gamma-BHC (Lindane)	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
Heptachlor	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
Aldrin	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
Heptachlor epoxide	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
Endosulfan I	ug/kg	23 U	17 U	22 U	22 U	18 U	19 U	
Dieldrin	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
4,4'-DDE	ug/kg	47 U	34 U	44 U	44 U	36 U	20 J	
Endrin	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
Endosulfan II	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
4,4'-DDD	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
Endosulfan sulfate	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
4,4'-DDT	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
Methoxychlor	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Endrin ketone	ug/kg	47 U	34 U	44 U	44 U	36 U	39 U	
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
gamma-Chlordane	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Toxaphene	ug/kg	470 U	340 U	440 U	440 U	360 U	390 U	
Aroclor-1016	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Aroclor-1221	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Aroclor-1232	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Aroclor-1242	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Aroclor-1248	ug/kg	230 U	170 U	220 U	220 U	180 U	190 U	
Aroclor-1254	ug/kg	470 U	340 U	440 U	440 U	360 U	390 U	
Aroclor-1260	ug/kg	470 U	340 U	440 U	440 U	360 U	390 U	

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	GB-18/MW19	GB-18/MW19	GB-19	GB-20/MW29	GB20/MW29	GB21/MW30	MW-31
	DEPTH	0-6"	5-5.5'	0-6"	0-6"	2-4'	0-2'	0-2'
	DATE	01/14/92	10/31/91	01/14/92	01/14/92	11/13/91	11/14/91	11/15/92
	ES ID	GB-18-1	S103104	GB-19-1	GB-20-1	S1311108	S1411110MW30	S1511115MW31
	LAB ID	152460	147937	152461	152462	148877	149073	149078
	UNITS							
Explosives								
HMX	ug/kg	1000 U	120 U	1000 U	1000 U	120 U	120 U	
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	240	
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	66 J	120 U	120 U	
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	
Tetryl	ug/kg	400 U	120 U	400 U	400 U	120 U	120 U	
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	350	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	130	
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	110 J	
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/kg	120 U	120 U	160	120 U	120 U	120 U	
Metals								
Aluminum	mg/kg	19100	17500	19200	21200	16900	16000	
Antimony	mg/kg	7.3 U J	8.1 U J	8.2 J	7 U J	11.4 U J	6.4 U J	
Arsenic	mg/kg	5	9.1	12.5	5.1	6.5	4	
Barium	mg/kg	1740	96.9	1190	211 R	95.2	253	
Beryllium	mg/kg	1.1 R	0.88	1.1 R	1.2 R	1.1	0.94	
Cadmium	mg/kg	5.2 J	2.5	3.9 J	3.9 J	2.5	2.7	
Calcium	mg/kg	8680	59100	6020	9770	86100	9150	
Chromium	mg/kg	25.6 J	28.5	27 J	29.3 J	25.1	23.1	
Cobalt	mg/kg	13.1	15.8	11.2	14.2	10.9	11.5	
Copper	mg/kg	82.4	27	619	50	28.7	74.7	
Iron	mg/kg	29800	34900	28800	31500	26600	27900	
Lead	mg/kg	173	22.3	2370	82.6	18.1	318	
Magnesium	mg/kg	5710	9870	6170	7010	8590	4790	
Manganese	mg/kg	1100	546	796	695	498	620	
Mercury	mg/kg	1.1	0.04 U	0.19 R	0.13 R	0.04 U	0.18 R	
Nickel	mg/kg	26.8	52.9 J	31.3	40.4	59 J	30.9 J	
Potassium	mg/kg	1950 J	2650	2460 J	2660 J	3170	2040	
Selenium	mg/kg	0.32 J	0.19 U J	0.64 J	0.36 J	0.16 U J	0.23 U J	
Silver	mg/kg	0.46 U	1.2 U	0.44 U	0.45 U	1.7 U	0.96 U	
Sodium	mg/kg	59 J	147 J	66.5 J	64 J	196 J	52.8 J	
Thallium	mg/kg	0.89 U	0.53 U	0.8 J	0.57 J	0.46 U	0.64 U	
Vanadium	mg/kg	30.1 J	26.8	29.6 J	30.2 J	27.4	25.7	
Zinc	mg/kg	621	100	399	175	86.3	220	
Cyanide	mg/kg	0.84 U	0.6 U	0.75 U	0.8 U	0.68 U	0.7 U	

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	MW-32	MW-34	MW-34	OB	OB	OB	OB
	DEPTH	0-2'	0-2'	0-2'	0-2	2-4	0-2	0-2
	DATE	11/19/91	11/20/91	11/20/91	01/18/93	01/18/93	01/18/93	01/18/93
	ES ID	S1911118MW32	S2011121MW34	S2011121MW34RE	GB23-1	GB23-2	GB23-6	GB24-1
	LAB ID	149328	149410	149410RE	177409	177410	177411	177412
	UNITS						DUP GB23-1	
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Bromomethane	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Vinyl Chloride	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Chloroethane	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Methylene Chloride	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Acetone	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Carbon Disulfide	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,1-Dichloroethene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,1-Dichloroethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,2-Dichloroethene (total)	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Chloroform	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,2-Dichloroethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
2-Butanone	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
1,1,1-Trichloroethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Carbon Tetrachloride	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Vinyl Acetate	ug/kg	12 U	12 U					
Bromodichloromethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,2-Dichloropropane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
cis-1,3-Dichloropropene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Trichloroethene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Dibromochloromethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
1,1,2-Trichloroethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Benzene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
trans-1,3-Dichloropropene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Bromoform	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
4-Methyl-2-Pentanone	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
2-Hexanone	ug/kg	12 U	12 U		12 U	12 U	13 U	12 U
Tetrachloroethene	ug/kg	6 U	6 U		2 J	12 U	15 J	12 U
1,1,2,2-Tetrachloroethane	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Toluene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Chlorobenzene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Ethylbenzene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Styrene	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
Xylene (total)	ug/kg	6 U	6 U		12 U	12 U	13 U	12 U
							DUP GB23-1	

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	MW-32	MW-34	MW-34	OB	OB	OB	OB
	DEPTH	0-2'	0-2'	0-2'	0-2	2-4	0-2	0-2
	DATE	11/19/91	11/20/91	11/20/91	01/18/93	01/18/93	01/18/93	01/18/93
	ES ID	S1911118MW32	S2011121MW34	S2011121MW34RE	GB23-1	GB23-2	GB23-6	GB24-1
	LAB ID	149328	149410	149410RE	177409	177410	177411	177412
	UNITS						DUP GB23-1	
Semivolatiles								
Phenol	ug/kg		730 U		420 U	410 U	420 U	390 U
bis(2-Chloroethyl) ether	ug/kg		730 U		420 U	410 U	420 U	390 U
2-Chlorophenol	ug/kg		730 U		420 U	410 U	420 U	390 U
1,3-Dichlorobenzene	ug/kg		730 U		420 U	410 U	420 U	390 U
1,4-Dichlorobenzene	ug/kg		730 U		420 U	410 U	420 U	390 U
Benzyl Alcohol	ug/kg		730 U					
1,2-Dichlorobenzene	ug/kg		730 U		420 U	410 U	420 U	390 U
2-Methylphenol	ug/kg		730 U		420 U	410 U	420 U	390 U
2,2'-oxybis(1-Chloropropane)	ug/kg		730 U		420 U	410 U	420 U	390 U
4-Methylphenol	ug/kg		730 U		420 U	410 U	420 U	390 U
N-Nitroso-di-n-propylamine	ug/kg		730 U		420 U	410 U	420 U	390 U
Hexachloroethane	ug/kg		730 U		420 U	410 U	420 U	390 U
Nitrobenzene	ug/kg		730 U		420 U	410 U	420 U	390 U
Isophorone	ug/kg		730 U		420 U	410 U	420 U	390 U
2-Nitrophenol	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4-Dimethylphenol	ug/kg		730 U		420 U	410 U	420 U	390 U
Benzoic acid	ug/kg		3500 U					
bis(2-Chloroethoxy) methane	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4-Dichlorophenol	ug/kg		730 U		420 U	410 U	420 U	390 U
1,2,4-Trichlorobenzene	ug/kg		730 U		420 U	410 U	420 U	390 U
Naphthalene	ug/kg		730 U		420 U	410 U	420 U	390 U
4-Chloroaniline	ug/kg		730 U		420 U	410 U	420 U	390 U
Hexachlorobutadiene	ug/kg		730 U		420 U	410 U	420 U	390 U
4-Chloro-3-methylphenol	ug/kg		730 U		420 U	410 U	420 U	390 U
2-Methylnaphthalene	ug/kg		730 U		420 U	410 U	420 U	390 U
Hexachlorocyclopentadiene	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4,6-Trichlorophenol	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4,5-Trichlorophenol	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
2-Chloronaphthalene	ug/kg		730 U		420 U	410 U	420 U	390 U
2-Nitroaniline	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
Dimethylphthalate	ug/kg		730 U		420 U	410 U	420 U	390 U
Acenaphthylene	ug/kg		730 U		420 U	410 U	420 U	390 U
2,6-Dinitrotoluene	ug/kg		730 U		41 J	410 U	290 J	210 J
3-Nitroaniline	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
Acenaphthene	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4-Dinitrophenol	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
4-Nitrophenol	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
Dibenzofuran	ug/kg		730 U		420 U	410 U	420 U	390 U
2,4-Dinitrotoluene	ug/kg		730 U		330 J	410 U	3400	2300
Diethylphthalate	ug/kg		730 U		420 U	410 U	67 J	390 U
4-Chlorophenyl-phenylether	ug/kg		730 U		420 U	410 U	420 U	390 U
Fluorene	ug/kg		730 U		420 U	410 U	420 U	390 U
4-Nitroaniline	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
4,6-Dinitro-2-methylphenol	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
N-Nitrosodiphenylamine	ug/kg		730 U		190 J	410 U	380 J	260 J
4-Bromophenyl-phenylether	ug/kg		730 U		420 U	410 U	420 U	390 U
Hexachlorobenzene	ug/kg		730 U		22 J	410 U	20 J	390 U
Pentachlorophenol	ug/kg		3500 U		1000 U	990 U	1000 U	950 U
Phenanthrene	ug/kg		730 U		420 U	410 U	420 U	390 U
Anthracene	ug/kg		730 U		420 U	410 U	420 U	18 J
Carbazole	ug/kg				420 U	410 U	420 U	390 U
Di-n-butylphthalate	ug/kg		730 U		1000	66 J	1500	380 J
Fluoranthene	ug/kg		730 U		420 U	410 U	420 U	390 U
Pyrene	ug/kg		730 U		420 U	410 U	420 U	390 U
Butylbenzylphthalate	ug/kg		730 U		420 U	64 J	420 U	390 U
3,3'-Dichlorobenzidine	ug/kg		1500 U		420 U	410 U	420 U	390 U
Benzo(a)anthracene	ug/kg		730 U		420 U	410 U	420 U	390 U
Chrysene	ug/kg		730 U		420 U	410 U	420 U	390 U
bis(2-Ethylhexyl)phthalate	ug/kg		730 U		400 J	360 J	460	290 J
Di-n-octylphthalate	ug/kg		730 U		420 U	19 J	420 U	390 U
Benzo(b)fluoranthene	ug/kg		730 U		420 U	410 U	420 U	390 U
Benzo(k)fluoranthene	ug/kg		730 U		420 U	410 U	420 U	390 U
Benzo(a)pyrene	ug/kg		730 U		420 U	410 U	420 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg		730 U		420 U	410 U	420 U	390 U
Dibenz(a,h)anthracene	ug/kg		730 U		420 U	410 U	420 U	390 U
Benzo(g,h,i)perylene	ug/kg		730 U		420 U	410 U	420 U	390 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	MW-32	MW-34	MW-34	OB	OB	OB	OB
	DEPTH	0-2'	0-2'	0-2'	0-2	2-4	0-2	0-2
	DATE	11/19/91	11/20/91	11/20/91	01/18/93	01/18/93	01/18/93	01/18/93
	ES ID	S1911118MW32	S2011121MW34	S2011121MW34RE	GB23-1	GB23-2	GB23-6	GB24-1
COMPOUND	LAB ID	149328	149410	149410RE	177409	177410	177411	177412
	UNITS						DUP GB23-1	
Pesticides/PCBs								
alpha-BHC	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
beta-BHC	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
delta-BHC	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
gamma-BHC (Lindane)	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
Heptachlor	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
Aldrin	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
Heptachlor epoxide	ug/kg		18 U	18 U R	2.2 U	2.1 U	2.2 U	2 U
Endosulfan I	ug/kg		18 U	18 U R	2.2 U	2.1 U	1.3 J	2 U
Dieldrin	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 U
4,4'-DDE	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	5.8
Endrin	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 U
Endosulfan II	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 U
4,4'-DDD	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	4.2
Endosulfan sulfate	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 U
4,4'-DDT	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 J
Methoxychlor	ug/kg		180 U	180 U R	22 U	21 U	22 U	20 U
Endrin ketone	ug/kg		35 U	36 U R	4.2 U	4 U	4.2 U	3.9 U
Endrin aldehyde	ug/Kg				4.2 U	4 U	4.2 U	3.9 U
alpha-Chlordane	ug/kg		180 U	180 U R	2.2 U	2.1 U	2.2 U	2 U
gamma-Chlordane	ug/kg		180 U	180 U R	2.2 U	2.1 U	2.2 U	2 U
Toxaphene	ug/kg		350 U	360 U R	220 U	210 U	220 U	200 U
Aroclor-1016	ug/kg		180 U	180 U R	42 U	40 U	42 U	39 U
Aroclor-1221	ug/kg		180 U	180 U R	86 U	81 U	86 U	79 U
Aroclor-1232	ug/kg		180 U	180 U R	42 U	40 U	42 U	39 U
Aroclor-1242	ug/kg		1400 U	180 U R	42 U	40 U	42 U	39 U
Aroclor-1248	ug/kg		180 U	180 U R	42 U	40 U	42 U	39 U
Aroclor-1254	ug/kg		350 U	360 U R	42 U	40 U	430 J	39 U
Aroclor-1260	ug/kg		350 U	360 U R	42 U	40 U	42 U	39 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	MW-32	MW-34	MW-34	OB	OB	OB	OB
	DEPTH	0-2'	0-2'	0-2'	0-2	2-4	0-2	0-2
	DATE	11/19/91	11/20/91	11/20/91	01/18/93	01/18/93	01/18/93	01/18/93
	ES ID	S1911118MW32	S2011121MW34	S2011121MW34RE	GB23-1	GB23-2	GB23-6	GB24-1
COMPOUND	LAB ID	149328	149410	149410RE	177409	177410	177411	177412
	UNITS						DUP GB23-1	
Explosives								
HMX	ug/kg	120 U		120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U		120 U	100 J	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U		260	120 U	200	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U		120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U		120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U		100 J	120 U	57 J	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U		430	120 U	280 J	64 J	
2-amino-4,6-Dinitrotoluene	ug/kg	120 U		370	120 U	270	140	
2,6-Dinitrotoluene	ug/kg	120 U		120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/kg	120 U		2400 J	120 U	1200 J	260	
Metals								
Aluminum	mg/kg	16100		20500	17100	17700	19100	
Antimony	mg/kg	5.7 J		26.6 J	6.3 UJ	18.5 J	7.3 J	
Arsenic	mg/kg	6.3 U		7.7 J	4.1 J	5.9 J	4.2 J	
Barium	mg/kg	67.5		4520	175 J	3070	1480	
Beryllium	mg/kg	0.86		0.74	0.77	0.69	0.9	
Cadmium	mg/kg	2.3		5.5	0.38 J	5.9	1	
Calcium	mg/kg	28600		8600	9950	9120	5780	
Chromium	mg/kg	26.6		35.4	30.7	31.4	34.3	
Cobalt	mg/kg	17		12.9	14.8	10.5	13.1	
Copper	mg/kg	32.7		1680	74.2	869	1400	
Iron	mg/kg	35000		36100	33000	30400	32700	
Lead	mg/kg	11.9		5200	163	3200	1310	
Magnesium	mg/kg	6850		7510	7290	6290	7190	
Manganese	mg/kg	803		385	434	385	855	
Mercury	mg/kg	0.07 R		0.41	0.11 J	0.27	0.2	
Nickel	mg/kg	49.3 J		39.5	55.1	39.7	49.1	
Potassium	mg/kg	1290		1770	1360	1340	2060	
Selenium	mg/kg	0.18 U J		1.5 J	0.9 J	0.45 J	0.88 J	
Silver	mg/kg	0.87 J		1 R	0.39 R	0.71 R	3.7	
Sodium	mg/kg	55.2 J		227 J	106 J	158 J	89.5 J	
Thallium	mg/kg	0.51 U		0.48 U	0.61 U	0.45 U	0.53 U	
Vanadium	mg/kg	22.3		28.3	24.7	26.5	30.4	
Zinc	mg/kg	95.7		1200	123	992	375	
Cyanide	mg/kg	0.54 U		0.77 U	0.73 U	0.78 U	0.7 U	

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	2-4	0-2	2-4	0-2	2-4	0-2	0-2
	DATE	01/18/93	01/18/93	01/18/93	01/19/93	01/19/93	01/19/93	01/19/93
	ES ID	GB24-2	GB25-1	GB25-2	GB26-1	GB26-2	GB26-4	GB27-1
	LAB ID	177413	177414	177415	177516	177518	177520	177521
	UNITS						DUP GB26-1	
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Bromomethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Vinyl Chloride	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Chloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Methylene Chloride	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Acetone	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Carbon Disulfide	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,1-Dichloroethene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,1-Dichloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,2-Dichloroethene (total)	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Chloroform	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,2-Dichloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
2-Butanone	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,1,1-Trichloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Carbon Tetrachloride	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Vinyl Acetate	ug/kg							
Bromodichloromethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,2-Dichloropropane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
cis-1,3-Dichloropropene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Trichloroethene	ug/kg	12 U	100	78	13 U	12 U	12 U	12 U
Dibromochloromethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,1,2-Trichloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Benzene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
trans-1,3-Dichloropropene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Bromoform	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
4-Methyl-2-Pentanone	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
2-Hexanone	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Tetrachloroethene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Toluene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Chlorobenzene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Ethylbenzene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Styrene	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U	12 U
Xylene (total)	ug/kg	12 U	12 U	12 U	13 U	12 U	12 U DUP GB26-1	12 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 2-4 01/18/93 GB24-2 177413	SOIL OB 0-2 01/18/93 GB25-1 177414	SOIL OB 2-4 01/18/93 GB25-2 177415	SOIL OB 0-2 01/19/93 GB26-1 177516	SOIL OB 2-4 01/19/93 GB26-2 177518	SOIL OB 0-2 01/19/93 GB26-4 177520 DUP GB26-1	SOIL OB 0-2 01/19/93 GB27-1 177521
Semivolatiles								
Phenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
bis(2-Chloroethyl) ether	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2-Chlorophenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
1,3-Dichlorobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
1,4-Dichlorobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzyl Alcohol	ug/kg							
1,2-Dichlorobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2-Methylphenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,2'-oxybis(1-Chloropropane)	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Methylphenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
N-Nitroso-di-n-propylamine	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Hexachloroethane	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Nitrobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Isophorone	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2-Nitrophenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4-Dimethylphenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzoic acid	ug/kg							
bis(2-Chloroethoxy) methane	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4-Dichlorophenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
1,2,4-Trichlorobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Naphthalene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Chloroaniline	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Hexachlorobutadiene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Chloro-3-methylphenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2-Methylnaphthalene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Hexachlorocyclopentadiene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4,6-Trichlorophenol	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4,5-Trichlorophenol	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
2-Chloronaphthalene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2-Nitroaniline	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
Dimethylphthalate	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Acenaphthylene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,6-Dinitrotoluene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
3-Nitroaniline	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
Acenaphthene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4-Dinitrophenol	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
4-Nitrophenol	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
Dibenzofuran	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
2,4-Dinitrotoluene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Diethylphthalate	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Chlorophenyl-phenylether	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Fluorene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Nitroaniline	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
4,6-Dinitro-2-methylphenol	ug/kg	880 U	970 U	890 U	980 U	980 U	990 U	950 U
N-Nitrosodiphenylamine	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
4-Bromophenyl-phenylether	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Hexachlorobenzene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Pentachlorophenol	ug/kg	880 U	970 U	890 U	980 U	140 J	990 U	950 U
Phenanthrene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Anthracene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Carbazole	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Di-n-butylphthalate	ug/kg	34 J	260 J	76 J	400 U	400 U	410 U	390 U
Fluoranthene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Pyrene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Butylbenzylphthalate	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
3,3'-Dichlorobenzidine	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzo(a)anthracene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Chrysene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
bis(2-Ethylhexyl)phthalate	ug/kg	120 J	420	190 J	870	400 U	1400	870
Di-n-octylphthalate	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzo(b)fluoranthene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzo(k)fluoranthene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzo(a)pyrene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Dibenz(a,h)anthracene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U
Benzo(g,h,i)perylene	ug/kg	360 U	400 U	370 U	400 U	400 U	410 U	390 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 2-4 01/18/93 GB24-2 177413	SOIL OB 0-2 01/18/93 GB25-1 177414	SOIL OB 2-4 01/18/93 GB25-2 177415	SOIL OB 0-2 01/19/93 GB26-1 177516	SOIL OB 2-4 01/19/93 GB26-2 177518	SOIL OB 0-2 01/19/93 GB26-4 177520 DUP GB26-1	SOIL OB 0-2 01/19/93 GB27-1 177521
Pesticides/PCBs								
alpha-BHC	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
beta-BHC	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
delta-BHC	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
gamma-BHC (Lindane)	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Heptachlor	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Aldrin	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Heptachlor epoxide	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Endosulfan I	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Dieldrin	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
4,4'-DDE	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
Endrin	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
Endosulfan II	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
4,4'-DDD	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
Endosulfan sulfate	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
4,4'-DDT	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
Methoxychlor	ug/kg	18 U	20 U	19 U	21 U	21 U	21 U	20 U
Endrin ketone	ug/kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
Endrin aldehyde	ug/Kg	3.6 U	4 U	3.6 U	4 U	4.1 U	4.1 U	3.9 U
alpha-Chlordane	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
gamma-Chlordane	ug/kg	1.8 U	2 U	1.9 U	2.1 U	2.1 U	2.1 U	2 U
Toxaphene	ug/kg	180 U	200 U	190 U	210 U	210 U	210 U	200 U
Aroclor-1016	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U
Aroclor-1221	ug/kg	73 U	80 U	73 U	82 U	84 U	83 U	80 U
Aroclor-1232	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U
Aroclor-1242	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U
Aroclor-1248	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U
Aroclor-1254	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U
Aroclor-1260	ug/kg	36 U	40 U	36 U	40 U	41 U	41 U	39 U

OB GROUNDS – PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 2-4 01/18/93 GB24-2 177413	SOIL OB 0-2 01/18/93 GB25-1 177414	SOIL OB 2-4 01/18/93 GB25-2 177415	SOIL OB 0-2 01/19/93 GB26-1 177516	SOIL OB 2-4 01/19/93 GB26-2 177518	SOIL OB 0-2 01/19/93 GB26-4 177520 DUP GB26-1	SOIL OB 0-2 01/19/93 GB27-1 177521
Explosives								
HMX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	7440	15000	14900	16500	11900	17400	14500
Antimony	mg/kg	5.8 UJ	6.5 UJ	5.4 UJ	6.5 UJ	5.9 UJ	6.1 UJ	5.6 UJ
Arsenic	mg/kg	1.5 J	4.1 J	2.2 J	6.5	5.2	5.4	5.9
Barium	mg/kg	42.5 J	103 J	75.9 J	120	73.3	178	90.9
Beryllium	mg/kg	0.4 J	0.7	0.66	0.91	0.57	0.89	0.71
Cadmium	mg/kg	0.33 U	0.37 U	0.31 U	0.37 U	0.34 U	0.35 U	0.32 U
Calcium	mg/kg	1060	38100	22900	4010	4070	4370	5680
Chromium	mg/kg	14.1	25.4	27.1	26.4	21.8	28.7	24.5
Cobalt	mg/kg	13.6	10.6	15.8	13.2	11.4	16.5	12.4
Copper	mg/kg	27.4	39.1	41.7	30.1	40.8	41.2	32.3
Iron	mg/kg	16100	29100	31400	31900	27600	34400	28200
Lead	mg/kg	17.9	57.2	22.1	67.5	21.5	32.7	16.8
Magnesium	mg/kg	3460	7800	6830	5490	4800	6100	5790
Manganese	mg/kg	346	416	382	422 J	498	1270 J	659
Mercury	mg/kg	0.03 J	0.04 J	0.04 J	0.06 J	0.03 U	0.06 J	0.06 J
Nickel	mg/kg	32.7	45.4	54.7	40.9	41.2	49	45.6
Potassium	mg/kg	592	1440	1300	1580	948	1740	1320
Selenium	mg/kg	0.3 J	0.75 J	0.58 J	0.15 UJ	0.16 UJ	0.27 UJ	0.22 UJ
Silver	mg/kg	0.34 U	0.38 U	0.32 U	0.38 U	0.35 U	0.36 U	0.33 U
Sodium	mg/kg	32.2 U	93.5 J	82.6 J	55.2 J	53.6 J	71.7 J	60.2 J
Thallium	mg/kg	0.57 U	0.54 U	0.51 U	0.34 U	0.38 U	0.65 U	0.52 U
Vanadium	mg/kg	10	22.6	20.2	27.5	20.3	29.3	22.9
Zinc	mg/kg	45.4	103	58.7	90.3	87.9	93.4	99.4
Cyanide	mg/kg	0.63 U	0.73 U	0.62 U	0.75 U	0.77 U	0.81 U	0.7 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	0-2	2-4	0-2	2-4	0-2	0-2
	DATE	01/19/93	01/14/93	01/14/93	01/19/93	01/19/93	01/19/93	01/18/93
	ES ID	GB27-3	GB28-1	GB28-2	GB29-1	GB29-2	GB29-4	GB30-1
	LAB ID	177523	177356	177358	177416	177417	177418	177419
	UNITS						DUP GB29-1	
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Bromomethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Vinyl Chloride	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Chloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Methylene Chloride	ug/kg	12 U	4 J	12 U	12 U	11 U	12 U	12 U
Acetone	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Carbon Disulfide	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,1-Dichloroethene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,1-Dichloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,2-Dichloroethene (total)	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Chloroform	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,2-Dichloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
2-Butanone	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,1,1-Trichloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Carbon Tetrachloride	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Vinyl Acetate	ug/kg							
Bromodichloromethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,2-Dichloropropane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
cis-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Trichloroethene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Dibromochloromethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,1,2-Trichloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Benzene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
trans-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Bromoform	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
4-Methyl-2-Pentanone	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
2-Hexanone	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Tetrachloroethene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Toluene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Chlorobenzene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Ethylbenzene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Styrene	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U	12 U
Xylene (total)	ug/kg	12 U	11 U	12 U	12 U	11 U	12 U DUP GB29-1	12 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/19/93 GB27-3 177523	SOIL OB 0-2 01/14/93 GB28-1 177356	SOIL OB 2-4 01/14/93 GB28-2 177356	SOIL OB 0-2 01/19/93 GB29-1 177416	SOIL OB 2-4 01/19/93 GB29-2 177417	SOIL OB 0-2 01/19/93 GB29-4 177418 DUP GB29-1	SOIL OB 0-2 01/18/93 GB30-1 177419
Semivolatiles								
Phenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
bis(2-Chloroethyl) ether	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2-Chlorophenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
1,3-Dichlorobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
1,4-Dichlorobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzyl Alcohol	ug/kg							
1,2-Dichlorobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2-Methylphenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,2'-oxybis(1-Chloropropane)	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
4-Methylphenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
N-Nitroso-di-n-propylamine	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Hexachloroethane	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Nitrobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Isophorone	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2-Nitrophenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4-Dimethylphenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzoic acid	ug/kg							
bis(2-Chloroethoxy) methane	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4-Dichlorophenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
1,2,4-Trichlorobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Naphthalene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
4-Chloroaniline	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Hexachlorobutadiene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
4-Chloro-3-methylphenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2-Methylnaphthalene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Hexachlorocyclopentadiene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4,6-Trichlorophenol	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4,5-Trichlorophenol	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
2-Chloronaphthalene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2-Nitroaniline	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
Dimethylphthalate	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Acenaphthylene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,6-Dinitrotoluene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
3-Nitroaniline	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
Acenaphthene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4-Dinitrophenol	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
4-Nitrophenol	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
Dibenzofuran	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
2,4-Dinitrotoluene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Diethylphthalate	ug/kg	390 U	380 U	370 U	420 U	380 U	30 J	26 J
4-Chlorophenyl-phenylether	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Fluorene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
4-Nitroaniline	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
4,6-Dinitro-2-methylphenol	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
N-Nitrosodiphenylamine	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
4-Bromophenyl-phenylether	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Hexachlorobenzene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Pentachlorophenol	ug/kg	940 U	920 U	890 U	1000 U	920 U	950 U	950 U
Phenanthrene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Anthracene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Carbazole	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Di-n-butylphthalate	ug/kg	390 U	380 U	25 J	30 J	61 J	22 J	37 J
Fluoranthene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Pyrene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Butylbenzylphthalate	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
3,3'-Dichlorobenzidine	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzo(a)anthracene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Chrysene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
bis(2-Ethylhexyl)phthalate	ug/kg	700	380 U	370 U	280 J	230 J	140 J	150 J
Di-n-octylphthalate	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzo(b)fluoranthene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzo(k)fluoranthene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzo(a)pyrene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Dibenz(a,h)anthracene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U
Benzo(g,h,i)perylene	ug/kg	390 U	380 U	370 U	420 U	380 U	390 U	390 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	0-2	2-4	0-2	2-4	0-2	0-2
	DATE	01/19/93	01/14/93	01/14/93	01/19/93	01/19/93	01/19/93	01/18/93
	ES ID	GB27-3	GB28-1	GB28-2	GB29-1	GB29-2	GB29-4	GB30-1
	LAB ID	177523	177358	177358	177416	177417	177418	177419
	UNITS						DUP GB29-1	
Pesticides/PCBs								
alpha-BHC	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
beta-BHC	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
delta-BHC	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
gamma-BHC (Lindane)	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Heptachlor	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Aldrin	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Heptachlor epoxide	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Endosulfan I	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Dieldrin	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
4,4'-DDE	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
Endrin	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
Endosulfan II	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
4,4'-DDD	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
Endosulfan sulfate	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
4,4'-DDT	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
Methoxychlor	ug/kg	20 U	19 U	19 U	22 U	19 U	20 U	20 U
Endrin ketone	ug/kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
Endrin aldehyde	ug/Kg	3.9 U	3.7 U	3.7 U	4.2 U	3.8 U	3.9 U	3.9 U
alpha-Chlordane	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
gamma-Chlordane	ug/kg	2 U	1.9 U	1.9 U	2.2 U	1.9 U	2 U	2 U
Toxaphene	ug/kg	200 U	190 U	190 U	220 U	190 U	200 U	200 U
Aroclor-1016	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U
Aroclor-1221	ug/kg	78 U	76 U	75 U	85 U	77 U	80 U	80 U
Aroclor-1232	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U
Aroclor-1242	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U
Aroclor-1248	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U
Aroclor-1254	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U
Aroclor-1260	ug/kg	39 U	37 U	37 U	42 U	38 U	39 U	39 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/19/93 GB27-3 177523	SOIL OB 0-2 01/14/93 GB28-1 177356	SOIL OB 2-4 01/14/93 GB28-2 177358	SOIL OB 0-2 01/19/93 GB29-1 177416	SOIL OB 2-4 01/19/93 GB29-2 177417	SOIL OB 0-2 01/19/93 GB29-4 177418 DUP GB29-1	SOIL OB 0-2 01/18/93 GB30-1 177419
Explosives								
HMX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	98 J	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	13800	11000	11600	14200	11400	13000	10900
Antimony	mg/kg	6.2 UJ	5.9 UJ	5.3 UJ	6.6 J	6.1 UJ	6.4 UJ	5.8 UJ
Arsenic	mg/kg	4.6	2.2 J	3.3 J	6.4 J	5 J	5.3 J	5.2 J
Barium	mg/kg	71.5	73.4 J	72.9 J	395 J	44.6 J	293 J	100 J
Beryllium	mg/kg	0.64	0.55	0.55	0.71	0.49 J	0.58 J	0.55
Cadmium	mg/kg	0.35 U	0.34 U	0.31 U	0.35 U	0.35 U	0.37 U	0.33 U
Calcium	mg/kg	41700	75600	54300	23500	1480	25200	99000
Chromium	mg/kg	24.7	17.4	20.4	23.6	21	20.6	17.6
Cobalt	mg/kg	11.8	10.3	9.6	13	12.8	9.8	8.4
Copper	mg/kg	33.1	24.6	30.3	179	27.5	104	19.5
Iron	mg/kg	26400	21200	24700	28100	24400	23500	21100
Lead	mg/kg	17.7	12.9	15.2	457	26.2	209	11.4
Magnesium	mg/kg	8600	11300	8030	7920	5250	6780	12300
Manganese	mg/kg	421	440	363	721	233	476	475
Mercury	mg/kg	0.03 U	0.05 J	0.04 J	0.04 J	0.04 J	0.06 J	0.03 U
Nickel	mg/kg	41.3	34.4	37.9	41.6	45	32.6	28.9
Potassium	mg/kg	1640	1270	1050	1440	909	1280	1230
Selenium	mg/kg	0.16 UJ	0.63 J	0.73 J	0.52 J	0.22 UJ	0.22 UJ	0.23 UJ
Silver	mg/kg	0.36 U	0.35 U	0.32 U	0.36 U	0.36 U	0.44 R	0.35 R
Sodium	mg/kg	113 J	165 J	120 J	87 J	38.6 J	85 J	188 J
Thallium	mg/kg	0.38 U	0.38 U	0.48 U	0.51 U	0.52 U	0.51 U	0.54 U
Vanadium	mg/kg	20.7	17.5	17.7	24.5	15.8	21.9	17.5
Zinc	mg/kg	93.9	70.3	84.9	162 J	83.8	684 J	68.9
Cyanide	mg/kg	0.71 U	0.65 U	0.59 U	0.75 U	0.69 U	0.72 U	0.71 U

OB GROUNDS – PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/18/93 GB30-3 177421	SOIL OB 0-2 01/15/93 GB31-1 177359	SOIL OB 2-4 01/15/93 GB31-2 177360	SOIL OB 0-2 01/15/93 GB32-1 177361	SOIL OB 4-5 01/15/93 GB32-3 177363	SOIL OB 0-2 01/18/93 GB33-1 177422	SOIL OB 2-4 01/18/93 GB33-2 177423
Volatile Organic Compounds								
Chloromethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Bromomethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Vinyl Chloride	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Chloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Methylene Chloride	ug/kg	11 U	12 U	12 U	12 U	2 J	12 U	11 U
Acetone	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Carbon Disulfide	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,1-Dichloroethene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,1-Dichloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Chloroform	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
2-Butanone	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,1,1-Trichloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Carbon Tetrachloride	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Vinyl Acetate	ug/kg							
Bromodichloromethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloropropane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
cis-1,3-Dichloropropene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Trichloroethene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Dibromochloromethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,1,2-Trichloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Benzene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
trans-1,3-Dichloropropene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Bromoform	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
4-Methyl-2-Pentanone	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
2-Hexanone	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Tetrachloroethene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Toluene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Chlorobenzene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Ethylbenzene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Styrene	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U
Xylene (total)	ug/kg	11 U	12 U	12 U	12 U	12 U	12 U	11 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/18/93 GB30-3 177421	SOIL OB 0-2 01/15/93 GB31-1 177359	SOIL OB 2-4 01/15/93 GB31-2 177360	SOIL OB 0-2 01/15/93 GB32-1 177361	SOIL OB 4-5 01/15/93 GB32-3 177363	SOIL OB 0-2 01/18/93 GB33-1 177422	SOIL OB 2-4 01/18/93 GB33-2 177423
Semivolatiles								
Phenol	ug/kg	380 U	400 U	410 U	410 U	360 U	380 U	360 U
bis(2-Chloroethyl) ether	ug/kg	380 U	400 U	410 U	410 U	360 U	380 U	360 U
2-Chlorophenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
1,3-Dichlorobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
1,4-Dichlorobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzyl Alcohol	ug/kg							
1,2-Dichlorobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2-Methylphenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,2'-oxybis(1-Chloropropane)	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
4-Methylphenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
N-Nitroso-di-n-propylamine	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Hexachloroethane	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Nitrobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Isophorone	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2-Nitrophenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4-Dimethylphenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzoic acid	ug/kg							
bis(2-Chloroethoxy) methane	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4-Dichlorophenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
1,2,4-Trichlorobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Naphthalene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
4-Chloroaniline	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Hexachlorobutadiene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
4-Chloro-3-methylphenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2-Methylnaphthalene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Hexachlorocyclopentadiene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4,6-Trichlorophenol	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4,5-Trichlorophenol	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
2-Chloronaphthalene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2-Nitroaniline	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
Dimethylphthalate	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Acenaphthylene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,6-Dinitrotoluene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
3-Nitroaniline	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
Acenaphthene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4-Dinitrophenol	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
4-Nitrophenol	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
Dibenzofuran	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
2,4-Dinitrotoluene	ug/kg	360 U	410	410 U	410 U	360 U	380 U	360 U
Diethylphthalate	ug/kg	23 J	400 U	410 U	410 U	360 U	21 J	360 U
4-Chlorophenyl-phenylether	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Fluorene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
4-Nitroaniline	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
4,6-Dinitro-2-methylphenol	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
N-Nitrosodiphenylamine	ug/kg	360 U	100 J	410 U	410 U	360 U	380 U	360 U
4-Bromophenyl-phenylether	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Hexachlorobenzene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Pentachlorophenol	ug/kg	870 U	960 U	990 U	980 U	880 U	930 U	880 U
Phenanthrene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Anthracene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Carbazole	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Di-n-butylphthalate	ug/kg	60 J	23 J	120 J	410 U	24 J	22 J	33 J
Fluoranthene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Pyrene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Butylbenzylphthalate	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
3,3'-Dichlorobenzidine	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzo(a)anthracene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Chrysene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
bis(2-Ethylhexyl)phthalate	ug/kg	200 J	400 U	610	410 U	360 U	360 J	180 J
Di-n-octylphthalate	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzo(b)fluoranthene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzo(k)fluoranthene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzo(a)pyrene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Indeno(1,2,3-cd)pyrene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Dibenz(a,h)anthracene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U
Benzo(g,h,i)perylene	ug/kg	360 U	400 U	410 U	410 U	360 U	380 U	360 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/18/93 GB30-3 177421	SOIL OB 0-2 01/15/93 GB31-1 177359	SOIL OB 2-4 01/15/93 GB31-2 177360	SOIL OB 0-2 01/15/93 GB32-1 177361	SOIL OB 4-5 01/15/93 GB32-3 177363	SOIL OB 0-2 01/18/93 GB33-1 177422	SOIL OB 2-4 01/18/93 GB33-2 177423
Pesticides/PCBs								
alpha-BHC	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
beta-BHC	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
delta-BHC	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
gamma-BHC (Lindane)	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Heptachlor	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Aldrin	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Heptachlor epoxide	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Endosulfan I	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Dieldrin	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
4,4'-DDE	ug/kg	3.6 U	2.4 J	4.1 U	4 U	3.7 U	3.9 U	3.6 U
Endrin	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
Endosulfan II	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
4,4'-DDD	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
Endosulfan sulfate	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
4,4'-DDT	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
Methoxychlor	ug/kg	18 U	21 U	21 U	21 U	19 U	20 U	19 U
Endrin ketone	ug/kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
Endrin aldehyde	ug/Kg	3.6 U	4 U	4.1 U	4 U	3.7 U	3.9 U	3.6 U
alpha-Chlordane	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
gamma-Chlordane	ug/kg	1.8 U	2.1 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U
Toxaphene	ug/kg	180 U	210 U	210 U	210 U	190 U	200 U	190 U
Aroclor-1016	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U
Aroclor-1221	ug/kg	73 U	81 U	83 U	82 U	76 U	78 U	73 U
Aroclor-1232	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U
Aroclor-1242	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U
Aroclor-1248	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U
Aroclor-1254	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U
Aroclor-1260	ug/kg	36 U	40 U	41 U	40 U	37 U	39 U	36 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 4-6 01/18/93 GB30-3 177421	SOIL OB 0-2 01/15/93 GB31-1 177359	SOIL OB 2-4 01/15/93 GB31-2 177360	SOIL OB 0-2 01/15/93 GB32-1 177361	SOIL OB 4-5 01/15/93 GB32-3 177363	SOIL OB 0-2 01/18/93 GB33-1 177422	SOIL OB 2-4 01/18/93 GB33-2 177423
Explosives								
HMX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	15000	9880	16400	15200	9750	10700	8670
Antimony	mg/kg	5.4 UJ	6.4 UJ	5.7 J	6.2 UJ	6.1 UJ	5.9 UJ	6 UJ
Arsenic	mg/kg	4 J	7.3 J	2.5 J	6.5 J	4.6 J	4.9 J	4.7 J
Barium	mg/kg	58 J	97.6 J	83.2 J	196 J	65.7 J	70.4 J	75.4 J
Beryllium	mg/kg	0.67	0.6	0.79	0.74	0.44 J	0.51 J	0.42 J
Cadmium	mg/kg	0.31 U	0.37 U	0.32 U	0.35 U	0.35 U	0.34 U	0.34 U
Calcium	mg/kg	6610	1960	10400	60900	61600	62600	77900
Chromium	mg/kg	27.2	14.4	30.2	21.3	17.4	17.1	14.1
Cobalt	mg/kg	16	10.1	16.7	10.8	7.3	9.1	7.1
Copper	mg/kg	36.5	20.2	33.4	33.7	22.2	23.1	20.7
Iron	mg/kg	31600	20600	34100	27000	19400	21400	18300
Lead	mg/kg	23.1	33.6 R	36.5 R	54.6	26.1 R	17.1	8.7
Magnesium	mg/kg	7400	3050	7040	16000	8670	7820	13200
Manganese	mg/kg	381	511	630	737	304	455	355
Mercury	mg/kg	0.04 J	0.06 J	0.03 J	0.04 J	0.04 J	0.03 J	0.04 J
Nickel	mg/kg	61.8	20.1	54.1	32.8	30.3	32.5	29.1
Potassium	mg/kg	1230	648	1100	1250	1050	1260	1190
Selenium	mg/kg	0.19 UJ	0.7 J	0.69 J	0.68 J	0.77 J	0.19 UJ	0.17 UJ
Silver	mg/kg	0.33 R	0.44 R	0.33 U	0.36 U	0.48 R	0.35 U	0.35 U
Sodium	mg/kg	66.9 J	35.2 U	52.5 J	149 J	139 J	160 J	154 J
Thallium	mg/kg	0.45 U	0.4 U	0.62 U	0.42 U	0.53 U	0.45 U	0.41 U
Vanadium	mg/kg	20.8	18.2	22	26.7	14.4	17.1	14.3
Zinc	mg/kg	171	44.4	75.6	89.4	52.7	68.9	75.2
Cyanide	mg/kg	0.62 U	0.72 U	0.72 U	0.72 U	0.64 U	0.7 U	0.66 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/19/93 GB34-1 177525	SOIL OB 6-8 01/19/93 GB34-4 177528	SOIL OB 0-2 01/20/93 GB35-1 177529	SOIL OB 2-4 01/20/93 GB35-2 177530	SOIL OB 0-2 01/20/93 GB35-6 177531 DUP GB35-1	SOIL OB 0-2 01/20/93 GB36-1 177532	SOIL OB 2-4 01/20/93 GB36-2 177533
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Bromomethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Vinyl Chloride	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Chloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Methylene Chloride	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Acetone	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Carbon Disulfide	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,1-Dichloroethene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,1-Dichloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,2-Dichloroethene (total)	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Chloroform	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,2-Dichloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
2-Butanone	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,1,1-Trichloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Carbon Tetrachloride	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Vinyl Acetate	ug/kg							
Bromodichloromethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,2-Dichloropropane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
cis-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Trichloroethene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Dibromochloromethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,1,2-Trichloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Benzene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
trans-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Bromoform	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
4-Methyl-2-Pentanone	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
2-Hexanone	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Tetrachloroethene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Toluene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Chlorobenzene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Ethylbenzene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Styrene	ug/kg	12 U	11 U	12 U	11 U	13 U	12 U	11 U
Xylene (total)	ug/kg	12 U	11 U	12 U	11 U	13 U DUP GB35-1	12 U	11 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/19/93 GB34-1 177525	SOIL OB 6-8 01/19/93 GB34-4 177526	SOIL OB 0-2 01/20/93 GB35-1 177529	SOIL OB 2-4 01/20/93 GB35-2 177530	SOIL OB 0-2 01/20/93 GB35-6 177531 DUP GB35-1	SOIL OB 0-2 01/20/93 GB36-1 177532	SOIL OB 2-4 01/20/93 GB36-2 177533
Semivolatiles								
Phenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
bis(2-Chloroethyl) ether	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2-Chlorophenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
1,3-Dichlorobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
1,4-Dichlorobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzyl Alcohol	ug/kg							
1,2-Dichlorobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2-Methylphenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,2'-oxybis(1-Chloropropane)	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Methylphenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
N-Nitroso-di-n-propylamine	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Hexachloroethane	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Nitrobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Isophorone	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2-Nitrophenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4-Dimethylphenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzoic acid	ug/kg							
bis(2-Chloroethoxy) methane	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4-Dichlorophenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
1,2,4-Trichlorobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Naphthalene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Chloroaniline	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Hexachlorobutadiene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Chloro-3-methylphenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2-Methylnaphthalene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Hexachlorocyclopentadiene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4,6-Trichlorophenol	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4,5-Trichlorophenol	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
2-Chloronaphthalene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2-Nitroaniline	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
Dimethylphthalate	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Acenaphthylene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,6-Dinitrotoluene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
3-Nitroaniline	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
Acenaphthene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4-Dinitrophenol	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
4-Nitrophenol	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
Dibenzofuran	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
2,4-Dinitrotoluene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Diethylphthalate	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Chlorophenyl-phenylether	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Fluorene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Nitroaniline	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
4,6-Dinitro-2-methylphenol	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
N-Nitrosodiphenylamine	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
4-Bromophenyl-phenylether	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Hexachlorobenzene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Pentachlorophenol	ug/kg	950 U	880 U	1000 U	880 U	1000 U	940 U	840 U
Phenanthrene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Anthracene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Carbazole	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Di-n-butylphthalate	ug/kg	33 J	63 J	420 U	12 J	15 J	390 U	350 U
Fluoranthene	ug/kg	390 U	360 U	420 U	360 U	24 J	390 U	350 U
Pyrene	ug/kg	390 U	360 U	420 U	360 U	16 J	390 U	350 U
Butylbenzylphthalate	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
3,3'-Dichlorobenzidine	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzo(a)anthracene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Chrysene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
bis(2-Ethylhexyl)phthalate	ug/kg	500	440	400 J	360 U	420 U	390 U	350 U
Di-n-octylphthalate	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzo(b)fluoranthene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzo(k)fluoranthene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzo(a)pyrene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Indeno(1,2,3-cd)pyrene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Dibenz(a,h)anthracene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U
Benzo(g,h,i)perylene	ug/kg	390 U	360 U	420 U	360 U	420 U	390 U	350 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/19/93 GB34-1 177525	SOIL OB 6-8 01/19/93 GB34-4 177528	SOIL OB 0-2 01/20/93 GB35-1 177529	SOIL OB 2-4 01/20/93 GB35-2 177530	SOIL OB 0-2 01/20/93 GB35-6 177531 DUP GB35-1	SOIL OB 0-2 01/20/93 GB36-1 177532	SOIL OB 2-4 01/20/93 GB36-2 177533
Pesticides/PCBs								
alpha-BHC	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
beta-BHC	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
delta-BHC	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
gamma-BHC (Lindane)	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Heptachlor	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Aldrin	ug/kg	2 U	2.5 J	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Heptachlor epoxide	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Endosulfan I	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Dieldrin	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
4,4'-DDE	ug/kg	12	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
Endrin	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
Endosulfan II	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
4,4'-DDD	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
Endosulfan sulfate	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
4,4'-DDT	ug/kg	5.3	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
Methoxychlor	ug/kg	20 U	19 U	21 U	19 U	22 U	20 U	18 U
Endrin ketone	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
Endrin aldehyde	ug/kg	3.9 U	3.6 U	4.2 U	3.6 U	4.2 U	3.9 U	3.5 U
alpha-Chlordane	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
gamma-Chlordane	ug/kg	2 U	1.9 U	2.1 U	1.9 U	2.2 U	2 U	1.8 U
Toxaphene	ug/kg	200 U	190 U	210 U	190 U	220 U	200 U	180 U
Aroclor-1016	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U
Aroclor-1221	ug/kg	80 U	74 U	85 U	74 U	85 U	79 U	71 U
Aroclor-1232	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U
Aroclor-1242	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U
Aroclor-1248	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U
Aroclor-1254	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U
Aroclor-1260	ug/kg	39 U	36 U	42 U	36 U	42 U	39 U	35 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	6-8	0-2	2-4	0-2	0-2	2-4
	DATE	01/19/93	01/19/93	01/20/93	01/20/93	01/20/93	01/20/93	01/20/93
	ES ID	GB34-1	GB34-4	GB35-1	GB35-2	GB35-6	GB36-1	GB36-2
	LAB ID	177525	177526	177529	177530	177531	177532	177533
	UNITS					DUP GB35-1		
Explosives								
HMX	ug/kg	120 U	120 U	75 J	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	68 J	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	62 J	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	16100	11300	18000	17800	16200	18100	16200
Antimony	mg/kg	10.1 J	5.8 UJ	5.8 UJ	6.8 J	6.3 J	5.9 J	5.8 UJ
Arsenic	mg/kg	11.8	5.5	6.2	7.7	5.3	4.6	9.7
Barium	mg/kg	1050	87.3	93.6	61.7	61.7	74.8	50.8
Beryllium	mg/kg	0.71	0.52 J	0.85	0.74	0.77	0.77	0.65
Cadmium	mg/kg	1.3	0.33 U	0.33 U	0.31 U	0.35 U	0.3 U	0.33 U
Calcium	mg/kg	9790	68200	1590	17700	1370	1660	22900
Chromium	mg/kg	25.4	19.2	23.5	29.3	25.1	24.8	27.4
Cobalt	mg/kg	11.2	11	9.4	16.3	10.3	20.4	13.2
Copper	mg/kg	482	29	17.5	24.5	17.2	17.7	17.5
Iron	mg/kg	26900	22100	25200	34200	30800	26100	30700
Lead	mg/kg	1350	22.8	14.4	5.4	19.1	12.7	8.2
Magnesium	mg/kg	5810	8990	3850	7790	4490	4490	7150
Manganese	mg/kg	501	415	701	646	775	426	507
Mercury	mg/kg	0.24 J	0.02 J	0.06 J	0.03 U	0.07 J	0.02 J	0.02 J
Nickel	mg/kg	32.4	37.6	26.3	48.7	28.3	28.3	42.8
Potassium	mg/kg	1710	1580	1110	1110	975	1400	1100
Selenium	mg/kg	0.26 UJ	0.24 UJ	0.23 UJ	0.23 UJ	0.21 UJ	0.2 UJ	0.18 UJ
Silver	mg/kg	0.38 U	0.34 U	0.34 U	0.32 U	0.36 U	0.31 U	0.34 U
Sodium	mg/kg	89.5 J	154 J	35.6 J	77.5 J	34.8 J	46.6 J	97.6 J
Thallium	mg/kg	0.62 U	0.56 U	0.55 U	0.54 U	0.5 U	0.46 U	0.43 U
Vanadium	mg/kg	25.4	17	27.1	22.3	26.1	27.8	19.7
Zinc	mg/kg	312	75.5	55	83.4	53.1	59.2	74.1
Cyanide	mg/kg	0.72 U	0.71 U	0.76 U	0.71 U	0.82 U	0.7 U	0.68 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	4-5.5	0-2	0-2	2-4	0-2	4-6
	DATE	01/11/93	01/11/93	01/11/93	01/11/93	01/11/93	01/08/93	01/08/93
	ES ID	MW36-1	MW36-3	MW36-6	MW37-1	MW37-2	MW36-1	MW36-3
	LAB ID	177145	177147	177148	177149	177150	177065	177067
	UNITS			DUP MW36-1				
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Bromomethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Vinyl Chloride	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Chloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Methylene Chloride	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Acetone	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Carbon Disulfide	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,1-Dichloroethene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,1-Dichloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Chloroform	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
2-Butanone	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,1,1-Trichloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Carbon Tetrachloride	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Vinyl Acetate	ug/kg							
Bromodichloromethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,2-Dichloropropane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
cis-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Trichloroethene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Dibromochloromethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,1,2-Trichloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Benzene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
trans-1,3-Dichloropropene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Bromoform	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
4-Methyl-2-Pentanone	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
2-Hexanone	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Tetrachloroethene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Toluene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Chlorobenzene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Ethylbenzene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Styrene	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
Xylene (total)	ug/kg	12 U	11 U	12 U	12 U	12 U	12 U	11 U
				DUP MW36-1				

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/11/93 MW36-1 177145	SOIL OB 4-5.5 01/11/93 MW36-3 177147	SOIL OB 0-2 01/11/93 MW36-6 177148 DUP MW36-1	SOIL OB 0-2 01/11/93 MW37-1 177149	SOIL OB 2-4 01/11/93 MW37-2 177150	SOIL OB 0-2 01/08/93 MW38-1 177065	SOIL OB 4-6 01/08/93 MW38-3 177067
Semivolatiles								
Phenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
bis(2-Chloroethyl) ether	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2-Chlorophenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
1,3-Dichlorobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
1,4-Dichlorobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzyl Alcohol	ug/kg							
1,2-Dichlorobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2-Methylphenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,2'-oxybis(1-Chloropropane)	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
4-Methylphenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
N-Nitroso-di-n-propylamine	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Hexachloroethane	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Nitrobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Isophorone	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2-Nitrophenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4-Dimethylphenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzoic acid	ug/kg							
bis(2-Chloroethoxy) methane	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4-Dichlorophenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
1,2,4-Trichlorobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Naphthalene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
4-Chloroaniline	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Hexachlorobutadiene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
4-Chloro-3-methylphenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2-Methylnaphthalene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Hexachlorocyclopentadiene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4,6-Trichlorophenol	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4,5-Trichlorophenol	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
2-Chloronaphthalene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2-Nitroaniline	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
Dimethylphthalate	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Acenaphthylene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,6-Dinitrotoluene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
3-Nitroaniline	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
Acenaphthene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4-Dinitrophenol	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
4-Nitrophenol	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
Dibenzofuran	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
2,4-Dinitrotoluene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Diethylphthalate	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	55 J
4-Chlorophenyl-phenylether	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Fluorene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
4-Nitroaniline	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
4,6-Dinitro-2-methylphenol	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
N-Nitrosodiphenylamine	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
4-Bromophenyl-phenylether	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Hexachlorobenzene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Pentachlorophenol	ug/kg	880 U	860 U	970 U	910 U	940 U	980 U	930 U
Phenanthrene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Anthracene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Carbazole	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Di-n-butylphthalate	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Fluoranthene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Pyrene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Butylbenzylphthalate	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
3,3'-Dichlorobenzidine	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzo(a)anthracene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Chrysene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
bis(2-Ethylhexyl)phthalate	ug/kg	290 J	220 J	520	340 J	540	420 U	600 U
Di-n-octylphthalate	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzo(b)fluoranthene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzo(k)fluoranthene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzo(a)pyrene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Indeno(1,2,3-cd)pyrene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Dibenz(a,h)anthracene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U
Benzo(g,h,i)perylene	ug/kg	360 U	350 U	400 U	370 U	390 U	400 U	380 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	4-5.5	0-2	0-2	2-4	0-2	4-6
	DATE	01/11/93	01/11/93	01/11/93	01/11/93	01/11/93	01/08/93	01/08/93
	ES ID	MW36-1	MW36-3	MW36-6	MW37-1	MW37-2	MW38-1	MW38-3
	LAB ID	177145	177147	177148	177149	177150	177065	177067
	UNITS			DUP MW36-1				
Pesticides/PCBs								
alpha-BHC	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
beta-BHC	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
delta-BHC	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
gamma-BHC (Lindane)	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Heptachlor	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Aldrin	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Heptachlor epoxide	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Endosulfan I	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Dieldrin	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
4,4'-DDE	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
Endrin	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
Endosulfan II	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
4,4'-DDD	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
Endosulfan sulfate	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
4,4'-DDT	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
Methoxychlor	ug/kg	20 U	19 U	20 U	19 U	20 U	21 U	20 U
Endrin ketone	ug/kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
Endrin aldehyde	ug/Kg	3.8 U	3.6 U	4 U	3.8 U	3.9 U	4.1 U	3.8 U
alpha-Chlordane	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
gamma-Chlordane	ug/kg	2 U	1.9 U	2 U	1.9 U	2 U	2.1 U	2 U
Toxaphene	ug/kg	200 U	190 U	200 U	190 U	200 U	210 U	200 U
Aroclor-1016	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U
Aroclor-1221	ug/kg	77 U	73 U	80 U	76 U	79 U	83 U	77 U
Aroclor-1232	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U
Aroclor-1242	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U
Aroclor-1248	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U
Aroclor-1254	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U
Aroclor-1260	ug/kg	38 U	36 U	40 U	38 U	39 U	41 U	38 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	4-5.5	0-2	0-2	2-4	0-2	4-6
	DATE	01/11/93	01/11/93	01/11/93	01/11/93	01/11/93	01/08/93	01/08/93
	ES ID	MW36-1	MW36-3	MW36-6	MW37-1	MW37-2	MW38-1	MW38-3
	LAB ID	177145	177147	177148	177149	177150	177065	177067
	UNITS			DUP MW36-1				
Explosives								
HMX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	17900	12700	17900	12600	15400	25100	16700
Antimony	mg/kg	6.4 UJ	5.7 UJ	6.4 UJ	5.6 UJ	5.9 UJ	6.2 UJ	6.2 UJ
Arsenic	mg/kg	5.2 J	2.9 J	5.4 J	4.9 J	6 J	4.1 J	4 J
Barium	mg/kg	118 J	46.9 J	95.6 J	58.6 J	115 J	118 J	85.9 J
Beryllium	mg/kg	0.94	0.59	0.81	0.58	0.83	1.5	0.85
Cadmium	mg/kg	0.36 U	0.33 U	0.37 U	0.32 U	0.34 U	0.35 U	0.35 U
Calcium	mg/kg	19800	4170	9720	6080	11100	2690	10000
Chromium	mg/kg	27.5 J	23.3 J	24.9 J	17.8 J	25.1 J	34.6 J	27.7 J
Cobalt	mg/kg	13.6	18.6	8.2	12.3	11.2	15.9	16.3
Copper	mg/kg	30.3 J	19.2 J	26.8 J	20.1 J	32 J	40.8 J	42 J
Iron	mg/kg	33700	27500	32800	23300	28900	32800	31100
Lead	mg/kg	14.5	20.2	15.9	15.7	17.8	18.9	38.6
Magnesium	mg/kg	6820	5750	5040	3770	7480	6450	6240
Manganese	mg/kg	606	540	311	437	647	297	379
Mercury	mg/kg	0.04 J	0.02 J	0.07 J	0.08 J	0.03 J	0.06 J	0.04 J
Nickel	mg/kg	46.1 J	43.3 J	28.2 J	23.2 J	42.7 J	49.8 J	50.4 J
Potassium	mg/kg	1350	754	1220	827	1180	2950	1800
Selenium	mg/kg	0.19 UJ	0.19 UJ	0.22 UJ	0.22 UJ	0.23 UJ	0.21 UJ	0.21 UJ
Silver	mg/kg	0.38 J	0.34 U	0.38 U	0.33 U	0.49 J	0.36 U	0.37 U
Sodium	mg/kg	58.2 J	31.6 U	35.2 U	30.6 U	44.4 J	64.3 J	67.4 J
Thallium	mg/kg	0.45 U	0.45 U	0.53 U	0.52 U	0.54 U	0.49 U	0.5 U
Vanadium	mg/kg	29.2 J	16.2 J	30.6 J	20.9 J	24.3 J	38.1 J	24.8 J
Zinc	mg/kg	97.6 J	34.7 J	58 J	63.3 J	87 J	90.6 J	120 J
Cyanide	mg/kg	0.58 U	0.58 U	0.6 U	0.58 U	2.6	0.62 U	0.58 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/07/93 MW39-1 177068	SOIL OB 4-6 01/07/93 MW39-3 177070	SOIL OB 0-2 01/07/93 MW40-1 177071	SOIL OB 2-4 01/07/93 MW40-2 177072	SOIL OB 0-2 01/12/93 MW41-1 177192	SOIL OB 2-4 01/12/93 MW41-2 177193
Volatile Organic Compounds							
Chloromethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Bromomethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Vinyl Chloride	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Chloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Methylene Chloride	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Acetone	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Carbon Disulfide	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,1-Dichloroethene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,1-Dichloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,2-Dichloroethene (total)	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Chloroform	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,2-Dichloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
2-Butanone	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,1,1-Trichloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Carbon Tetrachloride	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Vinyl Acetate	ug/kg						
Bromodichloromethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,2-Dichloropropane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
cis-1,3-Dichloropropene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Trichloroethene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Dibromochloromethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,1,2-Trichloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Benzene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
trans-1,3-Dichloropropene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Bromoform	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
4-Methyl-2-Pentanone	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
2-Hexanone	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Tetrachloroethene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
1,1,2,2-Tetrachloroethane	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Toluene	ug/kg	13 U	12 U	12 U	12 U	13 U	3 J
Chlorobenzene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Ethylbenzene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Styrene	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U
Xylene (total)	ug/kg	13 U	12 U	12 U	12 U	13 U	12 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	4-6	0-2	2-4	0-2	2-4
	DATE	01/07/93	01/07/93	01/07/93	01/07/93	01/12/93	01/12/93
	ES ID	MW39-1	MW39-3	MW40-1	MW40-2	MW41-1	MW41-2
	LAB ID	177068	177070	177071	177072	177192	177193
	UNITS						
Semivolatiles							
Phenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
bis(2-Chloroethyl) ether	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2-Chlorophenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
1,3-Dichlorobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
1,4-Dichlorobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzyl Alcohol	ug/kg						
1,2-Dichlorobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2-Methylphenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,2'-oxybis(1-Chloropropane)	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
4-Methylphenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
N-Nitroso-di-n-propylamine	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Hexachloroethane	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Nitrobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Isophorone	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2-Nitrophenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4-Dimethylphenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzoic acid	ug/kg						
bis(2-Chloroethoxy) methane	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4-Dichlorophenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
1,2,4-Trichlorobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Naphthalene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
4-Chloroaniline	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Hexachlorobutadiene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
4-Chloro-3-methylphenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2-Methylnaphthalene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Hexachlorocyclopentadiene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4,6-Trichlorophenol	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4,5-Trichlorophenol	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
2-Chloronaphthalene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2-Nitroaniline	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
Dimethylphthalate	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Acenaphthylene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,6-Dinitrotoluene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
3-Nitroaniline	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
Acenaphthene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4-Dinitrophenol	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
4-Nitrophenol	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
Dibenzofuran	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
2,4-Dinitrotoluene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Diethylphthalate	ug/kg	50 J	370 U	18 J	18 J	440 U	20 J
4-Chlorophenyl-phenylether	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Fluorene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
4-Nitroaniline	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
4,6-Dinitro-2-methylphenol	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
N-Nitrosodiphenylamine	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
4-Bromophenyl-phenylether	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Hexachlorobenzene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Pentachlorophenol	ug/kg	1000 U	900 U	990 U	1000 U	1100 U	940 U
Phenanthrene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Anthracene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Carbazole	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Di-n-butylphthalate	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Fluoranthene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Pyrene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Butylbenzylphthalate	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
3,3'-Dichlorobenzidine	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzo(a)anthracene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Chrysene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
bis(2-Ethylhexyl)phthalate	ug/kg	850 U	380 U	640 U	560 U	440 U	240 J
Di-n-octylphthalate	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzo(b)fluoranthene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzo(k)fluoranthene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzo(a)pyrene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Dibenz(a,h)anthracene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U
Benzo(g,h,i)perylene	ug/kg	420 U	370 U	410 U	410 U	440 U	390 U

OB GROUNDS - PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/07/93 MW39-1 177068	SOIL OB 4-6 01/07/93 MW39-3 177070	SOIL OB 0-2 01/07/93 MW40-1 177071	SOIL OB 2-4 01/07/93 MW40-2 177072	SOIL OB 0-2 01/12/93 MW41-1 177192	SOIL OB 2-4 01/12/93 MW41-2 177193
Pesticides/PCBs							
alpha-BHC	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
beta-BHC	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
delta-BHC	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
gamma-BHC (Lindane)	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Heptachlor	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Aldrin	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Heptachlor epoxide	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Endosulfan I	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Dieldrin	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
4,4'-DDE	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
Endrin	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
Endosulfan II	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
4,4'-DDD	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
Endosulfan sulfate	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
4,4'-DDT	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
Methoxychlor	ug/kg	22 U	19 U	22 U	22 U	22 U	20 U
Endrin ketone	ug/kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
Endrin aldehyde	ug/Kg	4.3 U	3.7 U	4.2 U	4.2 U	4.4 U	3.9 U
alpha-Chlordane	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
gamma-Chlordane	ug/kg	2.2 U	1.9 U	2.2 U	2.2 U	2.2 U	2 U
Toxaphene	ug/kg	220 U	190 U	220 U	220 U	220 U	200 U
Aroclor-1016	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U
Aroclor-1221	ug/kg	88 U	76 U	85 U	85 U	88 U	78 U
Aroclor-1232	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U
Aroclor-1242	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U
Aroclor-1248	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U
Aroclor-1254	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U
Aroclor-1260	ug/kg	43 U	37 U	42 U	42 U	44 U	39 U

OB GROUNDS – PHASE II
GRID BORING SOILS
SUMMARY OF VALIDATED RESULTS

COMPOUND	MATRIX LOCATION DEPTH DATE ES ID LAB ID UNITS	SOIL OB 0-2 01/07/93 MW39-1 177068	SOIL OB 4-6 01/07/93 MW39-3 177070	SOIL OB 0-2 01/07/93 MW40-1 177071	SOIL OB 2-4 01/07/93 MW40-2 177072	SOIL OB 0-2 01/12/93 MW41-1 177192	SOIL OB 2-4 01/12/93 MW41-2 177193
Explosives							
HMX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U
Metals							
Aluminum	mg/kg	20200	14400	20200	17700	13700	16500
Antimony	mg/kg	6 UJ	5.2 UJ	6.3 UJ	6.2 UJ	6.7 UJ	6.4 UJ
Arsenic	mg/kg	4.6 J	4.7 J	5.1 J	5.1 J	3.5 J	5 J
Barium	mg/kg	147 J	60.2 J	152 J	78 J	53 J	79.2 J
Beryllium	mg/kg	1	0.68	0.99	0.89	0.76	0.81
Cadmium	mg/kg	0.34 U	0.3 U	0.36 U	0.35 U	0.38 U	0.36 U
Calcium	mg/kg	4700	2330	3650	3420	1170	9540
Chromium	mg/kg	28.4 J	26.8 J	32.6 J	33.1 J	20.7 J	29.1 J
Cobalt	mg/kg	12.8	13.9	18.2	15.6	15.7	15.2
Copper	mg/kg	35.3 J	54.7 J	57.1 J	72.1 J	24.2 J	42.1 J
Iron	mg/kg	31400	30600	38000	37700	27000	34800
Lead	mg/kg	39	34.1	42	42	30.8	32.2
Magnesium	mg/kg	5260	6170	6620	7400	3990	7000
Manganese	mg/kg	574	395	1480	611	497	423
Mercury	mg/kg	0.36	0.03 U	0.44	0.05 J	0.13	0.07 J
Nickel	mg/kg	36.9 J	57 J	76 J	73.9 J	26.4 J	59.5 J
Potassium	mg/kg	1920	1580	2130	1810	770	1020
Selenium	mg/kg	0.52 J	0.94 J	0.27 J	0.25 UJ	0.23 UJ	0.19 UJ
Silver	mg/kg	0.35 U	0.31 U	0.39 J	0.4 J	0.4 U	0.36 U
Sodium	mg/kg	48.4 J	52.1 J	44 J	67.7 J	37 U	35.7 J
Thallium	mg/kg	0.55 U	0.56 U	0.56 J	0.6 U	0.55 U	0.48 U
Vanadium	mg/kg	33.4 J	23.4 J	35.2 J	32.7 J	22.7 J	24.3 J
Zinc	mg/kg	91.6 J	74.8 J	99.3 J	114 J	54.5 J	78.7 J
Cyanide	mg/kg	0.67 U	0.57 U	0.63 U	0.65 U	0.78 U	0.71 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS -- PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	PAD-A	PAD-A	PAD-A	PAD-A	PAD-B	PAD-B
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-2'	0-6"	0-6"
	DATE	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91	12/11/91	12/11/91
	ES ID	PB-A-1	PB-A-1A	PB-A-2	PB-A-2A	PB-A-2ARE	PB-B-1-1	PB-B-1-1RE
	LAB ID	151145	151146	151147	151148	151148	150783	150783
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Bromomethane	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Vinyl Chloride	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Chloroethane	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Methylene Chloride	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Acetone	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Carbon Disulfide	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,1-Dichloroethene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,1-Dichloroethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,2-Dichloroethene (total)	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Chloroform	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,2-Dichloroethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
2-Butanone	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
1,1,1-Trichloroethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Carbon Tetrachloride	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Vinyl Acetate	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Bromodichloromethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,2-Dichloropropane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
cis-1,3-Dichloropropene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Trichloroethene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Dibromochloromethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,1,2-Trichloroethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Benzene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
trans-1,3-Dichloropropene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Bromoform	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
4-Methyl-2-Pentanone	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
2-Hexanone	ug/Kg	11 U	11 U	13 U	13 U J	13 U J	11 U J	10 U J
Tetrachloroethene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
1,1,2,2-Tetrachloroethane	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Toluene	ug/Kg	5 U	2 J	6 U	7 U J	7 U J	6 U J	5 U J
Chlorobenzene	ug/Kg	5 U	4 J	6 U	7 U J	7 U J	6 U J	5 U J
Ethylbenzene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Styrene	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J
Xylene (total)	ug/Kg	5 U	6 U	6 U	7 U J	7 U J	6 U J	5 U J

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	PAD-A	PAD-A	PAD-A	PAD-A	PAD-B	PAD-B
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-2'	0-6"	0-6"
	DATE	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91	12/11/91	12/11/91
	ES ID	PB-A-1	PB-A-1A	PB-A-2	PB-A-2A	PB-A-2ARE	PB-B-1-1	PB-B-1-1RE
	LAB ID	151145	151146	151147	151148	151148	150783	150783
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
bis(2-Chloroethyl) ether	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2-Chlorophenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
1,3-Dichlorobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
1,4-Dichlorobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Benzyl Alcohol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
1,2-Dichlorobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2-Methylphenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg	730 U	710 U	720 U	750 U		960 U	
4-Methylphenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
N-Nitroso-di-n-propylamine	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Hexachloroethane	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Nitrobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Isophorone	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2-Nitrophenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4-Dimethylphenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Benzoic acid	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
bis(2-Chloroethoxy) methane	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4-Dichlorophenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
1,2,4-Trichlorobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Naphthalene	ug/Kg	730 U	710 U	720 U	750 U		160 J	
4-Chloroaniline	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Hexachlorobutadiene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
4-Chloro-3-methylphenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2-Methylnaphthalene	ug/Kg	88 J	67 J	67 J	100 J		960 U	
Hexachlorocyclopentadiene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4,6-Trichlorophenol	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4,5-Trichlorophenol	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
2-Chloronaphthalene	ug/Kg	730 U	710 U	720 U	750 U		130 J	
2-Nitroaniline	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
Dimethylphthalate	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Acenaphthylene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,6-Dinitrotoluene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
3-Nitroaniline	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
Acenaphthene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4-Dinitrophenol	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
4-Nitrophenol	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
Dibenzofuran	ug/Kg	730 U	710 U	720 U	750 U		960 U	
2,4-Dinitrotoluene	ug/Kg	470 J	310 J	860 J	1500 J		960 U	
Diethylphthalate	ug/Kg	730 U	250 J	720 U	750 U		960 U	
4-Chlorophenyl-phenylether	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Fluorene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
4-Nitroaniline	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
4,6-Dinitro-2-methylphenol	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
N-Nitrosodiphenylamine	ug/Kg	730 U	710 U	720 U	750 U		960 U	
4-Bromophenyl-phenylether	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Hexachlorobenzene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Pentachlorophenol	ug/Kg	3500 U	3400 U	3500 U	3600 U		4700 U	
Phenanthrene	ug/Kg	79 J	73 J	78 J	80 J		960 U	
Anthracene	ug/Kg	730 U	710 U	720 U	750 U		960 U	
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	730 U	160 J	720 U	750 U		960 U	
Fluoranthene	ug/Kg	730 U	100 J	720 U	750 U		960 U	
Pyrene	ug/Kg	730 U	86 J	720 U	750 U		960 U	
Butylbenzylphthalate	ug/Kg	730 U	140 J	720 U	750 U		960 U	
3,3'-Dichlorobenzidine	ug/Kg	1500 U	1400 U	1400 U	1500 U		1900 U	
Benzo(a)anthracene	ug/Kg	730 U	120 J	720 U	750 U		960 U	
Chrysene	ug/Kg	730 U	120 J	720 U	750 U		960 U	
bis(2-Ethylhexyl)phthalate	ug/Kg	730 U	190 J	720 U	750 U		960 U	
Di-n-octylphthalate	ug/Kg	730 U	140 J	720 U	750 U		960 U	
Benzo(b)fluoranthene	ug/Kg	730 U	130 J	720 U	750 U		960 U	
Benzo(k)fluoranthene	ug/Kg	730 U	120 J	720 U	750 U		960 U	
Benzo(a)pyrene	ug/Kg	730 U	120 J	720 U	750 U		960 U	
Indeno(1,2,3-cd)pyrene	ug/Kg	730 U	87 J	720 U	750 U		960 U	
Dibenz(a,h)anthracene	ug/Kg	730 U	74 J	720 U	750 U		960 U	
Benzo(g,h,i)perylene	ug/Kg	730 U	86 J	720 U	750 U		960 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	PAD-A	PAD-A	PAD-A	PAD-A	PAD-B	PAD-B
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-2'	0-6"	0-6"
	DATE	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91	12/11/91	12/11/91
	ES ID	PB-A-1	PB-A-1A	PB-A-2	PB-A-2A	PB-A-2ARE	PB-B-1-1	PB-B-1-1RE
	LAB ID	151145	151146	151147	151148	151148	150783	150783
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	88 U	52 U	17 U	18 U		180 U	
beta-BHC	ug/kg	88 U	52 U	17 U	18 U		180 U	
delta-BHC	ug/kg	88 U	52 U	17 U	18 U		180 U	
gamma-BHC (Lindane)	ug/kg	88 U	52 U	17 U	18 U		180 U	
Heptachlor	ug/kg	88 U	52 U	17 U	18 U		180 U	
Aldrin	ug/kg	88 U	52 U	17 U	18 U		180 U	
Heptachlor epoxide	ug/kg	88 U	52 U	17 U	18 U		180 U	
Endosulfan I	ug/kg	88 U	52 U	17 U	18 U		180 U	
Dieldrin	ug/kg	180 U	100 U	35 U	36 U		350 U	
4,4'-DDE	ug/kg	140 J	100 J	21 J	28 J		350 U	
Endrin	ug/kg	180 U	100 U	35 U	36 U		350 U	
Endosulfan II	ug/kg	180 U	100 U	35 U	36 U		350 U	
4,4'-DDD	ug/kg	180 U	100 U	35 U	36 U		350 U	
Endosulfan sulfate	ug/kg	180 U	100 U	35 U	36 U		350 U	
4,4'-DDT	ug/kg	180 U	100 U	35 U	36 U		350 U	
Methoxychlor	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Endrin ketone	ug/kg	180 U	100 U	35 U	36 U		350 U	
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	880 U	520 U	170 U	180 U		1800 U	
gamma-Chlordane	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Toxaphene	ug/kg	1800 U	1000 U	350 U	360 U		3500 U	
Aroclor-1016	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Aroclor-1221	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Aroclor-1232	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Aroclor-1242	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Aroclor-1248	ug/kg	880 U	520 U	170 U	180 U		1800 U	
Aroclor-1254	ug/kg	1800 U	1000 U	350 U	360 U		3500 U	
Aroclor-1260	ug/kg	1800 U	1000 U	350 U	360 U		3500 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	PAD-A	PAD-A	PAD-A	PAD-A	PAD-B	PAD-B
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-2'	0-6"	0-6"
	DATE	12/16/91	12/16/91	12/16/91	12/16/91	12/16/91	12/11/91	12/11/91
	ES ID	PB-A-1	PB-A-1A	PB-A-2	PB-A-2A	PB-A-2ARE	PB-B-1-1	PB-B-1-1RE
	LAB ID	151145	151146	151147	151148	151148	150783	150783
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U	1000 U	1000 U	1000 U		1000 U	
RDX	ug/Kg	120 U	120 U	120 U	120 U		120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
Tetryl	ug/Kg	400 U	400 U	400 U	400 U		400 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2,4-Dinitrotoluene	ug/Kg	1400	1500	1600	600		120 U	
Metals								
Aluminum	mg/kg	14800	15000	15800	13300		15700	
Antimony	mg/kg	15.3	5.7 J	18.7	13.5		9.9 U R	
Arsenic	mg/kg	4	4.4	10.3	7.1		8 J	
Barium	mg/kg	1290	1910	1540	1820		14700 J	
Beryllium	mg/kg	0.72 R	0.74 R	0.6 R	0.54 R		0.74 R	
Cadmium	mg/kg	3.3	2.6	9.8	5.9		9.5	
Calcium	mg/kg	37200	30500	36200	17700		24300 J	
Chromium	mg/kg	26.1	25.9	46.4	35.9		47.7	
Cobalt	mg/kg	15.3	13.5	15.5	11.2		15.5	
Copper	mg/kg	962	1660	3160	2090		1150 J	
Iron	mg/kg	41300	26300	49700	43900		48100 J	
Lead	mg/kg	1980	1560	2530	1220		231 J	
Magnesium	mg/kg	8450	8480	9370	8760		7010	
Manganese	mg/kg	447	417	1620 J	502 J		693	
Mercury	mg/kg	0.13 J	0.04 J	0.04 U	0.05 J		0.07 J	
Nickel	mg/kg	57.7	46.4	53.2	42.3		64.8	
Potassium	mg/kg	1280	1450	3160	1810		3150	
Selenium	mg/kg	0.52 U	0.53 U	0.19 J	0.21 J		0.32 J	
Silver	mg/kg	0.99 U	0.87 U	0.86 U	0.94 U		2.3	
Sodium	mg/kg	64.4 J	63.4 J	331 J	141 J		337 J	
Thallium	mg/kg	0.33 U	0.34 U	0.34 U	0.36 U		0.4 U	
Vanadium	mg/kg	16.2	18.6	21.9	16.7		36.2	
Zinc	mg/kg	222	350	2150	926		2610 J	
Cyanide	mg/kg	0.49 U	0.64 U	0.58 U	0.62 U		0.61 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-B	PAD-B	PAD C	PAD C	PAD C	PAD C	PAD C
	DEPTH	6-8'	6-8'	0-6"	0-6"	0-6"	2-4'	2-4'
	DATE	12/11/91	12/11/91	01/07/92	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBB-1-5	PBB-1-5RE	PBC-1-1	PBC-1-1A	PBC-1-1ARE	PBC-1-3	PBC-1-3DL
	LAB ID	150787	150787	151999	152000	152000	152003	152003
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Bromomethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Vinyl Chloride	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Chloroethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Methylene Chloride	ug/Kg	6 U J	6 U J	8 U J	6 U J	5 U J	6 U R	28 U
Acetone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Carbon Disulfide	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	2 R	28 U
1,1-Dichloroethene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,1-Dichloroethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,2-Dichloroethene (total)	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Chloroform	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,2-Dichloroethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
2-Butanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
1,1,1-Trichloroethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Carbon Tetrachloride	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Vinyl Acetate	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Bromodichloromethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,2-Dichloropropane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
cis-1,3-Dichloropropene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Trichloroethene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Dibromochloromethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,1,2-Trichloroethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Benzene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
trans-1,3-Dichloropropene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Bromoform	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
4-Methyl-2-Pentanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
2-Hexanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U R	56 U
Tetrachloroethene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Toluene	ug/Kg	6 U J	3 J	5 U J	6 U J	5 U J	6 U R	28 U
Chlorobenzene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Ethylbenzene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Styrene	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U
Xylene (total)	ug/Kg	6 U J	6 U J	5 U J	6 U J	5 U J	6 U R	28 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-B	PAD-B	PAD C	PAD C	PAD C	PAD C	PAD C
	DEPTH	6-8'	6-8'	0-6"	0-6"	0-6"	2-4'	2-4'
	DATE	12/11/91	12/11/91	01/07/92	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBB-1-5	PBB-1-5RE	PBC-1-1	PBC-1-1A	PBC-1-1ARE	PBC-1-3	PBC-1-3DL
	LAB ID	150787	150787	151999	152000	152000	152003	152003
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	740 U		710 U	710 U			
bis(2-Chloroethyl) ether	ug/Kg	740 U		710 U	710 U			
2-Chlorophenol	ug/Kg	740 U		710 U	710 U			
1,3-Dichlorobenzene	ug/Kg	740 U		710 U	710 U			
1,4-Dichlorobenzene	ug/Kg	740 U		710 U	710 U			
Benzyl Alcohol	ug/Kg	740 U		710 U	710 U			
1,2-Dichlorobenzene	ug/Kg	740 U		710 U	710 U			
2-Methylphenol	ug/Kg	740 U		710 U	710 U			
2,2'-oxybis(1-Chloropropane)	ug/Kg	740 U		710 U	710 U			
4-Methylphenol	ug/Kg	740 U		710 U	710 U			
N-Nitroso-di-n-propylamine	ug/Kg	740 U		710 U	710 U			
Hexachloroethane	ug/Kg	740 U		710 U	710 U			
Nitrobenzene	ug/Kg	740 U		710 U	710 U			
Isophorone	ug/Kg	740 U		710 U	710 U			
2-Nitrophenol	ug/Kg	740 U		710 U	710 U			
2,4-Dimethylphenol	ug/Kg	740 U		710 U	710 U			
Benzoic acid	ug/Kg	3600 U		3400 U	3400 U			
bis(2-Chloroethoxy) methane	ug/Kg	740 U		710 U	710 U			
2,4-Dichlorophenol	ug/Kg	740 U		710 U	710 U			
1,2,4-Trichlorobenzene	ug/Kg	740 U		710 U	710 U			
Naphthalene	ug/Kg	740 U		710 U	710 U			
4-Chloroaniline	ug/Kg	740 U		710 U	710 U			
Hexachlorobutadiene	ug/Kg	740 U		710 U	710 U			
4-Chloro-3-methylphenol	ug/Kg	740 U		710 U	710 U			
2-Methylnaphthalene	ug/Kg	740 U		710 U	710 U			
Hexachlorocyclopentadiene	ug/Kg	740 U		710 U	710 U			
2,4,6-Trichlorophenol	ug/Kg	740 U		710 U	710 U			
2,4,5-Trichlorophenol	ug/Kg	3600 U		3400 U	3400 U			
2-Chloronaphthalene	ug/Kg	740 U		710 U	710 U			
2-Nitroaniline	ug/Kg	3600 U		3400 U	3400 U			
Dimethylphthalate	ug/Kg	740 U		710 U	710 U			
Acenaphthylene	ug/Kg	740 U		710 U	710 U			
2,6-Dinitrotoluene	ug/Kg	740 U		710 U	710 U			
3-Nitroaniline	ug/Kg	3600 U		3400 U	3400 U			
Acenaphthene	ug/Kg	740 U		710 U	710 U			
2,4-Dinitrophenol	ug/Kg	3600 U		3400 U	3400 U			
4-Nitrophenol	ug/Kg	3600 U		3400 U	3400 U			
Dibenzofuran	ug/Kg	740 U		710 U	710 U			
2,4-Dinitrotoluene	ug/Kg	740 U		710 U	710 U			
Diethylphthalate	ug/Kg	740 U		710 U	710 U			
4-Chlorophenyl-phenylether	ug/Kg	740 U		710 U	710 U			
Fluorene	ug/Kg	740 U		710 U	710 U			
4-Nitroaniline	ug/Kg	3600 U		3400 U	3400 U			
4,6-Dinitro-2-methylphenol	ug/Kg	3600 U		3400 U	3400 U			
N-Nitrosodiphenylamine	ug/Kg	740 U		710 U	710 U			
4-Bromophenyl-phenylether	ug/Kg	740 U		710 U	710 U			
Hexachlorobenzene	ug/Kg	740 U		710 U	710 U			
Pentachlorophenol	ug/Kg	3600 U		3400 U	3400 U			
Phenanthrene	ug/Kg	740 U		710 U	710 U			
Anthracene	ug/Kg	740 U		710 U	710 U			
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	740 U		710 U	710 U			
Fluoranthene	ug/Kg	740 U		710 U	710 U			
Pyrene	ug/Kg	740 U		710 U	710 U			
Butylbenzylphthalate	ug/Kg	740 U		710 U	710 U			
3,3'-Dichlorobenzidine	ug/Kg	1500 U		1400 U	1400 U			
Benzo(a)anthracene	ug/Kg	740 U		710 U	710 U			
Chrysene	ug/Kg	740 U		710 U	710 U			
bis(2-Ethylhexyl)phthalate	ug/Kg	740 U		710 U	710 U			
Di-n-octylphthalate	ug/Kg	740 U		710 U	710 U			
Benzo(b)fluoranthene	ug/Kg	740 U		710 U	710 U			
Benzo(k) fluoranthene	ug/Kg	740 U		710 U	710 U			
Benzo(a)pyrene	ug/Kg	740 U		710 U	710 U			
Indeno(1,2,3-cd)pyrene	ug/Kg	740 U		710 U	710 U			
Dibenz(a,h)anthracene	ug/Kg	740 U		710 U	710 U			
Benzo(g,h,i)perylene	ug/Kg	740 U		710 U	710 U			

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-B	PAD-B	PAD C	PAD C	PAD C	PAD C	PAD C
	DEPTH	6-8'	6-8'	0-6"	0-6"	0-6"	2-4'	2-4'
	DATE	12/11/91	12/11/91	01/07/92	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBB-1-5	PBB-1-5RE	PBC-1-1	PBC-1-1A	PBC-1-1ARE	PBC-1-3	PBC-1-3DL
	LAB ID	150787	150787	151999	152000	152000	152003	152003
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U		17 U	17 U			
beta-BHC	ug/kg	18 U		17 U	17 U			
delta-BHC	ug/kg	18 U		17 U	17 U			
gamma-BHC (Lindane)	ug/kg	18 U		17 U	17 U			
Heptachlor	ug/kg	18 U		17 U	17 U			
Aldrin	ug/kg	18 U		17 U	17 U			
Heptachlor epoxide	ug/kg	18 U		17 U	17 U			
Endosulfan I	ug/kg	18 U		17 U	17 U			
Dieldrin	ug/kg	36 U		34 U	34 U			
4,4'-DDE	ug/kg	36 U		34 U	34 U			
Endrin	ug/kg	36 U		34 U	34 U			
Endosulfan II	ug/kg	36 U		34 U	34 U			
4,4'-DDD	ug/kg	36 U		34 U	34 U			
Endosulfan sulfate	ug/kg	36 U		34 U	34 U			
4,4'-DDT	ug/kg	36 U		34 U	34 U			
Methoxychlor	ug/kg	180 U		170 U	170 U			
Endrin ketone	ug/kg	36 U		34 U	34 U			
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	180 U		170 U	170 U			
gamma-Chlordane	ug/kg	180 U		170 U	170 U			
Toxaphene	ug/kg	360 U		340 U	340 U			
Aroclor-1016	ug/kg	180 U		170 U	170 U			
Aroclor-1221	ug/kg	180 U		170 U	170 U			
Aroclor-1232	ug/kg	180 U		170 U	170 U			
Aroclor-1242	ug/kg	180 U		170 U	170 U			
Aroclor-1248	ug/kg	180 U		170 U	170 U			
Aroclor-1254	ug/kg	360 U		340 U	340 U			
Aroclor-1260	ug/kg	360 U		340 U	340 U			

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-B	PAD-B	PAD C	PAD C	PAD C	PAD C	PAD C
	DEPTH	6-8'	6-8'	0-6"	0-6"	0-6"	2-4'	2-4'
	DATE	12/11/91	12/11/91	01/07/92	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBB-1-5	PBB-1-5RE	PBC-1-1	PBC-1-1A	PBC-1-1ARE	PBC-1-3	PBC-1-3DL
	LAB ID	150787	150787	151999	152000	152000	152003	152003
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U		1000 U	1000 U			
RDX	ug/Kg	120 U		120 U	120 U			
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U	120 U			
1,3-Dinitrobenzene	ug/Kg	120 U		120 U	120 U			
Tetryl	ug/Kg	400 U		400 U	400 U			
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U	120 U			
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U			
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U			
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U			
2,4-Dinitrotoluene	ug/Kg	120 U		120 U	120 U			
Metals								
Aluminum	mg/kg	16600		13100	15100			
Antimony	mg/kg	17.8 R		4.9 U J	5.2 U J			
Arsenic	mg/kg	5.6 J		6.1 J	5.3 J			
Barium	mg/kg	6040 J		102	166			
Beryllium	mg/kg	0.87 R		0.68 R	0.77 R			
Cadmium	mg/kg	5		4.5	3.6			
Calcium	mg/kg	33400 J		22400	27800			
Chromium	mg/kg	27		26 J	28.2 J			
Cobalt	mg/kg	11.6		12.7	13.8			
Copper	mg/kg	6890 J		93.7 J	1330 J			
Iron	mg/kg	39100 J		30400	36500			
Lead	mg/kg	3180 J		373	146			
Magnesium	mg/kg	13400		6330	7700			
Manganese	mg/kg	420		342	374			
Mercury	mg/kg	0.08		0.1 R	0.25 R			
Nickel	mg/kg	42.8		53 J	51.8 J			
Potassium	mg/kg	1850		1580 J	1930 J			
Selenium	mg/kg	0.2 J		0.45 J	0.4 J			
Silver	mg/kg	0.95 U		1.2	0.54 J			
Sodium	mg/kg	149 J		105 J	110 J			
Thallium	mg/kg	0.31 U		0.76 J	0.51 J			
Vanadium	mg/kg	21.6		19 R	20.6			
Zinc	mg/kg	712 J		613	1540			
Cyanide	mg/kg	0.52		0.6 U	0.55 U			

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD C	PAD C	PAD C	PAD C	OB	OB	OB
	DEPTH	2-4'	2-4'	2-4'	2-4'	0-2	0-2	0-2
	DATE	01/07/92	01/07/92	01/07/92	01/07/92	03/11/93	03/11/93	03/11/93
	ES ID	PBC-1-3A	PBC-1-3ADL	PBC-1-4	PBC-1-4A	PBC-2-1	PBC-2-2	PBC2-2RE
	LAB ID	152004	152004	152005	152006	179886	179887	179887R1
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
Bromomethane	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
Vinyl Chloride	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
Chloroethane	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
Methylene Chloride	ug/Kg	6 U J	950 U R			21	11 U	11 U
Acetone	ug/Kg	15 U J	1500 U R			11 U	11 U	11 U
Carbon Disulfide	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,1-Dichloroethene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,1-Dichloroethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,2-Dichloroethene (total)	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Chloroform	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,2-Dichloroethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
2-Butanone	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
1,1,1-Trichloroethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Carbon Tetrachloride	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Vinyl Acetate	ug/Kg	12 U J	1500 U R					
Bromodichloromethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,2-Dichloropropane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
cis-1,3-Dichloropropene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Trichloroethene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Dibromochloromethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,1,2-Trichloroethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Benzene	ug/Kg	2 J	180 R			11 U	11 U	11 U
trans-1,3-Dichloropropene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Bromoform	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
4-Methyl-2-Pentanone	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
2-Hexanone	ug/Kg	12 U J	1500 U R			11 U	11 U	11 U
Tetrachloroethene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Toluene	ug/Kg	2 J	740 U R			11 U	11 U	11 U
Chlorobenzene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Ethylbenzene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Styrene	ug/Kg	6 U J	740 U R			11 U	11 U	11 U
Xylene (total)	ug/Kg	6 U J	740 U R			11 U	11 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD C	PAD C	PAD C	PAD C	OB	OB	OB
	DEPTH	2-4'	2-4'	2-4'	2-4'	0-2	0-2	0-2
	DATE	01/07/92	01/07/92	01/07/92	01/07/92	03/11/93	03/11/93	03/11/93
	ES ID	PBC-1-3A	PBC-1-3ADL	PBC-1-4	PBC-1-4A	PBC-2-1	PBC-2-2	PBC2-2RE
	LAB ID	152004	152004	152005	152006	179886	179887	179887R1
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg			360 J	360 J	360 U	360 U	
bis(2-Chloroethyl) ether	ug/Kg			780 U	750 U	360 U	360 U	
2-Chlorophenol	ug/Kg			780 U	750 U	360 U	360 U	
1,3-Dichlorobenzene	ug/Kg			780 U	750 U	360 U	360 U	
1,4-Dichlorobenzene	ug/Kg			780 U	750 U	360 U	360 U	
Benzyl Alcohol	ug/Kg			780 U	750 U			
1,2-Dichlorobenzene	ug/Kg			780 U	750 U	360 U	360 U	
2-Methylphenol	ug/Kg			650 J	760	360 U	360 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg			760 U	750 U	360 U	360 U	
4-Methylphenol	ug/Kg			1100	1300	360 U	360 U	
N-Nitroso-di-n-propylamine	ug/Kg			780 U	750 U	360 U	360 U	
Hexachloroethane	ug/Kg			780 U	750 U	360 U	360 U	
Nitrobenzene	ug/Kg			780 U	750 U	360 U	360 U	
Isophorone	ug/Kg			780 U	750 U	360 U	360 U	
2-Nitrophenol	ug/Kg			760 U	750 U	360 U	360 U	
2,4-Dimethylphenol	ug/Kg			120 J	630 J	360 U	360 U	
Benzoic acid	ug/Kg			3800 U	3600 U			
bis(2-Chloroethoxy) methane	ug/Kg			780 U	750 U	360 U	360 U	
2,4-Dichlorophenol	ug/Kg			780 U	750 U	360 U	360 U	
1,2,4-Trichlorobenzene	ug/Kg			780 U	750 U	360 U	360 U	
Naphthalene	ug/Kg			84 J	80 J	55 J	59 J	
4-Chloroaniline	ug/Kg			780 U	750 U	360 U	360 U	
Hexachlorobutadiene	ug/Kg			780 U	750 U	360 U	360 U	
4-Chloro-3-methylphenol	ug/Kg			780 U	750 U	360 U	360 U	
2-Methylnaphthalene	ug/Kg			360 J	330 J	240 J	180 J	
Hexachlorocyclopentadiene	ug/Kg			780 U	750 U	360 U	360 U	
2,4,6-Trichlorophenol	ug/Kg			760 U	750 U	360 U	360 U	
2,4,5-Trichlorophenol	ug/Kg			3800 U	3600 U	870 U	880 U	
2-Chloronaphthalene	ug/Kg			780 U	750 U	360 U	360 U	
2-Nitroaniline	ug/Kg			3800 U	3800 U	870 U	880 U	
Dimethylphthalate	ug/Kg			780 U	750 U	360 U	360 U	
Acenaphthylene	ug/Kg			780 U	750 U	360 U	360 U	
2,6-Dinitrotoluene	ug/Kg			780 U	750 U	360 U	360 U	
3-Nitroaniline	ug/Kg			3800 U	3600 U	870 U	880 U	
Acenaphthene	ug/Kg			780 U	750 U	360 U	360 U	
2,4-Dinitrophenol	ug/Kg			3800 U	3600 U	870 U	880 U	
4-Nitrophenol	ug/Kg			3800 U	3600 U	870 U	880 U	
Dibenzofuran	ug/Kg			780 U	750 U	360 U	360 U	
2,4-Dinitrotoluene	ug/Kg			670 J	750 U	360 U	360 U	
Diethylphthalate	ug/Kg			760 U	750 U	360 U	360 U	
4-Chlorophenyl-phenylether	ug/Kg			780 U	750 U	360 U	360 U	
Fluorene	ug/Kg			780 U	750 U	360 U	360 U	
4-Nitroaniline	ug/Kg			3800 U	3600 U	870 U	880 U	
4,6-Dinitro-2-methylphenol	ug/Kg			3800 U	3600 U	870 U	880 U	
N-Nitrosodiphenylamine	ug/Kg			1100 J	510 J	360 U	360 U	
4-Bromophenyl-phenylether	ug/Kg			780 U	750 U	360 U	360 U	
Hexachlorobenzene	ug/Kg			780 U	750 U	360 U	360 U	
Pentachlorophenol	ug/Kg			3800 U	3600 U	870 U	880 U	
Phenanthrene	ug/Kg			220 J	200 J	100 J	88 J	
Anthracene	ug/Kg			780 U	750 U	360 U	360 U	
Carbazole	ug/Kg					360 U	360 U	
Di-n-butylphthalate	ug/Kg			780 U	750 U	360 U	360 U	
Fluoranthene	ug/Kg			780 U	750 U	20 J	19 J	
Pyrene	ug/Kg			780 U	750 U	120 J	97 J	
Butylbenzylphthalate	ug/Kg			780 U	750 U	360 U	360 U	
3,3'-Dichlorobenzidine	ug/Kg			1600 U	1500 U	360 U	360 U	
Benzo(a)anthracene	ug/Kg			780 U	750 U	77 J	56 J	
Chrysene	ug/Kg			780 U	750 U	160 J	130 J	
bis(2-Ethylhexyl)phthalate	ug/Kg			290 J	240 J	260 J	290 J	
Di-n-octylphthalate	ug/Kg			780 U	750 U	360 U	360 U	
Benzo(b)fluoranthene	ug/Kg			780 U	750 U	79 J	55 J	
Benzo(k) fluoranthene	ug/Kg			780 U	750 U	360 U	360 U	
Benzo(a)pyrene	ug/Kg			780 U	750 U	160 J	120 J	
Indeno(1,2,3-cd)pyrene	ug/Kg			780 U	750 U	63 J	46 J	
Dibenz(a,h)anthracene	ug/Kg			780 U	750 U	360 U	360 U	
Benzo(g,h,i)perylene	ug/Kg			780 U	750 U	350 J	320 J	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD C	PAD C	PAD C	PAD C	OB	OB	OB
	DEPTH	2-4'	2-4'	2-4'	2-4'	0-2	0-2	0-2
	DATE	01/07/92	01/07/92	01/07/92	01/07/92	03/11/93	03/11/93	03/11/93
	ES ID	PBC-1-3A	PBC-1-3ADL	PBC-1-4	PBC-1-4A	PBC-2-1	PBC-2-2	PBC2-2RE
	LAB ID	152004	152004	152005	152006	179886	179887	179887R1
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg			19 U	18 U	1.8 U	1.9 U	
beta-BHC	ug/kg			19 U	18 U	1.8 U	1.9 U	
delta-BHC	ug/kg			19 U	18 U	1.8 U	1.9 U	
gamma-BHC (Lindane)	ug/kg			19 U	18 U	1.8 U	1.9 U	
Heptachlor	ug/kg			19 U	18 U	1.8 U	1.9 U	
Aldrin	ug/kg			19 U	18 U	3.7	3.8	
Heptachlor epoxide	ug/kg			19 U	18 U	1.8 U	1.9 U	
Endosulfan I	ug/kg			19 U	18 U	1.8 U	2.6 J	
Dieldrin	ug/kg			38 U	36 U	3.6 U	3.6 U	
4,4'-DDE	ug/kg			38 U	36 U	3.6 U	3.6 U	
Endrin	ug/kg			38 U	36 U	3.6 U	3.6 U	
Endosulfan II	ug/kg			38 U	36 U	3.6 U	2.8 J	
4,4'-DDD	ug/kg			38 U	36 U	3.7	3.6 J	
Endosulfan sulfate	ug/kg			38 U	36 U	3.9	3.6 U	
4,4'-DDT	ug/kg			38 U	36 U	3.6 U	3.6 J	
Methoxychlor	ug/kg			190 U	180 U	18 U	19 U	
Endrin ketone	ug/kg			38 U	36 U	3.6 U	3.6 U	
Endrin aldehyde	ug/kg					3.6 U	4.5 J	
alpha-Chlordane	ug/kg			190 U	180 U	1.8 U	1.9 U	
gamma-Chlordane	ug/kg			190 U	180 U	1.8 U	1.9 U	
Toxaphene	ug/kg			380 U	380 U	180 U	190 U	
Aroclor-1016	ug/kg			190 U	180 U	36 U	36 U	
Aroclor-1221	ug/kg			190 U	180 U	72 U	74 U	
Aroclor-1232	ug/kg			190 U	180 U	36 U	36 U	
Aroclor-1242	ug/kg			190 U	180 U	36 U	36 U	
Aroclor-1248	ug/kg			190 U	180 U	36 U	36 U	
Aroclor-1254	ug/kg			380 U	380 U	36 U	36 U	
Aroclor-1260	ug/kg			380 U	360 U	36 U	36 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD C	PAD C	PAD C	PAD C	OB	OB	OB
	DEPTH	2-4'	2-4'	2-4'	2-4'	0-2	0-2	0-2
	DATE	01/07/92	01/07/92	01/07/92	01/07/92	03/11/93	03/11/93	03/11/93
	ES ID	PBC-1-3A	PBC-1-3ADL	PBC-1-4	PBC-1-4A	PBC-2-1	PBC-2-2	PBC2-2RE
	LAB ID	152004	152004	152005	152006	179886	179887	179887R1
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg			1000 U	1000 U	120 U	120 U	
RDX	ug/Kg			120 U	120 U	120 U	120 U	
1,3,5-Trinitrobenzene	ug/Kg			120 U	120 U	120 U	120 U	
1,3-Dinitrobenzene	ug/Kg			120 U	120 U	120 U	120 U	
Tetryl	ug/Kg			400 U	400 U	120 U	120 U	
2,4,6-Trinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	
2,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/Kg			120 U	120 U	180	820	
Metals								
Aluminum	mg/kg			16900	15700	13900	12600	
Antimony	mg/kg			6.4 U J	6 U J	4.6 J	3.5 UJ	
Arsenic	mg/kg			3.8 J	5 J	4.6	3.6	
Barium	mg/kg			911	566	124	102	
Beryllium	mg/kg			0.9 R	0.9 R	0.67 J	0.55 J	
Cadmium	mg/kg			3.9	3.3	1	5	
Calcium	mg/kg			23600	20600	22200	25200	
Chromium	mg/kg			32.1 J	27.3 J	28.3	31.6	
Cobalt	mg/kg			12.3	11.9	12.7	13.7	
Copper	mg/kg			522	281	2600	204	
Iron	mg/kg			37000	31800	29300	42600	
Lead	mg/kg			256	475	256	108	
Magnesium	mg/kg			7280	6210	7050	6580	
Manganese	mg/kg			475	562	322	377	
Mercury	mg/kg			0.16 R	0.13 R	0.04 U	0.04 U	
Nickel	mg/kg			46.9 J	42.1 J	50.6 J	66.1 J	
Potassium	mg/kg			2470 J	2030 J	1570	1420	
Selenium	mg/kg			0.21 J	0.34 J	0.22 UJ	0.29 J	
Silver	mg/kg			0.46 J	0.38 U	0.69 U	0.56 U	
Sodium	mg/kg			217 J	195 J	100 J	99.5 J	
Thallium	mg/kg			0.5 U	0.33 U	0.51 U	0.45 U	
Vanadium	mg/kg			23.9	23.1	20.1	18.7	
Zinc	mg/kg			578	440	579	2030	
Cyanide	mg/kg			0.71 U	0.6 U	0.65 U	0.65 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD D	PAD D	PAD D	PAD D
	DEPTH	0-2	0-2	0-2	0-6"	0-6"	0-6"	0-6"
	DATE	03/11/93	03/11/93	03/11/93	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBC-3-1	PBC-4-1	PBC-5-1	PBD-1-1	PBD-1-1RE	PBD-1-1A	PBD-1-1ARE
	LAB ID	179888	179889	179890	152009	152009	152010	152010
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Bromomethane	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Vinyl Chloride	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Chloroethane	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Methylene Chloride	ug/Kg	11 U	28 U	11 U	5 U J	7 U J	9 U J	5 U J
Acetone	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Carbon Disulfide	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,1-Dichloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,1-Dichloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,2-Dichloroethene (total)	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Chloroform	ug/Kg	11 U	7 J	11 U	5 U J	5 U J	5 U J	5 U J
1,2-Dichloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
2-Butanone	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
1,1,1-Trichloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Carbon Tetrachloride	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Vinyl Acetate	ug/Kg				10 U J	11 U J	11 U J	11 U J
Bromodichloromethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,2-Dichloropropane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
cis-1,3-Dichloropropene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Trichloroethene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Dibromochloromethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,1,2-Trichloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Benzene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
trans-1,3-Dichloropropene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Bromoform	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
4-Methyl-2-Pentanone	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
2-Hexanone	ug/Kg	11 U	28 U	11 U	10 U J	11 U J	11 U J	11 U J
Tetrachloroethene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
1,1,2,2-Tetrachloroethane	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Toluene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Chlorobenzene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Ethylbenzene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Styrene	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J
Xylene (total)	ug/Kg	11 U	28 U	11 U	5 U J	5 U J	5 U J	5 U J

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD D	PAD D	PAD D	PAD D
	DEPTH	0-2	0-2	0-2	0-6"	0-6"	0-6"	0-6"
	DATE	03/11/93	03/11/93	03/11/93	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBC-3-1	PBC-4-1	PBC-5-1	PBD-1-1	PBD-1-1RE	PBD-1-1A	PBD-1-1ARE
	LAB ID	179888	179889	179890	152009	152009	152010	152010
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
bis(2-Chloroethyl) ether	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2-Chlorophenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
1,3-Dichlorobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
1,4-Dichlorobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzyl Alcohol	ug/Kg				700 U		710 U	
1,2-Dichlorobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2-Methylphenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
4-Methylphenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
N-Nitroso-di-n-propylamine	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Hexachloroethane	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Nitrobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Isophorone	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2-Nitrophenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4-Dimethylphenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzoic acid	ug/Kg				3400 U		3500 U	
bis(2-Chloroethoxy) methane	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4-Dichlorophenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
1,2,4-Trichlorobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Naphthalene	ug/Kg	20 J	1800 U	3600 U	700 U		710 U	
4-Chloroaniline	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Hexachlorobutadiene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
4-Chloro-3-methylphenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2-Methylnaphthalene	ug/Kg	35 J	270 J	3600 U	700 U		710 U	
Hexachlorocyclopentadiene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4,6-Trichlorophenol	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4,5-Trichlorophenol	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
2-Chloronaphthalene	ug/Kg	18 J	1800 U	3600 U	700 U		710 U	
2-Nitroaniline	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
Dimethylphthalate	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Acenaphthylene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,6-Dinitrotoluene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
3-Nitroaniline	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
Acenaphthene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4-Dinitrophenol	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
4-Nitrophenol	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
Dibenzofuran	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
2,4-Dinitrotoluene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Diethylphthalate	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
4-Chlorophenyl-phenylether	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Fluorene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
4-Nitroaniline	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
4,6-Dinitro-2-methylphenol	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
N-Nitrosodiphenylamine	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
4-Bromophenyl-phenylether	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Hexachlorobenzene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Pentachlorophenol	ug/Kg	850 U	4300 U	8700 U	3400 U		3500 U	
Phenanthrene	ug/Kg	22 J	540 J	3600 U	700 U		710 U	
Anthracene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Carbazole	ug/Kg	350 U	1800 U	3600 U				
Di-n-butylphthalate	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Fluoranthene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Pyrene	ug/Kg	350 U	120 J	3600 U	700 U		710 U	
Butylbenzylphthalate	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
3,3'-Dichlorobenzidine	ug/Kg	350 U	1800 U	3600 U	1400 U		1400 U	
Benzo(a)anthracene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Chrysene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
bis(2-Ethylhexyl)phthalate	ug/Kg	350 U	750 J	410 J	700 U		710 U	
Di-n-octylphthalate	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzo(b)fluoranthene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzo(k)fluoranthene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzo(a)pyrene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Indeno(1,2,3-cd)pyrene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Dibenz(a,h)anthracene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	
Benzo(g,h,i)perylene	ug/Kg	350 U	1800 U	3600 U	700 U		710 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD D	PAD D	PAD D	PAD D
	DEPTH	0-2	0-2	0-2	0-6"	0-6"	0-6"	0-6"
	DATE	03/11/93	03/11/93	03/11/93	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBC-3-1	PBC-4-1	PBC-5-1	PBD-1-1	PBD-1-1RE	PBD-1-1A	PBD-1-1ARE
	LAB ID	179888	179889	179890	152009	152009	152010	152010
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	9.1 U	3.7 U	19 U	17 U		17 U	
beta-BHC	ug/kg	9.1 U	3.7 U	19 U	17 U		17 U	
delta-BHC	ug/kg	9.1 U	3.7 U	19 U	17 U		17 U	
gamma-BHC (Lindane)	ug/kg	9.1 U	3.7 U	9.6 J	17 U		17 U	
Heptachlor	ug/kg	32 J	3.7 U	19 U	17 U		17 U	
Aldrin	ug/kg	9.1 U	4 J	19 U	17 U		17 U	
Heptachlor epoxide	ug/kg	9.1 U	3.7 U	19 U	17 U		17 U	
Endosulfan I	ug/kg	9.1 U	1.9 J	19 U	17 U		17 U	
Dieldrin	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
4,4'-DDE	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
Endrin	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
Endosulfan II	ug/kg	18 U	7.2 U	110	34 U		35 U	
4,4'-DDD	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
Endosulfan sulfate	ug/kg	18 U	4.3 J	36 U	34 U		35 U	
4,4'-DDT	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
Methoxychlor	ug/kg	91 U	37 U	190 U	170 U		170 U	
Endrin ketone	ug/kg	18 U	7.2 U	36 U	34 U		35 U	
Endrin aldehyde	ug/kg	18 U	7.2 U	36 U				
alpha-Chlordane	ug/kg	69 J	6.1 J	270 J	170 U		170 U	
gamma-Chlordane	ug/kg	9.1 U	3.7 U	19 U	170 U		170 U	
Toxaphene	ug/kg	910 U	370 U	1900 U	340 U		350 U	
Aroclor-1016	ug/kg	180 U	72 U	360 U	170 U		170 U	
Aroclor-1221	ug/kg	360 U	150 U	740 U	170 U		170 U	
Aroclor-1232	ug/kg	180 U	72 U	360 U	170 U		170 U	
Aroclor-1242	ug/kg	180 U	72 U	360 U	170 U		170 U	
Aroclor-1248	ug/kg	180 U	72 U	360 U	170 U		170 U	
Aroclor-1254	ug/kg	180 U	72 U	360 U	340 U		350 U	
Aroclor-1260	ug/kg	180 U	72 U	360 U	340 U		350 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD D	PAD D	PAD D	PAD D
	DEPTH	0-2	0-2	0-2	0-6"	0-6"	0-6"	0-6"
	DATE	03/11/93	03/11/93	03/11/93	01/07/92	01/07/92	01/07/92	01/07/92
	ES ID	PBC-3-1	PBC-4-1	PBC-5-1	PBD-1-1	PBD-1-1RE	PBD-1-1A	PBD-1-1ARE
	LAB ID	179888	179889	179890	152009	152009	152010	152010
	UNITS							
Explosives								
HMX	ug/Kg	120 U	120 U	120 U	1000 U		1000 U	
RDX	ug/Kg	120 U	86 J	120 U	120 U		120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	130 J	120 U		120 U	
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
Tetryl	ug/Kg	120 U	120 U	120 U	400 U		400 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	
2,4-Dinitrotoluene	ug/Kg	120 U	360	980	120 U		120 U	
Metals								
Aluminum	mg/kg	10800	13300	14700	6860		14600	
Antimony	mg/kg	6.4 J	143 J	34.1 J	5.4 U J		4.9 U J	
Arsenic	mg/kg	3.9	4.1	5.6	4.7 J		4 J	
Barium	mg/kg	727	209	1190	48.5 J		195 J	
Beryllium	mg/kg	0.48 J	0.4 J	0.6 J	0.47 R		0.76 R	
Cadmium	mg/kg	2.6	7.2	3.1	2.4		4.7	
Calcium	mg/kg	31100	24500	27800	10400		19600	
Chromium	mg/kg	21.4	17.6	27.4	14.3 J		31.2 J	
Cobalt	mg/kg	12	8.4 J	14.4	6.7		14.4	
Copper	mg/kg	1430	563	13000	56.2		141	
Iron	mg/kg	23000	18700	29700	19400		36600	
Lead	mg/kg	837	603	4280	123		233	
Magnesium	mg/kg	5690	4460	7270	3230		6750	
Manganese	mg/kg	369	250	447	186		471	
Mercury	mg/kg	0.04 U	0.03 J	0.11	0.08 R		0.07 R	
Nickel	mg/kg	39.9 J	33.3 J	49.9 J	30.2 J		58.2 J	
Potassium	mg/kg	1110	678 J	1920	799 J		2280 J	
Selenium	mg/kg	0.15 UJ	0.37 J	0.21 UJ	0.34 J		0.34 J	
Silver	mg/kg	0.72 J	0.78 U	1.4	0.38 J		1.2 J	
Sodium	mg/kg	175 J	93.4 U	200 J	50.3 J		162 J	
Thallium	mg/kg	0.34 U	0.61 U	0.48 U	0.54 J		0.44 J	
Vanadium	mg/kg	18	12.8	21	10.9 R		21.6	
Zinc	mg/kg	799	127000	3180	427		959	
Cyanide	mg/kg	0.63 U	0.65 U	0.66 U	0.63 U		0.6 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD D	PAD D	PAD E	PAD E	PAD E	OB	OB
	DEPTH	2-4'	2-4'	0-6"	0-6"	2-4'	0-2	0-2
	DATE	01/07/92	01/07/92	01/08/92	01/08/92	01/08/92	03/11/93	03/11/93
	ES ID	PBD-1-3	PBD-1-3A	PBE-1-1	PBE-1-1R	PBE-1-3	PBE-2-1	PBE-3-1
	LAB ID	152013	152014	152094	152094	152096	179891	179892
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
Bromomethane	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
Vinyl Chloride	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
Chloroethane	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
Methylene Chloride	ug/Kg	6 U J	7 U J	6 U J	6 U J	7 U	11 U	11 U
Acetone	ug/Kg	11 U J	11 U J	10 U J	11 U J	24 U	11 U	11 U
Carbon Disulfide	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,1-Dichloroethene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,1-Dichloroethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,2-Dichloroethene (total)	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Chloroform	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,2-Dichloroethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
2-Butanone	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
1,1,1-Trichloroethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Carbon Tetrachloride	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Vinyl Acetate	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U		
Bromodichloromethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,2-Dichloropropane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
cis-1,3-Dichloropropene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Trichloroethene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Dibromochloromethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,1,2-Trichloroethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Benzene	ug/Kg	3 J	3 J	5 U J	5 U J	6 U	11 U	11 U
trans-1,3-Dichloropropene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Bromoform	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
4-Methyl-2-Pentanone	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
2-Hexanone	ug/Kg	11 U J	11 U J	10 U J	11 U J	12 U	11 U	11 U
Tetrachloroethene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
1,1,2,2-Tetrachloroethane	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Toluene	ug/Kg	2 J	6 U J	4 J	3 J	6 U	11 U	11 U
Chlorobenzene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Ethylbenzene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Styrene	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U
Xylene (total)	ug/Kg	5 U J	6 U J	5 U J	5 U J	6 U	11 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD D	PAD D	PAD E	PAD E	PAD E	OB	OB
	DEPTH	2-4'	2-4'	0-6"	0-6"	2-4'	0-2	0-2
	DATE	01/07/92	01/07/92	01/08/92	01/08/92	01/08/92	03/11/93	03/11/93
	ES ID	PBD-1-3	PBD-1-3A	PBE-1-1	PBE-1-1R	PBE-1-3	PBE-2-1	PBE-3-1
	LAB ID	152013	152014	152094	152094	152096	179891	179892
	UNITS							
Semivolatiles								
Phenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
bis(2-Chloroethyl) ether	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2-Chlorophenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
1,3-Dichlorobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
1,4-Dichlorobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzyl Alcohol	ug/Kg	720 U	720 U	680 U	780 U			
1,2-Dichlorobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2-Methylphenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
4-Methylphenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
N-Nitroso-di-n-propylamine	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Hexachloroethane	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Nitrobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Isophorone	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2-Nitrophenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4-Dimethylphenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzoic acid	ug/Kg	3500 U	3500 U	3300 U	3800 U			
bis(2-Chloroethoxy) methane	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4-Dichlorophenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
1,2,4-Trichlorobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Naphthalene	ug/Kg	210 J	190 J	680 U	780 U	34 J	20 J	
4-Chloroaniline	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Hexachlorobutadiene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
4-Chloro-3-methylphenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2-Methylnaphthalene	ug/Kg	220 J	160 J	680 U	780 U	120 J	30 J	
Hexachlorocyclopentadiene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4,6-Trichlorophenol	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4,5-Trichlorophenol	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
2-Chloronaphthalene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2-Nitroaniline	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
Dimethylphthalate	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Acenaphthylene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,6-Dinitrotoluene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
3-Nitroaniline	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
Acenaphthene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4-Dinitrophenol	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
4-Nitrophenol	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
Dibenzofuran	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
2,4-Dinitrotoluene	ug/Kg	720 U	720 U	680 U	160 J	360 U	370 U	
Diethylphthalate	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
4-Chlorophenyl-phenylether	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Fluorene	ug/Kg	720 U	720 U	680 U	780 U	380 U	370 U	
4-Nitroaniline	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
4,6-Dinitro-2-methylphenol	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
N-Nitrosodiphenylamine	ug/Kg	720 U	720 U	680 U	290 J	360 U	370 U	
4-Bromophenyl-phenylether	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Hexachlorobenzene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Pentachlorophenol	ug/Kg	3500 U	3500 U	3300 U	3800 U	870 U	900 U	
Phenanthrene	ug/Kg	160 J	180 J	680 U	780 U	65 J	20 J	
Anthracene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Carbazole	ug/Kg					360 U	370 U	
Di-n-butylphthalate	ug/Kg	720 U	720 U	680 U	660 J	360 U	370 U	
Fluoranthene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Pyrene	ug/Kg	720 U	720 U	680 U	780 U	18 J	370 U	
Butylbenzylphthalate	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
3,3'-Dichlorobenzidine	ug/Kg	1400 U	1400 U	1400 U	1600 U	360 U	370 U	
Benzo(a)anthracene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Chrysene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
bis(2-Ethylhexyl)phthalate	ug/Kg	420 J	290 J	680 U	780 U	360 U	370 U	
Di-n-octylphthalate	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzo(b)fluoranthene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzo(k)fluoranthene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzo(a)pyrene	ug/Kg	720 U	720 U	680 U	780 U	360 U	18 J	
Indeno(1,2,3-cd)pyrene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Dibenz(a,h)anthracene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	
Benzo(g,h,i)perylene	ug/Kg	720 U	720 U	680 U	780 U	360 U	370 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD D	PAD D	PAD E	PAD E	PAD E	OB	OB
	DEPTH	2-4'	2-4'	0-6"	0-6"	2-4'	0-2	0-2
	DATE	01/07/92	01/07/92	01/08/92	01/08/92	01/08/92	03/11/93	03/11/93
	ES ID	PBD-1-3	PBD-1-3A	PBE-1-1	PBE-1-1R	PBE-1-3	PBE-2-1	PBE-3-1
	LAB ID	152013	152014	152094	152094	152096	179891	179892
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
beta-BHC	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
delta-BHC	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
gamma-BHC (Lindane)	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
Heptachlor	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
Aldrin	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
Heptachlor epoxide	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
Endosulfan I	ug/kg	18 U	17 U	17 U		19 U	3.7 U	19 U
Dieldrin	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
4,4'-DDE	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
Endrin	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
Endosulfan II	ug/kg	35 U	35 U	33 U		38 U	4.6 J	37 U
4,4'-DDD	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
Endosulfan sulfate	ug/kg	35 U	35 U	33 U		38 U	3.9 J	37 U
4,4'-DDT	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
Methoxychlor	ug/kg	180 U	170 U	170 U		190 U	37 U	190 U
Endrin ketone	ug/kg	35 U	35 U	33 U		38 U	7.3 U	37 U
Endrin aldehyde	ug/kg						7.3 U	37 U
alpha-Chlordane	ug/kg	180 U	170 U	170 U		190 U	5.4	19 U
gamma-Chlordane	ug/kg	180 U	170 U	170 U		190 U	3.7 U	19 U
Toxaphene	ug/kg	350 U	350 U	330 U		380 U	370 U	1900 U
Aroclor-1016	ug/kg	180 U	170 U	170 U		190 U	73 U	370 U
Aroclor-1221	ug/kg	180 U	170 U	170 U		190 U	150 U	750 U
Aroclor-1232	ug/kg	180 U	170 U	170 U		190 U	73 U	370 U
Aroclor-1242	ug/kg	180 U	170 U	170 U		190 U	73 U	370 U
Aroclor-1248	ug/kg	180 U	170 U	170 U		190 U	73 U	370 U
Aroclor-1254	ug/kg	350 U	350 U	330 U		380 U	73 U	370 U
Aroclor-1260	ug/kg	350 U	350 U	330 U		380 U	73 U	370 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD D	PAD D	PAD E	PAD E	PAD E	OB	OB
	DEPTH	2-4'	2-4'	0-6"	0-6"	2-4'	0-2	0-2
	DATE	01/07/92	01/07/92	01/08/92	01/08/92	01/08/92	03/11/93	03/11/93
	ES ID	PBD-1-3	PBD-1-3A	PBE-1-1	PBE-1-1R	PBE-1-3	PBE-2-1	PBE-3-1
	LAB ID	152013	152014	152094	152094	152096	179891	179892
	UNITS							
Explosives								
HMX	ug/Kg	1000 U	1000 U	1000 U		1000 U	120 U	120 U
RDX	ug/Kg	120 U	190 J	120 U		120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
Tetryl	ug/Kg	400 U	400 U	400 U		400 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	130 U	120 U	120 U		510	240	120
Metals								
Aluminum	mg/kg	10600	10700	15500		20200	15700	14200
Antimony	mg/kg	75.6 J	21.8 J	5.1 U J		5.8 U J	5.4 UJ	13.3 J
Arsenic	mg/kg	8.6 J	6.2 J	4.5 J		5.8 J	5.2	4.8
Barium	mg/kg	1970 J	359 J	38		211	143	309
Beryllium	mg/kg	0.5 R	0.62 R	0.78 R		0.79 R	0.69 J	0.57
Cadmium	mg/kg	17.6	15.2	2.9		3.2	1.4	2.8
Calcium	mg/kg	124000 J	39800 J	25100		8720	22500	24500
Chromium	mg/kg	40 J	22 J	27.4 J		28.5 J	29.5	32.7
Cobalt	mg/kg	7.7	9.9	14.3		10.5	14.8	12.6
Copper	mg/kg	1640 J	254 J	37.9		133	125	235
Iron	mg/kg	24300	25000	35700		33200	33400	26800
Lead	mg/kg	16000 J	3930 J	30.4 R		205	140	224
Magnesium	mg/kg	7540	6010	7700		5810	7670	6570
Manganese	mg/kg	480	322	313		549	404	374
Mercury	mg/kg	0.06 R	0.1 R	0.07 R		0.09 R	0.06 J	0.05 J
Nickel	mg/kg	28.9 J	39.8 J	58.5 J		34.8 J	55.2 J	58.5 J
Potassium	mg/kg	2380 J	1410 J	1490 J		2170 J	2160	1550
Selenium	mg/kg	0.46 J	0.59 J	0.39 J		0.19 J	0.26 J	0.4 J
Silver	mg/kg	0.97 J	0.42 J	0.51 J		0.37 U	0.85 U	0.84 J
Sodium	mg/kg	324 J	130 J	93.7 J		322 J	141 J	197 J
Thallium	mg/kg	0.44	0.47	0.47 U		0.35 U	0.46 U	0.55 U
Vanadium	mg/kg	17.9	14.4 R	19.9		28.8	21.8	18.6
Zinc	mg/kg	1060	457	195		158	374 J	1060
Cyanide	mg/kg	0.58 U	0.63 U	0.6 U		0.61 U	0.66 U	0.67 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-F	PAD-F	OB
	DEPTH	0-2	0-2	0-2	0-2	0-6"	4-6'	0-2
	DATE	03/11/93	03/11/93	03/11/93	03/11/93	12/11/91	12/12/91	01/13/93
	ES ID	PBE3-1RE	PBE-4-1	PBE4-1RE	PBE-5-1	PB-F-1-1	PB-F-1-4	PBF-2-1
	LAB ID	179892R1	179893	179893R1	179894	150788	150791	177256
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
Bromomethane	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
Vinyl Chloride	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
Chloroethane	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
Methylene Chloride	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Acetone	ug/Kg	11 U	14 U	14 U	11 U	11 U	36 U	22 U
Carbon Disulfide	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,1-Dichloroethene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,1-Dichloroethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,2-Dichloroethene (total)	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Chloroform	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,2-Dichloroethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
2-Butanone	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
1,1,1-Trichloroethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Carbon Tetrachloride	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Vinyl Acetate	ug/Kg					11 U	11 U	
Bromodichloromethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,2-Dichloropropane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
cis-1,3-Dichloropropene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Trichloroethene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Dibromochloromethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,1,2-Trichloroethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Benzene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
trans-1,3-Dichloropropene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Bromoform	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
4-Methyl-2-Pentanone	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
2-Hexanone	ug/Kg	11 U	14 U	14 U	11 U	11 U	11 U	12 U
Tetrachloroethene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Toluene	ug/Kg	11 U	14 U	14 U	11 U	6 U	2 J	12 U
Chlorobenzene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Ethylbenzene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Styrene	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U
Xylene (total)	ug/Kg	11 U	14 U	14 U	11 U	6 U	6 U	12 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-F	PAD-F	OB
	DEPTH	0-2	0-2	0-2	0-2	0-6"	4-6'	0-2
	DATE	03/11/93	03/11/93	03/11/93	03/11/93	12/11/91	12/12/91	01/13/93
	ES ID	PBE3-1RE	PBE-4-1	PBE4-1RE	PBE-5-1	PB-F-1-1	PB-F-1-4	PBF-2-1
	LAB ID	179892R1	179893	179893R1	179894	150788	150791	177256
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
bis(2-Chloroethyl) ether	ug/Kg		390 U		360 U	730 U	730 U	360 U
2-Chlorophenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
1,3-Dichlorobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
1,4-Dichlorobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzyl Alcohol	ug/Kg					730 U	730 U	
1,2-Dichlorobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
2-Methylphenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,2'-oxybis(1-Chloropropane)	ug/Kg		390 U		360 U	730 U	730 U	360 U
4-Methylphenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
N-Nitroso-di-n-propylamine	ug/Kg		390 U		360 U	730 U	730 U	360 U
Hexachloroethane	ug/Kg		390 U		360 U	730 U	730 U	360 U
Nitrobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Isophorone	ug/Kg		390 U		360 U	730 U	730 U	360 U
2-Nitrophenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4-Dimethylphenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzoic acid	ug/Kg					3500 U	3600 U	
bis(2-Chloroethoxy) methane	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4-Dichlorophenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
1,2,4-Trichlorobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Naphthalene	ug/Kg		390 U		360 U	730 U	730 U	21 J
4-Chloroaniline	ug/Kg		390 U		360 U	730 U	730 U	360 U
Hexachlorobutadiene	ug/Kg		390 U		360 U	730 U	730 U	360 U
4-Chloro-3-methylphenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
2-Methylnaphthalene	ug/Kg		390 U		31 J	100 J	730 U	82 J
Hexachlorocyclopentadiene	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4,6-Trichlorophenol	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4,5-Trichlorophenol	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
2-Chloronaphthalene	ug/Kg		390 U		360 U	730 U	730 U	360 U
2-Nitroaniline	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
Dimethylphthalate	ug/Kg		390 U		360 U	730 U	730 U	360 U
Acenaphthylene	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,6-Dinitrotoluene	ug/Kg		390 U		360 U	730 U	730 U	360 U
3-Nitroaniline	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
Acenaphthene	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4-Dinitrophenol	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
4-Nitrophenol	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
Dibenzofuran	ug/Kg		390 U		360 U	730 U	730 U	360 U
2,4-Dinitrotoluene	ug/Kg		390 U		360 U	730 U	730 U	100 J
Diethylphthalate	ug/Kg		390 U		360 U	730 U	730 U	360 U
4-Chlorophenyl-phenylether	ug/Kg		390 U		360 U	730 U	730 U	360 U
Fluorene	ug/Kg		390 U		360 U	730 U	730 U	360 U
4-Nitroaniline	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
4,6-Dinitro-2-methylphenol	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
N-Nitrosodiphenylamine	ug/Kg		390 U		360 U	730 U	730 U	360 U
4-Bromophenyl-phenylether	ug/Kg		390 U		360 U	730 U	730 U	360 U
Hexachlorobenzene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Pentachlorophenol	ug/Kg		940 U		870 U	3500 U	3600 U	870 U
Phenanthrene	ug/Kg		390 U		360 U	730 U	730 U	34 J
Anthracene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Carbazole	ug/Kg		390 U		360 U			360 U
Di-n-butylphthalate	ug/Kg		390 U		360 U	730 U	730 U	270 J
Fluoranthene	ug/Kg		390 U		360 U	730 U	730 U	21 J
Pyrene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Butylbenzylphthalate	ug/Kg		390 U		360 U	730 U	730 U	360 U
3,3'-Dichlorobenzidine	ug/Kg		390 U		360 U	1500 U	1500 U	360 U
Benzo(a)anthracene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Chrysene	ug/Kg		390 U		360 U	730 U	730 U	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg		390 U		360 U	730 U	730 U	620
Di-n-octylphthalate	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzo(b)fluoranthene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzo(k)fluoranthene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzo(a)pyrene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Indeno(1,2,3-cd)pyrene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Dibenz(a,h)anthracene	ug/Kg		390 U		360 U	730 U	730 U	360 U
Benzo(g,h,i)perylene	ug/Kg		390 U		360 U	730 U	730 U	360 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-F	PAD-F	OB
	DEPTH	0-2	0-2	0-2	0-2	0-6"	4-6'	0-2
	DATE	03/11/93	03/11/93	03/11/93	03/11/93	12/11/91	12/12/91	01/13/93
	ES ID	PBE3-1RE	PBE-4-1	PBE4-1RE	PBE-5-1	PB-F-1-1	PB-F-1-4	PBF-2-1
	LAB ID	179892R1	179893	179893R1	179894	150788	150791	177256
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
beta-BHC	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
delta-BHC	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
gamma-BHC (Lindane)	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
Heptachlor	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
Aldrin	ug/kg		2 U		0.96 J	18 U	18 U	1.9 U
Heptachlor epoxide	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
Endosulfan I	ug/kg		2 U		1.8 U	18 U	18 U	1.9 U
Dieldrin	ug/kg		3.9 U		3.6 U	35 U	36 U	3.6 U
4,4'-DDE	ug/kg		3.9 U		3.6 U	35 U	36 U	1.5 J
Endrin	ug/kg		3.9 U		3.6 U	35 U	36 U	2.4 J
Endosulfan II	ug/kg		3.9 U		3.6 U	35 U	36 U	3.6 U
4,4'-DDD	ug/kg		3.9 U		3.6 U	35 U	36 U	2.3 J
Endosulfan sulfate	ug/kg		3.9 U		3.6 U	35 U	36 U	3.6 U
4,4'-DDT	ug/kg		3.9 U		3.6 U	35 U	36 U	3.6 U
Methoxychlor	ug/kg		20 U		18 U	180 U	180 U	19 U
Endrin ketone	ug/kg		3.9 U		3.6 U	35 U	36 U	3.6 U
Endrin aldehyde	ug/kg		3.9 U		3.6 U			3.6 U
alpha-Chlordane	ug/kg		2 U		1.4 J	180 U	180 U	1.9 U
gamma-Chlordane	ug/kg		2 U		1.8 U	180 U	180 U	1.9 U
Toxaphene	ug/kg		200 U		180 U	350 U	360 U	190 U
Aroclor-1016	ug/kg		39 U		36 U	180 U	180 U	36 U
Aroclor-1221	ug/kg		80 U		73 U	180 U	180 U	74 U
Aroclor-1232	ug/kg		39 U		36 U	180 U	180 U	36 U
Aroclor-1242	ug/kg		39 U		36 U	180 U	180 U	36 U
Aroclor-1248	ug/kg		39 U		36 U	180 U	180 U	36 U
Aroclor-1254	ug/kg		39 U		36 U	350 U	360 U	36 U
Aroclor-1260	ug/kg		39 U		36 U	350 U	360 U	36 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-F	PAD-F	OB
	DEPTH	0-2	0-2	0-2	0-2	0-6'	4-6'	0-2
	DATE	03/11/93	03/11/93	03/11/93	03/11/93	12/11/91	12/12/91	01/13/93
	ES ID	PBE3-1RE	PBE-4-1	PBE4-1RE	PBE-5-1	PB-F-1-1	PB-F-1-4	PBF-2-1
	LAB ID	179892R1	179893	179893R1	179894	150788	150791	177256
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U		120 U	1000 U	1000 U	120 U	
RDX	ug/Kg	120 U		120 U	280	120 U	120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U	160	120 U	120 U	
1,3-Dinitrobenzene	ug/Kg	120 U		120 U	120 U	120 U	120 U	
Tetryl	ug/Kg	120 U		120 U	400 U	400 U	120 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U	590	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U	2500	120 U	120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U	2700	120 U	120 U	
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/Kg	120 U		120 U	570	120 U	1700	
Metals								
Aluminum	mg/kg	12600		12900	16100	16100	12300	
Antimony	mg/kg	5 UJ		5.1 UJ	9.7 R	5.7 R	14.3 J	
Arsenic	mg/kg	5.6		4.1	4.1 J	3.5 J	6.7 J	
Barium	mg/kg	96.8		61.4	1560 J	178 J	991	
Beryllium	mg/kg	0.58 J		0.61 J	0.64 R	0.69 R	0.56	
Cadmium	mg/kg	0.36 U		0.37 U	8.8	3.3	1.6	
Calcium	mg/kg	19400		19200	105000 J	42300 J	17100	
Chromium	mg/kg	24.2		24.2	24.2	24.4	29.5	
Cobalt	mg/kg	14.9		13.5	9.1	11.2	11.5	
Copper	mg/kg	39.9		36.2	90.9 J	52 J	492	
Iron	mg/kg	27100		29000	22900 J	28300 J	29900	
Lead	mg/kg	26.2		180	2320 J	59.6	2850	
Magnesium	mg/kg	6410		6340	10600	7830	5410	
Manganese	mg/kg	317		290	365	389	399	
Mercury	mg/kg	0.05 U		0.03 J	0.17	0.03 U	0.09 J	
Nickel	mg/kg	50.5 J		51.9 J	37	39.8	37.1	
Potassium	mg/kg	1490		1620	3030	1780	1360	
Selenium	mg/kg	0.46 J		0.41 J	0.2 J	0.11 UJ	0.16 J	
Silver	mg/kg	0.78 U		0.8 U	1.8 U	0.92 U	0.47 J	
Sodium	mg/kg	98.3 J		102 J	191 J	97.3 J	88.5 J	
Thallium	mg/kg	0.51 U		0.45 U	0.65 U	0.35 U	0.34 U	
Vanadium	mg/kg	18.7		18.1	20.2	22.3	17.6	
Zinc	mg/kg	187 J		143 J	494 J	114 J	465	
Cyanide	mg/kg	0.56 U		0.53 U	1.1	0.66 U	0.67 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	6-8	0-2	0-2	0-2	0-2	0-2
	DATE	01/13/93	01/13/93	01/13/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBF-2-3	PBF-2-4	PBF-2-6	PBF-3-1	PBF-3-2	PBF-4-1	PBF-5-1
	LAB ID	177258	177259	177261	179982	179983	179984	179985
COMPOUND	UNITS			DUP PBF-2-1				
Volatile Organic Compounds								
Chloromethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Bromomethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Vinyl Chloride	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Chloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Methylene Chloride	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Acetone	ug/Kg		52 J	43 U	11 U	11 U	11 U	11 U
Carbon Disulfide	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,1-Dichloroethene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,1-Dichloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,2-Dichloroethene (total)	ug/Kg		60 U	12 U	11 U	11 U	11 U	1 J
Chloroform	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,2-Dichloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
2-Butanone	ug/Kg		60 U	9 J	11 U	11 U	11 U	11 U
1,1,1-Trichloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Carbon Tetrachloride	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Vinyl Acetate	ug/Kg							
Bromodichloromethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,2-Dichloropropane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
cis-1,3-Dichloropropene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Trichloroethene	ug/Kg		60 U	12 U	11 U	11 U	11 U	2 J
Dibromochloromethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
1,1,2-Trichloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Benzene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
trans-1,3-Dichloropropene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Bromoform	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
4-Methyl-2-Pentanone	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
2-Hexanone	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Tetrachloroethene	ug/Kg		60 U	12 U	11 U	11 U	11 U	4 J
1,1,2,2-Tetrachloroethane	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Toluene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Chlorobenzene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Ethylbenzene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Styrene	ug/Kg		60 U	12 U	11 U	11 U	11 U	11 U
Xylene (total)	ug/Kg		60 U	12 U	11 U	11 U	8 J	11 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	6-8	0-2	0-2	0-2	0-2	0-2
	DATE	01/13/93	01/13/93	01/13/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBF-2-3	PBF-2-4	PBF-2-6	PBF-3-1	PBF-3-2	PBF-4-1	PBF-5-1
	LAB ID	177258	177259	177261	179982	179983	179984	179985
COMPOUND	UNITS			DUP PBF-2-1				
Semivolatiles								
Phenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
bis(2-Chloroethyl) ether	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2-Chlorophenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
1,3-Dichlorobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
1,4-Dichlorobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzyl Alcohol	ug/Kg							
1,2-Dichlorobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2-Methylphenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
4-Methylphenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
N-Nitroso-di-n-propylamine	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Hexachloroethane	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Nitrobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Isophorone	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2-Nitrophenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,4-Dimethylphenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzoic acid	ug/Kg							
bis(2-Chloroethoxy) methane	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,4-Dichlorophenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
1,2,4-Trichlorobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Naphthalene	ug/Kg	94 J		510 U	23 J	20 J	3400 U	360 U
4-Chloroaniline	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Hexachlorobutadiene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
4-Chloro-3-methylphenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2-Methylnaphthalene	ug/Kg	660		110 J	66 J	63 J	1300 J	42 J
Hexachlorocyclopentadiene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,4,6-Trichlorophenol	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,4,5-Trichlorophenol	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
2-Chloronaphthalene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2-Nitroaniline	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
Dimethylphthalate	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Acenaphthylene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
2,6-Dinitrotoluene	ug/Kg	400 U		240 J	100 J	370 U	3400 U	300 J
3-Nitroaniline	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
Acenaphthene	ug/Kg	130 J		510 U	410 U	370 U	210 J	360 U
2,4-Dinitrophenol	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
4-Nitrophenol	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
Dibenzofuran	ug/Kg	93 J		510 U	410 U	370 U	3400 U	360 U
2,4-Dinitrotoluene	ug/Kg	400 U		3000 J	1100	180 J	3400 U	2400
Diethylphthalate	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
4-Chlorophenyl-phenylether	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Fluorene	ug/Kg	250 J		510 U	410 U	370 U	3400 U	360 U
4-Nitroaniline	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
4,6-Dinitro-2-methylphenol	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
N-Nitrosodiphenylamine	ug/Kg	400 U		470 J	610	370 U	3400 U	640
4-Bromophenyl-phenylether	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Hexachlorobenzene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	28 J
Pentachlorophenol	ug/Kg	970 U		1200 U	990 U	890 U	8400 U	880 U
Phenanthrene	ug/Kg	790		49 J	34 J	32 J	1000 J	22 J
Anthracene	ug/Kg	39 J		510 U	410 U	370 U	3400 U	360 U
Carbazole	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Di-n-butylphthalate	ug/Kg	400 U		260 J	180 J	230 J	3400 U	330 J
Fluoranthene	ug/Kg	60 J		26 J	410 U	370 U	3400 U	360 U
Pyrene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Butylbenzylphthalate	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
3,3'-Dichlorobenzidine	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzo(a)anthracene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Chrysene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg	710		800	410 U	370 U	3400 U	360 U
Di-n-octylphthalate	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzo(b)fluoranthene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzo(k)fluoranthene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzo(a)pyrene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Indeno(1,2,3-cd)pyrene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Dibenz(a,h)anthracene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U
Benzo(g,h,i)perylene	ug/Kg	400 U		510 U	410 U	370 U	3400 U	360 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	6-8	0-2	0-2	0-2	0-2	0-2
	DATE	01/13/93	01/13/93	01/13/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBF-2-3	PBF-2-4	PBF-2-8	PBF-3-1	PBF-3-2	PBF-4-1	PBF-5-1
	LAB ID	177256	177259	177261	179982	179983	179984	179985
COMPOUND	UNITS			DUP PBF-2-1				
Pesticides/PCBs								
alpha-BHC	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
beta-BHC	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
delta-BHC	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
gamma-BHC (Lindane)	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
Heptachlor	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
Aldrin	ug/kg	2.1 U		1.8 U	1.9 J	1 J	3.3	9.2 U
Heptachlor epoxide	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
Endosulfan I	ug/kg	2.1 U		1.8 U	2.1 U	3.7 J	1.4 J	9.2 U
Dieldrin	ug/kg	4 U		3.5 U	4.1 U	3.7 U	3.4 U	18 U
4,4'-DDE	ug/kg	4 U		1.8 J	4.1 U	3.7 U	3.4 U	18 U
Endrin	ug/kg	4 U		2.4 J	4.1 U	3.7 U	3.4 U	18 U
Endosulfan II	ug/kg	4 U		3.5 U	4.1 U	3.7 U	3.4 U	18 U
4,4'-DDD	ug/kg	4 U		1.8 J	3.6 J	2.1 J	2.4 J	18 U
Endosulfan sulfate	ug/kg	4 U		3.5 U	4.1 U	3.7 U	2.5 J	18 U
4,4'-DDT	ug/kg	4 U		3.5 U	4.1 U	2.6 J	3.4 U	18 U
Methoxychlor	ug/kg	21 U		18 U	21 U	19 U	18 U	92 U
Endrin ketone	ug/kg	4 U		3.5 U	4.1 U	3.7 U	3.4 U	18 U
Endrin aldehyde	ug/kg	4 U		3.5 U	4.1 U	3.7 U	3.4 U	18 U
alpha-Chlordane	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
gamma-Chlordane	ug/kg	2.1 U		1.8 U	2.1 U	1.9 U	1.8 U	9.2 U
Toxaphene	ug/kg	210 U		180 U	210 U	190 U	180 U	920 U
Aroclor-1016	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U
Aroclor-1221	ug/kg	81 U		71 U	82 U	76 U	70 U	360 U
Aroclor-1232	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U
Aroclor-1242	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U
Aroclor-1248	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U
Aroclor-1254	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U
Aroclor-1260	ug/kg	40 U		35 U	41 U	37 U	34 U	180 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH	4-6	6-8	0-2	0-2	0-2	0-2	0-2
	DATE	01/13/93	01/13/93	01/13/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBF-2-3	PBF-2-4	PBF-2-6	PBF-3-1	PBF-3-2	PBF-4-1	PBF-5-1
	LAB ID	177258	177259	177261	179982	179983	179984	179985
COMPOUND	UNITS			DUP PBF-2-1				
Explosives								
HMX	ug/Kg	120 U		120 U	120 U	120 U	120 U	380 U
RDX	ug/Kg	120 U		120 U	110 J	73 J	120 U	600 J
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U	590 J	720 J	92 J	500 J
1,3-Dinitrobenzene	ug/Kg	120 U		120 U	120 U	120 U	120 U	380 U
Tetryl	ug/Kg	120 U		120 U	220 J	860	410 J	1000
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U	520 J	1400 J	110 J	5000 J
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U	1400	2400	280 J	8900
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U	1300	2200	350 J	11000
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U	380 U
2,4-Dinitrotoluene	ug/Kg	120 U		740	800	850	370	5000
Metals								
Aluminum	mg/kg	16500		11200	14200	12700	14500	14200
Antimony	mg/kg	6.6 UJ		6.3 J	4.8 J	8 J	8.3 J	6 J
Arsenic	mg/kg	4.7 J		3.7 J	5.6	6.5	5.8	4.2
Barium	mg/kg	157		607	952	798	332	947
Beryllium	mg/kg	0.78		0.52 J	0.63 J	0.57 J	0.63 J	0.63 J
Cadmium	mg/kg	0.38 U		2.1	1.2	1.1	0.37 J	0.85
Calcium	mg/kg	3170		22700	23600	55800	29000	25000
Chromium	mg/kg	21.5		24.3	29.8	24.1	26.5	25.1
Cobalt	mg/kg	11.8		11.3	14.4	11.1	14.3	12.4
Copper	mg/kg	31.6 R		1090	303	222	216	255
Iron	mg/kg	24100		24700	35300	29000	31200	28400
Lead	mg/kg	94.3 J		1260	1570	1250	1540	678
Magnesium	mg/kg	3830		5430	6570	7960	7460	6240
Manganese	mg/kg	657		439	511	384	425	562
Mercury	mg/kg	0.22		0.05 J	0.11 J	0.13	0.15	0.08 J
Nickel	mg/kg	22.9		35.5	47.5 J	38.1 J	51.7 J	39.4 J
Potassium	mg/kg	1530		1160	1570	1860	1630	1440
Selenium	mg/kg	0.22 J		0.28 J	0.27 J	0.18 UJ	0.26 J	0.29 J
Silver	mg/kg	0.65 J		0.53 J	1 J	0.6 U	0.68 U	0.63 U
Sodium	mg/kg	78.5 J		84.7 J	139 J	148 J	121 J	125 J
Thallium	mg/kg	0.49 U		0.55 U	0.6 U	0.42 U	0.5 U	0.66 U
Vanadium	mg/kg	29.1		16	20.1	18.5	19.9	20.4
Zinc	mg/kg	70.2 J		345	304 J	259 J	200 J	1370
Cyanide	mg/kg	0.74 U		0.64 U	0.73 U	0.68 U	0.64 U	0.66 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2	0-6"	0-6"	2-4'	0-6"	0-2'	0-6"
	DATE	03/12/93	01/08/92	01/08/92	01/08/92	01/09/92	01/09/92	01/09/92
	ES ID	PBF-6-1	PBG-1-1	PBG-1-1RE	PBG-1-3	PBG-2-1	PBG-2-2	PBG-3-1
	LAB ID	179986	152101	152101	152103	152107	152108	152112
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Bromomethane	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Vinyl Chloride	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Chloroethane	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Methylene Chloride	ug/Kg	14 U	9 U J	8 U J	6 U	7 U	7 U	6 U
Acetone	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Carbon Disulfide	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,1-Dichloroethene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,1-Dichloroethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Chloroform	ug/Kg	14 U	12 J	9 J	6 U	6	6 U	10
1,2-Dichloroethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
2-Butanone	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
1,1,1-Trichloroethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Carbon Tetrachloride	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Vinyl Acetate	ug/Kg		13 U J	13 U J	12 U	11 U	13 U	12 U
Bromodichloromethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,2-Dichloropropane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
cis-1,3-Dichloropropene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Trichloroethene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Dibromochloromethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,1,2-Trichloroethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Benzene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
trans-1,3-Dichloropropene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Bromoform	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
4-Methyl-2-Pentanone	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
2-Hexanone	ug/Kg	14 U	13 U J	13 U J	12 U	11 U	13 U	12 U
Tetrachloroethene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Toluene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Chlorobenzene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Ethylbenzene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Styrene	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U
Xylene (total)	ug/Kg	14 U	6 U J	6 U J	6 U	6 U	6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2	0-6"	0-6"	2-4'	0-6"	0-2'	0-6"
	DATE	03/12/93	01/08/92	01/08/92	01/08/92	01/09/92	01/09/92	01/09/92
	ES ID	PBF-6-1	PBG-1-1	PBG-1-1RE	PBG-1-3	PBG-2-1	PBG-2-2	PBG-3-1
	LAB ID	179986	152101	152101	152103	152107	152108	152112
	UNITS							
Semivolatiles								
Phenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
bis(2-Chloroethyl) ether	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2-Chlorophenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
1,3-Dichlorobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
1,4-Dichlorobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzyl Alcohol	ug/Kg		790 U		780 U	800 U	750 U	810 U
1,2-Dichlorobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2-Methylphenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
4-Methylphenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
N-Nitroso-di-n-propylamine	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Hexachloroethane	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Nitrobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Isophorone	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2-Nitrophenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4-Dimethylphenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzoic acid	ug/Kg		3800 U		3800 U	3900 U	3800 U	3900 U
bis(2-Chloroethoxy) methane	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4-Dichlorophenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
1,2,4-Trichlorobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Naphthalene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
4-Chloroaniline	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Hexachlorobutadiene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
4-Chloro-3-methylphenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2-Methylnaphthalene	ug/Kg	55 J	790 U		780 U	800 U	750 U	810 U
Hexachlorocyclopentadiene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4,6-Trichlorophenol	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4,5-Trichlorophenol	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
2-Chloronaphthalene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2-Nitroaniline	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
Dimethylphthalate	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Acenaphthylene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,6-Dinitrotoluene	ug/Kg	570 J	790 U		780 U	800 U	750 U	810 U
3-Nitroaniline	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
Acenaphthene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4-Dinitrophenol	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
4-Nitrophenol	ug/Kg	2800 U	3800 U		3600 U	3900 U	3600 U	3900 U
Dibenzofuran	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
2,4-Dinitrotoluene	ug/Kg	8000	790 U		780 U	800 U	81 J	810 U
Diethylphthalate	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
4-Chlorophenyl-phenylether	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Fluorene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
4-Nitroaniline	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
4,6-Dinitro-2-methylphenol	ug/Kg	2800 U	3800 U		3800 U	3900 U	3600 U	3900 U
N-Nitrosodiphenylamine	ug/Kg	1500	790 U		780 U	190 J	750 U	810 U
4-Bromophenyl-phenylether	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Hexachlorobenzene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Pentachlorophenol	ug/Kg	2800 U	3600 U		3800 U	3900 U	3600 U	3900 U
Phenanthrene	ug/Kg	54 J	790 U		780 U	800 U	750 U	810 U
Anthracene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Carbazole	ug/Kg	1200 U						
Di-n-butylphthalate	ug/Kg	1200	790 U		780 U	800 U	750 U	810 U
Fluoranthene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Pyrene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Butylbenzylphthalate	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
3,3'-Dichlorobenzidine	ug/Kg	1200 U	1600 U		1600 U	1600 U	1500 U	1600 U
Benzo(a)anthracene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Chrysene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1200 U	790 U		200 J	800 U	420 J	810 U
Di-n-octylphthalate	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzo(b)fluoranthene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzo(k)fluoranthene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzo(a)pyrene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Dibenz(a,h)anthracene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U
Benzo(g,h,i)perylene	ug/Kg	1200 U	790 U		780 U	800 U	750 U	810 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2	0-6"	0-6"	2-4'	0-6"	0-2'	0-6"
	DATE	03/12/93	01/08/92	01/08/92	01/08/92	01/09/92	01/09/92	01/09/92
	ES ID	PBF-6-1	PBG-1-1	PBG-1-1RE	PBG-1-3	PBG-2-1	PBG-2-2	PBG-3-1
	LAB ID	179986	152101	152101	152103	152107	152108	152112
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
beta-BHC	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
delta-BHC	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
gamma-BHC (Lindane)	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
Heptachlor	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
Aldrin	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
Heptachlor epoxide	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
Endosulfan I	ug/kg	2.1 U	19 U		19 U	19 U	18 U	20 U
Dieldrin	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
4,4'-DDE	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
Endrin	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
Endosulfan II	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
4,4'-DDD	ug/kg	2.2 J	38 U		38 U	39 U	36 U	39 U
Endosulfan sulfate	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
4,4'-DDT	ug/kg	4.1 U	33 J		38 U	39 U	36 U	39 U
Methoxychlor	ug/kg	21 U	190 U		190 U	190 U	180 U	200 U
Endrin ketone	ug/kg	4.1 U	38 U		38 U	39 U	36 U	39 U
Endrin aldehyde	ug/kg	4.1 U						
alpha-Chlordane	ug/kg	2.1 U	190 U		190 U	190 U	180 U	200 U
gamma-Chlordane	ug/kg	2.1 U	190 U		190 U	190 U	180 U	200 U
Toxaphene	ug/kg	210 U	380 U		380 U	390 U	360 U	390 U
Aroclor-1016	ug/kg	41 U	190 U		190 U	190 U	180 U	200 U
Aroclor-1221	ug/kg	83 U	190 U		190 U	190 U	180 U	200 U
Aroclor-1232	ug/kg	41 U	190 U		190 U	190 U	180 U	200 U
Aroclor-1242	ug/kg	41 U	190 U		190 U	190 U	180 U	200 U
Aroclor-1248	ug/kg	41 U	190 U		190 U	190 U	180 U	200 U
Aroclor-1254	ug/kg	41 U	380 U		380 U	390 U	360 U	390 U
Aroclor-1260	ug/kg	41 U	380 U		380 U	390 U	360 U	390 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2	0-6"	0-6"	2-4'	0-6"	0-2'	0-6"
	DATE	03/12/93	01/08/92	01/08/92	01/08/92	01/09/92	01/09/92	01/09/92
	ES ID	PBF-6-1	PBG-1-1	PBG-1-1RE	PBG-1-3	PBG-2-1	PBG-2-2	PBG-3-1
	LAB ID	179986	152101	152101	152103	152107	152108	152112
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	250 U	960 J		1000 U	1300	1000 U	1000 U
RDX	ug/Kg	270	2900		120 U	4800	170 J	120 U
1,3,5-Trinitrobenzene	ug/Kg	250 U	250		210	260	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	250 U	120 U		120 U	120 U	120 U	120 U
Tetryl	ug/Kg	230 J	400 U		400 U	400 U	400 U	400 U
2,4,6-Trinitrotoluene	ug/Kg	520 J	390		290	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	1000	600		270	250	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	1000	480		530	150	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	250 U	120 U		120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	5100	180		110 J	240	300	76 J
Metals								
Aluminum	mg/kg	17100	22500		18500	9370	14200	18900
Antimony	mg/kg	18.4 J	6 U J		13.6 J	6 U J	5.6 U J	5.8 U J
Arsenic	mg/kg	6.4	4 J		9 J	4.7 J	3.7 J	6 J
Barium	mg/kg	2260	709		1390	422	481	554
Beryllium	mg/kg	0.69 J	0.64 R		0.99 R	0.56 R	0.82 R	0.91 R
Cadmium	mg/kg	1.9	11.3		4.3	9.6	9.2	6.7
Calcium	mg/kg	24500	92100		6310	138000	34400	23000
Chromium	mg/kg	31.5	37.3 J		30.5 J	24.4 J	26.5 J	41.4 J
Cobalt	mg/kg	14.1	10.7		13.7	7.4	12.5	13.4
Copper	mg/kg	743	466		1650	108	75.4	688
Iron	mg/kg	35000	35800		37400	25700	28500	32700
Lead	mg/kg	13100	509		3360	203	7.7	212
Magnesium	mg/kg	7240	7720		6730	10700	9650	6720
Manganese	mg/kg	573	505		618	359	610	799
Mercury	mg/kg	0.28	0.15 R		0.15 R	0.1 R	0.2 R	0.13 R
Nickel	mg/kg	42.7 J	46.2 J		43.2 J	34.8 J	35.5 J	39.9 J
Potassium	mg/kg	1920	1650 J		1500 J	1410 J	1730 J	2450 J
Selenium	mg/kg	1.8 UJ	1.2		0.27 J	0.28 J	0.35 J	0.3 J
Silver	mg/kg	0.74 J	1.2		2.9	0.99 J	0.59 J	0.37 J
Sodium	mg/kg	167 J	385 J		130 J	324 J	344 J	151 J
Thallium	mg/kg	0.42 U	0.51 U		0.46 U	0.39 U	0.49 U	0.62 U
Vanadium	mg/kg	24.7	20.2		25.8	16.9 R	21.6	27.8
Zinc	mg/kg	617	1600		615	740	297	585
Cyanide	mg/kg	0.77 U	0.55 U		0.64 U	0.7 U	0.62 U	0.6 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	2-4'	0-6"
	DATE	01/09/92	01/09/92	01/09/92	01/10/92	01/10/92	01/10/92	01/13/92
	ES ID	PBG-3-2	PBG-4-1	PBG-4-2	PBG-5-1	PBG-5-2	PBG-5-3	PBG-6-1
	LAB ID	152113	152203	152204	152206	152207	152208	152363
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Bromomethane	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Vinyl Chloride	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Chloroethane	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Methylene Chloride	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Acetone	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Carbon Disulfide	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,1-Dichloroethene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,1-Dichloroethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,2-Dichloroethene (total)	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Chloroform	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,2-Dichloroethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
2-Butanone	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
1,1,1-Trichloroethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Carbon Tetrachloride	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Vinyl Acetate	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Bromodichloromethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,2-Dichloropropane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
cis-1,3-Dichloropropene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Trichloroethene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Dibromochloromethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,1,2-Trichloroethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Benzene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
trans-1,3-Dichloropropene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Bromoform	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
4-Methyl-2-Pentanone	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
2-Hexanone	ug/Kg	12 U	13 U	12 U	12 U		12 U	12 U
Tetrachloroethene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Toluene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Chlorobenzene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Ethylbenzene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Styrene	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U
Xylene (total)	ug/Kg	6 U	6 U	6 U	6 U		6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	2-4'	0-6"
	DATE	01/09/92	01/09/92	01/09/92	01/10/92	01/10/92	01/10/92	01/13/92
	ES ID	PBG-3-2	PBG-4-1	PBG-4-2	PBG-5-1	PBG-5-2	PBG-5-3	PBG-6-1
	LAB ID	152113	152203	152204	152206	152207	152208	152363
	UNITS							
Semivolatiles								
Phenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
bis(2-Chloroethyl) ether	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2-Chlorophenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
1,3-Dichlorobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
1,4-Dichlorobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Benzyl Alcohol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
1,2-Dichlorobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2-Methylphenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
4-Methylphenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
N-Nitroso-di-n-propylamine	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Hexachloroethane	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Nitrobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Isophorone	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2-Nitrophenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4-Dimethylphenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Benzoic acid	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		98 J
bis(2-Chloroethoxy) methane	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4-Dichlorophenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
1,2,4-Trichlorobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Naphthalene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
4-Chloroaniline	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Hexachlorobutadiene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
4-Chloro-3-methylphenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2-Methylnaphthalene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Hexachlorocyclopentadiene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4,6-Trichlorophenol	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4,5-Trichlorophenol	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
2-Chloronaphthalene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2-Nitroaniline	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
Dimethylphthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Acenaphthylene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,6-Dinitrotoluene	ug/Kg	770 U	840 U	790 U	780 U	86 J		780 U
3-Nitroaniline	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
Acenaphthene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4-Dinitrophenol	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
4-Nitrophenol	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
Dibenzofuran	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
2,4-Dinitrotoluene	ug/Kg	770 U	840 U	790 U	510 J	1300		290 J
Diethylphthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
4-Chlorophenyl-phenylether	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Fluorene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
4-Nitroaniline	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
4,6-Dinitro-2-methylphenol	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
N-Nitrosodiphenylamine	ug/Kg	770 U	840 U	790 U	780 U	280 J		780 U
4-Bromophenyl-phenylether	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Hexachlorobenzene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Pentachlorophenol	ug/Kg	3700 U	4100 U	3800 U	3800 U	3800 U		3800 U
Phenanthrene	ug/Kg	770 U	840 U	790 U	780 U	790 U		96 J
Anthracene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Fluoranthene	ug/Kg	770 U	840 U	790 U	780 U	790 U		120 J
Pyrene	ug/Kg	770 U	840 U	790 U	780 U	790 U		110 J
Butylbenzylphthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
3,3'-Dichlorobenzidine	ug/Kg	1500 U	1700 U	1600 U	1600 U	1600 U		1600 U
Benzo(a)anthracene	ug/Kg	770 U	840 U	790 U	780 U	790 U		75 J
Chrysene	ug/Kg	770 U	840 U	790 U	780 U	790 U		100 J
bis(2-Ethylhexyl)phthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Di-n-octylphthalate	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Benzo(b)fluoranthene	ug/Kg	770 U	840 U	790 U	780 U	790 U		120 J
Benzo(k)fluoranthene	ug/Kg	770 U	840 U	790 U	780 U	790 U		75 J
Benzo(a)pyrene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Indeno(1,2,3-cd)pyrene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Dibenz(a,h)anthracene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U
Benzo(g,h,i)perylene	ug/Kg	770 U	840 U	790 U	780 U	790 U		780 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G	PAD G
	DEPTH	0-2'	0-6"	0-2'	0-6"	0-2'	2-4'	0-6"
	DATE	01/09/92	01/09/92	01/09/92	01/10/92	01/10/92	01/10/92	01/13/92
	ES ID	PBG-3-2	PBG-4-1	PBG-4-2	PBG-5-1	PBG-5-2	PBG-5-3	PBG-6-1
	LAB ID	152113	152203	152204	152206	152207	152208	152363
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
beta-BHC	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
delta-BHC	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
gamma-BHC (Lindane)	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
Heptachlor	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
Aldrin	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
Heptachlor epoxide	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
Endosulfan I	ug/kg	19 U	20 U	19 U	19 U	19 U		19 U
Dieldrin	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
4,4'-DDE	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
Endrin	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
Endosulfan II	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
4,4'-DDD	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
Endosulfan sulfate	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
4,4'-DDT	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
Methoxychlor	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Endrin ketone	ug/kg	37 U	41 U	36 U	38 U	38 U		38 U
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
gamma-Chlordane	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Toxaphene	ug/kg	370 U	410 U	380 U	380 U	380 U		380 U
Aroclor-1016	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Aroclor-1221	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Aroclor-1232	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Aroclor-1242	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Aroclor-1248	ug/kg	190 U	200 U	190 U	190 U	190 U		190 U
Aroclor-1254	ug/kg	370 U	410 U	380 U	380 U	380 U		380 U
Aroclor-1260	ug/kg	370 U	410 U	380 U	380 U	380 U		380 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	LOCATION	DEPTH	DATE	ES ID	LAB ID	UNITS						
	SOIL	PAD G	0-2'	01/09/92	PBG-3-2	152113		SOIL	PAD G	0-6"	01/09/92	PBG-4-1	152203
	SOIL	PAD G	0-2'	01/09/92	PBG-4-2	152204		SOIL	PAD G	0-6"	01/10/92	PBG-5-1	152206
	SOIL	PAD G	0-2'	01/10/92	PBG-5-2	152207		SOIL	PAD G	2-4'	01/10/92	PBG-5-3	152208
	SOIL	PAD G	0-6"	01/13/92	PBG-6-1	152363							
Explosives													
HMX	ug/Kg	1000	U	1000	U	J		1000	U	1000	U	J	
RDX	ug/Kg	120	U	120	U	J		120	U	120	U	J	
1,3,5-Trinitrobenzene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
1,3-Dinitrobenzene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
Tetryl	ug/Kg	400	U	400	U	J		400	U	400	U	J	
2,4,6-Trinitrotoluene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
4-amino-2,6-Dinitrotoluene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
2-amino-4,6-Dinitrotoluene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
2,6-Dinitrotoluene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
2,4-Dinitrotoluene	ug/Kg	120	U	120	U	J		120	U	120	U	J	
Metals													
Aluminum	mg/kg	18200		18000				21200		18100			
Antimony	mg/kg	7.4	J	8.7	U	J		8.2	U	J	8	U	J
Arsenic	mg/kg	5.7	J	5.2	J			5.1	J	4.8	J		
Barium	mg/kg	233		157				134		167			
Beryllium	mg/kg	0.94	R	0.86	R			0.86	R	0.86	R		
Cadmium	mg/kg	4.2		20.7				3.4		5.9			
Calcium	mg/kg	6040		26200				3410		4080			
Chromium	mg/kg	29.4	J	25.6	J			28.5	J	21	J		
Cobalt	mg/kg	15.3		12.3				12.1		11			
Copper	mg/kg	48.3		80.8				27		26			
Iron	mg/kg	30300		26500				31400		21200			
Lead	mg/kg	65.7		639				43.3	R	88.5			
Magnesium	mg/kg	5640		5050				4660		3680			
Manganese	mg/kg	948		693				736		750			
Mercury	mg/kg	0.13	R	0.17	R			0.19	R	0.28	R		
Nickel	mg/kg	53.5	J	30.7	J			29.1	J	19.8	J		
Potassium	mg/kg	1630	J	1810	J			2160	J	1680	J		
Selenium	mg/kg	0.14	U	0.19	U			0.22	U	0.38	J		
Silver	mg/kg	0.36	U	0.56	J			0.39	U	0.39	U		
Sodium	mg/kg	92.6	J	129	J			128	J	83.1	J		
Thallium	mg/kg	0.34	U	0.48	J			0.52	U	0.51	U		
Vanadium	mg/kg	27.2		25.4				30.3		25.9			
Zinc	mg/kg	172		216				93.1		127			
Cyanide	mg/kg	0.66	U	0.62	U			0.68	U	0.64	U		

COMPOUND	MATRIX	LOCATION	DEPTH	DATE	ES ID	LAB ID	UNITS						
	SOIL	PAD G	0-2'	01/10/92	PBG-5-2	152207		SOIL	PAD G	2-4'	01/10/92	PBG-5-3	152208
	SOIL	PAD G	0-6"	01/13/92	PBG-6-1	152363							
Explosives													
HMX	ug/Kg	1000	U										
RDX	ug/Kg	120	U										
1,3,5-Trinitrobenzene	ug/Kg	120	U										
1,3-Dinitrobenzene	ug/Kg	120	U										
Tetryl	ug/Kg	400	U										
2,4,6-Trinitrotoluene	ug/Kg	120	U										
4-amino-2,6-Dinitrotoluene	ug/Kg	590											
2-amino-4,6-Dinitrotoluene	ug/Kg	360											
2,6-Dinitrotoluene	ug/Kg	120	U										
2,4-Dinitrotoluene	ug/Kg	1200											
Metals													
Aluminum	mg/kg	19200		13300									
Antimony	mg/kg	5.9	U	J	5.8	U	J						
Arsenic	mg/kg	4.4	J	5.3									
Barium	mg/kg	161		511	R								
Beryllium	mg/kg	0.91	R	0.75	R								
Cadmium	mg/kg	3.1		7.8	J								
Calcium	mg/kg	5170		21200									
Chromium	mg/kg	23.9	J	45.7	J								
Cobalt	mg/kg	12.2		11.4									
Copper	mg/kg	37.8		439									
Iron	mg/kg	22400		23400									
Lead	mg/kg	50.2	R	291									
Magnesium	mg/kg	3970		5630									
Manganese	mg/kg	826		477									
Mercury	mg/kg	0.29	R	0.08	R								
Nickel	mg/kg	22.4	J	36									
Potassium	mg/kg	1890	J	1990	J								
Selenium	mg/kg	0.97	U	2.1	J								
Silver	mg/kg	0.38	U	0.37	U								
Sodium	mg/kg	115	J	441	J								
Thallium	mg/kg	0.48	U	0.51	J								
Vanadium	mg/kg	27.1		18.7	J								
Zinc	mg/kg	129		1560									
Cyanide	mg/kg	0.67	U	0.58	U								

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	OB	OB
	DEPTH	4' +	4' +	0-6"	0-6"	0-2'	0-2	2-4
	DATE	01/13/92	01/13/13	01/13/92	01/13/92	01/13/92	01/14/93	01/14/93
	ES ID	PBG-6-4	PBG-6-4RE	PBG-7-1	PBG-7-1RE	PBG-7-2	PBG-8-1	PBG-8-2
	LAB ID	152366	152366	152368	152368	152369	177323	177324
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Bromomethane	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Vinyl Chloride	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Chloroethane	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Methylene Chloride	ug/Kg	6 U J	12 U	6 U J	11 U J	6 U	12 U	
Acetone	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Carbon Disulfide	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,1-Dichloroethene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,1-Dichloroethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,2-Dichloroethene (total)	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Chloroform	ug/Kg	6 U J	6 U	6 U J	1 J	6 U	12 U	
1,2-Dichloroethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
2-Butanone	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
1,1,1-Trichloroethane	ug/Kg	6 U J	6 U	6 U J	6 U J	2 J	12 U	
Carbon Tetrachloride	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Vinyl Acetate	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U		
Bromodichloromethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,2-Dichloropropane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
cis-1,3-Dichloropropene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Trichloroethene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Dibromochloromethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,1,2-Trichloroethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Benzene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
trans-1,3-Dichloropropene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Bromoform	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
4-Methyl-2-Pentanone	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
2-Hexanone	ug/Kg	11 U J	11 U	11 U J	11 U J	12 U	12 U	
Tetrachloroethene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
1,1,2,2-Tetrachloroethane	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Toluene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Chlorobenzene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Ethylbenzene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Styrene	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	
Xylene (total)	ug/Kg	6 U J	6 U	6 U J	6 U J	6 U	12 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	OB	OB
	DEPTH	4' +	4' +	0-6"	0-6"	0-2'	0-2	2-4
	DATE	01/13/92	01/13/13	01/13/92	01/13/92	01/13/92	01/14/93	01/14/93
	ES ID	PBG-6-4	PBG-6-4RE	PBG-7-1	PBG-7-1RE	PBG-7-2	PBG-8-1	PBG-8-2
	LAB ID	152366	152366	152368	152368	152369	177323	177324
	UNITS							
Semivolatiles								
Phenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
bis(2-Chloroethyl) ether	ug/Kg	760 U		740 U		720 U	400 U	390 U
2-Chlorophenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
1,3-Dichlorobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
1,4-Dichlorobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Benzyl Alcohol	ug/Kg	760 U		740 U		720 U		
1,2-Dichlorobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
2-Methylphenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	760 U		740 U		720 U	400 U	390 U
4-Methylphenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
N-Nitroso-di-n-propylamine	ug/Kg	760 U		740 U		720 U	400 U	390 U
Hexachloroethane	ug/Kg	760 U		740 U		720 U	400 U	390 U
Nitrobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Isophorone	ug/Kg	760 U		740 U		720 U	400 U	390 U
2-Nitrophenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4-Dimethylphenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
Benzoic acid	ug/Kg	3700 U		3600 U		3500 U		
bis(2-Chloroethoxy) methane	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4-Dichlorophenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
1,2,4-Trichlorobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Naphthalene	ug/Kg	760 U		740 U		720 U	400 U	390 U
4-Chloroaniline	ug/Kg	760 U		740 U		720 U	400 U	390 U
Hexachlorobutadiene	ug/Kg	760 U		740 U		720 U	400 U	390 U
4-Chloro-3-methylphenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
2-Methylnaphthalene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Hexachlorocyclopentadiene	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4,6-Trichlorophenol	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4,5-Trichlorophenol	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
2-Chloronaphthalene	ug/Kg	760 U		740 U		720 U	400 U	390 U
2-Nitroaniline	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
Dimethylphthalate	ug/Kg	760 U		740 U		720 U	400 U	390 U
Acenaphthylene	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,6-Dinitrotoluene	ug/Kg	760 U		740 U		150 J	400 U	390 U
3-Nitroaniline	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
Acenaphthene	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4-Dinitrophenol	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
4-Nitrophenol	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
Dibenzofuran	ug/Kg	760 U		740 U		720 U	400 U	390 U
2,4-Dinitrotoluene	ug/Kg	78 J		740 U		3600	170 J	390 U
Diethylphthalate	ug/Kg	760 U		740 U		720 U	400 U	390 U
4-Chlorophenyl-phenylether	ug/Kg	760 U		740 U		720 U	400 U	390 U
Fluorene	ug/Kg	760 U		740 U		720 U	400 U	390 U
4-Nitroaniline	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
4,6-Dinitro-2-methylphenol	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
N-Nitrosodiphenylamine	ug/Kg	760 U		740 U		480 J	58 J	390 U
4-Bromophenyl-phenylether	ug/Kg	760 U		740 U		720 U	400 U	390 U
Hexachlorobenzene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Pentachlorophenol	ug/Kg	3700 U		3600 U		3500 U	970 U	960 U
Phenanthrene	ug/Kg	760 U		230 J		720 U	400 U	390 U
Anthracene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Carbazole	ug/Kg						400 U	390 U
Di-n-butylphthalate	ug/Kg	760 U		320 J		720 U	21 J	26 J
Fluoranthene	ug/Kg	760 U		420 J		720 U	400 U	390 U
Pyrene	ug/Kg	760 U		400 J		720 U	400 U	390 U
Butylbenzylphthalate	ug/Kg	760 U		740 U		720 U	400 U	390 U
3,3'-Dichlorobenzidine	ug/Kg	1500 U		1500 U		1400 U	400 U	390 U
Benzo(a)anthracene	ug/Kg	760 U		270 J		720 U	400 U	390 U
Chrysene	ug/Kg	760 U		330 J		720 U	400 U	390 U
bis(2-Ethylhexyl)phthalate	ug/Kg	760 U		740 U		720 U	210 J	210 J
Di-n-octylphthalate	ug/Kg	760 U		740 U		720 U	400 U	390 U
Benzo(b)fluoranthene	ug/Kg	760 U		400 J		720 U	400 U	390 U
Benzo(k)fluoranthene	ug/Kg	760 U		210 J		720 U	400 U	390 U
Benzo(a)pyrene	ug/Kg	760 U		230 J		720 U	400 U	390 U
Indeno(1,2,3-cd)pyrene	ug/Kg	760 U		180 J		720 U	400 U	390 U
Dibenz(a,h)anthracene	ug/Kg	760 U		740 U		720 U	400 U	390 U
Benzo(g,h,i)perylene	ug/Kg	760 U		210 J		720 U	400 U	390 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	OB	OB
	DEPTH	4' +	4' +	0-6"	0-6"	0-2'	0-2	2-4
	DATE	01/13/92	01/13/13	01/13/92	01/13/92	01/13/92	01/14/93	01/14/93
	ES ID	PBG-6-4	PBG-6-4RE	PBG-7-1	PBG-7-1RE	PBG-7-2	PBG-8-1	PBG-8-2
	LAB ID	152366	152366	152368	152368	152369	177323	177324
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	19 U		18 U		17 U	2.1 U	2 U
beta-BHC	ug/kg	19 U		18 U		17 U	2.1 U	2 U
delta-BHC	ug/kg	19 U		18 U		17 U	2.1 U	2 U
gamma-BHC (Lindane)	ug/kg	19 U		18 U		17 U	2.1 U	2 U
Heptachlor	ug/kg	19 U		18 U		17 U	2.1 U	2 U
Aldrin	ug/kg	19 U		18 U		17 U	2.1 U	2 U
Heptachlor epoxide	ug/kg	19 U		18 U		17 U	2.1 U	2 U
Endosulfan I	ug/kg	19 U		18 U		17 U	2.1 U	2 U
Dieldrin	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
4,4'-DDE	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
Endrin	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
Endosulfan II	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
4,4'-DDD	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
Endosulfan sulfate	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
4,4'-DDT	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
Methoxychlor	ug/kg	190 U		180 U		170 U	21 U	20 U
Endrin ketone	ug/kg	37 U		36 U		35 U	4.1 U	3.9 U
Endrin aldehyde	ug/kg						4.1 U	3.9 U
alpha-Chlordane	ug/kg	190 U		180 U		170 U	2.1 U	2 U
gamma-Chlordane	ug/kg	190 U		180 U		170 U	2.1 U	2 U
Toxaphene	ug/kg	370 U		360 U		350 U	210 U	200 U
Aroclor-1016	ug/kg	190 U		180 U		170 U	41 U	39 U
Aroclor-1221	ug/kg	190 U		180 U		170 U	83 U	80 U
Aroclor-1232	ug/kg	190 U		180 U		170 U	41 U	39 U
Aroclor-1242	ug/kg	190 U		180 U		170 U	41 U	39 U
Aroclor-1248	ug/kg	190 U		180 U		170 U	41 U	39 U
Aroclor-1254	ug/kg	370 U		360 U		350 U	41 U	39 U
Aroclor-1260	ug/kg	370 U		360 U		350 U	41 U	39 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD G	PAD G	PAD G	PAD G	PAD G	OB	OB
	DEPTH	4' +	4' +	0-6"	0-6"	0-2'	0-2	2-4
	DATE	01/13/92	01/13/13	01/13/92	01/13/92	01/13/92	01/14/93	01/14/93
	ES ID	PBG-6-4	PBG-6-4RE	PBG-7-1	PBG-7-1RE	PBG-7-2	PBG-8-1	PBG-8-2
	LAB ID	152366	152366	152368	152368	152369	177323	177324
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U		1000 U		1000 U	120 U	120 U
RDX	ug/Kg	120 U		120 U		120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U		80 J		120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U		120 U		120 U	120 U	120 U
Tetryl	ug/Kg	400 U		400 U		400 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U		120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U		210	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U		220	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	260		79 J		4000	3000 J	75 J
Metals								
Aluminum	mg/kg	22600		24900		19600	18100	14600
Antimony	mg/kg	6.2 UJ		6.1 J		9.8 J	6.2 UJ	5.8 UJ
Arsenic	mg/kg	3.9		6.8		3.7	5 J	4 J
Barium	mg/kg	354 R		1850		366 R	155	114
Beryllium	mg/kg	1.1 R		0.88 R		1 R	0.97	0.69
Cadmium	mg/kg	6.1 J		17 J		7.1 J	0.36 U	0.33 U
Calcium	mg/kg	12600		30200		25300	9770	52900
Chromium	mg/kg	156 J		54.7 J		53.4 J	263	28.6
Cobalt	mg/kg	15		15.1		15.4	13.6	11
Copper	mg/kg	162		15500		185	36.5 R	28.7 R
Iron	mg/kg	34600		48800		42900	26200	26200
Lead	mg/kg	37.5 R		1700		332	64.3 J	23.6 J
Magnesium	mg/kg	7190		9300		8340	5530	10900
Manganese	mg/kg	730		616		520	590	871
Mercury	mg/kg	0.13 R		0.08 R		0.09 R	0.03 U	0.04 J
Nickel	mg/kg	47.1		52.6		50.8	33.5	37.9
Potassium	mg/kg	3240 J		2580 J		2920 J	1470	1290
Selenium	mg/kg	0.18 UJ		3.3 J		0.7 J	0.26 UJ	0.23 UJ
Silver	mg/kg	0.39 U		2		0.36 U	0.37 U	0.34 U
Sodium	mg/kg	380 J		618		227 J	87.6 J	124 J
Thallium	mg/kg	0.59 J		0.33 U		0.53 J	0.61 U	0.54 U
Vanadium	mg/kg	30.4 J		29 J		27.2 J	28.6	22.3
Zinc	mg/kg	799		6380		772	116 J	95.2 J
Cyanide	mg/kg	0.69 U		0.62 U		0.65 U	0.74 U	0.69 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-H	PAD-H	PAD H
	DEPTH	4-6	0-2	0-2	2-4	0-6"	0-2'	0-2'
	DATE	01/14/93	01/14/93	01/12/93	01/12/93	12/12/91	12/12/91	12/12/91
	ES ID	PBG-8-3	PBG-8-6	PBG-9-1	PBG-9-2	PBH-1-1	PBH-1-2	PBH-1-2RE
	LAB ID	177325	177326	177195	177196	150794	150795	150795
	UNITS		DUP PBG-8-1					
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
Bromomethane	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
Vinyl Chloride	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
Chloroethane	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
Methylene Chloride	ug/Kg	11 U	12 U	2 J	12 U	5 U	5 U J	5 U J
Acetone	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	18 U J
Carbon Disulfide	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,1-Dichloroethene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,1-Dichloroethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,2-Dichloroethene (total)	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Chloroform	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,2-Dichloroethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
2-Butanone	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
1,1,1-Trichloroethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Carbon Tetrachloride	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Vinyl Acetate	ug/Kg					11 U	10 U J	10 U J
Bromodichloromethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,2-Dichloropropane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
cis-1,3-Dichloropropene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Trichloroethene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Dibromochloromethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
1,1,2-Trichloroethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Benzene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
trans-1,3-Dichloropropene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Bromoform	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
4-Methyl-2-Pentanone	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
2-Hexanone	ug/Kg	11 U	12 U	13 U	12 U	11 U	10 U J	10 U J
Tetrachloroethene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	2 J
1,1,2,2-Tetrachloroethane	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Toluene	ug/Kg	11 U	12 U	13 U	2 J	5 U	3 J	1 J
Chlorobenzene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Ethylbenzene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Styrene	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J
Xylene (total)	ug/Kg	11 U	12 U	13 U	12 U	5 U	5 U J	5 U J

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-H	PAD-H	PAD H
	DEPTH	4-6	0-2	0-2	2-4	0-6"	0-2'	0-2'
	DATE	01/14/93	01/14/93	01/12/93	01/12/93	12/12/91	12/12/91	12/12/91
	ES ID	PBG-6-3	PBG-6-6	PBG-9-1	PBG-9-2	PBH-1-1	PBH-1-2	PBH-1-2RE
	LAB ID	177325	177326	177195	177196	150794	150795	150795
COMPOUND	UNITS		DUP PBG-6-1					
Semivolatiles								
Phenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
bis(2-Chloroethyl) ether	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2-Chlorophenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
1,3-Dichlorobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
1,4-Dichlorobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Benzyl Alcohol	ug/Kg					710 U	680 U	
1,2-Dichlorobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2-Methylphenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
4-Methylphenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
N-Nitroso-di-n-propylamine	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Hexachloroethane	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Nitrobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Isophorone	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2-Nitrophenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4-Dimethylphenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Benzoic acid	ug/Kg					3400 U	3300 U	
bis(2-Chloroethoxy) methane	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4-Dichlorophenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
1,2,4-Trichlorobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Naphthalene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
4-Chloroaniline	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Hexachlorobutadiene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
4-Chloro-3-methylphenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2-Methylnaphthalene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Hexachlorocyclopentadiene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4,6-Trichlorophenol	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4,5-Trichlorophenol	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
2-Chloronaphthalene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2-Nitroaniline	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
Dimethylphthalate	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Acenaphthylene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,6-Dinitrotoluene	ug/Kg		380 J	360 U	380 U	510 J	680 U	
3-Nitroaniline	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
Acenaphthene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4-Dinitrophenol	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
4-Nitrophenol	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
Dibenzofuran	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
2,4-Dinitrotoluene	ug/Kg		6600 J	360 U	380 U	2200	760	
Diethylphthalate	ug/Kg		1200 U	360 U	22 J	710 U	680 U	
4-Chlorophenyl-phenylether	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Fluorene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
4-Nitroaniline	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
4,6-Dinitro-2-methylphenol	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
N-Nitrosodiphenylamine	ug/Kg		290 J	360 U	380 U	71 J	680 U	
4-Bromophenyl-phenylether	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Hexachlorobenzene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Pentachlorophenol	ug/Kg		3000 U	860 U	930 U	3400 U	3300 U	
Phenanthrene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Anthracene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Carbazole	ug/Kg		1200 U	360 U	380 U			
Di-n-butylphthalate	ug/Kg		5800 J	360 U	380 U	1500	110 J	
Fluoranthene	ug/Kg		1200 U	13 J	380 U	710 U	680 U	
Pyrene	ug/Kg		1200 U	13 J	380 U	710 U	680 U	
Butylbenzylphthalate	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
3,3'-Dichlorobenzidine	ug/Kg		1200 U	360 U	380 U	1400 U	1400 U	
Benzo(a)anthracene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Chrysene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
bis(2-Ethylhexyl)phthalate	ug/Kg		230 J	360 U	380 U	710 U	680 U	
Di-n-octylphthalate	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Benzo(b)fluoranthene	ug/Kg		1200 U	17 J	380 U	710 U	680 U	
Benzo(k) fluoranthene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Benzo(a)pyrene	ug/Kg		1200 U	14 J	380 U	710 U	680 U	
Indeno(1,2,3-cd)pyrene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Dibenz(a,h)anthracene	ug/Kg		1200 U	360 U	380 U	710 U	680 U	
Benzo(g,h,i)perylene	ug/Kg		1200 U	120 J	380 U	710 U	680 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-H	PAD-H	PAD H
	DEPTH	4-6	0-2	0-2	2-4	0-6"	0-2'	0-2'
	DATE	01/14/93	01/14/93	01/12/93	01/12/93	12/12/91	12/12/91	12/12/91
	ES ID	PBG-8-3	PBG-8-6	PBG-9-1	PBG-9-2	PBH-1-1	PBH-1-2	PBH-1-2RE
	LAB ID	177325	177326	177195	177196	150794	150795	150795
COMPOUND	UNITS		DUP PBG-8-1					
Pesticides/PCBs								
alpha-BHC	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
beta-BHC	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
delta-BHC	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
gamma-BHC (Lindane)	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
Heptachlor	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
Aldrin	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
Heptachlor epoxide	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
Endosulfan I	ug/kg		2 U	1.9 U	2 U	17 U	17 U	
Dieldrin	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
4,4'-DDE	ug/kg		3.8 U	1.9 J	3.8 U	34 U	33 U	
Endrin	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
Endosulfan II	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
4,4'-DDD	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
Endosulfan sulfate	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
4,4'-DDT	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
Methoxychlor	ug/kg		20 U	19 U	20 U	170 U	170 U	
Endrin ketone	ug/kg		3.8 U	3.6 U	3.8 U	34 U	33 U	
Endrin aldehyde	ug/kg		3.8 U	3.6 U	3.8 U			
alpha-Chlordane	ug/kg		2 U	3.5 J	2 U	170 U	170 U	
gamma-Chlordane	ug/kg		2 U	1.9 U	2 U	170 U	170 U	
Toxaphene	ug/kg		200 U	190 U	200 U	340 U	330 U	
Aroclor-1016	ug/kg		38 U	36 U	38 U	170 U	170 U	
Aroclor-1221	ug/kg		77 U	73 U	77 U	170 U	170 U	
Aroclor-1232	ug/kg		38 U	36 U	38 U	170 U	170 U	
Aroclor-1242	ug/kg		38 U	36 U	38 U	170 U	170 U	
Aroclor-1248	ug/kg		38 U	36 U	38 U	170 U	170 U	
Aroclor-1254	ug/kg		38 U	36 U	38 U	340 U	330 U	
Aroclor-1260	ug/kg		38 U	36 U	38 U	340 U	330 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	PAD-H	PAD-H	PAD H
	DEPTH	4-6	0-2	0-2	2-4	0-6"	0-2'	0-2'
	DATE	01/14/93	01/14/93	01/12/93	01/12/93	12/12/91	12/12/91	12/12/91
	ES ID	PBG-8-3	PBG-8-6	PBG-9-1	PBG-9-2	PBH-1-1	PBH-1-2	PBH-1-2RE
	LAB ID	177325	177326	177195	177196	150794	150795	150795
COMPOUND	UNITS		DUP PBG-8-1					
Explosives								
HMX	ug/Kg		120 U	120 U	120 U	1000 U	1000 U	
RDX	ug/Kg		120 U	120 U	120 U	120 U	120 U	
1,3,5-Trinitrobenzene	ug/Kg		120 U	120 U	120 U	200	350	
1,3-Dinitrobenzene	ug/Kg		120 U	120 U	120 U	440	150	
Tetryl	ug/Kg		120 U	120 U	120 U	400 U	400 U	
2,4,6-Trinitrotoluene	ug/Kg		120 U	120 U	120 U	120 U	910	
4-amino-2,6-Dinitrotoluene	ug/Kg		120 U	120 U	120 U	120 U	610	
2-amino-4,6-Dinitrotoluene	ug/Kg		120 U	120 U	120 U	120 U	1300	
2,6-Dinitrotoluene	ug/Kg		120 U	120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/Kg		410 J	120 J	120 U	3900	1500	
Metals								
Aluminum	mg/kg		14500	13300	14400	14000	13300	
Antimony	mg/kg		9.1 J	5.7 UJ	6 UJ	6.1 R	5.3 R	
Arsenic	mg/kg		4.6 J	6.2 J	4.7 J	4.7 J	3.7 J	
Barium	mg/kg		163	141	122	1810	571 J	
Beryllium	mg/kg		0.65	0.74	0.72	0.58 R	0.59 R	
Cadmium	mg/kg		0.34 U	0.51 J	0.34 U	4.5	3.6	
Calcium	mg/kg		14100	14600	29400	25200	26700	
Chromium	mg/kg		129	19.9	22.9	21.9	22.1	
Cobalt	mg/kg		12.5	10.5	11.9	11.2	11.2	
Copper	mg/kg		52.1 R	23.4 R	37.7 R	43.5	42.6	
Iron	mg/kg		24900	21600	26800	25400	26900	
Lead	mg/kg		145 J	24.4 J	38.1 J	75.8	58.8	
Magnesium	mg/kg		5220	4500	6080	6980	6380	
Manganese	mg/kg		490	644	537	315	336	
Mercury	mg/kg		0.04 J	0.04 J	0.04 J	0.09	0.04 U	
Nickel	mg/kg		35.2	26.7	38.3	41.6	39.8	
Potassium	mg/kg		1420	1370	1260	1440	1430	
Selenium	mg/kg		0.2 UJ	0.41 J	0.14 UJ	0.24 J	0.11 J	
Silver	mg/kg		0.35 U	0.34 U	0.35 U	0.99 U	0.87 U	
Sodium	mg/kg		86.5 J	74 J	114 J	109 J	113 J	
Thallium	mg/kg		0.47 U	0.48 U	0.32 U	0.52 U	0.33 U	
Vanadium	mg/kg		22.6	22.3	22.3	16.7	16.3	
Zinc	mg/kg		197 J	77.5 J	118 J	217	402	
Cyanide	mg/kg		0.7 U	0.66 U	0.71 U	0.63 U	0.59 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	0-2	2-4	0-2	0-2	0-2	0-2	0-2
	DATE	01/14/93	01/14/93	01/14/93	03/12/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBH-2-1	PBH2-1RE	PBH-2-2	PBH-3-1	PBH3-1RE	PBH-4-1	PBH4-1RE	PBH-5-1
	LAB ID	177327	177327R1	177328	179987	179987R1	179988	179988R1	179989
COMPOUND	UNITS								
Volatile Organic Compounds									
Chloromethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Bromomethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Vinyl Chloride	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Chloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Methylene Chloride	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Acetone	ug/Kg	11 U	11 U	100	11 U	11 U	10 U	10 U	11 U
Carbon Disulfide	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,1-Dichloroethene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,1-Dichloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,2-Dichloroethene (total)	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Chloroform	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,2-Dichloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
2-Butanone	ug/Kg	11 U	11 U	22	11 U	11 U	10 U	10 U	11 U
1,1,1-Trichloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Carbon Tetrachloride	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Vinyl Acetate	ug/Kg								
Bromodichloromethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,2-Dichloropropane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
cis-1,3-Dichloropropene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Trichloroethene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Dibromochloromethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
1,1,2-Trichloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Benzene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
trans-1,3-Dichloropropene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Bromoform	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
4-Methyl-2-Pentanone	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
2-Hexanone	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Tetrachloroethene	ug/Kg	11 U	11 U	11 U	11 U	11 U	4 J	4 J	2 J
1,1,2,2-Tetrachloroethane	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Toluene	ug/Kg	11 U	11 U	11 U	11 U	11 U	3 J	3 J	11 U
Chlorobenzene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Ethylbenzene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Styrene	ug/Kg	11 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U
Xylene (total)	ug/Kg	11 U	11 U	11 J	11 U	11 U	10 U	10 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	0-2	2-4	0-2	0-2	0-2	0-2	0-2
	DATE	01/14/93	01/14/93	01/14/93	03/12/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBH-2-1	PBH2-1RE	PBH-2-2	PBH-3-1	PBH3-1RE	PBH-4-1	PBH4-1RE	PBH-5-1
	LAB ID	177327	177327R1	177328	179987	179987R1	179988	179988R1	179989
COMPOUND	UNITS								
Semivolatiles									
Phenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
bis(2-Chloroethyl) ether	ug/Kg	350 U		730 U	360 U		350 U		350 U
2-Chlorophenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
1,3-Dichlorobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
1,4-Dichlorobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzyl Alcohol	ug/Kg								
1,2-Dichlorobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
2-Methylphenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	350 U		730 U	360 U		350 U		350 U
4-Methylphenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
N-Nitroso-di-n-propylamine	ug/Kg	350 U		730 U	360 U		350 U		350 U
Hexachloroethane	ug/Kg	350 U		730 U	360 U		350 U		350 U
Nitrobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Isophorone	ug/Kg	350 U		730 U	360 U		350 U		350 U
2-Nitrophenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,4-Dimethylphenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzoic acid	ug/Kg								
bis(2-Chloroethoxy) methane	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,4-Dichlorophenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
1,2,4-Trichlorobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Naphthalene	ug/Kg	350 U		570 J	360 U		250 J		350 U
4-Chloroaniline	ug/Kg	350 U		730 U	360 U		350 U		350 U
Hexachlorobutadiene	ug/Kg	350 U		730 U	360 U		350 U		350 U
4-Chloro-3-methylphenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
2-Methylnaphthalene	ug/Kg	350 U		4700	360 U		1100		350 U
Hexachlorocyclopentadiene	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,4,6-Trichlorophenol	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,4,5-Trichlorophenol	ug/Kg	850 U		1800 U	860 U		850 U		850 U
2-Chloronaphthalene	ug/Kg	350 U		730 U	360 U		350 U		350 U
2-Nitroaniline	ug/Kg	850 U		1800 U	860 U		850 U		20 J
Dimethylphthalate	ug/Kg	350 U		730 U	360 U		350 U		350 U
Acenaphthylene	ug/Kg	350 U		730 U	360 U		350 U		350 U
2,6-Dinitrotoluene	ug/Kg	220 J		140 J	110 J		83 J		170 J
3-Nitroaniline	ug/Kg	850 U		1800 U	860 U		850 U		850 U
Acenaphthene	ug/Kg	350 U		480 J	360 U		120 J		350 U
2,4-Dinitrophenol	ug/Kg	850 U		1800 U	860 U		850 U		850 U
4-Nitrophenol	ug/Kg	850 U		1800 U	860 U		850 U		850 U
Dibenzofuran	ug/Kg	350 U		730 U	360 U		82 J		350 U
2,4-Dinitrotoluene	ug/Kg	590		730 U	400		610		660
Diethylphthalate	ug/Kg	350 U		730 U	18 J		350 U		350 U
4-Chlorophenyl-phenylether	ug/Kg	350 U		730 U	360 U		350 U		350 U
Fluorene	ug/Kg	350 U		710 J	360 U		160 J		350 U
4-Nitroaniline	ug/Kg	850 U		1800 U	860 U		850 U		850 U
4,6-Dinitro-2-methylphenol	ug/Kg	850 U		1800 U	860 U		850 U		850 U
N-Nitrosodiphenylamine	ug/Kg	350 U		730 U	360 U		350 U		350 U
4-Bromophenyl-phenylether	ug/Kg	350 U		730 U	360 U		350 U		350 U
Hexachlorobenzene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Pentachlorophenol	ug/Kg	850 U		1800 U	860 U		850 U		850 U
Phenanthrene	ug/Kg	350 U		1700	360 U		260 J		350 U
Anthracene	ug/Kg	350 U		730 U	360 U		53 J		350 U
Carbazole	ug/Kg	350 U		730 U	360 U		350 U		350 U
Di-n-butylphthalate	ug/Kg	500		98 J	160 J		140 J		250 J
Fluoranthene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Pyrene	ug/Kg	350 U		730 U	360 U		30 J		350 U
Butylbenzylphthalate	ug/Kg	350 U		730 U	360 U		350 U		350 U
3,3'-Dichlorobenzidine	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzo(a)anthracene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Chrysene	ug/Kg	350 U		730 U	360 U		350 U		350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	190 J		400 J	360 U		350 U		350 U
Di-n-octylphthalate	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzo(b)fluoranthene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzo(k)fluoranthene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzo(a)pyrene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Dibenz(a,h)anthracene	ug/Kg	350 U		730 U	360 U		350 U		350 U
Benzo(g,h,i)perylene	ug/Kg	350 U		730 U	360 U		350 U		350 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	0-2	2-4	0-2	0-2	0-2	0-2	0-2
	DATE	01/14/93	01/14/93	01/14/93	03/12/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBH-2-1	PBH2-1RE	PBH-2-2	PBH-3-1	PBH3-1RE	PBH-4-1	PBH4-1RE	PBH-5-1
	LAB ID	177327	177327R1	177328	179987	179987R1	179988	179988R1	179989
COMPOUND	UNITS								
Pesticides/PCBs									
alpha-BHC	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
beta-BHC	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		2.1 J
delta-BHC	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
gamma-BHC (Lindane)	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Heptachlor	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Aldrin	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Heptachlor epoxide	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Endosulfan I	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Dieldrin	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
4,4'-DDE	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
Endrin	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
Endosulfan II	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
4,4'-DDD	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
Endosulfan sulfate	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
4,4'-DDT	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
Methoxychlor	ug/kg	18 U		19 U	18 U		36 U		18 U
Endrin ketone	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
Endrin aldehyde	ug/kg	3.5 U		3.7 U	3.5 U		6.9 U		3.5 U
alpha-Chlordane	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
gamma-Chlordane	ug/kg	1.8 U		1.9 U	1.8 U		3.6 U		1.8 U
Toxaphene	ug/kg	180 U		190 U	180 U		360 U		180 U
Aroclor-1016	ug/kg	35 U		37 U	35 U		69 U		35 U
Aroclor-1221	ug/kg	72 U		75 U	72 U		140 U		72 U
Aroclor-1232	ug/kg	35 U		37 U	35 U		69 U		35 U
Aroclor-1242	ug/kg	35 U		37 U	35 U		69 U		35 U
Aroclor-1248	ug/kg	35 U		37 U	35 U		69 U		35 U
Aroclor-1254	ug/kg	35 U		37 U	35 U		69 U		35 U
Aroclor-1260	ug/kg	35 U		37 U	35 U		69 U		35 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH	0-2	0-2	2-4	0-2	0-2	0-2	0-2	0-2
	DATE	01/14/93	01/14/93	01/14/93	03/12/93	03/12/93	03/12/93	03/12/93	03/12/93
	ES ID	PBH-2-1	PBH2-1RE	PBH-2-2	PBH-3-1	PBH3-1RE	PBH-4-1	PBH4-1RE	PBH-5-1
	LAB ID	177327	177327R1	177328	179987	179987R1	179988	179988R1	179989
COMPOUND	UNITS								
Explosives									
HMX	ug/Kg	120 U		120 U	120 U		120 U		120 U
RDX	ug/Kg	120 U		120 U	120 U		120 U		71 J
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U	120 U		130 J		79 J
1,3-Dinitrobenzene	ug/Kg	230		120 U	160		120		110 J
Tetryl	ug/Kg	120 U		120 U	120 U		180 J		100 J
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U	120 U		75 J		120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U	83 J		440 J		250
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U		860		250
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U		120 U		120 U
2,4-Dinitrotoluene	ug/Kg	3800		260	2300		2000		3400
Metals									
Aluminum	mg/kg	9080		13100	14400		14200		10600
Antimony	mg/kg	5.8 UJ		13.7 J	4.4 UJ		4.6 UJ		4.4 UJ
Arsenic	mg/kg	2.5 J		11.7 J	4.7		4.3		4
Barium	mg/kg	144		708	131		96		39.6
Beryllium	mg/kg	0.44 J		0.56	0.63 J		0.62 J		0.48 J
Cadmium	mg/kg	0.33 U		0.52 J	0.33 U		0.33 U		0.32 U
Calcium	mg/kg	30200		13300	34700		26400		20000
Chromium	mg/kg	17.5		33.8	28.8		25.7		19.7
Cobalt	mg/kg	8.5		12.7	14.3		14.4		13.9
Copper	mg/kg	27.9 R		742	44.2		44.7		33.2
Iron	mg/kg	19400		22100	32300		31000		26600
Lead	mg/kg	15.5		2760	75.6		68.7		30.5
Magnesium	mg/kg	4850		4890	7420		7220		5570
Manganese	mg/kg	292		522	410		348		271
Mercury	mg/kg	0.04 J		0.06 J	0.04 U		0.05 U		0.05 J
Nickel	mg/kg	32.1		26.8	51.8 J		51.3 J		48.5 J
Potassium	mg/kg	961		1400	1580		1570		967
Selenium	mg/kg	0.26 J		0.24 UJ	0.25 UJ		0.17 J		0.27 UJ
Silver	mg/kg	0.34 U		0.44 J	0.7 U		0.72 U		0.69 U
Sodium	mg/kg	70.7 J		112 J	139 J		126 J		82.6 J
Thallium	mg/kg	0.34 U		0.56 U	0.58 U		0.37 U		0.62 U
Vanadium	mg/kg	12.1		20.7	19.5		19.8		14.9
Zinc	mg/kg	70 J		457	89.9 J		93.5 J		77.6 J
Cyanide	mg/kg	0.63 U		0.65 U	0.64 U		0.63 U		0.64 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION		OB	PAD J	PAD J	PAD J	PAD J	PAD J	PAD J
	DEPTH		0-2	0-6"	0-6"	0-6"	0-6"	0-2'	0-6"
	DATE		03/12/93	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92
	ES ID		PBH-6-1	PBJ-1-1DL	PBJ-1-1DL1	PBJ-1-1	PBJ-1-1RE	PBJ-1-2	PBJ-2-1
	LAB ID		179990	152373	152373	152373	152373	152374	152376
	UNITS								
Volatile Organic Compounds									
Chloromethane	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Bromomethane	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Vinyl Chloride	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Chloroethane	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Methylene Chloride	ug/Kg		11 U			6 U J	6 U J	6 U	7 U
Acetone	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Carbon Disulfide	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,1-Dichloroethene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,1-Dichloroethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,2-Dichloroethene (total)	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Chloroform	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,2-Dichloroethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
2-Butanone	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
1,1,1-Trichloroethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Carbon Tetrachloride	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Vinyl Acetate	ug/Kg					11 U J	11 U J	12 U	12 U
Bromodichloromethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,2-Dichloropropane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
cis-1,3-Dichloropropene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Trichloroethene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Dibromochloromethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,1,2-Trichloroethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Benzene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
trans-1,3-Dichloropropene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Bromoform	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
4-Methyl-2-Pentanone	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
2-Hexanone	ug/Kg		11 U			11 U J	11 U J	12 U	12 U
Tetrachloroethene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
1,1,2,2-Tetrachloroethane	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Toluene	ug/Kg		11 U			6 U J	6 U J	6 U	1 J
Chlorobenzene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Ethylbenzene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Styrene	ug/Kg		11 U			6 U J	6 U J	6 U	6 U
Xylene (total)	ug/Kg		11 U			6 U J	6 U J	6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD J	PAD J	PAD J	PAD J	PAD J	PAD J
	DEPTH	0-2	0-6"	0-6"	0-6"	0-6"	0-2'	0-6"
	DATE	03/12/93	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92
	ES ID	PBH-6-1	PBJ-1-1DL	PBJ-1-1DL1	PBJ-1-1	PBJ-1-1RE	PBJ-1-2	PBJ-2-1
	LAB ID	179990	152373	152373	152373	152373	152374	152376
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	1800 U			800 U		770 U	840 U
bis(2-Chloroethyl) ether	ug/Kg	1800 U			800 U		770 U	840 U
2-Chlorophenol	ug/Kg	1800 U			800 U		770 U	840 U
1,3-Dichlorobenzene	ug/Kg	1800 U			800 U		770 U	840 U
1,4-Dichlorobenzene	ug/Kg	1800 U			800 U		770 U	840 U
Benzyl Alcohol	ug/Kg				800 U		770 U	840 U
1,2-Dichlorobenzene	ug/Kg	1800 U			800 U		770 U	840 U
2-Methylphenol	ug/Kg	1800 U			800 U		770 U	840 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	1800 U			800 U		770 U	840 U
4-Methylphenol	ug/Kg	1800 U			800 U		770 U	840 U
N-Nitroso-di-n-propylamine	ug/Kg	1800 U			800 U		770 U	840 U
Hexachloroethane	ug/Kg	1800 U			800 U		770 U	840 U
Nitrobenzene	ug/Kg	1800 U			800 U		770 U	840 U
Isophorone	ug/Kg	1800 U			800 U		770 U	840 U
2-Nitrophenol	ug/Kg	1800 U			800 U		770 U	840 U
2,4-Dimethylphenol	ug/Kg	1800 U			800 U		770 U	840 U
Benzoic acid	ug/Kg				3900 U		3800 U	4000 U
bis(2-Chloroethoxy) methane	ug/Kg	1800 U			800 U		770 U	840 U
2,4-Dichlorophenol	ug/Kg	1800 U			800 U		770 U	840 U
1,2,4-Trichlorobenzene	ug/Kg	1800 U			800 U		770 U	840 U
Naphthalene	ug/Kg	1800 U			800 U		770 U	840 U
4-Chloroaniline	ug/Kg	1800 U			800 U		770 U	840 U
Hexachlorobutadiene	ug/Kg	1800 U			800 U		770 U	840 U
4-Chloro-3-methylphenol	ug/Kg	1800 U			800 U		770 U	840 U
2-Methylnaphthalene	ug/Kg	280 J			800 U		770 U	840 U
Hexachlorocyclopentadiene	ug/Kg	1800 U			800 U		770 U	840 U
2,4,6-Trichlorophenol	ug/Kg	1800 U			800 U		770 U	840 U
2,4,5-Trichlorophenol	ug/Kg	4300 U			3900 U		3800 U	4000 U
2-Chloronaphthalene	ug/Kg	1800 U			800 U		770 U	840 U
2-Nitroaniline	ug/Kg	4300 U			3900 U		3800 U	4000 U
Dimethylphthalate	ug/Kg	1800 U			800 U		770 U	840 U
Acenaphthylene	ug/Kg	1800 U			800 U		770 U	840 U
2,6-Dinitrotoluene	ug/Kg	1800 U			800 U		770 U	840 U
3-Nitroaniline	ug/Kg	4300 U			3900 U		3800 U	4000 U
Acenaphthene	ug/Kg	100 J			800 U		770 U	840 U
2,4-Dinitrophenol	ug/Kg	4300 U			3900 U		3800 U	4000 U
4-Nitrophenol	ug/Kg	4300 U			3900 U		3800 U	4000 U
Dibenzofuran	ug/Kg	1800 U			800 U		770 U	840 U
2,4-Dinitrotoluene	ug/Kg	1800 J			130 J		770 U	820 J
Diethylphthalate	ug/Kg	1800 U			800 U		770 U	840 U
4-Chlorophenyl-phenylether	ug/Kg	1800 U			800 U		770 U	840 U
Fluorene	ug/Kg	170 J			800 U		770 U	840 U
4-Nitroaniline	ug/Kg	4300 U			3900 U		3800 U	4000 U
4,6-Dinitro-2-methylphenol	ug/Kg	4300 U			3900 U		3800 U	4000 U
N-Nitrosodiphenylamine	ug/Kg	1800 U			800 U		770 U	81 J
4-Bromophenyl-phenylether	ug/Kg	1800 U			800 U		770 U	840 U
Hexachlorobenzene	ug/Kg	1800 U			800 U		770 U	840 U
Pentachlorophenol	ug/Kg	4300 U			3900 U		3800 U	4000 U
Phenanthrene	ug/Kg	330 J			93 J		770 U	840 U
Anthracene	ug/Kg	69 J			800 U		770 U	840 U
Carbazole	ug/Kg	1800 U						
Di-n-butylphthalate	ug/Kg	140 J			480 J		770 U	840 U
Fluoranthene	ug/Kg	1800 U			96 J		770 U	840 U
Pyrene	ug/Kg	69 J			100 J		770 U	840 U
Butylbenzylphthalate	ug/Kg	1800 U			800 U		770 U	840 U
3,3'-Dichlorobenzidine	ug/Kg	1800 U			1600 U		1500 U	1700 U
Benzo(a)anthracene	ug/Kg	1800 U			800 U		770 U	840 U
Chrysene	ug/Kg	1800 U			800 U		770 U	840 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1800 U			800 U		770 U	190 J
Di-n-octylphthalate	ug/Kg	1800 U			800 U		770 U	840 U
Benzo(b)fluoranthene	ug/Kg	1800 U			800 U		770 U	840 U
Benzo(k)fluoranthene	ug/Kg	1800 U			800 U		770 U	840 U
Benzo(a)pyrene	ug/Kg	1800 U			800 U		770 U	840 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1800 U			800 U		770 U	840 U
Dibenz(a,h)anthracene	ug/Kg	1800 U			800 U		770 U	840 U
Benzo(g,h,i)perylene	ug/Kg	1800 U			800 U		770 U	840 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD J	PAD J	PAD J	PAD J	PAD J	PAD J
	DEPTH	0-2	0-6"	0-6"	0-6"	0-6"	0-2'	0-6"
	DATE	03/12/93	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92
	ES ID	PBH-6-1	PBJ-1-1DL	PBJ-1-1DL1	PBJ-1-1	PBJ-1-1RE	PBJ-1-2	PBJ-2-1
	LAB ID	179990	152373	152373	152373	152373	152374	152376
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
beta-BHC	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
delta-BHC	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
gamma-BHC (Lindane)	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
Heptachlor	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
Aldrin	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
Heptachlor epoxide	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
Endosulfan I	ug/kg	3.6 U	58 U	580 U R			19 U	20 U
Dieldrin	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
4,4'-DDE	ug/kg	4.5 J	980 R	830 J			32 J	38 J
Endrin	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
Endosulfan II	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
4,4'-DDD	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
Endosulfan sulfate	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
4,4'-DDT	ug/kg	3.6 J	320	1200 U R			38 U	40 U
Methoxychlor	ug/kg	36 U	580 U	5800 U R			190 U	200 U
Endrin ketone	ug/kg	7.1 U	120 U	1200 U R			38 U	40 U
Endrin aldehyde	ug/kg	7.1 U						
alpha-Chlordane	ug/kg	3.6 U	580 U	5800 U R			190 U	200 U
gamma-Chlordane	ug/kg	3.6 U	580 U	5800 U R			190 U	200 U
Toxaphene	ug/kg	360 U	1200 U	12000 U R			380 U	400 U
Aroclor-1016	ug/kg	71 U	580 U	5800 U R			190 U	200 U
Aroclor-1221	ug/kg	140 U	580 U	5800 U R			190 U	200 U
Aroclor-1232	ug/kg	71 U	580 U	5800 U R			190 U	200 U
Aroclor-1242	ug/kg	71 U	580 U	5800 U R			190 U	200 U
Aroclor-1248	ug/kg	71 U	580 U	5800 U R			190 U	200 U
Aroclor-1254	ug/kg	71 U	1200 U	12000 U R			380 U	400 U
Aroclor-1260	ug/kg	71 U	1200 U	12000 U R			380 U	400 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	PAD J	PAD J	PAD J	PAD J	PAD J	PAD J
	DEPTH	0-2	0-6"	0-6"	0-6"	0-6"	0-2'	0-6"
	DATE	03/12/93	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92	01/13/92
	ES ID	PBH-6-1	PBJ-1-1DL	PBJ-1-1DL1	PBJ-1-1	PBJ-1-1RE	PBJ-1-2	PBJ-2-1
	LAB ID	179990	152373	152373	152373	152373	152374	152376
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U			1000 U		1000 U	1000 U
RDX	ug/Kg	71 J			120 U		120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	200 J			120 U		120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U			120 U		120 U	120 U
Tetryl	ug/Kg	270 J			400 U		400 U	400 U
2,4,6-Trinitrotoluene	ug/Kg	210 J			120 U		120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	400 J			120 U		120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	640			120 U		120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U			120 U		120 U	120 U
2,4-Dinitrotoluene	ug/Kg	930			420		120 U	370
Metals								
Aluminum	mg/kg	6410			18800		26900	21800
Antimony	mg/kg	3.1 UJ			6.1 U J		5.8 U J	5.7 U J
Arsenic	mg/kg	4.6			3.7		4.9	4.1
Barium	mg/kg	124			8130		1660	2520
Beryllium	mg/kg	0.32 J			0.7 R		1.3 R	1 R
Cadmium	mg/kg	0.23 U			4.8 J		4.3 J	5.4 J
Calcium	mg/kg	16600			22800		11700	34400
Chromium	mg/kg	12			30.1 J		35.4 J	38.5 J
Cobalt	mg/kg	6.6			9.1		15.5	15.5
Copper	mg/kg	39			143		58.4	137
Iron	mg/kg	15000			20700		37700	42500
Lead	mg/kg	51.6			356		80.9	266
Magnesium	mg/kg	3480			16700		8650	10600
Manganese	mg/kg	209			334		774	619
Mercury	mg/kg	0.12			0.11 R		0.12 R	0.17 R
Nickel	mg/kg	27.6 J			38.4		42.5	57.3
Potassium	mg/kg	596			1520 J		2930 J	2310 J
Selenium	mg/kg	0.34 J			0.33 J		0.2 U J	0.24 J
Silver	mg/kg	0.49 U			0.39 U		0.37 U	0.37 U
Sodium	mg/kg	58.8 J			244 J		164 J	165 J
Thallium	mg/kg	0.52 U			0.43 J		0.48 U	0.56 J
Vanadium	mg/kg	9			17.8 J		39 J	27.1 J
Zinc	mg/kg	43.7 J			1380		246	512
Cyanide	mg/kg	0.65 U			0.7 U		0.72 U	0.69 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS -- PHASE I and II

COMPOUND	MATRIX / LOCATION / DEPTH / DATE / ES ID / LAB ID / UNITS	SOIL PAD J 0-2' 01/14/92 PBJ-2-2 152463	SOIL PAD J 0-6" 01/14/92 PBJ-3-1 152466	SOIL PAD-J 0-6" 01/14/92 PBJ-3-1RE 152468	SOIL PAD-J 0-2' 01/15/92 PBJ-3-2 152550	SOIL PAD-J 0-6" 01/15/92 PBJ-4-1 152553	SOIL PAD J 0-2' 01/15/92 PBJ-4-2 152554	SOIL PAD-J 4' + 01/15/92 PBJ-4-4 152556
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Bromomethane	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Vinyl Chloride	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Chloroethane	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Methylene Chloride	ug/Kg	6 U	7 U J	8 U J	6 U	12 U		6 U
Acetone	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Carbon Disulfide	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,1-Dichloroethene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,1-Dichloroethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,2-Dichloroethene (total)	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Chloroform	ug/Kg	2 J	6 J	8 U J	6 U	6 U		6 U
1,2-Dichloroethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
2-Butanone	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
1,1,1-Trichloroethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Carbon Tetrachloride	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Vinyl Acetate	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Bromodichloromethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,2-Dichloropropane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
cis-1,3-Dichloropropene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Trichloroethene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Dibromochloromethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,1,2-Trichloroethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Benzene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
trans-1,3-Dichloropropene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Bromoform	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
4-Methyl-2-Pentanone	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
2-Hexanone	ug/Kg	12 U	14 U J	15 U J	12 U	12 U		11 U
Tetrachloroethene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Toluene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Chlorobenzene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Ethylbenzene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Styrene	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U
Xylene (total)	ug/Kg	6 U	7 U J	8 U J	6 U	6 U		6 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD J	PAD J	PAD-J	PAD-J	PAD-J	PAD J	PAD-J
	DEPTH	0-2'	0-6"	0-6"	0-2'	0-6"	0-2'	4' +
	DATE	01/14/92	01/14/92	01/14/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-2-2	PBJ-3-1	PBJ-3-1RE	PBJ-3-2	PBJ-4-1	PBJ-4-2	PBJ-4-4
	LAB ID	152463	152466	152466	152550	152553	152554	152556
	UNITS							
Semivolatiles								
Phenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
bis(2-Chloroethyl) ether	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2-Chlorophenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
1,3-Dichlorobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
1,4-Dichlorobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzyl Alcohol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
1,2-Dichlorobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2-Methylphenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,2'-oxybis(1-Chloropropane)	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Methylphenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
N-Nitroso-di-n-propylamine	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Hexachloroethane	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Nitrobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Isophorone	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2-Nitrophenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4-Dimethylphenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzoic acid	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
bis(2-Chloroethoxy) methane	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4-Dichlorophenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
1,2,4-Trichlorobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Naphthalene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Chloroaniline	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Hexachlorobutadiene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Chloro-3-methylphenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2-Methylnaphthalene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Hexachlorocyclopentadiene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4,6-Trichlorophenol	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4,5-Trichlorophenol	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
2-Chloronaphthalene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2-Nitroaniline	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
Dimethylphthalate	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Acenaphthylene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,6-Dinitrotoluene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
3-Nitroaniline	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
Acenaphthene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4-Dinitrophenol	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
4-Nitrophenol	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
Dibenzofuran	ug/Kg	770 U	800 U		750 U	740 U	710 U	
2,4-Dinitrotoluene	ug/Kg	770 U	800 U		750 U	740 U	380 J	
Diethylphthalate	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Chlorophenyl-phenylether	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Fluorene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Nitroaniline	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
4,6-Dinitro-2-methylphenol	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
N-Nitrosodiphenylamine	ug/Kg	770 U	800 U		750 U	740 U	710 U	
4-Bromophenyl-phenylether	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Hexachlorobenzene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Pentachlorophenol	ug/Kg	3800 U	3900 U		3600 U	3600 U	3400 U	
Phenanthrene	ug/Kg	770 U	800 U		750 U	69 J	710 U	
Anthracene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Fluoranthene	ug/Kg	770 U	800 U		750 U	90 J	710 U	
Pyrene	ug/Kg	770 U	800 U		750 U	78 J	710 U	
Butylbenzylphthalate	ug/Kg	770 U	800 U		750 U	740 U	710 U	
3,3'-Dichlorobenzidine	ug/Kg	1500 U	1600 U		1500 U	1500 U	1400 U	
Benzo(a)anthracene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Chrysene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
bis(2-Ethylhexyl)phthalate	ug/Kg	110 J	800 U		750 U	140 J	710 U	
Di-n-octylphthalate	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzo(b)fluoranthene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzo(k) fluoranthene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzo(a)pyrene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Indeno(1,2,3-cd)pyrene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Dibenz(a,h)anthracene	ug/Kg	770 U	800 U		750 U	740 U	710 U	
Benzo(g,h,i)perylene	ug/Kg	770 U	800 U		750 U	740 U	710 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD J	PAD J	PAD-J	PAD-J	PAD-J	PAD J	PAD-J
	DEPTH	0-2'	0-6"	0-6"	0-2'	0-6"	0-2'	4' +
	DATE	01/14/92	01/14/92	01/14/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-2-2	PBJ-3-1	PBJ-3-1RE	PBJ-3-2	PBJ-4-1	PBJ-4-2	PBJ-4-4
	LAB ID	152463	152466	152466	152550	152553	152554	152556
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	19 U	19 U		18 U	18 U	17 U	
beta-BHC	ug/kg	19 U	19 U		18 U	18 U	17 U	
delta-BHC	ug/kg	19 U	19 U		18 U	18 U	17 U	
gamma-BHC (Lindane)	ug/kg	19 U	19 U		18 U	18 U	17 U	
Heptachlor	ug/kg	19 U	19 U		18 U	18 U	17 U	
Aldrin	ug/kg	19 U	19 U		18 U	18 U	17 U	
Heptachlor epoxide	ug/kg	19 U	19 U		18 U	18 U	17 U	
Endosulfan I	ug/kg	19 U	19 U		18 U	18 U	17 U	
Dieldrin	ug/kg	38 U	39 U		36 U	36 U	34 U	
4,4'-DDE	ug/kg	38 U	21 J		36 U	25 J	34 U	
Endrin	ug/kg	38 U	39 U		36 U	36 U	34 U	
Endosulfan II	ug/kg	38 U	39 U		36 U	36 U	34 U	
4,4'-DDD	ug/kg	38 U	39 U		36 U	36 U	34 U	
Endosulfan sulfate	ug/kg	38 U	39 U		36 U	36 U	34 U	
4,4'-DDT	ug/kg	38 U	39 U		36 U	36 U	34 U	
Methoxychlor	ug/kg	190 U	190 U		180 U	180 U	170 U	
Endrin ketone	ug/kg	38 U	39 U		36 U	36 U	34 U	
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	190 U	190 U		180 U	180 U	170 U	
gamma-Chlordane	ug/kg	190 U	190 U		180 U	180 U	170 U	
Toxaphene	ug/kg	360 U	390 U		360 U	360 U	340 U	
Aroclor-1016	ug/kg	190 U	190 U		180 U	180 U	170 U	
Aroclor-1221	ug/kg	190 U	190 U		180 U	180 U	170 U	
Aroclor-1232	ug/kg	190 U	190 U		180 U	180 U	170 U	
Aroclor-1242	ug/kg	190 U	190 U		180 U	180 U	170 U	
Aroclor-1248	ug/kg	190 U	190 U		180 U	180 U	170 U	
Aroclor-1254	ug/kg	360 U	390 U		360 U	360 U	340 U	
Aroclor-1260	ug/kg	360 U	390 U		360 U	360 U	340 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD J	PAD J	PAD-J	PAD-J	PAD-J	PAD J	PAD-J
	DEPTH	0-2'	0-6"	0-6"	0-2'	0-6"	0-2'	4' +
	DATE	01/14/92	01/14/92	01/14/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-2-2	PBJ-3-1	PBJ-3-1RE	PBJ-3-2	PBJ-4-1	PBJ-4-2	PBJ-4-4
	LAB ID	152463	152466	152466	152550	152553	152554	152556
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U	1000 U		1000 U	1000 U	1000 U	
RDX	ug/Kg	120 U	120 U		120 U	120 U	120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
1,3-Dinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
Tetryl	ug/Kg	400 U	400 U		400 U	400 U	400 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/Kg	120 U	300		120 U	86 J	130	
Metals								
Aluminum	mg/kg	21400	16800		17000	19900	20100	
Antimony	mg/kg	5.8 U J	6.1 U J		6.6 J	10.3 J	6.6 J	
Arsenic	mg/kg	4.3	4.8		7.1	8.1	5.2	
Barium	mg/kg	351 R	3470		2830	5610	707 R	
Beryllium	mg/kg	1 R	0.91 R		0.83 R	0.82 R	0.81 R	
Cadmium	mg/kg	4.1 J	4.8 J		3.8 J	6.9 J	4.5 J	
Calcium	mg/kg	19100	27200		22700 J	32300	37300	
Chromium	mg/kg	30.4 J	34.4 J		31.9 J	50.8 J	36.9 J	
Cobalt	mg/kg	15.2	11.9		11.8	16.5	17.2	
Copper	mg/kg	69.3	435		158	262	104	
Iron	mg/kg	33300	31600		31000	39200	39800	
Lead	mg/kg	115	448		29.2 R	1340	105	
Magnesium	mg/kg	7510	10200		7730	11400	9150	
Manganese	mg/kg	437	393		490	475	432	
Mercury	mg/kg	0.1 R	0.19 R		0.11 R	0.11 R	0.13 R	
Nickel	mg/kg	44.8	46.7		36.5	48	55.2	
Potassium	mg/kg	1980 J	1740 J		1730 J	2780 J	1760 J	
Selenium	mg/kg	0.21 J	0.31 J		0.12 U J	0.22 J	0.29 J	
Silver	mg/kg	0.4 J	0.65 J		0.74 J	0.61 J	0.45 J	
Sodium	mg/kg	145 J	341 J		224 J	258 J	202 J	
Thallium	mg/kg	0.63 J	0.35 J		0.59 J	0.35 J	0.48 J	
Vanadium	mg/kg	26.8 J	20.5 J		26 J	27.2 J	23.6 J	
Zinc	mg/kg	344	5790		700	1510	245	
Cyanide	mg/kg	0.7 U	0.64 U		0.52 U	0.58 U	0.62 U	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-6"	0-6"	0-6"
	DATE	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-5-1	PBJ-5-1RE	PBJ-5-2	PBJ-5-2RE	PBJ-6-1	PBJ-6-1DL	PBJ-6-1RE
	LAB ID	152557	152557	152558	152558	152560	152560	152560
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Bromomethane	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Vinyl Chloride	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Chloroethane	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Methylene Chloride	ug/Kg	10 U J	6 U J	6 U J	9 U J	8 U		7 U J
Acetone	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Carbon Disulfide	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,1-Dichloroethene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,1-Dichloroethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,2-Dichloroethene (total)	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Chloroform	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,2-Dichloroethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
2-Butanone	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
1,1,1-Trichloroethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Carbon Tetrachloride	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Vinyl Acetate	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Bromodichloromethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,2-Dichloropropane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
cis-1,3-Dichloropropene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Trichloroethene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Dibromochloromethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,1,2-Trichloroethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Benzene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
trans-1,3-Dichloropropene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Bromoform	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
4-Methyl-2-Pentanone	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
2-Hexanone	ug/Kg	12 U J	11 U J	11 U J	11 U J	12 U		12 U J
Tetrachloroethene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
1,1,2,2-Tetrachloroethane	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Toluene	ug/Kg	6 U J	6 U J	6 U J	1 J	6 U		6 U J
Chlorobenzene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Ethylbenzene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Styrene	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J
Xylene (total)	ug/Kg	6 U J	6 U J	6 U J	6 U J	6 U		6 U J

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-6"	0-6"	0-6"
	DATE	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-5-1	PBJ-5-1RE	PBJ-5-2	PBJ-5-2RE	PBJ-6-1	PBJ-6-1DL	PBJ-6-1RE
	LAB ID	152557	152557	152558	152558	152560	152560	152560
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	760 U		740 U		780 U		
bis(2-Chloroethyl) ether	ug/Kg	760 U		740 U		780 U		
2-Chlorophenol	ug/Kg	760 U		740 U		780 U		
1,3-Dichlorobenzene	ug/Kg	760 U		740 U		780 U		
1,4-Dichlorobenzene	ug/Kg	760 U		740 U		780 U		
Benzyl Alcohol	ug/Kg	760 U		740 U		780 U		
1,2-Dichlorobenzene	ug/Kg	760 U		740 U		780 U		
2-Methylphenol	ug/Kg	760 U		740 U		780 U		
2,2'-oxybis(1-Chloropropane)	ug/Kg	760 U		740 U		780 U		
4-Methylphenol	ug/Kg	760 U		740 U		780 U		
N-Nitroso-di-n-propylamine	ug/Kg	760 U		740 U		780 U		
Hexachloroethane	ug/Kg	760 U		740 U		780 U		
Nitrobenzene	ug/Kg	760 U		740 U		780 U		
Isophorone	ug/Kg	760 U		740 U		780 U		
2-Nitrophenol	ug/Kg	760 U		740 U		780 U		
2,4-Dimethylphenol	ug/Kg	760 U		740 U		780 U		
Benzoic acid	ug/Kg	3700 U		3800 U		3800 U		
bis(2-Chloroethoxy) methane	ug/Kg	760 U		740 U		780 U		
2,4-Dichlorophenol	ug/Kg	760 U		740 U		780 U		
1,2,4-Trichlorobenzene	ug/Kg	760 U		740 U		780 U		
Naphthalene	ug/Kg	760 U		740 U		780 U		
4-Chloroaniline	ug/Kg	760 U		740 U		780 U		
Hexachlorobutadiene	ug/Kg	760 U		740 U		780 U		
4-Chloro-3-methylphenol	ug/Kg	760 U		740 U		780 U		
2-Methylnaphthalene	ug/Kg	760 U		740 U		780 U		
Hexachlorocyclopentadiene	ug/Kg	760 U		740 U		780 U		
2,4,6-Trichlorophenol	ug/Kg	760 U		740 U		780 U		
2,4,5-Trichlorophenol	ug/Kg	3700 U		3800 U		3800 U		
2-Chloronaphthalene	ug/Kg	760 U		740 U		780 U		
2-Nitroaniline	ug/Kg	3700 U		3800 U		3800 U		
Dimethylphthalate	ug/Kg	760 U		740 U		780 U		
Acenaphthylene	ug/Kg	760 U		740 U		780 U		
2,6-Dinitrotoluene	ug/Kg	760 U		740 U		780 U		
3-Nitroaniline	ug/Kg	3700 U		3800 U		3800 U		
Acenaphthene	ug/Kg	760 U		740 U		780 U		
2,4-Dinitrophenol	ug/Kg	3700 U		3800 U		3800 U		
4-Nitrophenol	ug/Kg	3700 U		3800 U		3800 U		
Dibenzofuran	ug/Kg	760 U		740 U		780 U		
2,4-Dinitrotoluene	ug/Kg	760 U		740 U		780 U		
Diethylphthalate	ug/Kg	760 U		740 U		780 U		
4-Chlorophenyl-phenylether	ug/Kg	760 U		740 U		780 U		
Fluorene	ug/Kg	760 U		740 U		780 U		
4-Nitroaniline	ug/Kg	3700 U		3800 U		3800 U		
4,6-Dinitro-2-methylphenol	ug/Kg	3700 U		3800 U		3800 U		
N-Nitrosodiphenylamine	ug/Kg	760 U		740 U		780 U		
4-Bromophenyl-phenylether	ug/Kg	760 U		740 U		780 U		
Hexachlorobenzene	ug/Kg	760 U		740 U		780 U		
Pentachlorophenol	ug/Kg	3700 U		3600 U		3800 U		
Phenanthrene	ug/Kg	760 U		740 U		780 U		
Anthracene	ug/Kg	760 U		740 U		780 U		
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	760 U		740 U		780 U		
Fluoranthene	ug/Kg	760 U		740 U		780 U		
Pyrene	ug/Kg	760 U		740 U		780 U		
Butylbenzylphthalate	ug/Kg	760 U		740 U		780 U		
3,3'-Dichlorobenzidine	ug/Kg	1500 U		1500 U		1600 U		
Benzo(a)anthracene	ug/Kg	760 U		740 U		780 U		
Chrysene	ug/Kg	760 U		740 U		780 U		
bis(2-Ethylhexyl)phthalate	ug/Kg	760 U		740 U		780 U		
Di-n-octylphthalate	ug/Kg	760 U		740 U		780 U		
Benzo(b)fluoranthene	ug/Kg	760 U		740 U		780 U		
Benzo(k)fluoranthene	ug/Kg	760 U		740 U		780 U		
Benzo(a)pyrene	ug/Kg	760 U		740 U		780 U		
Indeno(1,2,3-cd)pyrene	ug/Kg	760 U		740 U		780 U		
Dibenz(a,h)anthracene	ug/Kg	760 U		740 U		780 U		
Benzo(g,h,i)perylene	ug/Kg	760 U		740 U		780 U		

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-6"	0-6"	0-6"
	DATE	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-5-1	PBJ-5-1RE	PBJ-5-2	PBJ-5-2RE	PBJ-6-1	PBJ-6-1DL	PBJ-6-1RE
	LAB ID	152557	152557	152558	152558	152560	152560	152560
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	18 U		18 U		19 U	57 U R	
beta-BHC	ug/kg	18 U		18 U		19 U	57 U R	
delta-BHC	ug/kg	18 U		18 U		19 U	57 U R	
gamma-BHC (Lindane)	ug/kg	18 U		18 U		19 U	57 U R	
Heptachlor	ug/kg	18 U		18 U		19 U	57 U R	
Aldrin	ug/kg	18 U		18 U		19 U	57 U R	
Heptachlor epoxide	ug/kg	18 U		18 U		19 U	57 U R	
Endosulfan I	ug/kg	18 U		18 U		19 U	57 U R	
Dieldrin	ug/kg	37 U		36 U		38 U	110 U R	
4,4'-DDE	ug/kg	18 J		36 U		97 R	79 J	
Endrin	ug/kg	37 U		36 U		38 U	110 U R	
Endosulfan II	ug/kg	37 U		36 U		38 U	110 U R	
4,4'-DDD	ug/kg	37 U		36 U		38 U	110 U R	
Endosulfan sulfate	ug/kg	37 U		36 U		38 U	110 U R	
4,4'-DDT	ug/kg	37 U		36 U		23 J	110 U R	
Methoxychlor	ug/kg	180 U		180 U		190 U	570 U R	
Endrin ketone	ug/kg	37 U		36 U		38 U	110 U R	
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	180 U		180 U		190 U	570 U R	
gamma-Chlordane	ug/kg	180 U		180 U		190 U	570 U R	
Toxaphene	ug/kg	370 U		360 U		380 U	1100 U R	
Aroclor-1016	ug/kg	180 U		180 U		190 U	570 U R	
Aroclor-1221	ug/kg	180 U		180 U		190 U	570 U R	
Aroclor-1232	ug/kg	180 U		180 U		190 U	570 U R	
Aroclor-1242	ug/kg	180 U		180 U		190 U	570 U R	
Aroclor-1248	ug/kg	180 U		180 U		190 U	570 U R	
Aroclor-1254	ug/kg	370 U		360 U		380 U	1100 U R	
Aroclor-1260	ug/kg	370 U		360 U		380 U	1100 U R	

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-6"	0-6"	0-2'	0-2'	0-6"	0-6"	0-6"
	DATE	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92	01/15/92
	ES ID	PBJ-5-1	PBJ-5-1RE	PBJ-5-2	PBJ-5-2RE	PBJ-6-1	PBJ-6-1DL	PBJ-6-1RE
	LAB ID	152557	152557	152558	152558	152560	152560	152560
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U		1000 U		1000 U		
RDX	ug/Kg	120 U		120 U		270 J		
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U		120		
1,3-Dinitrobenzene	ug/Kg	120 U		120 U		120 U		
Tetryl	ug/Kg	400 U		400 U		400 U		
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U		120 U		
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U		
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U		
2,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U		
2,4-Dinitrotoluene	ug/Kg	210		330		77 J		
Metals								
Aluminum	mg/kg	18800		16500		20700		
Antimony	mg/kg	15.3 J		6.4 J		5.7 U J		
Arsenic	mg/kg	7.7		6.7		4.5		
Barium	mg/kg	5650		2270		5180		
Beryllium	mg/kg	0.74 R		0.8 R		0.85 R		
Cadmium	mg/kg	10 J		4.9 J		6.9 J		
Calcium	mg/kg	32800		34900		37800		
Chromium	mg/kg	39.8 J		35.6 J		38.2 J		
Cobalt	mg/kg	13.7		13.9		13.8		
Copper	mg/kg	520		235		6560		
Iron	mg/kg	33800		33900		37400		
Lead	mg/kg	1840		530		117		
Magnesium	mg/kg	12600		9580		12700		
Manganese	mg/kg	464		419		445		
Mercury	mg/kg	0.07 R		0.11 R		0.19 R		
Nickel	mg/kg	48		50.1		55.5		
Potassium	mg/kg	2160 J		2070 J		2190 J		
Selenium	mg/kg	0.25 J		0.39 J		0.42 J		
Silver	mg/kg	0.89 J		0.62 J		1.2		
Sodium	mg/kg	376 J		296 J		189 J		
Thallium	mg/kg	0.54 J		38 J		0.39 U		
Vanadium	mg/kg	24.6 J		23.9 J		27.1 J		
Zinc	mg/kg	2160		985		2100		
Cyanide	mg/kg	0.65 U		0.6 U		0.64 U		

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-2'	0-2'	0-6"	0-6"	0-2'	0-2'	0-6"
	DATE	01/15/92	01/15/92	01/17/92	01/17/92	01/17/92	01/17/92	01/17/92
	ES ID	PBJ-6-2	PBJ-6-2RE	PBJ-7-1	PBJ-7-1RE	PBJ-7-2	PBJ-7-2RE	PBJ-8-1
	LAB ID	152561	152561	152672	152672	152673	152673	152677
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Bromomethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Vinyl Chloride	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Chloroethane	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Methylene Chloride	ug/Kg	9 U J	9 U J	5 U J	7 U J	10 U J	10 U J	7 U
Acetone	ug/Kg	11 U J	11 U J	11 U J	11 U J	20 U J	16 U J	13 U
Carbon Disulfide	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,1-Dichloroethene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,1-Dichloroethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,2-Dichloroethene (total)	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Chloroform	ug/Kg	3 J	5 U J	5 U J	6 U J	5 U J	7	7 U
1,2-Dichloroethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
2-Butanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
1,1,1-Trichloroethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Carbon Tetrachloride	ug/Kg	4 J	2 J	5 U J	6 U J	5 U J	5 U J	7 U
Vinyl Acetate	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Bromodichloromethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,2-Dichloropropane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
cis-1,3-Dichloropropene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Trichloroethene	ug/Kg	7	4 J	5 U J	6 U J	5 U J	5 U J	7 U
Dibromochloromethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,1,2-Trichloroethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Benzene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
trans-1,3-Dichloropropene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Bromoform	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
4-Methyl-2-Pentanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
2-Hexanone	ug/Kg	11 U J	11 U J	11 U J	11 U J	11 U J	11 U J	13 U
Tetrachloroethene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
1,1,2,2-Tetrachloroethane	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Toluene	ug/Kg	5 U J	5 U J	5 U J	6 U J	3 J	2 J	7 U
Chlorobenzene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Ethylbenzene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Styrene	ug/Kg	5 U J	5 U J	5 U J	6 U J	5 U J	5 U J	7 U
Xylene (total)	ug/Kg	5 U J	5 U J	5 U J	6 U J	3 J	5 U J	7 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-2'	0-2'	0-6"	0-6"	0-2'	0-2'	0-6"
	DATE	01/15/92	01/15/92	01/17/92	01/17/92	01/17/92	01/17/92	01/17/92
	ES ID	PBJ-6-2	PBJ-6-2RE	PBJ-7-1	PBJ-7-1RE	PBJ-7-2	PBJ-7-2RE	PBJ-8-1
	LAB ID	152561	152561	152672	152672	152673	152673	152677
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	720 U		750 U		700 U		870 U
bis(2-Chloroethyl) ether	ug/Kg	720 U		750 U		700 U		870 U
2-Chlorophenol	ug/Kg	720 U		750 U		700 U		870 U
1,3-Dichlorobenzene	ug/Kg	720 U		750 U		700 U		870 U
1,4-Dichlorobenzene	ug/Kg	720 U		750 U		700 U		870 U
Benzyl Alcohol	ug/Kg	720 U		750 U		700 U		870 U
1,2-Dichlorobenzene	ug/Kg	720 U		750 U		700 U		870 U
2-Methylphenol	ug/Kg	720 U		750 U		700 U		870 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	720 U		750 U		700 U		870 U
4-Methylphenol	ug/Kg	720 U		750 U		700 U		870 U
N-Nitroso-di-n-propylamine	ug/Kg	720 U		750 U		700 U		870 U
Hexachloroethane	ug/Kg	720 U		750 U		700 U		870 U
Nitrobenzene	ug/Kg	720 U		750 U		700 U		870 U
Isophorone	ug/Kg	720 U		750 U		700 U		870 U
2-Nitrophenol	ug/Kg	720 U		750 U		700 U		870 U
2,4-Dimethylphenol	ug/Kg	720 U		750 U		700 U		870 U
Benzoic acid	ug/Kg	3500 U		3600 U		3400 U		4200 U
bis(2-Chloroethoxy) methane	ug/Kg	720 U		750 U		700 U		870 U
2,4-Dichlorophenol	ug/Kg	720 U		750 U		700 U		870 U
1,2,4-Trichlorobenzene	ug/Kg	720 U		750 U		700 U		870 U
Naphthalene	ug/Kg	720 U		750 U		700 U		870 U
4-Chloroaniline	ug/Kg	720 U		750 U		700 U		870 U
Hexachlorobutadiene	ug/Kg	720 U		750 U		700 U		870 U
4-Chloro-3-methylphenol	ug/Kg	720 U		750 U		700 U		870 U
2-Methylnaphthalene	ug/Kg	720 U		750 U		700 U		870 U
Hexachlorocyclopentadiene	ug/Kg	720 U		750 U		700 U		870 U
2,4,6-Trichlorophenol	ug/Kg	720 U		750 U		700 U		870 U
2,4,5-Trichlorophenol	ug/Kg	3500 U		3600 U		3400 U		4200 U
2-Chloronaphthalene	ug/Kg	720 U		750 U		700 U		870 U
2-Nitroaniline	ug/Kg	3500 U		3600 U		3400 U		4200 U
Dimethylphthalate	ug/Kg	720 U		750 U		700 U		870 U
Acenaphthylene	ug/Kg	720 U		750 U		700 U		870 U
2,6-Dinitrotoluene	ug/Kg	720 U		750 U		700 U		870 U
3-Nitroaniline	ug/Kg	3500 U		3600 U		3400 U		4200 U
Acenaphthene	ug/Kg	720 U		750 U		700 U		870 U
2,4-Dinitrophenol	ug/Kg	3500 U		3600 U		3400 U		4200 U
4-Nitrophenol	ug/Kg	3500 U		3600 U		3400 U		4200 U
Dibenzofuran	ug/Kg	720 U		750 U		700 U		870 U
2,4-Dinitrotoluene	ug/Kg	720 U		750 U		700 U		870 U
Diethylphthalate	ug/Kg	720 U		750 U		700 U		870 U
4-Chlorophenyl-phenylether	ug/Kg	720 U		750 U		700 U		870 U
Fluorene	ug/Kg	720 U		750 U		700 U		870 U
4-Nitroaniline	ug/Kg	3500 U		3600 U		3400 U		4200 U
4,6-Dinitro-2-methylphenol	ug/Kg	3500 U		3600 U		3400 U		4200 U
N-Nitrosodiphenylamine	ug/Kg	720 U		750 U		700 U		870 U
4-Bromophenyl-phenylether	ug/Kg	720 U		750 U		700 U		870 U
Hexachlorobenzene	ug/Kg	720 U		750 U		700 U		870 U
Pentachlorophenol	ug/Kg	3500 U		3600 U		3400 U		4200 U
Phenanthrene	ug/Kg	270 J		750 U		700 U		870 U
Anthracene	ug/Kg	720 U		750 U		700 U		870 U
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	720 U		750 U		700 U		870 U
Fluoranthene	ug/Kg	330 J		750 U		700 U		870 U
Pyrene	ug/Kg	230 J		750 U		700 U		870 U
Butylbenzylphthalate	ug/Kg	720 U		750 U		700 U		870 U
3,3'-Dichlorobenzidine	ug/Kg	1400 U		1500 U		1400 U		1700 U
Benzo(a)anthracene	ug/Kg	86 J		750 U		700 U		870 U
Chrysene	ug/Kg	120 J		750 U		700 U		870 U
bis(2-Ethylhexyl)phthalate	ug/Kg	130 J		120 J		1100		190 J
Di-n-octylphthalate	ug/Kg	720 U		750 U		700 U		870 U
Benzo(b)fluoranthene	ug/Kg	81 J		750 U		700 U		870 U
Benzo(k)fluoranthene	ug/Kg	96 J		750 U		700 U		870 U
Benzo(a)pyrene	ug/Kg	78 J		750 U		700 U		870 U
Indeno(1,2,3-cd)pyrene	ug/Kg	720 U		750 U		700 U		870 U
Dibenz(a,h)anthracene	ug/Kg	720 U		750 U		700 U		870 U
Benzo(g,h,i)perylene	ug/Kg	720 U		750 U		700 U		870 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-2'	0-2'	0-6"	0-6"	0-2'	0-2'	0-6"
	DATE	01/15/92	01/15/92	01/17/92	01/17/92	01/17/92	01/17/92	01/17/92
	ES ID	PBJ-6-2	PBJ-6-2RE	PBJ-7-1	PBJ-7-1RE	PBJ-7-2	PBJ-7-2RE	PBJ-6-1
	LAB ID	152561	152561	152672	152672	152673	152673	152677
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/kg	17 U		18 U		17 U		21 U
beta-BHC	ug/kg	17 U		18 U		17 U		21 U
delta-BHC	ug/kg	17 U		18 U		17 U		21 U
gamma-BHC (Lindane)	ug/kg	17 U		18 U		17 U		21 U
Heptachlor	ug/kg	17 U		18 U		17 U		21 U
Aldrin	ug/kg	17 U		18 U		17 U		21 U
Heptachlor epoxide	ug/kg	17 U		18 U		17 U		21 U
Endosulfan I	ug/kg	17 U		18 U		17 U		21 U
Dieldrin	ug/kg	35 U		36 U		34 U		42 U
4,4'-DDE	ug/kg	19 J		36 U		34 U		42 U
Endrin	ug/kg	35 U		36 U		34 U		41 J
Endosulfan II	ug/kg	35 U		36 U		34 U		42 U
4,4'-DDD	ug/kg	35 U		36 U		34 U		42 U
Endosulfan sulfate	ug/kg	35 U		36 U		34 U		42 U
4,4'-DDT	ug/kg	35 U		36 U		34 U		42 U
Methoxychlor	ug/kg	170 U		180 U		170 U		210 U
Endrin ketone	ug/kg	35 U		36 U		34 U		42 U
Endrin aldehyde	ug/kg							
alpha-Chlordane	ug/kg	170 U		180 U		170 U		210 U
gamma-Chlordane	ug/kg	170 U		180 U		170 U		210 U
Toxaphene	ug/kg	350 U		360 U		340 U		420 U
Aroclor-1016	ug/kg	170 U		180 U		170 U		210 U
Aroclor-1221	ug/kg	170 U		180 U		170 U		210 U
Aroclor-1232	ug/kg	170 U		180 U		170 U		210 U
Aroclor-1242	ug/kg	170 U		180 U		170 U		210 U
Aroclor-1248	ug/kg	170 U		180 U		170 U		210 U
Aroclor-1254	ug/kg	350 U		360 U		340 U		420 U
Aroclor-1260	ug/kg	350 U		360 U		340 U		420 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J	PAD-J
	DEPTH	0-2'	0-2'	0-6"	0-6"	0-2'	0-2'	0-6"
	DATE	01/15/92	01/15/92	01/17/92	01/17/92	01/17/92	01/17/92	01/17/92
	ES ID	PBJ-6-2	PBJ-6-2RE	PBJ-7-1	PBJ-7-1RE	PBJ-7-2	PBJ-7-2RE	PBJ-8-1
	LAB ID	152561	152561	152672	152672	152673	152673	152677
	UNITS							
Explosives								
HMX	ug/Kg	1000 U		1000 U J		1000 U		1000 U J
RDX	ug/Kg	120 U		120 U J		120 U		120 U J
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U J		120 U		120 U J
1,3-Dinitrobenzene	ug/Kg	120 U		120 U J		120 U		120 U J
Tetryl	ug/Kg	400 U		400 U J		400 U		400 U J
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U J		120 U		120 U J
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U J		120 U		120 U J
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U J		120 U		120 U J
2,6-Dinitrotoluene	ug/Kg	120 U		120 U J		120 U		120 U J
2,4-Dinitrotoluene	ug/Kg	140		120 U J		120 U		71 J
Metals								
Aluminum	mg/kg	14200		21900 J		17900 J		15700 J
Antimony	mg/kg	5.6 U J		10.3 J		5.7 U J		8.7 J
Arsenic	mg/kg	3.8		5.6		5.1		4.7
Barium	mg/kg	785 R		10300 J		6130 J		7010 J
Beryllium	mg/kg	0.73 R		0.78		0.64		0.66
Cadmium	mg/kg	3.8 J		4.5		3.9		7
Calcium	mg/kg	32200		31000 J		28500 J		29800 J
Chromium	mg/kg	27.1 J		32.1 J		27.8 J		26.9 J
Cobalt	mg/kg	12.5		9.4		10.4		7.7
Copper	mg/kg	64.9		182		108 J		155
Iron	mg/kg	33400		31400		29800		25500
Lead	mg/kg	74.3 R		1370		453		317
Magnesium	mg/kg	7730		16600 J		13600 J		7970 J
Manganese	mg/kg	376		536		423		533
Mercury	mg/kg	0.15 R		0.02 J		0.02 J		0.33
Nickel	mg/kg	45.4		47.6		46.9		31.4
Potassium	mg/kg	1490 J		1910		1360		1470
Selenium	mg/kg	0.29 J		0.98 U J		0.2 J		0.21 U J
Silver	mg/kg	0.36 U		0.98 U		0.93 U		1.2 U
Sodium	mg/kg	106 J		157 J		89.3 J		41.4 U
Thallium	mg/kg	0.61 J		0.47 U		0.45 U		0.5 U
Vanadium	mg/kg	19.1 J		21		17.3		19
Zinc	mg/kg	262		2170 J		3180 J		1840 J
Cyanide	mg/kg	0.63 U		0.68 U		0.64 U		0.63 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	OB	OB	OB	OB
	DEPTH	0-2'	0-2	2-4	0-2	4-5
	DATE	01/17/92	01/13/93	01/13/93	01/12/93	01/12/93
	ES ID	PBJ-8-2	PBJ-9-1	PBJ-9-2	PBJ-10-1	PBJ-10-3
	LAB ID	152678	177264	177265	177200	177202
COMPOUND	UNITS					
Volatile Organic Compounds						
Chloromethane	ug/Kg	12 U	12 U	12 U	12 U	11 U
Bromomethane	ug/Kg	12 U	12 U	12 U	12 U	11 U
Vinyl Chloride	ug/Kg	12 U	12 U	12 U	12 U	11 U
Chloroethane	ug/Kg	12 U	12 U	12 U	12 U	11 U
Methylene Chloride	ug/Kg	10 U	12 U	12 U	12 U	11 U
Acetone	ug/Kg	12 U	12 U	12 U	12 U	11 U
Carbon Disulfide	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,1-Dichloroethene	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,1-Dichloroethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	ug/Kg	6 U	12 U	12 U	12 U	11 U
Chloroform	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,2-Dichloroethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
2-Butanone	ug/Kg	12 U	12 U	12 U	12 U	11 U
1,1,1-Trichloroethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
Carbon Tetrachloride	ug/Kg	6 U	12 U	12 U	12 U	11 U
Vinyl Acetate	ug/Kg	12 U				
Bromodichloromethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,2-Dichloropropane	ug/Kg	6 U	12 U	12 U	12 U	11 U
cis-1,3-Dichloropropene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Trichloroethene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Dibromochloromethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,1,2-Trichloroethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
Benzene	ug/Kg	6 U	12 U	12 U	12 U	11 U
trans-1,3-Dichloropropene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Bromoform	ug/Kg	6 U	12 U	12 U	12 U	11 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U	12 U	12 U	11 U
2-Hexanone	ug/Kg	12 U	12 U	12 U	12 U	11 U
Tetrachloroethene	ug/Kg	6 U	12 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U	12 U	12 U	12 U	11 U
Toluene	ug/Kg	6 U	12 U	3 J	12 U	11 U
Chlorobenzene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Ethylbenzene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Styrene	ug/Kg	6 U	12 U	12 U	12 U	11 U
Xylene (total)	ug/Kg	6 U	12 U	12 U	12 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	OB	OB	OB	OB
	DEPTH	0-2'	0-2	2-4	0-2	4-5
	DATE	01/17/92	01/13/93	01/13/93	01/12/93	01/12/93
	ES ID	PBJ-8-2	PBJ-9-1	PBJ-9-2	PBJ-10-1	PBJ-10-3
	LAB ID	152678	177264	177265	177200	177202
COMPOUND	UNITS					
Semivolatiles						
Phenol	ug/Kg	800 U	390 U	360 U		380 U
bis(2-Chloroethyl) ether	ug/Kg	800 U	390 U	360 U		380 U
2-Chlorophenol	ug/Kg	800 U	390 U	360 U		380 U
1,3-Dichlorobenzene	ug/Kg	800 U	390 U	360 U		380 U
1,4-Dichlorobenzene	ug/Kg	800 U	390 U	360 U		380 U
Benzyl Alcohol	ug/Kg	800 U				
1,2-Dichlorobenzene	ug/Kg	800 U	390 U	360 U		380 U
2-Methylphenol	ug/Kg	800 U	390 U	360 U		380 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	800 U	390 U	360 U		380 U
4-Methylphenol	ug/Kg	800 U	390 U	360 U		380 U
N-Nitroso-di-n-propylamine	ug/Kg	800 U	390 U	360 U		380 U
Hexachloroethane	ug/Kg	800 U	390 U	360 U		380 U
Nitrobenzene	ug/Kg	800 U	390 U	360 U		380 U
Isophorone	ug/Kg	800 U	390 U	360 U		380 U
2-Nitrophenol	ug/Kg	800 U	390 U	360 U		380 U
2,4-Dimethylphenol	ug/Kg	800 U	390 U	360 U		380 U
Benzoic acid	ug/Kg	3900 U				
bis(2-Chloroethoxy) methane	ug/Kg	800 U	390 U	360 U		380 U
2,4-Dichlorophenol	ug/Kg	800 U	390 U	360 U		380 U
1,2,4-Trichlorobenzene	ug/Kg	800 U	390 U	360 U		380 U
Naphthalene	ug/Kg	800 U	390 U	360 U		380 U
4-Chloroaniline	ug/Kg	800 U	390 U	360 U		380 U
Hexachlorobutadiene	ug/Kg	800 U	390 U	360 U		380 U
4-Chloro-3-methylphenol	ug/Kg	800 U	390 U	360 U		380 U
2-Methylnaphthalene	ug/Kg	800 U	390 U	360 U		380 U
Hexachlorocyclopentadiene	ug/Kg	800 U	390 U	360 U		380 U
2,4,6-Trichlorophenol	ug/Kg	800 U	390 U	360 U		380 U
2,4,5-Trichlorophenol	ug/Kg	3900 U	950 U	870 U		930 U
2-Chloronaphthalene	ug/Kg	800 U	390 U	360 U		380 U
2-Nitroaniline	ug/Kg	3900 U	950 U	870 U		930 U
Dimethylphthalate	ug/Kg	800 U	390 U	360 U		380 U
Acenaphthylene	ug/Kg	800 U	390 U	360 U		380 U
2,6-Dinitrotoluene	ug/Kg	800 U	390 U	360 U		380 U
3-Nitroaniline	ug/Kg	3900 U	950 U	870 U		930 U
Acenaphthene	ug/Kg	800 U	390 U	360 U		380 U
2,4-Dinitrophenol	ug/Kg	3900 U	950 U	870 U	1000 U	930 U
4-Nitrophenol	ug/Kg	3900 U	950 U	870 U	1000 U	930 U
Dibenzofuran	ug/Kg	800 U	390 U	360 U	420 U	380 U
2,4-Dinitrotoluene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Diethylphthalate	ug/Kg	800 U	390 U	360 U	24 J	18 J
4-Chlorophenyl-phenylether	ug/Kg	800 U	390 U	360 U	420 U	380 U
Fluorene	ug/Kg	800 U	390 U	360 U	420 U	380 U
4-Nitroaniline	ug/Kg	3900 U	950 U	870 U	1000 U	930 U
4,6-Dinitro-2-methylphenol	ug/Kg	3900 U	950 U	870 U	1000 U	930 U
N-Nitrosodiphenylamine	ug/Kg	800 U	390 U	360 U	420 U	380 U
4-Bromophenyl-phenylether	ug/Kg	800 U	390 U	360 U	420 U	380 U
Hexachlorobenzene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Pentachlorophenol	ug/Kg	3900 U	950 U	870 U	1000 U	930 U
Phenanthrene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Anthracene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Carbazole	ug/Kg		390 U	360 U	420 U	380 U
Di-n-butylphthalate	ug/Kg	800 U	390 U	360 U	420 U	380 U
Fluoranthene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Pyrene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Butylbenzylphthalate	ug/Kg	800 U	390 U	360 U	420 U	380 U
3,3'-Dichlorobenzidine	ug/Kg	1600 U	390 U	360 U	420 U	380 U
Benzo(a)anthracene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Chrysene	ug/Kg	800 U	390 U	360 U	420 U	380 U
bis(2-Ethylhexyl)phthalate	ug/Kg	430 J	530	360 U	420 U	380 U
Di-n-octylphthalate	ug/Kg	800 U	390 U	360 U	420 U	380 U
Benzo(b)fluoranthene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Benzo(k)fluoranthene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Benzo(a)pyrene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Indeno(1,2,3-cd)pyrene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Dibenz(a,h)anthracene	ug/Kg	800 U	390 U	360 U	420 U	380 U
Benzo(g,h,i)perylene	ug/Kg	800 U	390 U	360 U	420 U	380 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	OB	OB	OB	OB
	DEPTH	0-2'	0-2	2-4	0-2	4-5
	DATE	01/17/92	01/13/93	01/13/93	01/12/93	01/12/93
	ES ID	PBJ-8-2	PBJ-9-1	PBJ-9-2	PBJ-10-1	PBJ-10-3
	LAB ID	152678	177264	177265	177200	177202
COMPOUND	UNITS					
Pesticides/PCBs						
alpha-BHC	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
beta-BHC	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
delta-BHC	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
gamma-BHC (Lindane)	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
Heptachlor	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
Aldrin	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
Heptachlor epoxide	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
Endosulfan I	ug/kg	19 U	2 U	1.9 U	2.1 U	2 U
Dieldrin	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
4,4'-DDE	ug/kg	39 U	6.1	3.6 U	4.2 U	2.9 J
Endrin	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
Endosulfan II	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
4,4'-DDD	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
Endosulfan sulfate	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
4,4'-DDT	ug/kg	39 U	2.8 J	3.6 U	4.2 U	3.8 U
Methoxychlor	ug/kg	190 U	20 U	19 U	21 U	20 U
Endrin ketone	ug/kg	39 U	3.9 U	3.6 U	4.2 U	3.8 U
Endrin aldehyde	ug/kg		3.9 U	3.6 U	4.2 U	3.8 U
alpha-Chlordane	ug/kg	190 U	2 U	1.9 U	2.1 U	2 U
gamma-Chlordane	ug/kg	190 U	2 U	1.9 U	2.1 U	2 U
Toxaphene	ug/kg	390 U	200 U	190 U	210 U	200 U
Aroclor-1016	ug/kg	190 U	39 U	36 U	42 U	38 U
Aroclor-1221	ug/kg	190 U	80 U	74 U	85 U	77 U
Aroclor-1232	ug/kg	190 U	39 U	36 U	42 U	38 U
Aroclor-1242	ug/kg	190 U	39 U	36 U	42 U	38 U
Aroclor-1248	ug/kg	190 U	39 U	36 U	42 U	38 U
Aroclor-1254	ug/kg	390 U	39 U	36 U	42 U	38 U
Aroclor-1260	ug/kg	390 U	39 U	36 U	42 U	38 U

SENECA ARMY DEPOT
OB GROUNDS

PAD BORINGS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-J	OB	OB	OB	OB
	DEPTH	0-2'	0-2	2-4	0-2	4-5
	DATE	01/17/92	01/13/93	01/13/93	01/12/93	01/12/93
	ES ID	PBJ-8-2	PBJ-9-1	PBJ-9-2	PBJ-10-1	PBJ-10-3
	LAB ID	152678	177264	177265	177200	177202
COMPOUND	UNITS					
Explosives						
HMX	ug/Kg	1000 U	120 U	120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg	400 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
Metals						
Aluminum	mg/kg	14200 J	11900	10200	13300	13400
Antimony	mg/kg	6.9 U J	6.1 UJ	5.5 UJ	6.1 UJ	5.8 UJ
Arsenic	mg/kg	4.9	4.8 J	6.2 J	4.4 J	4.4 J
Barium	mg/kg	307 R	407	112	91.7	116
Beryllium	mg/kg	0.7	0.58	0.5 J	0.59	0.59
Cadmium	mg/kg	4.3	0.35 U	0.4 J	0.35 U	0.33 U
Calcium	mg/kg	7060 J	12700	70400	71300	35800
Chromium	mg/kg	18.3 J	19.6	16.3	19.2	24.2
Cobalt	mg/kg	9.7	10.6	7.1	8.5	16.6
Copper	mg/kg	108 J	31.5 R	19.3 R	19.5 R	23 R
Iron	mg/kg	37100	23600	18700	24700	29900
Lead	mg/kg	34.9 R	28.8 J	17.2 J	20.2	25.2 J
Magnesium	mg/kg	4610 J	5470	9190	17400	7090
Manganese	mg/kg	645	401	308	474	512
Mercury	mg/kg	1.1	0.15	0.11	0.11	0.08
Nickel	mg/kg	24.9	34.3	26.5	29.4	46.1
Potassium	mg/kg	1210	1000	1020	902	822
Selenium	mg/kg	0.16 U J	0.24 J	0.2 UJ	0.23 UJ	0.23 UJ
Silver	mg/kg	1.1 U	0.36 U	0.33 U	0.36 U	0.35 U
Sodium	mg/kg	39.7 U	67.9 J	129 J	167 J	92 J
Thallium	mg/kg	0.48 J	0.52 U	0.47 U	0.54 U	0.55 U
Vanadium	mg/kg	23.1	19.8	15.5	20.3	17.5
Zinc	mg/kg	333 J	91.4 J	70.8 J	62.3 J	56.2 J
Cyanide	mg/kg	0.57 U	0.7 U	0.67 U	0.76 U	0.69 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	LH-01	LH-02	LH-02RE	LH-04	LH-06	LH-07	LH-09
	LAB ID	175819	175820	175820R1	175822	175824	175825	175827
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Bromomethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Vinyl Chloride	ug/Kg	12 U	12 U			12 U	12 U	12 U
Chloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Methylene Chloride	ug/Kg	12 U	12 U			12 U	12 U	12 U
Acetone	ug/Kg	12 U	12 U			12 U	12 U	12 U
Carbon Disulfide	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,1-Dichloroethene	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,1-Dichloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,2-Dichloroethene (total)	ug/Kg	12 U	12 U			12 U	12 U	12 U
Chloroform	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,2-Dichloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
2-Butanone	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,1,1-Trichloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Carbon Tetrachloride	ug/Kg	12 U	12 U			12 U	12 U	12 U
Vinyl Acetate	ug/Kg							
Bromodichloromethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,2-Dichloropropane	ug/Kg	12 U	12 U			12 U	12 U	12 U
cis-1,3-Dichloropropene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Trichloroethene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Dibromochloromethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,1,2-Trichloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Benzene	ug/Kg	12 U	12 U			12 U	12 U	12 U
trans-1,3-Dichloropropene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Bromoform	ug/Kg	12 U	12 U			12 U	12 U	12 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U			12 U	12 U	12 U
2-Hexanone	ug/Kg	12 U	12 U			12 U	12 U	12 U
Tetrachloroethene	ug/Kg	12 U	12 U			12 U	12 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	12 U	12 U			12 U	12 U	12 U
Toluene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Chlorobenzene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Ethylbenzene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Styrene	ug/Kg	12 U	12 U			12 U	12 U	12 U
Xylene (total)	ug/Kg	12 U	12 U			12 U	12 U	12 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	LH-01	LH-02	LH-02RE	LH-04	LH-06	LH-07	LH-09
	LAB ID	175819	175820	175820R1	175822	175824	175825	175827
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
bis(2-Chloroethyl) ether	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2-Chlorophenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
1,3-Dichlorobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
1,4-Dichlorobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzyl Alcohol	ug/Kg							
1,2-Dichlorobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2-Methylphenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Methylphenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
N-Nitroso-di-n-propylamine	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Hexachloroethane	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Nitrobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Isophorone	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2-Nitrophenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4-Dimethylphenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzoic Acid	ug/Kg							
bis(2-Chloroethoxy) methane	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4-Dichlorophenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
1,2,4-Trichlorobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Naphthalene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Chloroaniline	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Hexachlorobutadiene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Chloro-3-methylphenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2-Methylnaphthalene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Hexachlorocyclopentadiene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4,6-Trichlorophenol	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4,5-Trichlorophenol	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
2-Chloronaphthalene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2-Nitroaniline	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
Dimethylphthalate	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Acenaphthylene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,6-Dinitrotoluene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
3-Nitroaniline	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
Acenaphthene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4-Dinitrophenol	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
4-Nitrophenol	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
Dibenzofuran	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
2,4-Dinitrotoluene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Diethylphthalate	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Chlorophenyl-phenylether	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Fluorene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Nitroaniline	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
4,6-Dinitro-2-methylphenol	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
N-Nitrosodiphenylamine	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
4-Bromophenyl-phenylether	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Hexachlorobenzene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Pentachlorophenol	ug/Kg	990 U	990 U	980 U		980 U	1000 U	980 U
Phenanthrene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Anthracene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Carbazole	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Di-n-butylphthalate	ug/Kg	15 J	410 U	400 U		24 J	410 U	410 U
Fluoranthene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Pyrene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Butylbenzylphthalate	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
3,3'-Dichlorobenzidine	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzo(a)anthracene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Chrysene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
bis(2-Ethylhexyl)phthalate	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Di-n-octylphthalate	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzo(b)fluoranthene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzo(k)fluoranthene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzo(a)pyrene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Indeno(1,2,3-cd)pyrene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Dibenz(a,h)anthracene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U
Benzo(g,h,i)perylene	ug/Kg	410 U	410 U	400 U		410 U	410 U	410 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	LH-01	LH-02	LH-02RE	LH-04	LH-06	LH-07	LH-09
	LAB ID	175819	175820	175820R1	175822	175824	175825	175827
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
beta-BHC	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
delta-BHC	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
gamma-BHC (Lindane)	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Heptachlor	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Aldrin	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Heptachlor epoxide	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Endosulfan I	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Dieldrin	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
4,4'-DDE	ug/Kg	1.8 J	4.1 U			4.1 U	4.1 U	4 U
Endrin	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
Endosulfan II	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
4,4'-DDD	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
Endosulfan sulfate	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
4,4'-DDT	ug/Kg	1.8 J	4.1 U			4.1 U	4.1 U	4 U
Methoxychlor	ug/Kg	21 U	21 U			21 U	21 U	21 U
Endrin ketone	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
Endrin aldehyde	ug/Kg	4 U	4.1 U			4.1 U	4.1 U	4 U
alpha-Chlordane	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
gamma-Chlordane	ug/Kg	2.1 U	2.1 U			2.1 U	2.1 U	2.1 U
Toxaphene	ug/Kg	210 U	210 U			210 U	210 U	210 U
Aroclor-1016	ug/Kg	40 U	41 U			41 U	41 U	40 U
Aroclor-1221	ug/Kg	82 U	83 U			83 U	83 U	82 U
Aroclor-1232	ug/Kg	40 U	41 U			41 U	41 U	40 U
Aroclor-1242	ug/Kg	40 U	41 U			41 U	41 U	40 U
Aroclor-1248	ug/Kg	40 U	41 U			41 U	41 U	40 U
Aroclor-1254	ug/Kg	40 U	41 U			41 U	41 U	40 U
Aroclor-1260	ug/Kg	40 U	41 U			41 U	41 U	40 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	LH-01	LH-02	LH-02RE	LH-04	LH-06	LH-07	LH-09
	LAB ID	175819	175820	175820R1	175822	175824	175825	175827
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U	120 U			120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U			120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U			120 U	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U			120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U			120 U	120 U	120 U
Metals								
Aluminum	mg/kg	18100	15600		16000		14900	14200
Antimony	mg/kg	5.9 UJ	5.2 UJ		7.7 UJ		5.4 UJ	6.3 UJ
Arsenic	mg/kg	4.8	6.9		5.2		4.5	4.6
Barium	mg/kg	100	74.6		107		126	127
Beryllium	mg/kg	0.87	0.79		0.8		0.83	0.78
Cadmium	mg/kg	0.34 U	0.3 U		0.47 J		0.44 J	0.57 J
Calcium	mg/kg	3680	1810		2090		2370	5800
Chromium	mg/kg	22.7	27.6		21.4		19.1	22
Cobalt	mg/kg	9.9	11.5		11.1		11.8	10.8
Copper	mg/kg	23	31.7		24.5		20.3	26.7
Iron	mg/kg	25900	27300		30100		23300	23400
Lead	mg/kg	94.1	42.8		45.8		37.8	51.2
Magnesium	mg/kg	3680	3540		3540		3430	3770
Manganese	mg/kg	783	944		811		1280	605
Mercury	mg/kg	0.15 R	0.11 R		0.14 R		0.14 R	0.12 R
Nickel	mg/kg	23.9	20.4		21.8		20.7	24.3
Potassium	mg/kg	1400	1060		858		946	1230
Selenium	mg/kg	0.84	0.59 J		0.61 J		0.5 J	0.57 J
Silver	mg/kg	0.35 U	0.31 U		0.46 U		0.32 U	0.37 U
Sodium	mg/kg	45 J	29.4 J		42.8 U		29.7 U	37.5 J
Thallium	mg/kg	0.42 U	0.48 U		0.71 U		0.49 U	0.58 U
Vanadium	mg/kg	32.7	27.3		29.9		26.2	24.9
Zinc	mg/kg	110	172		74.9		80.8	93.8
Cyanide	mg/kg	0.67 U	0.73 U		0.88 U		0.72 U	0.74 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.5	2.5	2.5
	DATE	12/09/92	12/09/92	12/09/92	12/09/92	12/08/92	12/08/92	12/08/92
	ES ID	LH-14	LH-16	LH-17	LH-18	LH-21	LH-210	LH-23
	LAB ID	175832	175834	175835	175836	175704	175707	175706
COMPOUND	UNITS						DUP LH-21	
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Bromomethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Vinyl Chloride	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Chloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Methylene Chloride	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Acetone	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Carbon Disulfide	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,1-Dichloroethene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,1-Dichloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloroethene (total)	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Chloroform	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
2-Butanone	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,1,1-Trichloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Carbon Tetrachloride	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Vinyl Acetate	ug/Kg							
Bromodichloromethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,2-Dichloropropane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
cis-1,3-Dichloropropene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Trichloroethene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Dibromochloromethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,1,2-Trichloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Benzene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
trans-1,3-Dichloropropene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Bromoform	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
4-Methyl-2-Pentanone	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
2-Hexanone	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Tetrachloroethene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Toluene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Chlorobenzene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Ethylbenzene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Styrene	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U
Xylene (total)	ug/Kg	12 U	13 U	13 U	12 U	13 U	13 U	12 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.5	2.5	2.5
	DATE	12/09/92	12/09/92	12/09/92	12/09/92	12/08/92	12/08/92	12/08/92
	ES ID	LH-14	LH-16	LH-17	LH-18	LH-21	LH-210	LH-23
	LAB ID	175832	175834	175835	175836	175704	175707	175706
	UNITS						DUP LH-21	
Semivolatiles								
Phenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
bis(2-Chloroethyl) ether	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2-Chlorophenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
1,3-Dichlorobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
1,4-Dichlorobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzyl Alcohol	ug/Kg							
1,2-Dichlorobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2-Methylphenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Methylphenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
N-Nitroso-di-n-propylamine	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Hexachloroethane	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Nitrobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Isophorone	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2-Nitrophenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4-Dimethylphenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzoic Acid	ug/Kg							
bis(2-Chloroethoxy) methane	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4-Dichlorophenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
1,2,4-Trichlorobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Naphthalene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Chloroaniline	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Hexachlorobutadiene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Chloro-3-methylphenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2-Methylnaphthalene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Hexachlorocyclopentadiene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4,6-Trichlorophenol	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4,5-Trichlorophenol	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
2-Chloronaphthalene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2-Nitroaniline	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
Dimethylphthalate	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Acenaphthylene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,6-Dinitrotoluene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
3-Nitroaniline	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
Acenaphthene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4-Dinitrophenol	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
4-Nitrophenol	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
Dibenzofuran	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
2,4-Dinitrotoluene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Diethylphthalate	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Chlorophenyl-phenylether	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Fluorene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Nitroaniline	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
4,6-Dinitro-2-methylphenol	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
N-Nitrosodiphenylamine	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
4-Bromophenyl-phenylether	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Hexachlorobenzene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Pentachlorophenol	ug/Kg	990 U	1000 U	1000 U	990 U	1000 U	1000 U	990 U
Phenanthrene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Anthracene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Carbazole	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Di-n-butylphthalate	ug/Kg	16 J	15 J	27 J	12 J	410 U	420 U	410 U
Fluoranthene	ug/Kg	410 U	410 U	420 U	410 U	16 J	16 J	410 U
Pyrene	ug/Kg	410 U	410 U	420 U	410 U	17 J	15 J	410 U
Butylbenzylphthalate	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
3,3'-Dichlorobenzidine	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzo(a)anthracene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Chrysene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
bis(2-Ethylhexyl)phthalate	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Di-n-octylphthalate	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzo(b)fluoranthene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzo(k)fluoranthene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzo(a)pyrene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Indeno(1,2,3-cd)pyrene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Dibenz(a,h)anthracene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U
Benzo(g,h,i)perylene	ug/Kg	410 U	410 U	420 U	410 U	410 U	420 U	410 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.5	2.5	2.5
	DATE	12/09/92	12/09/92	12/09/92	12/09/92	12/08/92	12/08/92	12/08/92
	ES ID	LH-14	LH-16	LH-17	LH-18	LH-21	LH-210	LH-23
	LAB ID	175832	175834	175835	175836	175704	175707	175706
COMPOUND	UNITS						DUP LH-21	
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
beta-BHC	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
delta-BHC	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
gamma-BHC (Lindane)	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Heptachlor	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Aldrin	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Heptachlor epoxide	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Endosulfan I	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Dieldrin	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
4,4'-DDE	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
Endrin	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
Endosulfan II	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
4,4'-DDD	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
Endosulfan sulfate	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
4,4'-DDT	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
Methoxychlor	ug/Kg	21 U	21 U	21 U	21 U	21 U	21 U	21 U
Endrin ketone	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
Endrin aldehyde	ug/Kg	4.1 U	4.1 U	4.2 U	4.1 U	4.1 U	4.2 U	4.1 U
alpha-Chlordane	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
gamma-Chlordane	ug/Kg	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Toxaphene	ug/Kg	210 U	210 U	210 U	210 U	210 U	210 U	210 U
Aroclor-1016	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U
Aroclor-1221	ug/Kg	83 U	84 U	85 U	83 U	84 U	85 U	84 U
Aroclor-1232	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U
Aroclor-1242	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U
Aroclor-1248	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U
Aroclor-1254	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U
Aroclor-1260	ug/Kg	41 U	41 U	42 U	41 U	41 U	42 U	41 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS -- PHASE II

COMPOUND	MATRIX / LOCATION / DEPTH(FT.) / DATE / ES ID / LAB ID / UNITS							
	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.5	2.5	2.5
	DATE	12/09/92	12/09/92	12/09/92	12/09/92	12/08/92	12/08/92	12/08/92
	ES ID	LH-14	LH-16	LH-17	LH-18	LH-21	LH-210	LH-23
	LAB ID	175832	175834	175835	175836	175704	175707	175706
	UNITS						DUP LH-21	
Explosives								
HMX	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/kg	19700	20000	16700	15900	21600	19100	18600
Antimony	mg/kg	6.7 UJ	6.7 UJ	6.5 UJ	6.5 UJ	6.7 UJ	6.3 UJ	6 UJ
Arsenic	mg/kg	4.4	4.7	5	4.9	4.8	5.3	4.8
Barium	mg/kg	150	160	152	135	136	123	143
Beryllium	mg/kg	0.98	1.1	0.96	0.9	1.1	1	0.94
Cadmium	mg/kg	0.45 J	0.38 U	0.44 J	0.39 J	0.38 U	0.36 U	0.91
Calcium	mg/kg	4370	5330	3850	3370	2820	2650	2690
Chromium	mg/kg	26.7	25.9	23.3	22.6	28.4	25.2	26.3
Cobalt	mg/kg	11.4	11.2	10.9	11.8	12.7	13.8	12.1
Copper	mg/kg	30.3	27.2	32.2	31.4	27.4	24.4	49.7
Iron	mg/kg	27000	26800	26400	28400	30000	28700	29100
Lead	mg/kg	41.3	42	60.2	46.6	39.1	39.3	64.3
Magnesium	mg/kg	4650	4380	4080	3960	4740	4270	4700
Manganese	mg/kg	896	857	775	863	805	1030	765
Mercury	mg/kg	0.08 R	0.11 R	0.14 R	0.13 R	0.12 R	0.17 R	0.18 R
Nickel	mg/kg	31.9	31.3	28.3	28	32.5	28.1	32.7
Potassium	mg/kg	2460	2390	1740	1350	2140	1590	1860
Selenium	mg/kg	0.64 J	1.1	0.94 J	0.8 J	0.94	0.8 J	0.79 J
Silver	mg/kg	0.4 U	0.68 J	0.47 J	0.8 J	0.39 U	0.37 U	0.35 U
Sodium	mg/kg	41.6 J	54.6 J	45.6 J	41.8 J	54 J	34.6 U	47.7 J
Thallium	mg/kg	0.47 U	0.38 U	0.57 U	0.62 U	0.43 U	0.44 U	0.5 U
Vanadium	mg/kg	32.8	33.4	28.5	28	35.4	31.8	30.4
Zinc	mg/kg	97.2	88.1	91.3	85.9	98.2	84.8	106
Cyanide	mg/kg	0.73 U	0.73 U	0.73 U	0.71 U	0.6 U	0.76 U	0.73 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	03/08/93	03/08/93	03/08/93	03/08/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-26	LH-27	LH-28	LH-29	LH-31	LH-32	LH-33
	LAB ID	179702	179703	179704	179705	179798	179799	179800
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Bromomethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Vinyl Chloride	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Chloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Methylene Chloride	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Acetone	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Carbon Disulfide	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,1-Dichloroethene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,1-Dichloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,2-Dichloroethene (total)	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Chloroform	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,2-Dichloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
2-Butanone	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,1,1-Trichloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Carbon Tetrachloride	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Vinyl Acetate	ug/Kg							
Bromodichloromethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,2-Dichloropropane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
cis-1,3-Dichloropropene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Trichloroethene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Dibromochloromethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,1,2-Trichloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Benzene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
trans-1,3-Dichloropropene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Bromoform	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
2-Hexanone	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Tetrachloroethene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Toluene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Chlorobenzene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Ethylbenzene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Styrene	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U
Xylene (total)	ug/Kg	12 U	12 U	12 U	13 U	13 U	13 U	12 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX LOCATION DEPTH(FT.) DATE ES ID LAB ID UNITS	SOIL OB 2.0 03/08/93 LH-26 179702	SOIL OB 2.0 03/08/93 LH-27 179703	SOIL OB 2.0 03/08/93 LH-28 179704	SOIL OB 2.0 03/08/93 LH-29 179705	SOIL OB 2.0 03/09/93 LH-31 179798	SOIL OB 2.0 03/09/93 LH-32 179799	SOIL OB 2.0 03/09/93 LH-33 179800
Semivolatiles								
Phenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
bis(2-Chloroethyl) ether	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2-Chlorophenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
1,3-Dichlorobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
1,4-Dichlorobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzyl Alcohol	ug/Kg							
1,2-Dichlorobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2-Methylphenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
4-Methylphenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
N-Nitroso-di-n-propylamine	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Hexachloroethane	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Nitrobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Isophorone	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2-Nitrophenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4-Dimethylphenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzoic Acid	ug/Kg							
bis(2-Chloroethoxy) methane	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4-Dichlorophenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
1,2,4-Trichlorobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Naphthalene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
4-Chloroaniline	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Hexachlorobutadiene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
4-Chloro-3-methylphenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2-Methylnaphthalene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Hexachlorocyclopentadiene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4,6-Trichlorophenol	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4,5-Trichlorophenol	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
2-Chloronaphthalene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2-Nitroaniline	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
Dimethylphthalate	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Acenaphthylene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,6-Dinitrotoluene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
3-Nitroaniline	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
Acenaphthene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4-Dinitrophenol	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
4-Nitrophenol	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
Dibenzofuran	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
2,4-Dinitrotoluene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Diethylphthalate	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
4-Chlorophenyl-phenylether	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Fluorene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
4-Nitroaniline	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
4,6-Dinitro-2-methylphenol	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
N-Nitrosodiphenylamine	ug/Kg	390 U	390 U	410 U	420 U	62 J	110 J	410 U
4-Bromophenyl-phenylether	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Hexachlorobenzene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Pentachlorophenol	ug/Kg	950 U	950 U	990 U	1000 U	980 U	1000 U	990 U
Phenanthrene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Anthracene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Carbazole	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Di-n-butylphthalate	ug/Kg	390 U	390 U	410 U	420 U	340 J	460	410 U
Fluoranthene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Pyrene	ug/Kg	390 U	390 U	410 U	420 U	13 J	410 U	15 J
Butylbenzylphthalate	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
3,3'-Dichlorobenzidine	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzo(a)anthracene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Chrysene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
bis(2-Ethylhexyl)phthalate	ug/Kg	460	390 U	270 J	120 J	400 U	410 U	150 J
Di-n-octylphthalate	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzo(b)fluoranthene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzo(k)fluoranthene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzo(a)pyrene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Indeno(1,2,3-cd)pyrene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Dibenz(a,h)anthracene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U
Benzo(g,h,i)perylene	ug/Kg	390 U	390 U	410 U	420 U	400 U	410 U	410 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	DATE	03/08/93	03/08/93	03/08/93	03/08/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-26	LH-27	LH-28	LH-29	LH-31	LH-32	LH-33
	LAB ID	179702	179703	179704	179705	179798	179799	179800
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
beta-BHC	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
delta-BHC	ug/Kg	2 U	2 U	2.1 U	2.2 U	0.95 J	1.2 J	2.1 U
gamma-BHC (Lindane)	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Heptachlor	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Aldrin	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Heptachlor epoxide	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Endosulfan I	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Dieldrin	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
4,4'-DDE	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
Endrin	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
Endosulfan II	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
4,4'-DDD	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
Endosulfan sulfate	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
4,4'-DDT	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	2.2 J	4.1 U
Methoxychlor	ug/Kg	20 U	20 U	21 U	22 U	21 U	21 U	21 U
Endrin ketone	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
Endrin aldehyde	ug/Kg	3.9 U	3.9 U	4.1 U	4.2 U	4.1 U	4 U	4.1 U
alpha-Chlordane	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
gamma-Chlordane	ug/Kg	2 U	2 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 U
Toxaphene	ug/Kg	200 U	200 U	210 U	220 U	210 U	210 U	210 U
Aroclor-1016	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U
Aroclor-1221	ug/Kg	80 U	80 U	84 U	85 U	83 U	82 U	83 U
Aroclor-1232	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U
Aroclor-1242	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U
Aroclor-1248	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U
Aroclor-1254	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U
Aroclor-1260	ug/Kg	39 U	39 U	41 U	42 U	41 U	40 U	41 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX LOCATION DEPTH(FT.) DATE ES ID LAB ID UNITS	SOIL OB 2.0 03/08/93 LH-26 179702	SOIL OB 2.0 03/08/93 LH-27 179703	SOIL OB 2.0 03/08/93 LH-28 179704	SOIL OB 2.0 03/08/93 LH-29 179705	SOIL OB 2.0 03/09/93 LH-31 179798	SOIL OB 2.0 03/09/93 LH-32 179799	SOIL OB 2.0 03/09/93 LH-33 179800
Explosives								
HMX	ug/Kg	120 U	68 J	120 U	120 U	120 U	120 U	120 U
RDX	ug/Kg	140	85 J	89 J	93 J	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	66 J	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	520	120 U	120 U
Metals								
Aluminum	mg/kg	15800	17400	18700	16200	15400	17900	16500
Antimony	mg/kg	6 UJ	6.1 UJ	6.8 J	5.9 UJ	6 UJ	8.2 J	6.6 UJ
Arsenic	mg/kg	6.2	5.8	5.8	5.5	5.5	5.7	5.5
Barium	mg/kg	165	151	269	149	374	656	297
Beryllium	mg/kg	0.83	0.78	0.84	0.82	0.83	0.87	0.77
Cadmium	mg/kg	0.41 J	0.37 J	0.51 J	0.34 U	2.7	1.4	0.54 J
Calcium	mg/kg	6780	2360	3410	2640	3670	5290	3540
Chromium	mg/kg	23.6	22.6	25	20.6	23.4	27.1	23.3
Cobalt	mg/kg	11	12.8	10.9	10.6	13.7	15.5	10.6
Copper	mg/kg	98.4	89.2	127	42.6	239	427	375
Iron	mg/kg	27400	24900	27900	22700	27600	29700	26400
Lead	mg/kg	162 J	177 J	415	228 J	1530	1250	533
Magnesium	mg/kg	4690	4020	4690	3710	4580	5750	4470
Manganese	mg/kg	560	655	542	784	933	900	561
Mercury	mg/kg	0.05 J	0.05 J	0.05 J	0.1 J	0.1 J	0.08 J	0.14 J
Nickel	mg/kg	32.3	26.5	29	25.6	31.7	36.8	27.2
Potassium	mg/kg	1360	1680	1870	1270	1240	1490	1310
Selenium	mg/kg	0.24 UJ	0.23 UJ	0.23 UJ	0.22 UJ	0.18 J	0.21 UJ	0.25 UJ
Silver	mg/kg	0.36 U	0.36 U	0.38 U	0.35 U	0.36 U	0.35 U	0.39 U
Sodium	mg/kg	60.8 J	54.5 J	63.8 J	46.4 J	49.1 J	67.7 J	61.1 J
Thallium	mg/kg	0.57 U	0.54 U	0.55 U	0.51 U	0.41 U	0.5 U	0.6 U
Vanadium	mg/kg	25.9	28.5	30.5	25.3	25.7	27.8	26.6
Zinc	mg/kg	115 J	91.3 J	135 J	79.1 J	245	443	194 J
Cyanide	mg/kg	0.71 U	0.72 U	0.73 U	0.75 U	0.75 U	0.75 U	0.73 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0
	DATE	03/09/93	03/09/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-35	LH-35D	LH-36	LH-37	LH-40
	LAB ID	179802	179809	179803	179804	179807
COMPOUND	UNITS		DUP LH-35			
Volatile Organic Compounds						
Chloromethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Bromomethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Vinyl Chloride	ug/Kg	12 U	12 U	13 U	12 U	13 U
Chloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Methylene Chloride	ug/Kg	12 U	12 U	13 U	12 U	13 U
Acetone	ug/Kg	12 U	12 U	13 U	12 U	13 U
Carbon Disulfide	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,1-Dichloroethene	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,1-Dichloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,2-Dichloroethene (total)	ug/Kg	12 U	12 U	13 U	12 U	13 U
Chloroform	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,2-Dichloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
2-Butanone	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,1,1-Trichloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Carbon Tetrachloride	ug/Kg	12 U	12 U	13 U	12 U	13 U
Vinyl Acetate	ug/Kg					
Bromodichloromethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,2-Dichloropropane	ug/Kg	12 U	12 U	13 U	12 U	13 U
cis-1,3-Dichloropropene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Trichloroethene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Dibromochloromethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,1,2-Trichloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Benzene	ug/Kg	12 U	12 U	13 U	12 U	13 U
trans-1,3-Dichloropropene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Bromoform	ug/Kg	12 U	12 U	13 U	12 U	13 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U	13 U	12 U	13 U
2-Hexanone	ug/Kg	12 U	12 U	13 U	12 U	13 U
Tetrachloroethene	ug/Kg	12 U	12 U	13 U	12 U	13 U
1,1,2,2-Tetrachloroethane	ug/Kg	12 U	12 U	13 U	12 U	13 U
Toluene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Chlorobenzene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Ethylbenzene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Styrene	ug/Kg	12 U	12 U	13 U	12 U	13 U
Xylene (total)	ug/Kg	12 U	12 U	13 U	12 U	13 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0
	DATE	03/09/93	03/09/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-35	LH-35D	LH-36	LH-37	LH-40
	LAB ID	179802	179809	179803	179804	179807
COMPOUND	UNITS		DUP LH-35			
Semivolatiles						
Phenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
bis(2-Chloroethyl) ether	ug/Kg	400 U	400 U	420 U	390 U	420 U
2-Chlorophenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
1,3-Dichlorobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
1,4-Dichlorobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzyl Alcohol	ug/Kg					
1,2-Dichlorobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
2-Methylphenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Methylphenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
N-Nitroso-di-n-propylamine	ug/Kg	400 U	400 U	420 U	390 U	420 U
Hexachloroethane	ug/Kg	400 U	400 U	420 U	390 U	420 U
Nitrobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Isophorone	ug/Kg	400 U	400 U	420 U	390 U	420 U
2-Nitrophenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4-Dimethylphenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzoic Acid	ug/Kg					
bis(2-Chloroethoxy) methane	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4-Dichlorophenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
1,2,4-Trichlorobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Naphthalene	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Chloroaniline	ug/Kg	400 U	400 U	420 U	390 U	420 U
Hexachlorobutadiene	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Chloro-3-methylphenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
2-Methylnaphthalene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Hexachlorocyclopentadiene	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4,6-Trichlorophenol	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4,5-Trichlorophenol	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
2-Chloronaphthalene	ug/Kg	400 U	400 U	420 U	390 U	420 U
2-Nitroaniline	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
Dimethylphthalate	ug/Kg	400 U	400 U	420 U	390 U	420 U
Acenaphthylene	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,6-Dinitrotoluene	ug/Kg	400 U	400 U	420 U	390 U	420 U
3-Nitroaniline	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
Acenaphthene	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4-Dinitrophenol	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
4-Nitrophenol	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
Dibenzofuran	ug/Kg	400 U	400 U	420 U	390 U	420 U
2,4-Dinitrotoluene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Diethylphthalate	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Chlorophenyl-phenylether	ug/Kg	400 U	400 U	420 U	390 U	420 U
Fluorene	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Nitroaniline	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
4,6-Dinitro-2-methylphenol	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
N-Nitrosodiphenylamine	ug/Kg	400 U	400 U	420 U	390 U	420 U
4-Bromophenyl-phenylether	ug/Kg	400 U	400 U	420 U	390 U	420 U
Hexachlorobenzene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Pentachlorophenol	ug/Kg	980 U	970 U	1000 U	940 U	1000 U
Phenanthrene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Anthracene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Carbazole	ug/Kg	400 U	400 U	420 U	390 U	420 U
Di-n-butylphthalate	ug/Kg	400 U	400 U	420 U	390 U	63 J
Fluoranthene	ug/Kg	400 U	400 U	420 U	390 U	21 J
Pyrene	ug/Kg	400 U	400 U	420 U	390 U	16 J
Butylbenzylphthalate	ug/Kg	400 U	400 U	420 U	390 U	420 U
3,3'-Dichlorobenzidine	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzo(a)anthracene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Chrysene	ug/Kg	400 U	400 U	420 U	390 U	420 U
bis(2-Ethylhexyl)phthalate	ug/Kg	400 U	400 U	420 U	390 U	420 U
Di-n-octylphthalate	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzo(b)fluoranthene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzo(k)fluoranthene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzo(a)pyrene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Indeno(1,2,3-cd)pyrene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Dibenz(a,h)anthracene	ug/Kg	400 U	400 U	420 U	390 U	420 U
Benzo(g,h,i)perylene	ug/Kg	400 U	400 U	420 U	390 U	420 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0
	DATE	03/09/93	03/09/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-35	LH-35D	LH-36	LH-37	LH-40
	LAB ID	179802	179809	179803	179804	179807
COMPOUND	UNITS		DUP LH-35			
Pesticides/PCBs						
alpha-BHC	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
beta-BHC	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
delta-BHC	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
gamma-BHC (Lindane)	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Heptachlor	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Aldrin	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Heptachlor epoxide	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Endosulfan I	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Dieldrin	ug/Kg	5.8 J	4 U	4.2 U	3.9 U	4.2 U
4,4'-DDE	ug/Kg	4.1 U	4 U	4.2 U	2.4 J	6.4
Endrin	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
Endosulfan II	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
4,4'-DDD	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
Endosulfan sulfate	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
4,4'-DDT	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	5
Methoxychlor	ug/Kg	21 U	21 U	22 U	20 U	22 U
Endrin ketone	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
Endrin aldehyde	ug/Kg	4.1 U	4 U	4.2 U	3.9 U	4.2 U
alpha-Chlordane	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
gamma-Chlordane	ug/Kg	2.1 U	2.1 U	2.2 U	2 U	2.2 U
Toxaphene	ug/Kg	210 U	210 U	220 U	200 U	220 U
Aroclor-1016	ug/Kg	41 U	40 U	42 U	39 U	42 U
Aroclor-1221	ug/Kg	83 U	81 U	86 U	78 U	85 U
Aroclor-1232	ug/Kg	41 U	40 U	42 U	39 U	42 U
Aroclor-1242	ug/Kg	41 U	40 U	42 U	39 U	42 U
Aroclor-1248	ug/Kg	41 U	40 U	42 U	39 U	42 U
Aroclor-1254	ug/Kg	41 U	40 U	42 U	39 U	42 U
Aroclor-1260	ug/Kg	41 U	40 U	42 U	39 U	42 U

OB GROUNDS
LOW HILL SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH(FT.)	2.0	2.0	2.0	2.0	2.0
	DATE	03/09/93	03/09/93	03/09/93	03/09/93	03/09/93
	ES ID	LH-35	LH-35D	LH-36	LH-37	LH-40
	LAB ID	179802	179809	179803	179804	179807
COMPOUND	UNITS		DUP LH-35			
Explosives						
HMX	ug/Kg	120 U	120 U	120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U
Metals						
Aluminum	mg/kg	15100	15100	16700	14300	16000
Antimony	mg/kg	6.3 UJ	6.5 UJ	6.6 UJ	7.1 J	6.3 UJ
Arsenic	mg/kg	4.3	4.6	5	4.8	5
Barium	mg/kg	118	114	163	140	151
Beryllium	mg/kg	0.72	0.75	0.76	0.63	0.77
Cadmium	mg/kg	0.36 U	0.37 U	0.38 U	0.35 U	0.36 U
Calcium	mg/kg	1720	1620	2100	2500	3020
Chromium	mg/kg	19.1	19.3	20.3	17.1	21.1
Cobalt	mg/kg	8.6	8.5	8.4	7	10.5
Copper	mg/kg	46.4	49.8	71.1	72.4	60.3
Iron	mg/kg	23500	23100	23000	22400	26700
Lead	mg/kg	106 J	90.9 J	372	115 J	112 J
Magnesium	mg/kg	3310	3290	3490	3070	3600
Manganese	mg/kg	516	483	559	398	625
Mercury	mg/kg	0.06 J	0.06 J	0.09 J	0.07 J	0.11 J
Nickel	mg/kg	19.9	19.8	19.9	16.9	21.7
Potassium	mg/kg	925	876	1450	1010	1330
Selenium	mg/kg	0.19 UJ	0.26 UJ	0.27 UJ	0.23 J	0.23 UJ
Silver	mg/kg	0.37 U	0.38 U	0.39 U	0.36 U	0.37 U
Sodium	mg/kg	48.2 J	50.8 J	51.1 J	49.5 J	51.1 J
Thallium	mg/kg	0.46 U	0.61 U	0.65 U	0.44 U	0.55 U
Vanadium	mg/kg	25.2	25.5	27.4	24.4	26.6
Zinc	mg/kg	66.2 J	64.7 J	74.4 J	92.4 J	78 J
Cyanide	mg/kg	0.74 U	0.7 U	0.78 U	0.71 U	0.76 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	OB	PAD B	OB	OB	PAD C	PAD C
	DEPTH	3.5'	2.0 feet	2.5'	2.0 feet	2.0 feet	4.0'	4.0'
	DATE	12/03/91	12/04/92	12/10/91	12/03/92	12/03/92	12/03/91	12/03/91
	ES ID	BE-A-1-91	BE-A-3	BE-B-2-91	BE-B-3	BE-B-4	BE-C-2-91	BE-C-3-91
	LAB ID	150037	175276	150657	175278	175279	150040	150041
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Bromomethane	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Vinyl Chloride	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Chloroethane	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Methylene Chloride	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Acetone	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Carbon Disulfide	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,1-Dichloroethene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,1-Dichloroethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,2-Dichloroethene (total)	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Chloroform	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,2-Dichloroethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
2-Butanone	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
1,1,1-Trichloroethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Carbon Tetrachloride	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Vinyl Acetate	ug/kg	11 U		12 U			11 U	12 U
Bromodichloromethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,2-Dichloropropane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
cis-1,3-Dichloropropene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Trichloroethene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Dibromochloromethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
1,1,2-Trichloroethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Benzene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
trans-1,3-Dichloropropene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Bromoform	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
4-Methyl-2-Pentanone	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
2-Hexanone	ug/kg	11 U	12 U	12 U	12 U		11 U	12 U
Tetrachloroethene	ug/kg	6 U	12 U	6 U	12 U		6	1 J
1,1,2,2-Tetrachloroethane	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Toluene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Chlorobenzene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Ethylbenzene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Styrene	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U
Xylene (total)	ug/kg	6 U	12 U	6 U	12 U		6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX / LOCATION / DEPTH / DATE / ES ID / LAB ID / UNITS	SOIL PAD A 3.5' 12/03/91 BE-A-1-91 150037	SOIL OB 2.0 feet 12/04/92 BE-A-3 175276	SOIL PAD B 2.5' 12/10/91 BE-B-2-91 150657	SOIL OB 2.0 feet 12/03/92 BE-B-3 175278	SOIL OB 2.0 feet 12/03/92 BE-B-4 175279	SOIL PAD C 4.0' 12/03/91 BE-C-2-91 150040	SOIL PAD C 4.0' 12/03/91 BE-C-3-91 150041
Semivolatiles								
Phenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
bis(2-Chloroethyl) ether	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2-Chlorophenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
1,3-Dichlorobenzene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
1,4-Dichlorobenzene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzyl Alcohol	ug/kg	740 U		770 U			750 U	800 U
1,2-Dichlorobenzene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2-Methylphenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,2'-oxybis(1-Chloropropane)	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
4-Methylphenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
N-Nitroso-di-n-propylamine	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Hexachloroethane	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Nitrobenzene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Isophorone	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2-Nitrophenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4-Dimethylphenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzoic acid	ug/kg	3600 U		3800 U			3700 U	3900 U
bis(2-Chloroethoxy) methane	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4-Dichlorophenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
1,2,4-Trichlorobenzene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Naphthalene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
4-Chloroaniline	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Hexachlorobutadiene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
4-Chloro-3-methylphenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2-Methylnaphthalene	ug/kg	740 U	410 U	770 U	15 J		750 U	800 U
Hexachlorocyclopentadiene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4,6-Trichlorophenol	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4,5-Trichlorophenol	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
2-Chloronaphthalene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2-Nitroaniline	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
Dimethylphthalate	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Acenaphthylene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,6-Dinitrotoluene	ug/kg	740 U	410 U	770 U	470		750 U	800 U
3-Nitroaniline	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
Acenaphthene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4-Dinitrophenol	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
4-Nitrophenol	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
Dibenzofuran	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
2,4-Dinitrotoluene	ug/kg	740 U	410 U	130 J	5600 J		750 U	730 J
Diethylphthalate	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
4-Chlorophenyl-phenylether	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Fluorene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
4-Nitroaniline	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
4,6-Dinitro-2-methylphenol	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
N-Nitrosodiphenylamine	ug/kg	740 U	410 U	770 U	240 J		750 U	190 J
4-Bromophenyl-phenylether	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Hexachlorobenzene	ug/kg	740 U	410 U	770 U	20 J		750 U	800 U
Pentachlorophenol	ug/kg	3600 U	990 U	3800 U	1000 U		3700 U	3900 U
Phenanthrene	ug/kg	740 U	410 U	770 U	25 J		750 U	800 U
Anthracene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Carbazole	ug/kg		410 U		420 U			
Di-n-butylphthalate	ug/kg	740 U	410 U	380 J	790		740 J	200 J
Fluoranthene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Pyrene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Butylbenzylphthalate	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
3,3'-Dichlorobenzidine	ug/kg	1500 U	410 U	1500 U	420 U		1500 U	1600 U
Benzo(a)anthracene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Chrysene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
bis(2-Ethylhexyl)phthalate	ug/kg	740 U	410 U	170 J	300 J		750 U	800 U
Di-n-octylphthalate	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzo(b)fluoranthene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzo(k)fluoranthene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzo(a)pyrene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Indeno(1,2,3-cd)pyrene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Dibenz(a,h)anthracene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U
Benzo(g,h,i)perylene	ug/kg	740 U	410 U	770 U	420 U		750 U	800 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	OB	PAD B	OB	OB	PAD C	PAD C
	DEPTH	3.5'	2.0 feet	2.5'	2.0 feet	2.0 feet	4.0'	4.0'
	DATE	12/03/91	12/04/92	12/10/91	12/03/92	12/03/92	12/03/91	12/03/91
	ES ID	BE-A-1-91	BE-A-3	BE-B-2-91	BE-B-3	BE-B-4	BE-C-2-91	BE-C-3-91
	LAB ID	150037	175276	150657	175278	175279	150040	150041
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
beta-BHC	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
delta-BHC	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
gamma-BHC (Lindane)	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
Heptachlor	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
Aldrin	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
Heptachlor epoxide	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
Endosulfan I	ug/Kg	18 U	2.1 U	190 U	2.2 U		18 U	19 U
Dieldrin	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
4,4'-DDE	ug/Kg	36 U	14 J	380 U	6.2		37 U	39 U
Endrin	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
Endosulfan II	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
4,4'-DDD	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
Endosulfan sulfate	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
4,4'-DDT	ug/Kg	36 U	9 J	2800	11		37 U	39 U
Methoxychlor	ug/Kg	180 U	21 U	1900 U	22 U		180 U	190 U
Endrin ketone	ug/Kg	36 U	4 U	380 U	4.2 U		37 U	39 U
Endrin aldehyde	ug/Kg		4 U		4.2 U			
alpha-Chlordane	ug/Kg	180 U	2.1 U	1900 U	2.2 U		180 U	190 U
gamma-Chlordane	ug/Kg	180 U	2.1 U	1900 U	2.2 U		180 U	190 U
Toxaphene	ug/Kg	360 U	210 U	3800 U	220 U		370 U	390 U
Aroclor-1016	ug/Kg	180 U	40 U	1900 U	42 U		180 U	190 U
Aroclor-1221	ug/Kg	180 U	82 U	1900 U	86 U		180 U	190 U
Aroclor-1232	ug/Kg	180 U	40 U	1900 U	42 U		180 U	190 U
Aroclor-1242	ug/Kg	180 U	40 U	1900 U	42 U		180 U	190 U
Aroclor-1248	ug/Kg	180 U	40 U	1900 U	42 U		180 U	190 U
Aroclor-1254	ug/Kg	360 U	40 U	3800 U	42 U		370 U	390 U
Aroclor-1260	ug/Kg	360 U	40 U	3800 U	42 U		370 U	390 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD A	OB	PAD B	OB	OB	PAD C	PAD C
	DEPTH	3.5'	2.0 feet	2.5'	2.0 feet	2.0 feet	4.0'	4.0'
	DATE	12/03/91	12/04/92	12/10/91	12/03/92	12/03/92	12/03/91	12/03/91
	ES ID	BE-A-1-91	BE-A-3	BE-B-2-91	BE-B-3	BE-B-4	BE-C-2-91	BE-C-3-91
	LAB ID	150037	175276	150657	175278	175279	150040	150041
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U	120 U	1000 U	120 U		1000 U	1000 U
RDX	ug/Kg	120 U	120 U	120 U	120 U		120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	250	120 J		610	180
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U		120 U	120 U
Tetryl	ug/Kg	400 U	120 U	400 U	120 U		400 U	400 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	300	430		120 U	240
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	200 J		120 U	240
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	360	170		120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U		120 U	120 U
2,4-Dinitrotoluene	ug/Kg	140	120 J	590	530		440	460
Metals								
Aluminum	mg/Kg	18300	19000	19400		23900	20700	30500
Antimony	mg/Kg	14.5 R	11.2 R	68.8 R		17.7 R	6.1 R	67.7 R
Arsenic	mg/Kg	5 R	4.5 J	10.1 R		7.7 J	6.2 R	20
Barium	mg/Kg	1040	607	19600		2510	2240	3900
Beryllium	mg/Kg	0.85 R	0.77	0.77 R		0.96	0.79 R	0.86 R
Cadmium	mg/Kg	3.9 J	0.74	15 J		5.5	28.2	16.3 J
Calcium	mg/Kg	8210	10900	11700		7030	15200	12300
Chromium	mg/Kg	24.5 R	27	48.1 R		41.6	53.6 R	46 R
Cobalt	mg/Kg	17.6	10.6	19.5		14.6	13.8	11.4
Copper	mg/Kg	767	504	38100		3050	3800	3620
Iron	mg/Kg	28200	29400	43200		37200	36200	33800
Lead	mg/Kg	7880 J	1380	41200 J		7210	56700 J	29000 J
Magnesium	mg/Kg	7030	5740	9210		6390	8060	8770
Manganese	mg/Kg	1260	381	646		518	610	676
Mercury	mg/Kg	0.04 UJ	0.09 J	0.2 J		0.15	0.21 J	0.23 J
Nickel	mg/Kg	31.5	32.9	44.8		46.3	49.9	51.6
Potassium	mg/Kg	1740 J	1950	3570 J		3060	2880 J	3060 J
Selenium	mg/Kg	0.21 UJ	0.79 J	3.2 J		3 J	1 UJ	0.86 UJ
Silver	mg/Kg	0.38 R	0.37 U	3.1 R		0.74 J	4.7	6.5
Sodium	mg/Kg	66.6 J	94 R	347 J		158 R	353 J	482 J
Thallium	mg/Kg	0.67 U	0.45 U	0.34 U		0.51 U	0.64 U	0.55 U
Vanadium	mg/Kg	28.8	29.1	29.2		36	22.9	31.8
Zinc	mg/Kg	210	426	5380		2070	7640	3380
Cyanide	mg/Kg	0.65 U	0.62 U	0.67 U		0.59 U	0.6 U	0.69 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD-D	PAD D	OB	PAD E
	DEPTH	2.0 feet	2.0 feet	2.0 feet	3.0'	2.5'	2.0 feet	3.0'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/04/92	12/03/91
	ES ID	BE-C-5	BE-C-5RE	BE-C-6	BE-D-1-91	BE-D-2-91	BE-D-3	BE-E-1-91
	LAB ID	175280	175280R1	175281	150104	150105	175282	150106
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U				11 U	12 U	12 U
Bromomethane	ug/kg	12 U				11 U	12 U	12 U
Vinyl Chloride	ug/kg	12 U				11 U	12 U	12 U
Chloroethane	ug/kg	12 U				11 U	12 U	12 U
Methylene Chloride	ug/kg	12 U				6 U	12 U	6 U
Acetone	ug/kg	12 U				11 U	12 U	12 U
Carbon Disulfide	ug/kg	12 U				6 U	12 U	6 U
1,1-Dichloroethene	ug/kg	12 U				6 U	12 U	6 U
1,1-Dichloroethane	ug/kg	12 U				6 U	12 U	6 U
1,2-Dichloroethene (total)	ug/kg	12 U				6 U	12 U	6 U
Chloroform	ug/kg	12 U				6 U	12 U	6 U
1,2-Dichloroethane	ug/kg	12 U				6 U	12 U	6 U
2-Butanone	ug/kg	12 U				11 U	12 U	12 U
1,1,1-Trichloroethane	ug/kg	12 U				6 U	12 U	6 U
Carbon Tetrachloride	ug/kg	12 U				6 U	12 U	6 U
Vinyl Acetate	ug/kg					11 U		12 U
Bromodichloromethane	ug/kg	12 U				6 U	12 U	6 U
1,2-Dichloropropane	ug/kg	12 U				6 U	12 U	6 U
cis-1,3-Dichloropropene	ug/kg	12 U				6 U	12 U	6 U
Trichloroethene	ug/kg	4 J				6 U	12 U	6 U
Dibromochloromethane	ug/kg	12 U				6 U	12 U	6 U
1,1,2-Trichloroethane	ug/kg	12 U				6 U	12 U	6 U
Benzene	ug/kg	12 U				6 U	12 U	6 U
trans-1,3-Dichloropropene	ug/kg	12 U				6 U	12 U	6 U
Bromoform	ug/kg	12 U				6 U	12 U	6 U
4-Methyl-2-Pentanone	ug/kg	12 U				11 U	12 U	12 U
2-Hexanone	ug/kg	12 U				11 U	12 U	12 U
Tetrachloroethene	ug/kg	12 U				1 J	2 J	6 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U				6 U	12 U	6 U
Toluene	ug/kg	12 U				6 U	12 U	6 U
Chlorobenzene	ug/kg	12 U				6 U	12 U	6 U
Ethylbenzene	ug/kg	12 U				6 U	12 U	6 U
Styrene	ug/kg	12 U				6 U	12 U	6 U
Xylene (total)	ug/kg	12 U				6 U	12 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD-D	PAD D	OB	PAD E
	DEPTH	2.0 feet	2.0 feet	2.0 feet	3.0'	2.5'	2.0 feet	3.0'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/04/92	12/03/91
	ES ID	BE-C-5	BE-C-5RE	BE-C-6	BE-D-1-91	BE-D-2-91	BE-D-3	BE-E-1-91
	LAB ID	175280	175280R1	175281	150104	150105	175282	150106
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/kg	400 U				750 U	400 U	750 U
bis(2-Chloroethyl) ether	ug/kg	400 U				750 U	400 U	750 U
2-Chlorophenol	ug/kg	400 U				750 U	400 U	750 U
1,3-Dichlorobenzene	ug/kg	400 U				750 U	400 U	750 U
1,4-Dichlorobenzene	ug/kg	400 U				750 U	400 U	750 U
Benzyl Alcohol	ug/kg					750 U		750 U
1,2-Dichlorobenzene	ug/kg	400 U				750 U	400 U	750 U
2-Methylphenol	ug/kg	400 U				750 U	400 U	750 U
2,2'-oxybis(1-Chloropropane)	ug/kg	400 U				750 U	400 U	750 U
4-Methylphenol	ug/kg	400 U				750 U	400 U	750 U
N-Nitroso-di-n-propylamine	ug/kg	400 U				750 U	400 U	750 U
Hexachloroethane	ug/kg	400 U				750 U	400 U	750 U
Nitrobenzene	ug/kg	400 U				750 U	400 U	750 U
Isophorone	ug/kg	400 U				750 U	400 U	750 U
2-Nitrophenol	ug/kg	400 U				750 U	400 U	750 U
2,4-Dimethylphenol	ug/kg	400 U				750 U	400 U	750 U
Benzoic acid	ug/kg					3600 U		3700 U
bis(2-Chloroethoxy) methane	ug/kg	400 U				750 U	400 U	750 U
2,4-Dichlorophenol	ug/kg	400 U				750 U	400 U	750 U
1,2,4-Trichlorobenzene	ug/kg	400 U				750 U	400 U	750 U
Naphthalene	ug/kg	400 U				750 U	400 U	750 U
4-Chloroaniline	ug/kg	400 U				750 U	400 U	750 U
Hexachlorobutadiene	ug/kg	400 U				750 U	400 U	750 U
4-Chloro-3-methylphenol	ug/kg	400 U				750 U	400 U	750 U
2-Methylnaphthalene	ug/kg	15 J				750 U	27 J	750 U
Hexachlorocyclopentadiene	ug/kg	400 U				750 U	400 U	750 U
2,4,6-Trichlorophenol	ug/kg	400 U				750 U	400 U	750 U
2,4,5-Trichlorophenol	ug/kg	980 U				3800 U	970 U	3700 U
2-Chloronaphthalene	ug/kg	400 U				750 U	400 U	750 U
2-Nitroaniline	ug/kg	980 U				3600 U	970 U	3700 U
Dimethylphthalate	ug/kg	400 U				750 U	400 U	750 U
Acenaphthylene	ug/kg	400 U				750 U	400 U	750 U
2,6-Dinitrotoluene	ug/kg	250 J				750 U	120 J	750 U
3-Nitroaniline	ug/kg	980 U				3600 U	970 U	3700 U
Acenaphthene	ug/kg	400 U				750 U	400 U	750 U
2,4-Dinitrophenol	ug/kg	980 U				3600 U	970 U	3700 U
4-Nitrophenol	ug/kg	980 U				3600 U	970 U	3700 U
Dibenzofuran	ug/kg	400 U				750 U	400 U	750 U
2,4-Dinitrotoluene	ug/kg	2900 J				750 U	1400	750 U
Diethylphthalate	ug/kg	400 U				750 U	400 U	750 U
4-Chlorophenyl-phenylether	ug/kg	400 U				750 U	400 U	750 U
Fluorene	ug/kg	400 U				750 U	400 U	750 U
4-Nitroaniline	ug/kg	980 U				3600 U	970 U	3700 U
4,6-Dinitro-2-methylphenol	ug/kg	980 U				3600 U	970 U	3700 U
N-Nitrosodiphenylamine	ug/kg	360 J				750 U	82 J	750 U
4-Bromophenyl-phenylether	ug/kg	400 U				750 U	400 U	750 U
Hexachlorobenzene	ug/kg	400 U				750 U	400 U	750 U
Pentachlorophenol	ug/kg	980 U				3600 U	970 U	3700 U
Phenanthrene	ug/kg	400 U				750 U	78 J	750 U
Anthracene	ug/kg	400 U				750 U	25 J	750 U
Carbazole	ug/kg	400 U					400 U	
Di-n-butylphthalate	ug/kg	720				400 J	690	750 U
Fluoranthene	ug/kg	400 U				750 U	180 J	750 U
Pyrene	ug/kg	400 U				750 U	180 J	750 U
Butylbenzylphthalate	ug/kg	400 U				750 U	400 U	750 U
3,3'-Dichlorobenzidine	ug/kg	400 U				1500 U	400 U	1500 U
Benzo(a)anthracene	ug/kg	400 U				750 U	130 J	750 U
Chrysene	ug/kg	400 U				750 U	160 J	750 U
bis(2-Ethylhexyl)phthalate	ug/kg	400 U				750 U	400 U	750 U
Di-n-octylphthalate	ug/kg	400 U				750 U	400 U	750 U
Benzo(b)fluoranthene	ug/kg	400 U				750 U	180 J	750 U
Benzo(k)fluoranthene	ug/kg	400 U				750 U	180 J	750 U
Benzo(a)pyrene	ug/kg	400 U				750 U	120 J	750 U
Indeno(1,2,3-cd)pyrene	ug/kg	400 U				750 U	130 J	750 U
Dibenz(a,h)anthracene	ug/kg	400 U				750 U	400 U	750 U
Benzo(g,h,i)perylene	ug/kg	400 U				750 U	93 J	750 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD-D	PAD D	OB	PAD E
	DEPTH	2.0 feet	2.0 feet	2.0 feet	3.0'	2.5'	2.0 feet	3.0'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/04/92	12/03/91
	ES ID	BE-C-5	BE-C-5RE	BE-C-6	BE-D-1-91	BE-D-2-91	BE-D-3	BE-E-1-91
	LAB ID	175280	175280R1	175281	150104	150105	175282	150106
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.1 U	2.1 U			18 U	2.1 U	18 U
beta-BHC	ug/Kg	2.1 U	2.1 U			18 U	2.1 U	18 U
delta-BHC	ug/Kg	2.1 U	2.1 U			18 U	15 J	18 U
gamma-BHC (Lindane)	ug/Kg	2.1 U	2.1 U			18 U	2.1 U	18 U
Heptachlor	ug/Kg	2.1 U	2.1 U			18 U	2.1 U	18 U
Aldrin	ug/Kg	2.1 U	2.1 U			18 U	2.1 U	18 U
Heptachlor epoxide	ug/Kg	2.1 U	2.1 U			18 U	1.2 J	18 U
Endosulfan I	ug/Kg	2.1 U	2.1 U			18 U	1.8 J	18 U
Dieldrin	ug/Kg	4.1 U	4.1 U			36 U	4 U	37 U
4,4'-DDE	ug/Kg	1.3 J	1.2 J			36 U	7.8 J	37 U
Endrin	ug/Kg	4.1 U	4.1 U			36 U	4 U	37 U
Endosulfan II	ug/Kg	4.1 U	4.1 U			36 U	4 U	37 U
4,4'-DDD	ug/Kg	4.1 U	4.1 U			36 U	2.4 J	37 U
Endosulfan sulfate	ug/Kg	4.1 U	4.1 U			36 U	4 U	37 U
4,4'-DDT	ug/Kg	2.2 J	2.6 J			36 U	4 U	37 U
Methoxychlor	ug/Kg	21 U	21 U			180 U	21 U	180 U
Endrin ketone	ug/Kg	4.1 U	4.1 U			36 U	4 U	37 U
Endrin aldehyde	ug/Kg	4.1 U	4.1 U				4 U	
alpha-Chlordane	ug/Kg	2.1 U	2.1 U			180 U	2.1 U	180 U
gamma-Chlordane	ug/Kg	2.1 U	2.1 U			180 U	2.1 U	180 U
Toxaphene	ug/Kg	210 U	210 U			360 U	210 U	370 U
Aroclor-1016	ug/Kg	41 U	41 U			180 U	40 U	180 U
Aroclor-1221	ug/Kg	82 U	82 U			180 U	82 U	180 U
Aroclor-1232	ug/Kg	41 U	41 U			180 U	40 U	180 U
Aroclor-1242	ug/Kg	41 U	41 U			180 U	40 U	180 U
Aroclor-1248	ug/Kg	41 U	41 U			180 U	40 U	180 U
Aroclor-1254	ug/Kg	41 U	41 U			360 U	40 U	370 U
Aroclor-1260	ug/Kg	41 U	41 U			360 U	40 U	370 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD-D	PAD D	OB	PAD E
	DEPTH	2.0 feet	2.0 feet	2.0 feet	3.0'	2.5'	2.0 feet	3.0'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/04/92	12/03/91
	ES ID	BE-C-5	BE-C-5RE	BE-C-6	BE-D-1-91	BE-D-2-91	BE-D-3	BE-E-1-91
	LAB ID	175280	175280R1	175281	150104	150105	175282	150106
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U				1000 U	120 U	1000 U
RDX	ug/Kg	120 U				120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	140				170	91 J	120 J
1,3-Dinitrobenzene	ug/Kg	120 U				120 U	120 U	120 U
Tetryl	ug/Kg	120 U				400 U	120 U	400 U
2,4,6-Trinitrotoluene	ug/Kg	160 J				120 U	95 J	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	240 J				120 U	66 J	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	240 J				110 J	69 J	86 J
2,6-Dinitrotoluene	ug/Kg	120 U				120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	1000 J				360	910	1900
Metals								
Aluminum	mg/Kg			16800	16800		21100	17500
Antimony	mg/Kg			17.7 R	54.2 R		19.6 R	5.4 R
Arsenic	mg/Kg			6.4 J	6.9 R		8.1 J	6.2 R
Barium	mg/Kg			1360	740 R		753	680 R
Beryllium	mg/Kg			0.83	0.78 R		0.83	0.85 R
Cadmium	mg/Kg			1.7	10.9 J		24.4	7.9 J
Calcium	mg/Kg			11300	10600		13300	8930
Chromium	mg/Kg			27.4	31.1 R		43.2	32.2 R
Cobalt	mg/Kg			11.9	11.2		12.5	14.2
Copper	mg/Kg			4860	704		12900	444
Iron	mg/Kg			27700	33400		33400	52000
Lead	mg/Kg			5730	14400 J		9380	1260 J
Magnesium	mg/Kg			6650	5690		6000	5930
Manganese	mg/Kg			529	751		672	656
Mercury	mg/Kg			0.09	0.23 J		0.42	0.18 J
Nickel	mg/Kg			37.9	36.7		48.8	47.2
Potassium	mg/Kg			2240	1930 J		2850	2030 J
Selenium	mg/Kg			0.74 J	0.19 J		1 J	0.28 J
Silver	mg/Kg			0.86 J	1.7 R		42.6	0.54 R
Sodium	mg/Kg			82.6 R	295 R		318 R	123 R
Thallium	mg/Kg			0.6 U	0.62 U		0.62 U	0.61 U
Vanadium	mg/Kg			27.5	25.3		29.9	28
Zinc	mg/Kg			966	13000		6530	775
Cyanide	mg/Kg			0.61 U	0.67 U		0.59 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	PAD F	PAD F	PAD-F	PAD F	PAD-F
	DEPTH	2.0 feet	2.0 feet	2.0'	2.0'	2.0'	2.0'	2.0'
	DATE	12/03/92	12/03/92	12/12/91	12/10/91	12/10/91	12/10/91	12/10/91
	ES ID	BE-E-3	BE-E-3RE	BE-F-1-91	BE-F-2-91	BE-F-2-91DL	BE-F-2A-91	BE-F-2A-91DL
	LAB ID	175284	175284R1	150624	150658	150658DL	150659	150659
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	13 U		11 U	11 U		11 U	
Bromomethane	ug/kg	13 U		11 U	11 U		11 U	
Vinyl Chloride	ug/kg	13 U		11 U	11 U		11 U	
Chloroethane	ug/kg	13 U		11 U	11 U		11 U	
Methylene Chloride	ug/kg	13 U		6 U	5 U		6 U	
Acetone	ug/kg	13 U		11 U	11 U		11 U	
Carbon Disulfide	ug/kg	13 U		6 U	5 U		6 U	
1,1-Dichloroethene	ug/kg	13 U		6 U	5 U		6 U	
1,1-Dichloroethane	ug/kg	13 U		6 U	5 U		6 U	
1,2-Dichloroethene (total)	ug/kg	13 U		6 U	5 U		6 U	
Chloroform	ug/kg	13 U		6 U	5 U		6 U	
1,2-Dichloroethane	ug/kg	13 U		6 U	5 U		6 U	
2-Butanone	ug/kg	13 U		11 U	11 U		11 U	
1,1,1-Trichloroethane	ug/kg	13 U		6 U	5 U		6 U	
Carbon Tetrachloride	ug/kg	13 U		6 U	5 U		6 U	
Vinyl Acetate	ug/kg			11 U	11 U		11 U	
Bromodichloromethane	ug/kg	13 U		6 U	5 U		6 U	
1,2-Dichloropropane	ug/kg	13 U		6 U	5 U		6 U	
cis-1,3-Dichloropropene	ug/kg	13 U		6 U	5 U		6 U	
Trichloroethene	ug/kg	13 U		6 U	5 U		6 U	
Dibromochloromethane	ug/kg	13 U		6 U	5 U		6 U	
1,1,2-Trichloroethane	ug/kg	13 U		6 U	5 U		6 U	
Benzene	ug/kg	13 U		6 U	1 J		6 U	
trans-1,3-Dichloropropene	ug/kg	13 U		6 U	5 U		6 U	
Bromoform	ug/kg	13 U		6 U	5 U		6 U	
4-Methyl-2-Pentanone	ug/kg	13 U		11 U	11 U		11 U	
2-Hexanone	ug/kg	13 U		11 U	11 U		11 U	
Tetrachloroethene	ug/kg	8 J		6 U	2 J		1 J	
1,1,2,2-Tetrachloroethane	ug/kg	13 U		6 U	5 U		6 U	
Toluene	ug/kg	13 U		6 U	5 J		2 J	
Chlorobenzene	ug/kg	13 U		6 U	5 U		6 U	
Ethylbenzene	ug/kg	13 U		6 U	5 U		6 U	
Styrene	ug/kg	13 U		6 U	5 U		6 U	
Xylene (total)	ug/kg	13 U		6 U	5 U		6 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	PAD F	PAD F	PAD-F	PAD F	PAD-F
	DEPTH	2.0 feet	2.0 feet	2.0'	2.0'	2.0'	2.0'	2.0'
	DATE	12/03/92	12/03/92	12/12/91	12/10/91	12/10/91	12/10/91	12/10/91
	ES ID	BE-E-3	BE-E-3RE	BE-F-1-91	BE-F-2-91	BE-F-2-91DL	BE-F-2A-91	BE-F-2A-91DL
	LAB ID	175284	175284R1	150624	150658	150658DL	150659	150659
	UNITS							
Semivolatiles								
Phenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
bis(2-Chloroethyl) ether	ug/kg	420 U	420 U	720 U	730 U		720 U	
2-Chlorophenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
1,3-Dichlorobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
1,4-Dichlorobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Benzyl Alcohol	ug/kg			720 U	730 U		720 U	
1,2-Dichlorobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
2-Methylphenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,2'-oxybis(1-Chloropropane)	ug/kg	420 U	420 U	720 U	730 U		720 U	
4-Methylphenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
N-Nitroso-di-n-propylamine	ug/kg	420 U	420 U	720 U	730 U		720 U	
Hexachloroethane	ug/kg	420 U	420 U	720 U	730 U		720 U	
Nitrobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Isophorone	ug/kg	420 U	420 U	720 U	730 U		720 U	
2-Nitrophenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4-Dimethylphenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
Benzoic acid	ug/kg			3500 U	3500 U		3500 U	
bis(2-Chloroethoxy) methane	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4-Dichlorophenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
1,2,4-Trichlorobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Naphthalene	ug/kg	420 U	420 U	720 U	730 U		720 U	
4-Chloroaniline	ug/kg	420 U	420 U	720 U	730 U		720 U	
Hexachlorobutadiene	ug/kg	420 U	420 U	720 U	730 U		720 U	
4-Chloro-3-methylphenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
2-Methylnaphthalene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Hexachlorocyclopentadiene	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4,6-Trichlorophenol	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4,5-Trichlorophenol	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
2-Chloronaphthalene	ug/kg	420 U	420 U	720 U	730 U		720 U	
2-Nitroaniline	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
Dimethylphthalate	ug/kg	420 U	420 U	720 U	730 U		720 U	
Acenaphthylene	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,6-Dinitrotoluene	ug/kg	350 J	130 J	720 U	100 J		250 J	
3-Nitroaniline	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
Acenaphthene	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4-Dinitrophenol	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
4-Nitrophenol	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
Dibenzofuran	ug/kg	420 U	420 U	720 U	730 U		720 U	
2,4-Dinitrotoluene	ug/kg	4400 J	1900 J	720 U	1400		4200	
Diethylphthalate	ug/kg	420 U	420 U	720 U	730 U		720 U	
4-Chlorophenyl-phenylether	ug/kg	420 U	420 U	720 U	730 U		720 U	
Fluorene	ug/kg	420 U	420 U	720 U	730 U		720 U	
4-Nitroaniline	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
4,6-Dinitro-2-methylphenol	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
N-Nitrosodiphenylamine	ug/kg	120 J	340 J	720 U	1000 J		580 J	
4-Bromophenyl-phenylether	ug/kg	420 U	420 U	720 U	730 U		720 U	
Hexachlorobenzene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Pentachlorophenol	ug/kg	1000 U	1000 U	3500 U	3500 U		3500 U	
Phenanthrene	ug/kg	420 U	420 U	720 U	730 U		75 J	
Anthracene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Carbazole	ug/kg	420 U	420 U					
Di-n-butylphthalate	ug/kg	1100	1000	720 U	200 J		3100 J	
Fluoranthene	ug/kg	420 U	420 U	720 U	730 U		66 J	
Pyrene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Butylbenzylphthalate	ug/kg	420 U	420 U	720 U	730 U		720 U	
3,3'-Dichlorobenzidine	ug/kg	420 U	420 U	1400 U	1500 U		1400 U	
Benzo(a)anthracene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Chrysene	ug/kg	420 U	420 U	720 U	730 U		720 U	
bis(2-Ethylhexyl)phthalate	ug/kg	190 J	420 U	720 U	730 U		89 J	
Di-n-octylphthalate	ug/kg	420 U	420 U	720 U	220 J		720 U	
Benzo(b)fluoranthene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Benzo(k)fluoranthene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Benzo(a)pyrene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Indeno(1,2,3-cd)pyrene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Dibenz(a,h)anthracene	ug/kg	420 U	420 U	720 U	730 U		720 U	
Benzo(g,h,i)perylene	ug/kg	420 U	420 U	720 U	730 U		720 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	PAD F	PAD F	PAD-F	PAD F	PAD-F
	DEPTH	2.0 feet	2.0 feet	2.0'	2.0'	2.0'	2.0'	2.0'
	DATE	12/03/92	12/03/92	12/12/91	12/10/91	12/10/91	12/10/91	12/10/91
	ES ID	BE-E-3	BE-E-3RE	BE-F-1-91	BE-F-2-91	BE-F-2-91DL	BE-F-2A-91	BE-F-2A-91DL
	LAB ID	175284	175284R1	150624	150658	150658DL	150659	150659
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.2 U		17 U	18 U		17 U	
beta-BHC	ug/Kg	2.2 U		17 U	18 U		17 U	
delta-BHC	ug/Kg	2.2 U		17 U	18 U		17 U	
gamma-BHC (Lindane)	ug/Kg	2.2 U		17 U	18 U		17 U	
Heptachlor	ug/Kg	2.2 U		17 U	18 U		17 U	
Aldrin	ug/Kg	3.2 J		17 U	18 U		17 U	
Heptachlor epoxide	ug/Kg	2.2 U		17 U	18 U		17 U	
Endosulfan I	ug/Kg	2.2 U		17 U	18 U		17 U	
Dieldrin	ug/Kg	4.2 U		35 U	35 U		35 U	
4,4'-DDE	ug/Kg	4.2 U		35 U	35 U		35 U	
Endrin	ug/Kg	4.2 U		35 U	35 U		35 U	
Endosulfan II	ug/Kg	4.2 U		35 U	35 U		35 U	
4,4'-DDD	ug/Kg	4.2 U		35 U	35 U		35 U	
Endosulfan sulfate	ug/Kg	4.2 U		35 U	35 U		35 U	
4,4'-DDT	ug/Kg	2.5 J		35 U	35 U		35 U	
Methoxychlor	ug/Kg	22 U		170 U	180 U		170 U	
Endrin ketone	ug/Kg	4.2 U		35 U	35 U		35 U	
Endrin aldehyde	ug/Kg	4.2 U						
alpha-Chlordane	ug/Kg	2.2 U		170 U	180 U		170 U	
gamma-Chlordane	ug/Kg	2.2 U		170 U	180 U		170 U	
Toxaphene	ug/Kg	220 U		350 U	350 U		350 U	
Aroclor-1016	ug/Kg	42 U		170 U	180 U		170 U	
Aroclor-1221	ug/Kg	86 U		170 U	180 U		170 U	
Aroclor-1232	ug/Kg	42 U		170 U	180 U		170 U	
Aroclor-1242	ug/Kg	42 U		170 U	180 U		170 U	
Aroclor-1248	ug/Kg	42 U		170 U	180 U		170 U	
Aroclor-1254	ug/Kg	42 U		350 U	350 U		350 U	
Aroclor-1260	ug/Kg	42 U		350 U	350 U		180 J	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	PAD F	PAD F	PAD-F	PAD F	PAD-F
	DEPTH	2.0 feet	2.0 feet	2.0'	2.0'	2.0'	2.0'	2.0'
	DATE	12/03/92	12/03/92	12/12/91	12/10/91	12/10/91	12/10/91	12/10/91
	ES ID	BE-E-3	BE-E-3RE	BE-F-1-91	BE-F-2-91	BE-F-2-91DL	BE-F-2A-91	BE-F-2A-91DL
	LAB ID	175284	175284R1	150624	150658	150658DL	150659	150659
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U		1000 U	1000 U	10000 R	1000 U	25000 R
RDX	ug/Kg	120 U		180	1000	1200 R	1100	3100 R
1,3,5-Trinitrobenzene	ug/Kg	120 U		110 J	7700 R	7800 J	5800 R	6800 J
1,3-Dinitrobenzene	ug/Kg	120 U		120 U	180	1200 R	200	3100 R
Tetryl	ug/Kg	120 U		400 U	400 U	4000 R	400 U	10000 R
2,4,6-Trinitrotoluene	ug/Kg	120 U		150	26000 R	25000 J	80000 R	80000 J
4-amino-2,6-Dinitrotoluene	ug/Kg	78 J		870	1300 J	1900 R	150 J	3100 R
2-amino-4,6-Dinitrotoluene	ug/Kg	70 J		1000	2500	2500 R	1800	2000 R
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	1200 R	120 U	3100 R
2,4-Dinitrotoluene	ug/Kg	430		200	1600 J	1500 R	1600 J	1800 R
Metals								
Aluminum	mg/Kg	19500		14600	19900		21300	
Antimony	mg/Kg	12.6 R		5.5 R	21.3 R		19.9 R	
Arsenic	mg/Kg	6.1 J		8 R	9.5 R		15.4 R	
Barium	mg/Kg	699		674 R	3300		4570	
Beryllium	mg/Kg	1.1		0.85 R	0.71 R		0.78 R	
Cadmium	mg/Kg	5.1		3.5 J	10.1 J		11.4 J	
Calcium	mg/Kg	6080		6070	17200			
Chromium	mg/Kg	32.6		21.1 R	34.1 R		37 R	
Cobalt	mg/Kg	13.2		10.9	11.7		12.1	
Copper	mg/Kg	847		100	787		1770	
Iron	mg/Kg	32500		23600	47600		42200	
Lead	mg/Kg	1090		2350 J	5310 J		9340 J	
Magnesium	mg/Kg	6280		4700	6780		7570	
Manganese	mg/Kg	604		836	697		758	
Mercury	mg/Kg	0.24		0.25 J	0.09 J		0.3 J	
Nickel	mg/Kg	43.9		26	41.7		53.1	
Potassium	mg/Kg	2250		1380 J	2160 J		2500 J	
Selenium	mg/Kg	2.1 J		0.17 J	1 UJ		1.1 R	
Silver	mg/Kg	0.91 J		0.36 R	1.1 R		2.1 R	
Sodium	mg/Kg	109 R		72.9 J	335 J		414 J	
Thallium	mg/Kg	0.64 U		0.35 U	0.32 U		0.35 U	
Vanadium	mg/Kg	28.8		25.3	25.7		29.1	
Zinc	mg/Kg	958		138	2730		2160	
Cyanide	mg/Kg	0.6 U		0.65 U	2		2.2	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD G	PAD-G	PAD G	PAD G
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.5'	2.5'	4.0'	4.5'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/05/91	12/05/91
	ES ID	BE-F-5	BE-F-6	BE-F-6RE	BE-G-1-91	BE-G-1-91	BE-G-2-91	BE-G-3-91
	LAB ID	175287	175288	175288R1	150190	150190R1	150400	150401
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	12 U		11 U		11 U	11 U
Bromomethane	ug/kg	12 U	12 U		11 U		11 U	11 U
Vinyl Chloride	ug/kg	12 U	12 U		11 U		11 U	11 U
Chloroethane	ug/kg	12 U	12 U		11 U		11 U	11 U
Methylene Chloride	ug/kg	12 U	12 U		6 U		6 U	6 U
Acetone	ug/kg	12 U	12 U		11 U		11 U	11 U
Carbon Disulfide	ug/kg	12 U	12 U		6 U		6 U	6 U
1,1-Dichloroethene	ug/kg	12 U	12 U		6 U		6 U	6 U
1,1-Dichloroethane	ug/kg	12 U	12 U		6 U		6 U	6 U
1,2-Dichloroethene (total)	ug/kg	12 U	12 U		6 U		6 U	6 U
Chloroform	ug/kg	12 U	12 U		6 U		6 U	6 U
1,2-Dichloroethane	ug/kg	12 U	12 U		6 U		6 U	6 U
2-Butanone	ug/kg	12 U	12 U		11 U		11 U	11 U
1,1,1-Trichloroethane	ug/kg	12 U	12 U		6 U		6 U	6 U
Carbon Tetrachloride	ug/kg	12 U	12 U		6 U		6 U	6 U
Vinyl Acetate	ug/kg				11 U		11 U	11 U
Bromodichloromethane	ug/kg	12 U	12 U		6 U		6 U	6 U
1,2-Dichloropropane	ug/kg	12 U	12 U		6 U		6 U	6 U
cis-1,3-Dichloropropene	ug/kg	12 U	12 U		6 U		6 U	6 U
Trichloroethene	ug/kg	12 U	12 U		1 J		6 U	6 U
Dibromochloromethane	ug/kg	12 U	12 U		6 U		6 U	6 U
1,1,2-Trichloroethane	ug/kg	12 U	12 U		6 U		6 U	6 U
Benzene	ug/kg	12 U	12 U		6 U		6 U	6 U
trans-1,3-Dichloropropene	ug/kg	12 U	12 U		6 U		6 U	6 U
Bromoform	ug/kg	12 U	12 U		6 U		6 U	6 U
4-Methyl-2-Pentanone	ug/kg	12 U	12 U		11 U		11 U	11 U
2-Hexanone	ug/kg	12 U	12 U		11 U		11 U	11 U
Tetrachloroethene	ug/kg	3 J	6 J		6 U		15	6 U
1,1,2,2-Tetrachloroethane	ug/kg	12 U	12 U		6 U		6 U	6 U
Toluene	ug/kg	12 U	12 U		6 U		6 U	1 J
Chlorobenzene	ug/kg	12 U	12 U		6 U		6 U	6 U
Ethylbenzene	ug/kg	12 U	12 U		6 U		6 U	6 U
Styrene	ug/kg	12 U	12 U		6 U		6 U	6 U
Xylene (total)	ug/kg	12 U	12 U		6 U		6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD G	PAD-G	PAD G	PAD G
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.5'	2.5'	4.0'	4.5'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/05/91	12/05/91
	ES ID	BE-F-5	BE-F-6	BE-F-6RE	BE-G-1-91	BE-G-1-91	BE-G-2-91	BE-G-3-91
	LAB ID	175287	175288	175288R1	150190	150190R1	150400	150401
	UNITS							
Semivolatiles								
Phenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
bis(2-Chloroethyl) ether	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2-Chlorophenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
1,3-Dichlorobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
1,4-Dichlorobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzyl Alcohol	ug/kg				730 U		730 U	750 U
1,2-Dichlorobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2-Methylphenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,2'-oxybis(1-Chloropropane)	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
4-Methylphenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
N-Nitroso-di-n-propylamine	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Hexachloroethane	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Nitrobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Isophorone	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2-Nitrophenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4-Dimethylphenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzoic acid	ug/kg				3500 U		3500 U	3600 U
bis(2-Chloroethoxy) methane	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4-Dichlorophenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
1,2,4-Trichlorobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Naphthalene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
4-Chloroaniline	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Hexachlorobutadiene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
4-Chloro-3-methylphenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2-Methylnaphthalene	ug/kg	22 J	390 U	390 U	730 U		730 U	750 U
Hexachlorocyclopentadiene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4,6-Trichlorophenol	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4,5-Trichlorophenol	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
2-Chloronaphthalene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2-Nitroaniline	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
Dimethylphthalate	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Acenaphthylene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,6-Dinitrotoluene	ug/kg	400 U	390 U	390 U	730 U		150 J	100 J
3-Nitroaniline	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
Acenaphthene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4-Dinitrophenol	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
4-Nitrophenol	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
Dibenzofuran	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
2,4-Dinitrotoluene	ug/kg	180 J	46 J	18 J	730 U		2800	2500
Diethylphthalate	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
4-Chlorophenyl-phenylether	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Fluorene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
4-Nitroaniline	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
4,6-Dinitro-2-methylphenol	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
N-Nitrosodiphenylamine	ug/kg	400 U	390 U	390 U	730 U		530 J	270 J
4-Bromophenyl-phenylether	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Hexachlorobenzene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Pentachlorophenol	ug/kg	980 U	950 U	950 U	3500 U		3500 U	3600 U
Phenanthrene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Anthracene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Carbazole	ug/kg	400 U	390 U	390 U				
Di-n-butylphthalate	ug/kg	140 J	390 U	390 U	730 U		730 U	140 J
Fluoranthene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Pyrene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Butylbenzylphthalate	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
3,3'-Dichlorobenzidine	ug/kg	400 U	390 U	390 U	1500 U		1500 U	1500 U
Benzo(a)anthracene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Chrysene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
bis(2-Ethylhexyl)phthalate	ug/kg	320 J	210 J	390 U	730 U		730 U	750 U
Di-n-octylphthalate	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzo(b)fluoranthene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzo(k)fluoranthene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzo(a)pyrene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Indeno(1,2,3-cd)pyrene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Dibenz(a,h)anthracene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U
Benzo(g,h,i)perylene	ug/kg	400 U	390 U	390 U	730 U		730 U	750 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD G	PAD-G	PAD G	PAD G
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.5'	2.5'	4.0'	4.5'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/05/91	12/05/91
	ES ID	BE-F-5	BE-F-6	BE-F-6RE	BE-G-1-91	BE-G-1-91	BE-G-2-91	BE-G-3-91
	LAB ID	175287	175288	175288R1	150190	150190R1	150400	150401
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
beta-BHC	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
delta-BHC	ug/Kg	2.4 J	2 U	2 U	18 U		18 U	18 U
gamma-BHC (Lindane)	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
Heptachlor	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
Aldrin	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
Heptachlor epoxide	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
Endosulfan I	ug/Kg	2.1 U	2 U	2 U	18 U		18 U	18 U
Dieldrin	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
4,4'-DDE	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
Endrin	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
Endosulfan II	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
4,4'-DDD	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
Endosulfan sulfate	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
4,4'-DDT	ug/Kg	5.3 J	3.9 U	2.6 J	35 U		35 U	36 U
Methoxychlor	ug/Kg	21 U	20 U	20 U	180 U		180 U	180 U
Endrin ketone	ug/Kg	4 U	3.9 U	3.9 U	35 U		35 U	36 U
Endrin aldehyde	ug/Kg	4 U	3.9 U	3.9 U				
alpha-Chlordane	ug/Kg	2.1 U	2 U	2 U	180 U		180 U	180 U
gamma-Chlordane	ug/Kg	2.1 U	2 U	2 U	180 U		180 U	180 U
Toxaphene	ug/Kg	210 U	200 U	200 U	350 U		350 U	360 U
Aroclor-1016	ug/Kg	40 U	39 U	39 U	180 U		180 U	180 U
Aroclor-1221	ug/Kg	82 U	79 U	79 U	180 U		180 U	180 U
Aroclor-1232	ug/Kg	40 U	39 U	39 U	180 U		180 U	180 U
Aroclor-1242	ug/Kg	40 U	39 U	39 U	180 U		180 U	180 U
Aroclor-1248	ug/Kg	40 U	39 U	39 U	180 U		180 U	180 U
Aroclor-1254	ug/Kg	40 U	39 U	39 U	350 U		350 U	360 U
Aroclor-1260	ug/Kg	40 U	39 U	39 U	350 U		350 U	360 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	PAD G	PAD-G	PAD G	PAD G
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.5'	2.5'	4.0'	4.5'
	DATE	12/03/92	12/03/92	12/03/92	12/04/91	12/04/91	12/05/91	12/05/91
	ES ID	BE-F-5	BE-F-6	BE-F-6RE	BE-G-1-91	BE-G-1-91	BE-G-2-91	BE-G-3-91
	LAB ID	175287	175288	175288R1	150190	150190R1	150400	150401
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	580	150		1100 UJ	960 UJ	980 U	930 U
RDX	ug/Kg	1300	170		83 J	120 UJ	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	170	120 U		127 J	86 J	3900	350
1,3-Dinitrobenzene	ug/Kg	120 U	120 U		140 UJ	120 UJ	160	120 U
Tetryl	ug/Kg	120 U	120 U		450 UJ	380 UJ	390 U	370 U
2,4,6-Trinitrotoluene	ug/Kg	280	85 J		140 UJ	150 J	2100	760
4-amino-2,6-Dinitrotoluene	ug/Kg	650	270		710 J	370 J	1300	300
2-amino-4,6-Dinitrotoluene	ug/Kg	720	320		880 J	480 J	1800	320
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		140 UJ	120 UJ	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	300	110 J		100 J	78 J	670	800
Metals								
Aluminum	mg/Kg	18400	18300				20700	21100
Antimony	mg/Kg	17 R	11.8 R				115 R	35.7 R
Arsenic	mg/Kg	5.4 J	5.1 J				20	11.7 R
Barium	mg/Kg	975	563				4740	1400
Beryllium	mg/Kg	0.86	0.95				0.87 R	1 R
Cadmium	mg/Kg	2.2	0.41 J				6.9 J	9 J
Calcium	mg/Kg	11200	6640				14800	18000
Chromium	mg/Kg	31.1	25.3				32.2 R	71 R
Cobalt	mg/Kg	13.3	13.3				12.2	11.9
Copper	mg/Kg	263	118				5300	632
Iron	mg/Kg	36200	27000				34200	35200
Lead	mg/Kg	2290	2320				22400 J	7800 J
Magnesium	mg/Kg	6140	5410				9910	6080
Manganese	mg/Kg	682	577				662	947
Mercury	mg/Kg	1	0.17				0.19 J	0.42 J
Nickel	mg/Kg	38.9	31.5				39.9	33.9
Potassium	mg/Kg	2370	1750				2100 J	3430 J
Selenium	mg/Kg	1.2 J	1 J				1.9 R	0.17 R
Silver	mg/Kg	0.81 J	0.39 U				2.1 R	1.2 R
Sodium	mg/Kg	134 R	62.3 R				368 J	235 J
Thallium	mg/Kg	0.41 U	0.5 U				0.35 U	0.35 U
Vanadium	mg/Kg	26.2	29.2				26.9	33.8
Zinc	mg/Kg	389	134				1650	862
Cyanide	mg/Kg	0.73 U	0.72 U				0.64 U	0.64 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS -- PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-G	OB	OB	OB	OB	OB	PAD H
	DEPTH	3.0'	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet	4.0'
	DATE	12/05/91	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/12/91
	ES ID	BE-G-6-91	BE-G-11	BE-G-13	BE-G13RE	BE-G-14	BE-G14RE	BE-H-2-91
	LAB ID	150404	175293	175560	175560R1	175561	175561R1	150627
COMPOUND	UNITS					DUP BE-G-13		
Volatile Organic Compounds								
Chloromethane	ug/kg		12 U	12 U		12 U		11 U
Bromomethane	ug/kg		12 U	12 U		12 U		11 U
Vinyl Chloride	ug/kg		12 U	12 U		12 U		11 U
Chloroethane	ug/kg		12 U	12 U		12 U		11 U
Methylene Chloride	ug/kg		12 U	12 U		12 U		6 U
Acetone	ug/kg		12 U	12 U		12 U		11 U
Carbon Disulfide	ug/kg		12 U	12 U		12 U		6 U
1,1-Dichloroethene	ug/kg		12 U	12 U		12 U		6 U
1,1-Dichloroethane	ug/kg		12 U	12 U		12 U		6 U
1,2-Dichloroethene (total)	ug/kg		12 U	12 U		12 U		6 U
Chloroform	ug/kg		12 U	12 U		12 U		2 J
1,2-Dichloroethane	ug/kg		12 U	12 U		12 U		6 U
2-Butanone	ug/kg		12 U	12 U		12 U		11 U
1,1,1-Trichloroethane	ug/kg		12 U	12 U		12 U		6 U
Carbon Tetrachloride	ug/kg		12 U	12 U		12 U		6 U
Vinyl Acetate	ug/kg							11 U
Bromodichloromethane	ug/kg		12 U	12 U		12 U		6 U
1,2-Dichloropropane	ug/kg		12 U	12 U		12 U		6 U
cis-1,3-Dichloropropene	ug/kg		12 U	12 U		12 U		6 U
Trichloroethene	ug/kg		12 U	12 U		12 U		6 U
Dibromochloromethane	ug/kg		12 U	12 U		12 U		6 U
1,1,2-Trichloroethane	ug/kg		12 U	12 U		12 U		6 U
Benzene	ug/kg		12 U	12 U		12 U		6 U
trans-1,3-Dichloropropene	ug/kg		12 U	12 U		12 U		6 U
Bromoform	ug/kg		12 U	12 U		12 U		6 U
4-Methyl-2-Pentanone	ug/kg		12 U	12 U		12 U		11 U
2-Hexanone	ug/kg		12 U	12 U		12 U		11 U
Tetrachloroethene	ug/kg		12 U	12 U		2 J		110
1,1,2,2-Tetrachloroethane	ug/kg		12 U	12 U		12 U		6 U
Toluene	ug/kg		12 U	12 U		12 U		6 U
Chlorobenzene	ug/kg		12 U	12 U		12 U		6 U
Ethylbenzene	ug/kg		12 U	12 U		12 U		6 U
Styrene	ug/kg		12 U	12 U		12 U		6 U
Xylene (total)	ug/kg		12 U	12 U		12 U		6 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-G	OB	OB	OB	OB	OB	PAD H
	DEPTH	3.0'	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet	4.0'
	DATE	12/05/91	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/12/91
	ES ID I	BE-G-6-91	BE-G-11	BE-G-13	BE-G13RE	BE-G-14	BE-G14RE	BE-H-2-91
	LAB ID	150404	175293	175560	175560R1	175561	175561R1	150627
COMPOUND	UNITS					DUP BE-G-13		
Semivolatiles								
Phenol	ug/kg		620 U	400 U		400 U	400 U	730 U
bis(2-Chloroethyl) ether	ug/kg		620 U	400 U		400 U	400 U	730 U
2-Chlorophenol	ug/kg		620 U	400 U		400 U	400 U	730 U
1,3-Dichlorobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
1,4-Dichlorobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
Benzyl Alcohol	ug/kg							730 U
1,2-Dichlorobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
2-Methylphenol	ug/kg		620 U	400 U		400 U	400 U	730 U
2,2'-oxybis(1-Chloropropane)	ug/kg		620 U	400 U		400 U	400 U	730 U
4-Methylphenol	ug/kg		620 U	400 U		400 U	400 U	730 U
N-Nitroso-di-n-propylamine	ug/kg		620 U	400 U		400 U	400 U	730 U
Hexachloroethane	ug/kg		620 U	400 U		400 U	400 U	730 U
Nitrobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
Isophorone	ug/kg		620 U	400 U		400 U	400 U	730 U
2-Nitrophenol	ug/kg		620 U	400 U		400 U	400 U	730 U
2,4-Dimethylphenol	ug/kg		620 U	400 U		400 U	400 U	730 U
Benzoic acid	ug/kg							3500 U
bis(2-Chloroethoxy) methane	ug/kg		620 U	400 U		400 U	400 U	730 U
2,4-Dichlorophenol	ug/kg		620 U	400 U		400 U	400 U	730 U
1,2,4-Trichlorobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
Naphthalene	ug/kg		88 J	400 U		400 U	400 U	730 U
4-Chloroaniline	ug/kg		620 U	400 U		400 U	400 U	730 U
Hexachlorobutadiene	ug/kg		620 U	400 U		400 U	400 U	730 U
4-Chloro-3-methylphenol	ug/kg		620 U	400 U		400 U	400 U	730 U
2-Methylnaphthalene	ug/kg		52 J	400 U		400 U	400 U	730 U
Hexachlorocyclopentadiene	ug/kg		620 U	400 U		400 U	400 U	730 U
2,4,6-Trichlorophenol	ug/kg		620 U	400 U		400 U	400 U	730 U
2,4,5-Trichlorophenol	ug/kg		1500 U	980 U		980 U	980 U	3500 U
2-Chloronaphthalene	ug/kg		620 U	400 U		400 U	400 U	730 U
2-Nitroaniline	ug/kg		1500 U	980 U		980 U	980 U	3500 U
Dimethylphthalate	ug/kg		620 U	400 U		400 U	400 U	730 U
Acenaphthylene	ug/kg		42 J	400 U		400 U	400 U	730 U
2,6-Dinitrotoluene	ug/kg		620 U	400 U		400 U	400 U	200 J
3-Nitroaniline	ug/kg		1500 U	980 U		980 U	980 U	3500 U
Acenaphthene	ug/kg		270 J	400 U		400 U	400 U	730 U
2,4-Dinitrophenol	ug/kg		1500 U	980 U		980 U	980 U	3500 U
4-Nitrophenol	ug/kg		1500 U	980 U		980 U	980 U	3500 U
Dibenzofuran	ug/kg		140 J	400 U		400 U	400 U	730 U
2,4-Dinitrotoluene	ug/kg		290 J	400 U		400 U	400 U	3600
Diethylphthalate	ug/kg		620 U	400 U		400 U	400 U	730 U
4-Chlorophenyl-phenylether	ug/kg		620 U	400 U		400 U	400 U	730 U
Fluorene	ug/kg		210 J	400 U		400 U	400 U	730 U
4-Nitroaniline	ug/kg		1500 U	980 U		980 U	980 U	3500 U
4,6-Dinitro-2-methylphenol	ug/kg		1500 U	980 U		980 U	980 U	3500 U
N-Nitrosodiphenylamine	ug/kg		500 J	400 U		400 U	400 U	120 J
4-Bromophenyl-phenylether	ug/kg		620 U	400 U		400 U	400 U	730 U
Hexachlorobenzene	ug/kg		620 U	400 U		400 U	400 U	730 U
Pentachlorophenol	ug/kg		1500 U	980 U		980 U	980 U	3500 U
Phenanthrene	ug/kg		2600	14 J		400 U	400 U	730 U
Anthracene	ug/kg		440 J	400 U		400 U	400 U	730 U
Carbazole	ug/kg		1000	400 U		400 U	400 U	
Di-n-butylphthalate	ug/kg		130 J	13 J		400 U	400 U	540 J
Fluoranthene	ug/kg		4400	22 J		400 U	400 U	730 U
Pyrene	ug/kg		5600 J	17 J		400 U	400 U	730 U
Butylbenzylphthalate	ug/kg		620 U	400 U		400 U	400 U	730 U
3,3'-Dichlorobenzidine	ug/kg		620 U	400 U		400 U	400 U	1500 U
Benzo(a)anthracene	ug/kg		3900	400 U		400 U	400 U	730 U
Chrysene	ug/kg		8900 J	400 U		400 U	400 U	730 U
bis(2-Ethylhexyl)phthalate	ug/kg		360 J	42 J		400 U	30 J	730 U
Di-n-octylphthalate	ug/kg		620 U	400 U		400 U	400 U	730 U
Benzo(b)fluoranthene	ug/kg		11000 J	14 J		400 U	400 U	730 U
Benzo(k)fluoranthene	ug/kg		4500	400 U		400 U	400 U	730 U
Benzo(a)pyrene	ug/kg		3700	400 U		400 U	400 U	730 U
Indeno(1,2,3-cd)pyrene	ug/kg		2300	400 U		400 U	400 U	730 U
Dibenz(a,h)anthracene	ug/kg		290 J	400 U		400 U	400 U	730 U
Benzo(g,h,i)perylene	ug/kg		810	400 U		400 U	400 U	730 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-G	OB	OB	OB	OB	OB	PAD H
	DEPTH	3.0'	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet	4.0'
	DATE	12/05/91	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/12/91
	ES ID I	BE-G-6-91	BE-G-11	BE-G-13	BE-G13RE	BE-G-14	BE-G14RE	BE-H-2-91
	LAB ID	150404	175293	175560	175560R1	175561	175561R1	150627
COMPOUND	UNITS					DUP BE-G-13		
Pesticides/PCBs								
alpha-BHC	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
beta-BHC	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
delta-BHC	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
gamma-BHC (Lindane)	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
Heptachlor	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
Aldrin	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
Heptachlor epoxide	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
Endosulfan I	ug/Kg		21 U	2.1 U	2.1 U	2 U		18 U
Dieldrin	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
4,4'-DDE	ug/Kg		32 J	4.1 U	2.7 J	3.8 J		35 U
Endrin	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
Endosulfan II	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
4,4'-DDD	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
Endosulfan sulfate	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
4,4'-DDT	ug/Kg		92 J	4.1 U	3.7 J	4.4 J		35 U
Methoxychlor	ug/Kg		210 U	21 U	21 U	20 U		180 U
Endrin ketone	ug/Kg		41 U	4.1 U	4.1 U	4 U		35 U
Endrin aldehyde	ug/Kg		41 U	4.1 U	4.1 U	4 U		
alpha-Chlordane	ug/Kg		21 U	2.1 U	2.1 U	2 U		180 U
gamma-Chlordane	ug/Kg		21 U	2.1 U	2.1 U	2 U		180 U
Toxaphene	ug/Kg		2100 U	210 U	210 U	200 U		350 U
Aroclor-1016	ug/Kg		410 U	41 U	41 U	40 U		180 U
Aroclor-1221	ug/Kg		820 U	83 U	83 U	81 U		180 U
Aroclor-1232	ug/Kg		410 U	41 U	41 U	40 U		180 U
Aroclor-1242	ug/Kg		410 U	41 U	41 U	40 U		180 U
Aroclor-1248	ug/Kg		410 U	41 U	41 U	40 U		180 U
Aroclor-1254	ug/Kg		410 U	41 U	41 U	40 U		350 U
Aroclor-1260	ug/Kg		410 U	41 U	41 U	40 U		350 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD-G	OB	OB	OB	OB	OB	PAD H
	DEPTH	3.0'	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet	4.0'
	DATE	12/05/91	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/12/91
	ES ID	BE-G-6-91	BE-G-11	BE-G-13	BE-G13RE	BE-G-14	BE-G14RE	BE-H-2-91
	LAB ID	150404	175293	175560	175560R1	175561	175561R1	150627
COMPOUND	UNITS					DUP BE-G-13		
Explosives								
HMX	ug/Kg		120 U	120 U		120 U		1000 U
RDX	ug/Kg		120 U	120 U		120 U		120 U
1,3,5-Trinitrobenzene	ug/Kg		170	120 U		120 U		330
1,3-Dinitrobenzene	ug/Kg		120 U	120 U		120 U		120 U
Tetryl	ug/Kg		120 U	120 U		120 U		400 U
2,4,6-Trinitrotoluene	ug/Kg		120 U	120 U		120 U		110 J
4-amino-2,6-Dinitrotoluene	ug/Kg		70 J	120 U		120 U		190
2-amino-4,6-Dinitrotoluene	ug/Kg		110 J	120 U		120 U		110 J
2,6-Dinitrotoluene	ug/Kg		120 U	120 U		120 U		120 U
2,4-Dinitrotoluene	ug/Kg		260	120 U		120 U		230
Metals								
Aluminum	mg/Kg	38900	26100	15000		13000		13400
Antimony	mg/Kg	8.7 R	23 R	6 U R		12.8 R		40.8 R
Arsenic	mg/Kg	0.86 R	8 J	6.2 J		5.6 J		25.8
Barium	mg/Kg	2890	1650	206		191		2580
Beryllium	mg/Kg	0.99 R	0.65	0.82		0.77		0.59 R
Cadmium	mg/Kg	27.9	26	0.52 J		0.73		6.1 J
Calcium	mg/Kg	30000	41900	9190		7140		6580
Chromium	mg/Kg	67.8 R	109	24.4		20.7		27.6 R
Cobalt	mg/Kg	11.2	12.7	12.1		11.2		8
Copper	mg/Kg	998	918	66.1		69.2		1930
Iron	mg/Kg	29700	36200	28600		23700		25900
Lead	mg/Kg	8710 J	5450	249 J		5250 J		6900 J
Magnesium	mg/Kg	8230	9540	5200		4140		5620
Manganese	mg/Kg	584	602	557		513		487
Mercury	mg/Kg	0.1 J	0.06 J	0.12 J		0.13		0.13 J
Nickel	mg/Kg	64.5	57.7	33.1		28.2		25.9
Potassium	mg/Kg	2680 J	2530	1120		974		1120 J
Selenium	mg/Kg	0.12 R	0.92 J	1.4 J		1.2 J		0.34 R
Silver	mg/Kg	15.3	3.7	0.35 U		0.57 J		0.98 R
Sodium	mg/Kg	516 J	656 R	54.2 R		39.9 R		110 J
Thallium	mg/Kg	0.39 U	0.49 U	0.57 U		0.46 U		0.34 U
Vanadium	mg/Kg	41.4	35.6	25.8		22.7		20.5
Zinc	mg/Kg	5300	4040	281		239		1590
Cyanide	mg/Kg	0.7 U	0.72 U	0.75 U		0.73 U		0.59 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD H	OB	PAD J	PAD J	PAD J	OB	OB
	DEPTH	4.0'	2.0 feet	3.0'	3.0'	3.0'	2.0 feet	2.0 feet
	DATE	12/10/91	12/04/92	12/06/91	12/06/91	12/06/91	12/07/92	12/07/92
	ES ID	BE-H-3-91	BE-H-5	BE-J-4-9	BE-J-5-91	BE-J-6-91	BE-J-8	BE-J8RE
	LAB ID	150662	175294	150409	150410	150411	175562	175562R1
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Bromomethane	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Vinyl Chloride	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Chloroethane	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Methylene Chloride	ug/kg	**6 U**	11 U	**6 U**	**5 U**	**6 U**	5 J	
Acetone	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Carbon Disulfide	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,1-Dichloroethene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,1-Dichloroethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,2-Dichloroethene (total)	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Chloroform	ug/kg	**6 U**	11 U	6 U	5 U	6 U	12 U	
1,2-Dichloroethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
2-Butanone	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
1,1,1-Trichloroethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Carbon Tetrachloride	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Vinyl Acetate	ug/kg	12 U		12 U	11 U	11 U		
Bromodichloromethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,2-Dichloropropane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
cis-1,3-Dichloropropene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Trichloroethene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Dibromochloromethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,1,2-Trichloroethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Benzene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
trans-1,3-Dichloropropene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Bromoform	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
4-Methyl-2-Pentanone	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
2-Hexanone	ug/kg	12 U	11 U	12 U	11 U	11 U	12 U	
Tetrachloroethene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
1,1,2,2-Tetrachloroethane	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Toluene	ug/kg	6 U	11 U	6 U	5 U	1 J	12 U	
Chlorobenzene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Ethylbenzene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Styrene	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	
Xylene (total)	ug/kg	6 U	11 U	6 U	5 U	6 U	12 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD H	OB	PAD J	PAD J	PAD J	OB	OB
	DEPTH	4.0'	2.0 feet	3.0'	3.0'	3.0'	2.0 feet	2.0 feet
	DATE	12/10/91	12/04/92	12/06/91	12/06/91	12/06/91	12/07/92	12/07/92
	ES ID	BE-H-3-91	BE-H-5	BE-J-4-9	BE-J-5-91	BE-J-6-91	BE-J-8	BE-J8RE
	LAB ID	150662	175294	150409	150410	150411	175562	175562R1
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
bis(2-Chloroethyl) ether	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2-Chlorophenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
1,3-Dichlorobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
1,4-Dichlorobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Benzyl Alcohol	ug/kg	750 U		750 U	700 U	720 U		
1,2-Dichlorobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2-Methylphenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,2'-oxybis(1-Chloropropane)	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
4-Methylphenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
N-Nitroso-di-n-propylamine	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Hexachloroethane	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Nitrobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Isophorone	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2-Nitrophenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4-Dimethylphenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Benzoic acid	ug/kg	3600 U		88 J	3400 U	3500 U		
bis(2-Chloroethoxy) methane	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4-Dichlorophenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
1,2,4-Trichlorobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Naphthalene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
4-Chloroaniline	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Hexachlorobutadiene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
4-Chloro-3-methylphenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2-Methylnaphthalene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Hexachlorocyclopentadiene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4,6-Trichlorophenol	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4,5-Trichlorophenol	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
2-Chloronaphthalene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2-Nitroaniline	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
Dimethylphthalate	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Acenaphthylene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,6-Dinitrotoluene	ug/kg	760	43 J	750 U	700 U	720 U	400 U	
3-Nitroaniline	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
Acenaphthene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4-Dinitrophenol	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
4-Nitrophenol	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
Dibenzofuran	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
2,4-Dinitrotoluene	ug/kg	12000 J	520 J	750 U	700 U	720 U	400 U	
Diethylphthalate	ug/kg	750 U	14 J	750 U	700 U	720 U	400 U	
4-Chlorophenyl-phenylether	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Fluorene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
4-Nitroaniline	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
4,6-Dinitro-2-methylphenol	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
N-Nitrosodiphenylamine	ug/kg	1500	400 U	750 U	700 U	720 U	400 U	
4-Bromophenyl-phenylether	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Hexachlorobenzene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Pentachlorophenol	ug/kg	3600 U	960 U	3600 U	3400 U	3500 U	970 U	
Phenanthrene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Anthracene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Carbazole	ug/kg		400 U				400 U	
Di-n-butylphthalate	ug/kg	430 J	400 U	750 U	700 U	720 U	20 J	
Fluoranthene	ug/kg	750 U	400 U	750 U	700 U	720 U	26 J	
Pyrene	ug/kg	750 U	400 U	750 U	700 U	720 U	24 J	
Butylbenzylphthalate	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
3,3'-Dichlorobenzidine	ug/kg	1500 U	400 U	1500 U	1400 U	1400 U	400 U	
Benzo(a)anthracene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Chrysene	ug/kg	750 U	400 U	750 U	700 U	720 U	25 J	
bis(2-Ethylhexyl)phthalate	ug/kg	750 U	400 U	750 U	700 U	720 U	32 J	
Di-n-octylphthalate	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Benzo(b)fluoranthene	ug/kg	750 U	400 U	750 U	700 U	720 U	23 J	
Benzo(k)fluoranthene	ug/kg	750 U	400 U	750 U	700 U	720 U	21 J	
Benzo(a)pyrene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Indeno(1,2,3-cd)pyrene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Dibenz(a,h)anthracene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	
Benzo(g,h,i)perylene	ug/kg	750 U	400 U	750 U	700 U	720 U	400 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD H	OB	PAD J	PAD J	PAD J	OB	OB
	DEPTH	4.0'	2.0 feet	3.0'	3.0'	3.0'	2.0 feet	2.0 feet
	DATE	12/10/91	12/04/92	12/06/91	12/06/91	12/06/91	12/07/92	12/07/92
	ES ID	BE-H-3-91	BE-H-5	BE-J-4-9	BE-J-5-91	BE-J-6-91	BE-J-8	BE-J8RE
	LAB ID	150662	175294	150409	150410	150411	175562	175562R1
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
beta-BHC	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
delta-BHC	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
gamma-BHC (Lindane)	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
Heptachlor	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
Aldrin	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
Heptachlor epoxide	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
Endosulfan I	ug/Kg	18 U	2 U	18 U	17 U	18 U	2.1 U	2.1 U
Dieldrin	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
4,4'-DDE	ug/Kg	36 U	3.2 J	36 U	34 U	35 U	4.9 J	18
Endrin	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
Endosulfan II	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
4,4'-DDD	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
Endosulfan sulfate	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
4,4'-DDT	ug/Kg	36 U	3.6 J	36 U	34 U	35 U	4.6 J	17
Methoxychlor	ug/Kg	180 U	20 U	180 U	170 U	180 U	21 U	21 U
Endrin ketone	ug/Kg	36 U	3.9 U	36 U	34 U	35 U	4 U	4 U
Endrin aldehyde	ug/Kg		3.9 U				4 U	4 U
alpha-Chlordane	ug/Kg	180 U	2 U	180 U	170 U	180 U	2.1 U	2.1 U
gamma-Chlordane	ug/Kg	180 U	2 U	180 U	170 U	180 U	2.1 U	2.1 U
Toxaphene	ug/Kg	360 U	200 U	360 U	340 U	350 U	210 U	210 U
Aroclor-1016	ug/Kg	180 U	39 U	180 U	170 U	180 U	40 U	40 U
Aroclor-1221	ug/Kg	180 U	80 U	180 U	170 U	180 U	81 U	81 U
Aroclor-1232	ug/Kg	180 U	39 U	180 U	170 U	180 U	40 U	40 U
Aroclor-1242	ug/Kg	180 U	39 U	180 U	170 U	180 U	40 U	40 U
Aroclor-1248	ug/Kg	180 U	39 U	180 U	170 U	180 U	40 U	40 U
Aroclor-1254	ug/Kg	360 U	39 U	360 U	340 U	350 U	40 U	40 U
Aroclor-1260	ug/Kg	360 U	39 U	360 U	340 U	350 U	40 U	40 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	PAD H	OB	PAD J	PAD J	PAD J	OB	OB
	DEPTH	4.0'	2.0 feet	3.0'	3.0'	3.0'	2.0 feet	2.0 feet
	DATE	12/10/91	12/04/92	12/06/91	12/06/91	12/06/91	12/07/92	12/07/92
	ES ID	BE-H-3-91	BE-H-5	BE-J-4-9	BE-J-5-91	BE-J-6-91	BE-J-8	BE-J8RE
	LAB ID	150662	175294	150409	150410	150411	175562	175562R1
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	1000 U	120 U	990 U	1000 U	990 U	120 U	
RDX	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	
1,3,5-Trinitrobenzene	ug/Kg	320	60 J	120 U	120 U	120 U	120 U	
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	
Tetryl	ug/Kg	400 U	120 U	390 U	400 U	390 U	120 U	
2,4,6-Trinitrotoluene	ug/Kg	210	120 U	120 U	120 U	120 U	120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	540	66 J	120 U	120 U	120 U	120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	440	71 J	120 U	120 U	120 U	120 U	
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U	120 U	120 U	120 U	
2,4-Dinitrotoluene	ug/Kg	1500 J	240	120 U	170	92 J	120 U	
Metals								
Aluminum	mg/Kg	18700	19100	16700	13800	16000	15700	
Antimony	mg/Kg	108 R	6.5 U R	5.4 R	5.1 R	5.5 R	7.7 R	
Arsenic	mg/Kg	25	11.5 J	4.1 R	3.4 R	4.6 R	5.9 J	
Barium	mg/Kg	4400	883	213 R	136 R	470 R	2200	
Beryllium	mg/Kg	0.73 R	0.89	0.9 R	0.74 R	0.95 R	0.77	
Cadmium	mg/Kg	5.6 J	0.95	3.4 J	4.5 J	3.4 J	0.73	
Calcium	mg/Kg	9640	15500	3310	8200	7930	7430	
Chromium	mg/Kg	35.4 R	26.9	19 R	21.8 R	19.9 J	22.7	
Cobalt	mg/Kg	12.7	12.7	9.7	7.4	7.9	10.4	
Copper	mg/Kg	2900	427	29.8	137	59.9	54.1	
Iron	mg/Kg	38000	26500	24100	18500	20800	23400	
Lead	mg/Kg	24200 J	1370	32.4 J	644 J	48 J	363	
Magnesium	mg/Kg	8450	5660	3320	3650	4270	5390	
Manganese	mg/Kg	732	699	978	451	802	599	
Mercury	mg/Kg	0.52 J	0.13	0.37 J	0.27 J	0.39 J	0.18	
Nickel	mg/Kg	42.5	29.6	15.7	21.9	20	24.5	
Potassium	mg/Kg	1900 J	2670	1550 J	1150 J	1380 J	1410	
Selenium	mg/Kg	2.4 R	1.2 J	0.1 R	0.1 R	0.1 R	0.53 J	
Silver	mg/Kg	1.4 R	0.38 U	0.34 U	0.45 R	0.55 R	0.38 U	
Sodium	mg/Kg	312 J	82.8 R	54.7 J	54.5 J	56 J	113 R	
Thallium	mg/Kg	0.35 U	0.42 U	0.33 U	0.32 U	0.33 U	0.47 U	
Vanadium	mg/Kg	28.2	32.5	30.1	24	26.5	26.1	
Zinc	mg/Kg	992	303	138	903	156	446	
Cyanide	mg/Kg	0.6 U	0.67 U	0.66 U	0.62 U	0.44 U	0.71 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet
	DATE	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	BE-J-10	BE-J-13	BE-J13RE	BE-J-14	BE-J14RE
	LAB ID	175564	175567	175567R1	175568	175568R1
COMPOUND	UNITS				DUP BE-J-10	
Volatile Organic Compounds						
Chloromethane	ug/kg	12 U	12 U	12 U	13 U	
Bromomethane	ug/kg	12 U	12 U	12 U	13 U	
Vinyl Chloride	ug/kg	12 U	12 U	12 U	13 U	
Chloroethane	ug/kg	12 U	12 U	12 U	13 U	
Methylene Chloride	ug/kg	12 U	2 J	5 J	13 U	
Acetone	ug/kg	12 U	12 U	12 U	13 U	
Carbon Disulfide	ug/kg	12 U	12 U	12 U	13 U	
1,1-Dichloroethene	ug/kg	12 U	12 U	12 U	13 U	
1,1-Dichloroethane	ug/kg	12 U	12 U	12 U	13 U	
1,2-Dichloroethene (total)	ug/kg	12 U	12 U	12 U	13 U	
Chloroform	ug/kg	12 U	12 U	12 U	13 U	
1,2-Dichloroethane	ug/kg	12 U	12 U	12 U	13 U	
2-Butanone	ug/kg	12 U	12 U	12 U	13 U	
1,1,1-Trichloroethane	ug/kg	12 U	12 U	12 U	13 U	
Carbon Tetrachloride	ug/kg	12 U	12 U	12 U	13 U	
Vinyl Acetate	ug/kg					
Bromodichloromethane	ug/kg	12 U	12 U	12 U	13 U	
1,2-Dichloropropane	ug/kg	12 U	12 U	12 U	13 U	
cis-1,3-Dichloropropene	ug/kg	12 U	12 U	12 U	13 U	
Trichloroethene	ug/kg	12 U	12 U	12 U	13 U	
Dibromochloromethane	ug/kg	12 U	12 U	12 U	13 U	
1,1,2-Trichloroethane	ug/kg	12 U	12 U	12 U	13 U	
Benzene	ug/kg	12 U	12 U	12 U	13 U	
trans-1,3-Dichloropropene	ug/kg	12 U	12 U	12 U	13 U	
Bromoform	ug/kg	12 U	12 U	12 U	13 U	
4-Methyl-2-Pentanone	ug/kg	12 U	12 U	12 U	13 U	
2-Hexanone	ug/kg	12 U	12 U	12 U	13 U	
Tetrachloroethene	ug/kg	12 U	25 J	67 J	13 U	
1,1,2,2-Tetrachloroethane	ug/kg	12 U	12 U	12 U	13 U	
Toluene	ug/kg	12 U	12 U	12 U	13 U	
Chlorobenzene	ug/kg	12 U	12 U	12 U	13 U	
Ethylbenzene	ug/kg	12 U	12 U	12 U	13 U	
Styrene	ug/kg	12 U	12 U	12 U	13 U	
Xylene (total)	ug/kg	12 U	12 U	12 U	13 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet
	DATE	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	BE-J-10	BE-J-13	BE-J13RE	BE-J-14	BE-J14RE
	LAB ID	175564	175567	175567R1	175568	175568R1
COMPOUND	UNITS				DUP BE-J-10	
Semivolatiles						
Phenol	ug/kg	420 U	410 U		400 U	
bis(2-Chloroethyl) ether	ug/kg	420 U	410 U		400 U	
2-Chlorophenol	ug/kg	420 U	410 U		400 U	
1,3-Dichlorobenzene	ug/kg	420 U	410 U		400 U	
1,4-Dichlorobenzene	ug/kg	420 U	410 U		400 U	
Benzyl Alcohol	ug/kg					
1,2-Dichlorobenzene	ug/kg	420 U	410 U		400 U	
2-Methylphenol	ug/kg	420 U	410 U		400 U	
2,2'-oxybis(1-Chloropropane)	ug/kg	420 U	410 U		400 U	
4-Methylphenol	ug/kg	420 U	410 U		400 U	
N-Nitroso-di-n-propylamine	ug/kg	420 U	410 U		400 U	
Hexachloroethane	ug/kg	420 U	410 U		400 U	
Nitrobenzene	ug/kg	420 U	410 U		400 U	
Isophorone	ug/kg	420 U	410 U		400 U	
2-Nitrophenol	ug/kg	420 U	410 U		400 U	
2,4-Dimethylphenol	ug/kg	420 U	410 U		400 U	
Benzoic acid	ug/kg					
bis(2-Chloroethoxy) methane	ug/kg	420 U	410 U		400 U	
2,4-Dichlorophenol	ug/kg	420 U	410 U		400 U	
1,2,4-Trichlorobenzene	ug/kg	420 U	410 U		400 U	
Naphthalene	ug/kg	420 U	26 J		400 U	
4-Chloroaniline	ug/kg	420 U	410 U		400 U	
Hexachlorobutadiene	ug/kg	420 U	410 U		400 U	
4-Chloro-3-methylphenol	ug/kg	420 U	410 U		400 U	
2-Methylnaphthalene	ug/kg	420 U	410 U		400 U	
Hexachlorocyclopentadiene	ug/kg	420 U	410 U		400 U	
2,4,6-Trichlorophenol	ug/kg	420 U	410 U		400 U	
2,4,5-Trichlorophenol	ug/kg	1000 U	990 U		960 U	
2-Chloronaphthalene	ug/kg	420 U	410 U		400 U	
2-Nitroaniline	ug/kg	1000 U	990 U		960 U	
Dimethylphthalate	ug/kg	420 U	410 U		400 U	
Acenaphthylene	ug/kg	420 U	410 U		400 U	
2,6-Dinitrotoluene	ug/kg	420 U	410 U		400 U	
3-Nitroaniline	ug/kg	1000 U	990 U		960 U	
Acenaphthene	ug/kg	420 U	410 U		400 U	
2,4-Dinitrophenol	ug/kg	1000 U	990 U		960 U	
4-Nitrophenol	ug/kg	1000 U	990 U		960 U	
Dibenzofuran	ug/kg	420 U	410 U		400 U	
2,4-Dinitrotoluene	ug/kg	420 U	400 U		400 U	
Diethylphthalate	ug/kg	420 U	410 U		400 U	
4-Chlorophenyl-phenylether	ug/kg	420 U	410 U		400 U	
Fluorene	ug/kg	420 U	410 U		400 U	
4-Nitroaniline	ug/kg	1000 U	990 U		960 U	
4,6-Dinitro-2-methylphenol	ug/kg	1000 U	990 U		960 U	
N-Nitrosodiphenylamine	ug/kg	420 U	410 U		400 U	
4-Bromophenyl-phenylether	ug/kg	420 U	410 U		400 U	
Hexachlorobenzene	ug/kg	420 U	410 U		400 U	
Pentachlorophenol	ug/kg	1000 U	990 U		960 U	
Phenanthrene	ug/kg	17 J	23 J		22 J	
Anthracene	ug/kg	420 U	410 U		400 U	
Carbazole	ug/kg	420 U	410 U		400 U	
Di-n-butylphthalate	ug/kg	21 J	23 J		18 J	
Fluoranthene	ug/kg	19 J	20 J		25 J	
Pyrene	ug/kg	16 J	17 J		20 J	
Butylbenzylphthalate	ug/kg	420 U	410 U		400 U	
3,3'-Dichlorobenzidine	ug/kg	420 U	410 U		400 U	
Benzo(a)anthracene	ug/kg	420 U	410 U		400 U	
Chrysene	ug/kg	14 J	13 J		16 J	
bis(2-Ethylhexyl)phthalate	ug/kg	27 J	110 J		30 J	
Di-n-octylphthalate	ug/kg	420 U	410 U		400 U	
Benzo(b)fluoranthene	ug/kg	420 U	410 U		15 J	
Benzo(k)fluoranthene	ug/kg	420 U	410 U		15 J	
Benzo(a)pyrene	ug/kg	420 U	410 U		400 U	
Indeno(1,2,3-cd)pyrene	ug/kg	420 U	410 U		400 U	
Dibenz(a,h)anthracene	ug/kg	420 U	410 U		400 U	
Benzo(g,h,i)perylene	ug/kg	420 U	410 U		400 U	

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS -- PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet
	DATE	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	BE-J-10	BE-J-13	BE-J13RE	BE-J-14	BE-J14RE
	LAB ID	175564	175567	175567R1	175568	175568R1
COMPOUND	UNITS				DUP BE-J-10	
Pesticides/PCBs						
alpha-BHC	ug/Kg	2.2 U	2.1 U		2 U	2 U
beta-BHC	ug/Kg	2.2 U	2.1 U		2 U	2 U
delta-BHC	ug/Kg	2.2 U	2.1 U		2 U	2 U
gamma-BHC (Lindane)	ug/Kg	2.2 U	2.1 U		2 U	2 U
Heptachlor	ug/Kg	2.2 U	2.1 U		2 U	2 U
Aldrin	ug/Kg	2.2 U	2.1 U		2 U	2 U
Heptachlor epoxide	ug/Kg	2.2 U	2.1 U		2 U	2 U
Endosulfan I	ug/Kg	2.2 U	2.1 U		2 U	2 U
Dieldrin	ug/Kg	4.3 U	4.1 U		4 U	4 U
4,4'-DDE	ug/Kg	6.7 J	6.5		4 U	3.9 J
Endrin	ug/Kg	4.3 U	4.1 U		4 U	4 U
Endosulfan II	ug/Kg	4.3 U	4.1 U		4 U	4 U
4,4'-DDD	ug/Kg	4.3 U	4.1 U		4 U	4 U
Endosulfan sulfate	ug/Kg	4.3 U	4.1 U		4 U	4 U
4,4'-DDT	ug/Kg	8.3 J	9		4 U	5.4 J
Methoxychlor	ug/Kg	22 U	21 U		20 U	20 U
Endrin ketone	ug/Kg	4.3 U	4.1 U		4 U	4 U
Endrin aldehyde	ug/Kg	4.3 U	4.1 U		4 U	4 U
alpha-Chlordane	ug/Kg	2.2 U	2.1 U		2 U	2 U
gamma-Chlordane	ug/Kg	2.2 U	2.1 U		2 U	2 U
Toxaphene	ug/Kg	220 U	210 U		200 U	200 U
Aroclor-1016	ug/Kg	43 U	41 U		40 U	40 U
Aroclor-1221	ug/Kg	87 U	84 U		80 U	80 U
Aroclor-1232	ug/Kg	43 U	41 U		40 U	40 U
Aroclor-1242	ug/Kg	43 U	41 U		40 U	40 U
Aroclor-1248	ug/Kg	43 U	41 U		40 U	40 U
Aroclor-1254	ug/Kg	43 U	41 U		40 U	40 U
Aroclor-1260	ug/Kg	43 U	41 U		40 U	40 U

SENECA ARMY DEPOT
OB GROUNDS

BERM EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE I and II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB
	DEPTH	2.0 feet	2.0 feet	2.0 feet	2.0 feet	2.0 feet
	DATE	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	BE-J-10	BE-J-13	BE-J13RE	BE-J-14	BE-J14RE
	LAB ID	175564	175567	175567R1	175568	175568R1
COMPOUND	UNITS				DUP BE-J-10	
Explosives						
HMX	ug/Kg	120 U	120 U		120 U	
RDX	ug/Kg	120 U	120 U		120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U		120 U	
1,3-Dinitrobenzene	ug/Kg	120 U	120 U		120 U	
Tetryl	ug/Kg	120 U	120 U		120 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U		120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	
2,4-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	
Metals						
Aluminum	mg/Kg	22400	24500		26300	
Antimony	mg/Kg	16 R	16.2 R		5.9 U R	
Arsenic	mg/Kg	4.9 J	5.3 J		5 J	
Barium	mg/Kg	28300	22000		34400	
Beryllium	mg/Kg	0.52 J	0.65		0.54 J	
Cadmium	mg/Kg	5.1	3.8		5.8	
Calcium	mg/Kg	12600	20300		7870	
Chromium	mg/Kg	52.7	34.9		22.1	
Cobalt	mg/Kg	30.7	26.4		33.4	
Copper	mg/Kg	231	348		340	
Iron	mg/Kg	95800 J	24500		17400 J	
Lead	mg/Kg	347	204		2040 J	
Magnesium	mg/Kg	24100 J	22300		23100	
Manganese	mg/Kg	897	528		1320	
Mercury	mg/Kg	0.23	0.36		0.15	
Nickel	mg/Kg	38.2	33.8		17.7	
Potassium	mg/Kg	1380	1600		1070	
Selenium	mg/Kg	1 J	1.1 J		0.77 J	
Silver	mg/Kg	0.41 U	0.53 J		0.35 U	
Sodium	mg/Kg	709 R	519 R		319 R	
Thallium	mg/Kg	0.45 U	0.4 U		0.52 U	
Vanadium	mg/Kg	23.9	25.3		20.9	
Zinc	mg/Kg	3190	2390		3240	
Cyanide	mg/Kg	0.78 U	0.75 U		0.54 U	

SENECA ARMY DEPOT
OB GROUNDS

GEOPHYSICAL ANOMALY EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL
	LOCATION	GAE-G	GAE-G	GAE-J
	DEPTH	2.0'	2.0'	1.0'
	DATE	12/11/91	12/11/91	12/11/91
	ES ID	GAE-G-1	GAE-G-2	GAE-J-1
	LAB ID	150679	150680	150681
COMPOUND	UNITS			
Volatile Organic Compounds				
Chloromethane	ug/Kg	12 U	12 U	12 U
Bromomethane	ug/Kg	12 U	12 U	12 U
Vinyl Chloride	ug/Kg	12 U	12 U	12 U
Chloroethane	ug/Kg	12 U	12 U	12 U
Methylene Chloride	ug/Kg	6 U	6 U	6 U
Acetone	ug/Kg	12 U	12 U	12 U
Carbon Disulfide	ug/Kg	6 U	6 U	6 U
1,1-Dichloroethene	ug/Kg	6 U	6 U	6 U
1,1-Dichloroethane	ug/Kg	6 U	6 U	6 U
1,2-Dichloroethene (total)	ug/Kg	6 U	6 U	6 U
Chloroform	ug/Kg	6 U	9	6 U
1,2-Dichloroethane	ug/Kg	6 U	6 U	6 U
2-Butanone	ug/Kg	12 U	12 U	12 U
1,1,1-Trichloroethane	ug/Kg	6 U	6 U	6 U
Carbon Tetrachloride	ug/Kg	6 U	6 U	6 U
Vinyl Acetate	ug/Kg	12 U	12 U	12 U
Bromodichloromethane	ug/Kg	6 U	6 U	6 U
1,2-Dichloropropane	ug/Kg	6 U	6 U	6 U
cis-1,3-Dichloropropene	ug/Kg	6 U	6 U	6 U
Trichloroethene	ug/Kg	6 U	6 U	6 U
Dibromochloromethane	ug/Kg	6 U	6 U	6 U
1,1,2-Trichloroethane	ug/Kg	6 U	6 U	6 U
Benzene	ug/Kg	6 U	6 U	6 U
trans-1,3-Dichloropropene	ug/Kg	6 U	6 U	6 U
Bromoform	ug/Kg	6 U	6 U	6 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U	12 U
2-Hexanone	ug/Kg	12 U	12 U	12 U
Tetrachloroethene	ug/Kg	6 U	11	6 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U	6 U	6 U
Toluene	ug/Kg	6 U	6 U	6 U
Chlorobenzene	ug/Kg	6 U	6 U	6 U
Ethylbenzene	ug/Kg	6 U	6 U	6 U
Styrene	ug/Kg	6 U	6 U	6 U
Xylene (total)	ug/Kg	6 U	6 U	6 U

SENECA ARMY DEPOT
OB GROUNDS

GEOPHYSICAL ANOMALY EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL
	LOCATION	GAE-G	GAE-G	GAE-J
	DEPTH	2.0'	2.0'	1.0'
	DATE	12/11/91	12/11/91	12/11/91
	ES ID	GAE-G-1	GAE-G-2	GAE-J-1
	LAB ID	150679	150680	150681
COMPOUND	UNITS			
Semivolatiles				
Phenol	ug/Kg	800 U	2900 U	790 U
bis(2-Chloroethyl) ether	ug/Kg	800 U	2900 U	790 U
2-Chlorophenol	ug/Kg	800 U	2900 U	790 U
1,3-Dichlorobenzene	ug/Kg	800 U	2900 U	790 U
1,4-Dichlorobenzene	ug/Kg	800 U	2900 U	790 U
Benzyl Alcohol	ug/Kg	800 U	2900 U	790 U
1,2-Dichlorobenzene	ug/Kg	800 U	2900 U	790 U
2-Methylphenol	ug/Kg	800 U	2900 U	790 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	800 U	2900 U	790 U
4-Methylphenol	ug/Kg	800 U	2900 U	790 U
N-Nitroso-di-n-propylamine	ug/Kg	800 U	2900 U	790 U
Hexachloroethane	ug/Kg	800 U	2900 U	790 U
Nitrobenzene	ug/Kg	800 U	2900 U	790 U
Isophorone	ug/Kg	800 U	2900 U	790 U
2-Nitrophenol	ug/Kg	800 U	2900 U	790 U
2,4-Dimethylphenol	ug/Kg	800 U	2900 U	790 U
Benzoic acid	ug/Kg	3900 U	14000 U	3800 U
bis(2-Chloroethoxy) methane	ug/Kg	800 U	2900 U	790 U
2,4-Dichlorophenol	ug/Kg	800 U	2900 U	790 U
1,2,4-Trichlorobenzene	ug/Kg	800 U	2900 U	790 U
Naphthalene	ug/Kg	800 U	2900 U	790 U
4-Chloroaniline	ug/Kg	800 U	2900 U	790 U
Hexachlorobutadiene	ug/Kg	800 U	2900 U	790 U
4-Chloro-3-methylphenol	ug/Kg	800 U	2900 U	790 U
2-Methylnaphthalene	ug/Kg	800 U	2900 U	790 U
Hexachlorocyclopentadiene	ug/Kg	800 U	2900 U	790 U
2,4,6-Trichlorophenol	ug/Kg	800 U	2900 U	790 U
2,4,5-Trichlorophenol	ug/Kg	3900 U	14000 U	3800 U
2-Chloronaphthalene	ug/Kg	800 U	2900 U	790 U
2-Nitroaniline	ug/Kg	3900 U	14000 U	3800 U
Dimethylphthalate	ug/Kg	800 U	2900 U	790 U
Acenaphthylene	ug/Kg	800 U	2900 U	790 U
2,6-Dinitrotoluene	ug/Kg	800 U	2000 J	790 U
3-Nitroaniline	ug/Kg	3900 U	14000 U	3800 U
Acenaphthene	ug/Kg	800 U	2900 U	790 U
2,4-Dinitrophenol	ug/Kg	3900 U	14000 U	3800 U
4-Nitrophenol	ug/Kg	3900 U	14000 U	3800 U
Dibenzofuran	ug/Kg	800 U	2900 U	790 U
2,4-Dinitrotoluene	ug/Kg	800 U	33000	790 U
Diethylphthalate	ug/Kg	800 U	2900 U	790 U
4-Chlorophenyl-phenylether	ug/Kg	800 U	2900 U	790 U
Fluorene	ug/Kg	800 U	2900 U	790 U
4-Nitroaniline	ug/Kg	3900 U	14000 U	3800 U
4,6-Dinitro-2-methylphenol	ug/Kg	3900 U	14000 U	3800 U
N-Nitrosodiphenylamine (1)	ug/Kg	800 U	7000	790 U
4-Bromophenyl-phenylether	ug/Kg	800 U	2900 U	790 U
Hexachlorobenzene	ug/Kg	800 U	2900 U	790 U
Pentachlorophenol	ug/Kg	3900 U	14000 U	3800 U
Phenanthrene	ug/Kg	800 U	2900 U	790 U
Anthracene	ug/Kg	800 U	2900 U	790 U
Carbazole	ug/Kg			
Di-n-butylphthalate	ug/Kg	800 U	730 J	790 U
Fluoranthene	ug/Kg	800 U	2900 U	790 U
Pyrene	ug/Kg	800 U	2900 U	790 U
Butylbenzylphthalate	ug/Kg	800 U	2900 U	790 U
3,3'-Dichlorobenzidine	ug/Kg	1600 U	5700 U	1600 U
Benzo(a)anthracene	ug/Kg	800 U	2900 U	790 U
Chrysene	ug/Kg	800 U	2900 U	790 U
bis(2-Ethylhexyl)phthalate	ug/Kg	800 U	2900 U	790 U
Di-n-octylphthalate	ug/Kg	800 U	2900 U	790 U
Benzo(b)fluoranthene	ug/Kg	800 U	2900 U	790 U
Benzo(k)fluoranthene	ug/Kg	800 U	2900 U	790 U
Benzo(a)pyrene	ug/Kg	800 U	2900 U	790 U
Indeno(1,2,3-cd)pyrene	ug/Kg	800 U	2900 U	790 U
Dibenz(a,h)anthracene	ug/Kg	800 U	2900 U	790 U
Benzo(g,h,i)perylene	ug/Kg	800 U	2900 U	790 U

SENECA ARMY DEPOT
OB GROUNDS

GEOPHYSICAL ANOMALY EXCAVATIONS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL
	LOCATION	GAE-G	GAE-G	GAE-J
	DEPTH	2.0'	2.0'	1.0'
	DATE	12/11/91	12/11/91	12/11/91
	ES ID	GAE-G-1	GAE-G-2	GAE-J-1
	LAB ID	150679	150680	150681
COMPOUND	UNITS			
Pesticides/PCBs				
alpha-BHC	ug/Kg	20 U	18 U	19 U
beta-BHC	ug/Kg	20 U	18 U	19 U
delta-BHC	ug/Kg	20 U	18 U	19 U
gamma-BHC (Lindane)	ug/Kg	20 U	18 U	19 U
Heptachlor	ug/Kg	20 U	18 U	19 U
Aldrin	ug/Kg	20 U	18 U	19 U
Heptachlor epoxide	ug/Kg	20 U	18 U	19 U
Endosulfan I	ug/Kg	20 U	18 U	19 U
Dieldrin	ug/Kg	39 U	36 U	38 U
4,4'-DDE	ug/Kg	39 U	36 U	38 U
Endrin	ug/Kg	39 U	36 U	38 U
Endosulfan II	ug/Kg	39 U	36 U	38 U
4,4'-DDD	ug/Kg	39 U	36 U	38 U
Endosulfan sulfate	ug/Kg	39 U	36 U	38 U
4,4'-DDT	ug/Kg	39 U	36 U	38 U
Methoxychlor	ug/Kg	200 U	180 U	190 U
Endrin ketone	ug/Kg	39 U	36 U	38 U
EndrinAldehyde	ug/Kg			
alpha-Chlordane	ug/Kg	200 U	180 U	190 U
gamma-Chlordane	ug/Kg	200 U	180 U	190 U
Toxaphene	ug/Kg	390 U	360 U	380 U
Aroclor-1016	ug/Kg	200 U	180 U	190 U
Aroclor-1221	ug/Kg	200 U	180 U	190 U
Aroclor-1232	ug/Kg	200 U	180 U	190 U
Aroclor-1242	ug/Kg	200 U	180 U	190 U
Aroclor-1248	ug/Kg	200 U	180 U	190 U
Aroclor-1254	ug/Kg	390 U	360 U	380 U
Aroclor-1260	ug/Kg	390 U	360 U	380 U

SENECA ARMY DEPOT
OB GROUNDS

GEOPHYSICAL ANOMALY EXCAVATIONS
SUMMARY OF VALIDATED RESULTS - PHASE II

	MATRIX	SOIL		SOIL		SOIL	
	LOCATION	GAE-G		GAE-G		GAE-J	
	DEPTH	2.0'		2.0'		1.0'	
	DATE	12/11/91		12/11/91		12/11/91	
	ES ID	GAE-G-1		GAE-G-2		GAE-J-1	
	LAB ID	150679		150680		150681	
COMPOUND	UNITS						
Explosives							
HMX	ug/Kg	1000 U		1000 U		1000 U	
RDX	ug/Kg	120 U		120 U		120 U	
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U		120 U	
1,3-Dinitrobenzene	ug/Kg	120 U		120 U		120 U	
Tetryl	ug/Kg	400 U		400 U		400 U	
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U		120 U	
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U	
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U	
2,6-Dinitrotoluene	ug/Kg	120 U		120 U		120 U	
2,4-Dinitrotoluene	ug/Kg	120 U		4000		120 U	
Metals							
Aluminum	mg/Kg	20400		14100		30200	
Antimony	mg/Kg	12.5 U	R	30	R	8.2 U	R
Arsenic	mg/Kg	6	J	6.1	J	6.2	J
Barium	mg/Kg	190	J	270	J	700	J
Beryllium	mg/Kg	1.2	R	0.78	R	1.1	R
Cadmium	mg/Kg	3.3		4.7		3.7	
Calcium	mg/Kg	4350	J	4810	J	4140	J
Chromium	mg/Kg	28.6		1430		33.7	
Cobalt	mg/Kg	11.5		9.1		23	
Copper	mg/Kg	21.6	J	316	J	27.6	J
Iron	mg/Kg	27000	J	32800	J	33700	J
Lead	mg/Kg	18		390	J	50.4	
Magnesium	mg/Kg	4580		3520		7050	
Manganese	mg/Kg	705		710		646	
Mercury	mg/Kg	0.08	J	0.04	J	0.74	
Nickel	mg/Kg	33.1		20.1		31.8	
Potassium	mg/Kg	3160		1890		3500	
Selenium	mg/Kg	0.25	J	0.77	J	0.31	J
Silver	mg/Kg	2 U		0.86 U		1.3 U	
Sodium	mg/Kg	141	J	318	J	84.9	J
Thallium	mg/Kg	0.5 U		0.35 U		0.62 U	
Vanadium	mg/Kg	31		25.7		41.6	
Zinc	mg/Kg	108	J	637	J	139	J
Cyanide	mg/Kg	0.55 U		0.59 U		0.54 U	

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-01	DW-02	DW-02RE	DW-03	DW-04	DW-05	DW-06	DW-07
	LAB ID	176036	176037	176037R1	176038	176039	176040	176041	176042
	UNITS								
Volatile Organic Compounds									
Chloromethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Bromomethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Vinyl Chloride	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Chloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Methylene Chloride	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Acetone	ug/Kg	38 U	230		13 U	15 U	16 U	36 U	43 U
Carbon Disulfide	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,1-Dichloroethene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,1-Dichloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,2-Dichloroethene (total)	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Chloroform	ug/Kg	3 J	13 U		13 U	15 U	16 U	14 U	13 U
1,2-Dichloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
2-Butanone	ug/Kg	6 J	11 J		13 U	15 U	16 U	14 U	13 U
1,1,1-Trichloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Carbon Tetrachloride	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Vinyl Acetate	ug/Kg								
Bromodichloromethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,2-Dichloropropane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
cis-1,3-Dichloropropene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Trichloroethene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Dibromochloromethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,1,2-Trichloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Benzene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
trans-1,3-Dichloropropene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Bromoform	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
4-Methyl-2-Pentanone	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
2-Hexanone	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Tetrachloroethene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
1,1,2,2-Tetrachloroethane	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Toluene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Chlorobenzene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Ethylbenzene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Styrene	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U
Xylene (total)	ug/Kg	14 U	13 U		13 U	15 U	16 U	14 U	13 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-01	DW-02	DW-02RE	DW-03	DW-04	DW-05	DW-06	DW-07
	LAB ID	176036	176037	176037R1	176038	176039	176040	176041	176042
COMPOUND	UNITS								
Semivolatiles									
Phenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
bis(2-Chloroethyl) ether	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2-Chlorophenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
1,3-Dichlorobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
1,4-Dichlorobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Benzyl Alcohol	ug/Kg								
1,2-Dichlorobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2-Methylphenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Methylphenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
N-Nitroso-di-n-propylamine	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Hexachloroethane	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Nitrobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Isophorone	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2-Nitrophenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4-Dimethylphenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Benzoic Acid	ug/Kg								
bis(2-Chloroethoxy) methane	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4-Dichlorophenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
1,2,4-Trichlorobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Naphthalene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Chloroaniline	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Hexachlorobutadiene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Chloro-3-Methylphenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2-Methylnaphthalene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Hexachlorocyclopentadiene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4,6-Trichlorophenol	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4,5-Trichlorophenol	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
2-Chloronaphthalene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2-Nitroaniline	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
Dimethylphthalate	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Acenaphthylene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,6-Dinitrotoluene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
3-Nitroaniline	ug/Kg	1200 U	1100 U	350 J	1100 U	1200 U	1200 U	1100 U	1200 U
Acenaphthene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4-Dinitrophenol	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
4-Nitrophenol	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
Dibenzofuran	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
2,4-Dinitrotoluene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Diethylphthalate	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Chlorophenyl-phenylether	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Fluorene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Nitroaniline	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
4,6-Dinitro-2-methylphenol	ug/Kg	1200 U	1100 U	1100 U	1100 U	1200 U	1200 U	1100 U	1200 U
N-Nitrosodiphenylamine	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
4-Bromophenyl-phenylether	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Hexachlorobenzene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Pentachlorophenol	ug/Kg	1200 U	1100 U	1100 U	23 J	1200 U	1200 U	1100 U	1200 U
Phenanthrene	ug/Kg	490 U	470 U	470 U	26 J	480 U	480 U	470 U	490 U
Anthracene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Carbazole	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Di-n-butylphthalate	ug/Kg	490 U	470 U	470 U	470 U	23 J	480 U	470 U	490 U
Fluoranthene	ug/Kg	490 U	470 U	470 U	50 J	480 U	480 U	470 U	490 U
Pyrene	ug/Kg	490 U	470 U	470 U	43 J	23 J	480 U	470 U	490 U
Butylbenzylphthalate	ug/Kg	490 U	470 U	470 U	470 U	480 U	86 J	470 U	490 U
3,3'-Dichlorobenzidine	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Benzo(a)anthracene	ug/Kg	490 U	470 U	470 U	22 J	480 U	480 U	470 U	490 U
Chrysene	ug/Kg	490 U	470 U	470 U	27 J	480 U	480 U	470 U	490 U
bis(2-Ethylhexyl)phthalate	ug/Kg	60 J	25 J	470 U	470 U	98 J	31 J	94 J	110 J
Di-n-octylphthalate	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Benzo(b)fluoranthene	ug/Kg	490 U	470 U	470 U	26 J	480 U	480 U	470 U	490 U
Benzo(k)fluoranthene	ug/Kg	490 U	470 U	470 U	23 J	480 U	480 U	470 U	490 U
Benzo(a)pyrene	ug/Kg	490 U	470 U	470 U	20 J	480 U	480 U	470 U	490 U
Indeno(1,2,3-cd)pyrene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Dibenz(a,h)anthracene	ug/Kg	490 U	470 U	470 U	470 U	480 U	480 U	470 U	490 U
Benzo(g,h,i)perylene	ug/Kg	490 U	470 U	470 U	470 U	23 J	480 U	470 U	490 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS -- PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-01	DW-02	DW-02RE	DW-03	DW-04	DW-05	DW-06	DW-07
	LAB ID	176036	176037	176037R1	176038	176039	176040	176041	176042
COMPOUND	UNITS								
Pesticides/PCBs									
alpha-BHC	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
beta-BHC	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
delta-BHC	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
gamma-BHC (Lindane)	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Heptachlor	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Aldrin	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Heptachlor epoxide	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Endosulfan I	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Dieldrin	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
4,4'-DDE	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
Endrin	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
Endosulfan II	ug/Kg	18 J	4.7 U		4.7 U	4.8 U	480 J	4.7 U	4.2 J
4,4'-DDD	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
Endosulfan sulfate	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
4,4'-DDT	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
Methoxychlor	ug/Kg	25 U	24 U		24 U	24 U	250 U	24 U	25 U
Endrin ketone	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
Endrin aldehyde	ug/Kg	4.9 U	4.7 U		4.7 U	4.8 U	48 U	4.7 U	4.8 U
alpha-Chlordane	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
gamma-Chlordane	ug/Kg	2.5 U	2.4 U		2.4 U	2.4 U	25 U	2.4 U	2.5 U
Toxaphene	ug/Kg	250 U	240 U		240 U	240 U	2500 U	240 U	250 U
Aroclor-1016	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U
Aroclor-1221	ug/Kg	99 U	95 U		94 U	97 U	980 U	96 U	97 U
Aroclor-1232	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U
Aroclor-1242	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U
Aroclor-1248	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U
Aroclor-1254	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U
Aroclor-1260	ug/Kg	49 U	47 U		47 U	48 U	480 U	47 U	48 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-01	DW-02	DW-02RE	DW-03	DW-04	DW-05	DW-06	DW-07
	LAB ID	176036	176037	176037R1	176038	176039	176040	176041	176042
COMPOUND	UNITS								
Explosives									
HMX	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U	120 U
Metals									
Aluminum	mg/kg	15400	13200		14100	17400	16100	16100	10300
Antimony	mg/kg	13.3 UJ	10 UJ		7.8 UJ	14.9 UJ	9.5 UJ	10.9 UJ	9 UJ
Arsenic	mg/kg	3.3	4		4	6.2	4.7	4.7	4.8
Barium	mg/kg	163	125		87.9	93.8	99.7	124	82.5
Beryllium	mg/kg	0.88 J	0.72 J		0.62 J	0.78 J	0.83 J	0.85 J	0.56 J
Cadmium	mg/kg	0.76 U	0.58 U		0.45 U	0.86 U	0.54 U	0.63 U	0.52 U
Calcium	mg/kg	7140	2730		4990	1670	2840	4210	3380
Chromium	mg/kg	23.2	17.8		18.7	22.5	22.8	20	14.4
Cobalt	mg/kg	9.2 J	9.5		9.7	11.1 J	12.3	9.1 J	6.7 J
Copper	mg/kg	27.8	19		23.7	15.2	21.8	19.6	14.8
Iron	mg/kg	25500	21100		20800	26700	24200	21600	16100
Lead	mg/kg	41.8	13.8 J		24	23.2	24.4	17.5 J	20.6
Magnesium	mg/kg	3890	3270		4360	3580	3870	3200	2610
Manganese	mg/kg	639	827		682	794	900	778	395
Mercury	mg/kg	0.12 J	0.08 J		0.11 J	0.1 J	0.11 J	0.13 J	0.15 J
Nickel	mg/kg	26.5	22.4		24.4	22.3	27.3	21.3	15.8
Potassium	mg/kg	1770	1590		1960	1190 J	1690	1920	2160
Selenium	mg/kg	0.78 J	0.91 J		0.66 J	0.8 J	0.8 J	0.84 J	0.79 J
Silver	mg/kg	0.78 U	0.98 J		0.46 U	0.88 U	0.56 U	0.65 U	0.53 U
Sodium	mg/kg	73.3 U	55.5 U		42.9 U	275 J	52.2 U	60.3 U	49.9 U
Thallium	mg/kg	0.65 U	0.7 U		0.59 U	0.47 U	0.48 U	0.75 U	0.44 U
Vanadium	mg/kg	26.4	24.4		23.7	27.8	26	27.7	18
Zinc	mg/kg	81.9	51.3		75.8	71.8	70.1	62	56.4
Cyanide	mg/kg	0.82 U	0.55 U		0.6 U	0.71 U	0.72 U	0.55 U	0.75 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS - PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-08	DW-09	DW-09RE	DW-10	DW-11	DW-12
	LAB ID	176043	176044	176044R1	176045	176046	176047
	UNITS						DUP DW-4
Volatile Organic Compounds							
Chloromethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Bromomethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Vinyl Chloride	ug/Kg	12 U	12 U		12 U	11 U	14 U
Chloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Methylene Chloride	ug/Kg	12 U	12 U		12 U	11 U	14 U
Acetone	ug/Kg	12 U	44 U		19 U	11 U	39 U
Carbon Disulfide	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,1-Dichloroethene	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,1-Dichloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,2-Dichloroethene (total)	ug/Kg	12 U	12 U		12 U	11 U	14 U
Chloroform	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,2-Dichloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
2-Butanone	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,1,1-Trichloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Carbon Tetrachloride	ug/Kg	12 U	12 U		12 U	11 U	14 U
Vinyl Acetate	ug/Kg						
Bromodichloromethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,2-Dichloropropane	ug/Kg	12 U	12 U		12 U	11 U	14 U
cis-1,3-Dichloropropene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Trichloroethene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Dibromochloromethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,1,2-Trichloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Benzene	ug/Kg	12 U	12 U		12 U	11 U	14 U
trans-1,3-Dichloropropene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Bromoform	ug/Kg	12 U	12 U		12 U	11 U	14 U
4-Methyl-2-Pentanone	ug/Kg	12 U	12 U		12 U	11 U	14 U
2-Hexanone	ug/Kg	12 U	12 U		12 U	11 U	14 U
Tetrachloroethene	ug/Kg	12 U	12 U		12 U	11 U	14 U
1,1,2,2-Tetrachloroethane	ug/Kg	12 U	12 U		12 U	11 U	14 U
Toluene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Chlorobenzene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Ethylbenzene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Styrene	ug/Kg	12 U	12 U		12 U	11 U	14 U
Xylene (total)	ug/Kg	12 U	12 U		12 U	11 U	14 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-08	DW-09	DW-09RE	DW-10	DW-11	DW-12
	LAB ID	176043	176044	176044R1	176045	176046	176047
COMPOUND	UNITS						DUP DW-4
Semivolatiles							
Phenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
bis(2-Chloroethyl) ether	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2-Chlorophenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
1,3-Dichlorobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
1,4-Dichlorobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Benzyl Alcohol	ug/Kg						
1,2-Dichlorobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2-Methylphenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
4-Methylphenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
N-Nitroso-di-n-propylamine	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Hexachloroethane	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Nitrobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Isophorone	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2-Nitrophenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2,4-Dimethylphenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Benzoic Acid	ug/Kg						
bis(2-Chloroethoxy) methane	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2,4-Dichlorophenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
1,2,4-Trichlorobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Naphthalene	ug/Kg	42 J	430 U	2100 U	530 U	2100 U	510 U
4-Chloroaniline	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Hexachlorobutadiene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
4-Chloro-3-Methylphenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2-Methylnaphthalene	ug/Kg	53 J	430 U	2100 U	530 U	2100 U	510 U
Hexachlorocyclopentadiene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2,4,6-Trichlorophenol	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2,4,5-Trichlorophenol	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
2-Chloronaphthalene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
2-Nitroaniline	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
Dimethylphthalate	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Acenaphthylene	ug/Kg	540	430 U	2100 U	47 J	2100 U	510 U
2,6-Dinitrotoluene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
3-Nitroaniline	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
Acenaphthene	ug/Kg	120 J	430 U	2100 U	44 J	2100 U	510 U
2,4-Dinitrophenol	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
4-Nitrophenol	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
Dibenzofuran	ug/Kg	52 J	430 U	2100 U	530 U	2100 U	510 U
2,4-Dinitrotoluene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Diethylphthalate	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
4-Chlorophenyl-phenylether	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Fluorene	ug/Kg	130 J	430 U	2100 U	37 J	2100 U	510 U
4-Nitroaniline	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
4,6-Dinitro-2-methylphenol	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
N-Nitrosodiphenylamine	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
4-Bromophenyl-phenylether	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Hexachlorobenzene	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Pentachlorophenol	ug/Kg	1300 U	1000 U	5200 U	1300 U	5000 U	1200 U
Phenanthrene	ug/Kg	1800	140 J	420 J	420 J	180 J	510 U
Anthracene	ug/Kg	700	27 J	2100 U	98 J	2100 U	510 U
Carbazole	ug/Kg	1200	34 J	2100 U	240 J	120 J	510 U
Di-n-butylphthalate	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	24 J
Fluoranthene	ug/Kg	3600	180 J	550 J	640	320 J	510 U
Pyrene	ug/Kg	3900	180 J	580 J	610	280 J	510 U
Butylbenzylphthalate	ug/Kg	540 U	430 U	2100 U	51 J	2100 U	510 U
3,3'-Dichlorobenzidine	ug/Kg	540 U	430 U	2100 U	530 U	2100 U	510 U
Benzo(a)anthracene	ug/Kg	2400	94 J	260 J	300 J	160 J	510 U
Chrysene	ug/Kg	2700	140 J	360 J	370 J	240 J	510 U
bis(2-Ethylhexyl)phthalate	ug/Kg	100 J	10000 J	11000 J	4200	16000	42 J
Di-n-octylphthalate	ug/Kg	540 U	430 U	2100 U	530 U	410 J	510 U
Benzo(b)fluoranthene	ug/Kg	3900	130 J	260 J	360 J	210 J	510 U
Benzo(k)fluoranthene	ug/Kg	2800	97 J	260 J	300 J	220 J	510 U
Benzo(a)pyrene	ug/Kg	2800	26 J	200 J	260 J	150 J	510 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1600	82 J	130 J	140 J	2100 U	510 U
Dibenz(a,h)anthracene	ug/Kg	670	23 J	2100 U	530 U	2100 U	510 U
Benzo(g,h,i)perylene	ug/Kg	960	110 J	140 J	76 J	110 J	510 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

COMPOUND	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-08	DW-09	DW-09RE	DW-10	DW-11	DW-12
	LAB ID	176043	176044	176044R1	176045	176046	176047
	UNITS						DUP DW-4
Pesticides/PCBs							
alpha-BHC	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
beta-BHC	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
delta-BHC	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
gamma-BHC (Lindane)	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Heptachlor	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Aldrin	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Heptachlor epoxide	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Endosulfan I	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Dieldrin	ug/Kg	8.1 U	4.3 U		4.1 U	3.7 U	5.1 U
4,4'-DDE	ug/Kg	8.1 U	4.3 U		2.4 J	3.7 U	5.1 U
Endrin	ug/Kg	7.7 J	6.1 J		4.1 U	3.7 U	5.1 U
Endosulfan II	ug/Kg	8.1 U	4.3 U		4.1 U	3.7 U	5.1 U
4,4'-DDD	ug/Kg	8.1 U	4.3 U		4.1 U	3.7 U	5.1 U
Endosulfan sulfate	ug/Kg	11 J	4.3 U		4.1 U	3.7 U	5.1 U
4,4'-DDT	ug/Kg	8.1 U	3.4 J		7	3.7 U	5.1 U
Methoxychlor	ug/Kg	42 U	22 U		21 U	19 U	26 U
Endrin ketone	ug/Kg	8.1 U	4.3 U		4.1 U	3.7 U	5.1 U
Endrin aldehyde	ug/Kg	8.1 U	4.3 U		4.1 U	3.7 U	5.1 U
alpha-Chlordane	ug/Kg	3.9 J	2.2 U		2.1 U	1.9 U	2.6 U
gamma-Chlordane	ug/Kg	4.2 U	2.2 U		2.1 U	1.9 U	2.6 U
Toxaphene	ug/Kg	420 U	220 U		210 U	190 U	260 U
Aroclor-1016	ug/Kg	81 U	43 U		41 U	37 U	51 U
Aroclor-1221	ug/Kg	160 U	87 U		83 U	75 U	100 U
Aroclor-1232	ug/Kg	81 U	43 U		41 U	37 U	51 U
Aroclor-1242	ug/Kg	81 U	43 U		41 U	37 U	51 U
Aroclor-1248	ug/Kg	81 U	43 U		41 U	37 U	51 U
Aroclor-1254	ug/Kg	81 U	43 U		41 U	37 U	51 U
Aroclor-1260	ug/Kg	81 U	43 U		41 U	37 U	51 U

OB GROUNDS
DOWNWIND SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	DATE	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92	12/10/92
	ES ID	DW-08	DW-09	DW-09RE	DW-10	DW-11	DW-12
	LAB ID	176043	176044	176044R1	176045	176046	176047
COMPOUND	UNITS						DUP DW-4
Explosives							
HMX	ug/Kg	120 U	120 U		120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U		120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U
1,3-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U		120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
4-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U
Metals							
Aluminum	mg/kg	12700	9910		4940	4590	17000
Antimony	mg/kg	9.2 UJ	11.8 UJ		11.4 UJ	7.6 UJ	8.7 UJ
Arsenic	mg/kg	4.3	5.9		5.1	5	5.1
Barium	mg/kg	127	72.5		66.3	29	94
Beryllium	mg/kg	0.71 J	0.55 J		0.35 J	0.29 J	0.85
Cadmium	mg/kg	0.6 J	0.72 J		0.65 U	0.44 U	0.5 U
Calcium	mg/kg	59700	77900		194000	195000	1830
Chromium	mg/kg	18.3	24.3		17.5	13.4	23.3
Cobalt	mg/kg	9.2	8.4 J		5.1 J	5.9 J	12.5
Copper	mg/kg	26.5	36.5		26.2	23.1	15.9
Iron	mg/kg	21100	19100		15700	13500	26900
Lead	mg/kg	26.1	144		231	101	22.4
Magnesium	mg/kg	13700	9220		10800	12700	3600
Manganese	mg/kg	666	522		378	370	938
Mercury	mg/kg	0.04 J	0.06 J		0.1 J	0.06 J	0.1 J
Nickel	mg/kg	26.3	24.7		17.1	18.9	22.8
Potassium	mg/kg	1970	1490		1080	901	1080
Selenium	mg/kg	0.59 J	0.77 J		0.59 J	0.62 J	1 J
Silver	mg/kg	0.54 U	0.79 J		0.67 U	0.45 U	0.51 U
Sodium	mg/kg	195 J	241 J		1900	356 J	47.9 U
Thallium	mg/kg	0.47 U	0.59 U		2.3 U	2.5 U	0.59 U
Vanadium	mg/kg	29.5	27.3		21.9	17.8	27.9
Zinc	mg/kg	84	122		114	86.8	72.8
Cyanide	mg/kg	0.62 U	0.57 U		0.61 R	0.55 U	0.76 U

OB GROUNDS
BURN KETTLE SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
	DATE	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93
	ES ID	BKTL-1	BKTL-1RE	BKTL-2	BKTL-3	BKTL-4	BKTL-5
	LAB ID	179822	179822R1	179823	179824	179825	179826
COMPOUND	UNITS						
Volatile Organic Compounds							
Chloromethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Bromomethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Vinyl Chloride	ug/Kg	14 U		12 U	12 U	13 U	12 U
Chloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Methylene Chloride	ug/Kg	14 U		12 U	12 U	13 U	12 U
Acetone	ug/Kg	14 U		12 U	12 U	13 U	12 U
Carbon Disulfide	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,1-Dichloroethene	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,1-Dichloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,2-Dichloroethene (total)	ug/Kg	14 U		12 U	12 U	13 U	12 U
Chloroform	ug/Kg	14 U		2 J	12 U	13 U	12 U
1,2-Dichloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
2-Butanone	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,1,1-Trichloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Carbon Tetrachloride	ug/Kg	14 U		12 U	12 U	13 U	12 U
Vinyl Acetate	ug/Kg						
Bromodichloromethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,2-Dichloropropane	ug/Kg	14 U		12 U	12 U	13 U	12 U
cis-1,3-Dichloropropene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Trichloroethene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Dibromochloromethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,1,2-Trichloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Benzene	ug/Kg	14 U		12 U	12 U	13 U	12 U
trans-1,3-Dichloropropene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Bromoform	ug/Kg	14 U		12 U	12 U	13 U	12 U
4-Methyl-2-Pentanone	ug/Kg	14 U		12 U	12 U	13 U	12 U
2-Hexanone	ug/Kg	14 U		12 U	12 U	13 U	12 U
Tetrachloroethene	ug/Kg	14 U		12 U	12 U	13 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	14 U		12 U	12 U	13 U	12 U
Toluene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Chlorobenzene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Ethylbenzene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Styrene	ug/Kg	14 U		12 U	12 U	13 U	12 U
Xylene (total)	ug/Kg	14 U		12 U	12 U	13 U	12 U

OB GROUNDS
BURN KETTLE SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
	DATE	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93
	ES ID	BKTL-1	BKTL-1RE	BKTL-2	BKTL-3	BKTL-4	BKTL-5
	LAB ID	179822	179822R1	179823	179824	179825	179826
COMPOUND	UNITS						
Semivolatiles							
Phenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
bis(2-Chloroethyl) ether	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2-Chlorophenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
1,3-Dichlorobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
1,4-Dichlorobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzyl Alcohol	ug/Kg						
1,2-Dichlorobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2-Methylphenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Methylphenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
N-Nitroso-di-n-propylamine	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Hexachloroethane	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Nitrobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Isophorone	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2-Nitrophenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4-Dimethylphenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzoic Acid							
bis(2-Chloroethoxy) methane	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4-Dichlorophenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
1,2,4-Trichlorobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Naphthalene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Chloroaniline	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Hexachlorobutadiene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Chloro-3-Methylphenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2-Methylnaphthalene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Hexachlorocyclopentadiene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4,6-Trichlorophenol	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4,5-Trichlorophenol	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
2-Chloronaphthalene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2-Nitroaniline	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
Dimethylphthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Acenaphthylene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,6-Dinitrotoluene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
3-Nitroaniline	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
Acenaphthene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4-Dinitrophenol	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
4-Nitrophenol	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
Dibenzofuran	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
2,4-Dinitrotoluene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Diethylphthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Chlorophenyl-phenyl ether	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Fluorene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Nitroaniline	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
4,6-Dinitro-2-methylphenol	ug/Kg	1100 U	1100 U	1000 U	980 U	1000 U	980 U
N-Nitrosodiphenylamine	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
4-Bromophenyl-phenyl ether	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Hexachlorobenzene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Pentachlorophenol	ug/Kg	540 R	1100 U	1000 U	980 U	1000 U	980 U
Phenanthrene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Anthracene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Carbazole	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Di-n-butylphthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Fluoranthene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Pyrene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Butylbenzylphthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
3,3'-Dichlorobenzidine	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzo(a)anthracene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Chrysene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
bis(2-Ethylhexyl)phthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Di-n-octylphthalate	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzo(b)fluoranthene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzo(k)fluoranthene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzo(a)pyrene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Indeno(1,2,3-cd)pyrene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Dibenz(a,h)anthracene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U
Benzo(g,h,i)perylene	ug/Kg	450 U	450 U	410 U	400 U	420 U	400 U

OB GROUNDS
BURN KETTLE SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
	DATE	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93
	ES ID	BKTL-1	BKTL-1RE	BKTL-2	BKTL-3	BKTL-4	BKTL-5
	LAB ID	179822	179822R1	179823	179824	179825	179826
COMPOUND	UNITS						
Pesticides/PCBs							
alpha-BHC	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
beta-BHC	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
delta-BHC	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
gamma-BHC (Lindane)	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Heptachlor	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Aldrin	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Heptachlor epoxide	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Endosulfan I	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Dieldrin	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
4,4'-DDE	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
Endrin	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
Endosulfan II	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
4,4'-DDD	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
Endosulfan sulfate	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
4,4'-DDT	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
Methoxychlor	ug/Kg	23 U		21 U	21 U	22 U	21 U
Endrin ketone	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
Endrin aldehyde	ug/Kg	4.5 U		4.1 U	4 U	4.2 U	4 U
alpha-Chlordane	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
gamma-Chlordane	ug/Kg	2.3 U		2.1 U	2.1 U	2.2 U	2.1 U
Toxaphene	ug/Kg	230 U		210 U	210 U	220 U	210 U
Aroclor-1016	ug/Kg	45 U		41 U	40 U	42 U	40 U
Aroclor-1221	ug/Kg	92 U		84 U	82 U	85 U	82 U
Aroclor-1232	ug/Kg	45 U		41 U	40 U	42 U	40 U
Aroclor-1242	ug/Kg	45 U		41 U	40 U	42 U	40 U
Aroclor-1248	ug/Kg	45 U		41 U	40 U	42 U	40 U
Aroclor-1254	ug/Kg	45 U		41 U	40 U	42 U	40 U
Aroclor-1260	ug/Kg	45 U		41 U	40 U	42 U	40 U

OB GROUNDS
BURN KETTLE SOILS
SUMMARY OF VALIDATED RESULTS – PHASE II

	MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION	OB	OB	OB	OB	OB	OB
	DEPTH(FT.)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
	DATE	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93	03/10/93
	ES ID	BKTL-1	BKTL-1RE	BKTL-2	BKTL-3	BKTL-4	BKTL-5
	LAB ID	179822	179822R1	179823	179824	179825	179826
COMPOUND	UNITS						
Explosives							
HMX	ug/Kg	120 U		120 U	120 U	120 U	120 U
RDX	ug/Kg	120 U		120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U		120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U		120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U		120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U		120 U	120 U	120 U	120 U
Metals							
Aluminum	mg/kg	19300		17300	17300	14600	18200
Antimony	mg/kg	11.8 UJ		9.8 UJ	9.7 J	12.2 UJ	8.2 UJ
Arsenic	mg/kg	3.7		4.6	6.6	5.8	6.3
Barium	mg/kg	153		106	130	136	155
Beryllium	mg/kg	0.99 J		0.97	0.85 J	0.73 J	0.99
Cadmium	mg/kg	0.68 U		0.56 U	0.53 U	0.7 U	0.47 U
Calcium	mg/kg	5380		3540	10200	11300	5440
Chromium	mg/kg	54.1		21.6	24	22.2	23.4
Cobalt	mg/kg	16.9		10.7	11.2	11.1 J	11.1
Copper	mg/kg	56.2		15.4	24.2	32.2	23.4
Iron	mg/kg	54800		28300	28000	27300	31500
Lead	mg/kg	30.4		16.7 J	20.3	201	19.4
Magnesium	mg/kg	6610		3310	6270	4670	4610
Manganese	mg/kg	922		1150	613	688	1150
Mercury	mg/kg	0.05 J		0.05 J	0.05 J	0.14 J	0.07 J
Nickel	mg/kg	48.3		20.4	31.5	35.1	26.9
Potassium	mg/kg	1720		993	1410	1280	1620
Selenium	mg/kg	0.29 UJ		0.18 J	0.29 J	0.31 J	0.25 UJ
Silver	mg/kg	0.7 U		0.58 U	0.54 U	0.72 U	0.49 U
Sodium	mg/kg	65.1 U		54.2 J	50.8 U	67.1 U	48.1 J
Thallium	mg/kg	0.67 U		0.37 U	0.61 U	0.58 U	0.6 U
Vanadium	mg/kg	30.3		31.4	27.3	25.3	32.4
Zinc	mg/kg	73.2		57.6	58	90.1	53.4
Cyanide	mg/kg	0.68 U		0.63 U	0.62 U	0.63 U	0.62 U

GROUNDWATER

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER
	LOCATION	MW-5	MW-5	OB	MW-6	MW-6	OB	MW-7
	DATE	01/08/92	01/08/92	03/01/93	01/14/92	01/14/92	03/02/93	01/10/92
	ES ID	MW-5	MW-5 Filtered	MW-5	MW-6	MW-6 Filtered	MW-6	MW-7
	LAB ID	152138	152168	179428	152488	152496	179505	152211
	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Bromomethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Vinyl Chloride	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Chloroethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Methylene Chloride	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Acetone	ug/L	9 J		5 U	10 U		5 U	10 U
Carbon Disulfide	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
trans-1,2-Dichloroethene	ug/L			0.5 U			0.5 U	
cis-1,2-Dichloroethene	ug/L			0.5 U			0.5 U	
1,2-Dichloroethene (total)	ug/L	5 U			5 U			5 U
Chloroform	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
2-Butanone	ug/L	10 U		5 U	10 U		5 U	10 U
1,1,1-Trichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Carbon Tetrachloride	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Vinyl Acetate	ug/L	10 U			10 U			10 U
Bromodichloromethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloropropane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Trichloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Dibromochloromethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1,2-Trichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Benzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Bromoform	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
4-Methyl-2-Pentanone	ug/L	10 U		5 U	10 U		5 U	10 U
2-Hexanone	ug/L	10 U		5 U	10 U		5 U	10 U
Tetrachloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Toluene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Chlorobenzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Ethylbenzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Styrene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Xylene (total)	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Dichlorodifluoromethane	ug/L			0.5 U			0.5 U	
Trichlorofluoromethane	ug/L			0.5 U			0.5 U	
2,2-Dichloropropane	ug/L			0.5 U			0.5 U	
Bromochloromethane	ug/L			0.5 U			0.5 U	
1,1-Dichloropropene	ug/L			0.5 U			0.5 U	
Dibromomethane	ug/L			0.5 U			0.5 U	
1,3-Dichloropropane	ug/L			0.5 U			0.5 U	
1,2-Dibromoethane	ug/L			0.5 U			0.5 U	
1,1,1,2-Tetrachloroethane	ug/L			0.5 U			0.5 U	
Isopropylbenzene	ug/L			0.5 U			0.5 U	
Bromobenzene	ug/L			0.5 U			0.5 U	
1,2,3-Trichloropropane	ug/L			0.5 U			0.5 U	
n-Propylbenzene	ug/L			0.5 U			0.5 U	
2-Chlorotoluene	ug/L			0.5 U			0.5 U	
4-Chlorotoluene	ug/L			0.5 U			0.5 U	
1,3,5-Trimethylbenzene	ug/L			0.5 U			0.5 U	
tert-Butylbenzene	ug/L			0.5 U			0.5 U	
1,2,4-Trimethylbenzene	ug/L			0.5 U			0.5 U	
sec-Butylbenzene	ug/L			0.5 U			0.5 U	
1,3-Dichlorobenzene	ug/L			0.5 U			0.5 U	
1,4-Dichlorobenzene	ug/L			0.5 U			0.5 U	
p-Isopropyltoluene	ug/L			0.5 U			0.5 U	
1,2-Dichlorobenzene	ug/L			0.5 U			0.5 U	
n-Butylbenzene	ug/L			0.5 U			0.5 U	
1,2-Dibromo-3-Chloropropane	ug/L			0.5 U			0.5 U	
1,2,4-Trichlorobenzene	ug/L			0.5 U			0.5 U	
Hexachlorobutadiene	ug/L			0.5 U			0.5 U	
Naphthalene	ug/L			0.5 U			0.5 U	
1,2,3-Trichlorobenzene	ug/L			0.5 U			0.5 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER
	LOCATION	MW-5	MW-5	OB	MW-6	MW-6	OB	MW-7
	DATE	01/08/92	01/08/92	03/01/93	01/14/92	01/14/92	03/02/93	01/10/92
	ES ID	MW-5	MW-5 Filtered	MW-5	MW-6	MW-6 Filtered	MW-6	MW-7
	LAB ID	152138	152168	179428	152488	152496	179505	152211
	UNITS							
Semivolatiles								
Phenol	ug/L	10 U		10 U	11 U		10 U	11 U
bis(2-Chloroethyl) ether	ug/L	10 U		10 U	11 U		10 U	11 U
2-Chlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
1,3-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
1,4-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzyl Alcohol	ug/L	10 U			11 U			11 U
1,2-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
2-Methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U		10 U	11 U		10 U	11 U
4-Methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
N-Nitroso-di-n-propylamine	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachloroethane	ug/L	10 U		10 U	11 U		10 U	11 U
Nitrobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Isophorone	ug/L	10 U		10 U	11 U		10 U	11 U
2-Nitrophenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dimethylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
Benzoic acid	ug/L	52 U			54 U			55 U
bis(2-Chloroethoxy) methane	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dichlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
1,2,4-Trichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Naphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chloroaniline	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorobutadiene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chloro-3-methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
2-Methylnaphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorocyclopentadiene	ug/L	10 U		10 U	11 U		10 U	11 U
2,4,6-Trichlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,4,5-Trichlorophenol	ug/L	52 U		25 U	54 U		25 U	55 U
2-Chloronaphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
2-Nitroaniline	ug/L	52 U		25 U	54 U		25 U	55 U
Dimethylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Acenaphthylene	ug/L	10 U		10 U	11 U		10 U	11 U
2,6-Dinitrotoluene	ug/L	10 U		10 U	11 U		10 U	11 U
3-Nitroaniline	ug/L	52 U		25 U	54 U		25 U	55 U
Acenaphthene	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dinitrophenol	ug/L	52 U		25 U	54 U		25 U	55 U
4-Nitrophenol	ug/L	52 U		25 U	54 U		25 U	55 U
Dibenzofuran	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dinitrotoluene	ug/L	10 U		10 U	11 U		10 U	11 U
Diethylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chlorophenyl-phenylether	ug/L	10 U		10 U	11 U		10 U	11 U
Fluorene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Nitroaniline	ug/L	52 U		25 U	54 U		25 U	55 U
4,6-Dinitro-2-methylphenol	ug/L	52 U		25 U	54 U		25 U	55 U
N-Nitrosodiphenylamine	ug/L	10 U		10 U	11 U		10 U	11 U
4-Bromophenyl-phenylether	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Pentachlorophenol	ug/L	52 U		25 U	54 U		25 U	55 U
Phenanthrene	ug/L	10 U		10 U	11 U		10 U	11 U
Anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Carbazole	ug/L			10 U			10 U	
Di-n-butylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Butylbenzylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
3,3'-Dichlorobenzidine	ug/L	21 U		10 U	22 U		10 U	22 U
Benzo(a)anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Chrysene	ug/L	10 U		10 U	11 U		10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Di-n-octylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(b)fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(k)fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(a)pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Dibenz(a,h)anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(g,h,i)perylene	ug/L	10 U		10 U	11 U		10 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-5	MW-5	OB	MW-6	MW-6	OB	MW-7
	ES ID	01/08/92	01/08/92	03/01/93	01/14/92	01/14/92	03/02/93	01/10/92
	LAB ID	MW-5	MW-5 Filtered	MW-5	MW-6	MW-6 Filtered	MW-6	MW-7
COMPOUND	UNITS	152138	152168	179428	152488	152496	179505	152211
Pesticides/PCBs								
alpha-BHC	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
beta-BHC	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
delta-BHC	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
gamma-BHC (Lindane)	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
Heptachlor	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
Aldrin	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
Heptachlor epoxide	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
Endosulfan I	ug/L	0.05 U		0.054 U	0.053 U		0.05 U	0.057 U
Dieldrin	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
4,4'-DDE	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
Endrin	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
Endosulfan II	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
4,4'-DDD	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
Endosulfan sulfate	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
4,4'-DDT	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
Methoxychlor	ug/L	0.5 U		0.54 U	0.53 U		0.5 U	0.57 U
Endrin ketone	ug/L	0.1 U		0.11 U	0.11 U		0.1 U	0.11 U
Endrin aldehyde	ug/L			0.11 U			0.1 U	
alpha-Chlordane	ug/L	0.5 U		0.054 U	0.53 U		0.05 U	0.57 U
gamma-Chlordane	ug/L	0.5 U		0.054 U	0.53 U		0.05 U	0.57 U
Toxaphene	ug/L	1 U		5.4 U	1.1 U		5 U	1.1 U
Aroclor-1016	ug/L	0.5 U		1.1 U	0.53 U		1 U	0.57 U
Aroclor-1221	ug/L	0.5 U		2.2 U	0.53 U		2 U	0.57 U
Aroclor-1232	ug/L	0.5 U		1.1 U	0.53 U		1 U	0.57 U
Aroclor-1242	ug/L	0.5 U		1.1 U	0.53 U		1 U	0.57 U
Aroclor-1248	ug/L	0.5 U		1.1 U	0.53 U		1 U	0.57 U
Aroclor-1254	ug/L	1 U		1.1 U	1.1 U		1 U	1.1 U
Aroclor-1260	ug/L	1 U		1.1 U	1.1 U		1 U	1.1 U
Explosives								
HMX	ug/L	1 U		0.12 U	1 U		0.12 U	1 U
RDX	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
Tetryl	ug/L	0.4 U		0.12 U	0.4 U		0.12 U	0.4 U
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
		MW-5	MW-5	OB	MW-6	MW-6	OB	MW-7
	DATE	01/08/92	01/08/92	03/01/93	01/14/92	01/14/92	03/02/93	01/10/92
	ES ID	MW-5	MW-5 Filtered	MW-5	MW-6	MW-6 Filtered	MW-6	MW-7
	LAB ID	152138	152168	179428	152488	152496	179505	152211
	UNITS							
Metals								
Aluminum	ug/l	3540 J	24.5 U	2180	5490 J	24.5 U	3440	27500
Antimony	ug/l	55.8 U	53.2 U	54 U	53.2 U	53.3 U	53.7 U	55.8 U
Arsenic	ug/l	3.5 U	3.5 U	1.7 U	3.5 U	3.5 U	1.7 U	3.5 U
Barium	ug/l	71.3 J	44 R	69.4 J	108 J	68.6 J	94.1 J	253
Beryllium	ug/l	1.2 U	1.1 U R	0.3 U	1.1 U	1.3 R	0.3 U	2.5 R
Cadmium	ug/l	2.9 U	3 U	3.1 U	3 U	3 U	3.1 U	2.9 U
Calcium	ug/l	95500	98100	106000	110000	91300	108000	122000
Chromium	ug/l	7.1 R	6.2 U R	3.9 R	9.2 J	6.2 U R	4.9 J	36.7 R
Cobalt	ug/l	19.9 U	20.4 U	5 U	20.4 U	20.5 U	5 U	19.9 U
Copper	ug/l	24.7 J	10.2 U	2.4 R	12 J	10.2 U	5.6 J	42.7
Iron	ug/l	4960	7 U R	2420	7660 J	7 U R	4550	39600
Lead	ug/l	1.4 J	1.2 U	1.1 J	3.4	1.2 U	2.3 J	37.3
Magnesium	ug/l	20600	22000	26100	38300	29200	33600	28700
Manganese	ug/l	71.6 J	5.9 J	51.2	151	5.5 J	77.9	707 J
Mercury	ug/l	0.18 R	0.17 R	0.06 U	0.17 R	0.15 R	0.06 U	0.23 R
Nickel	ug/l	15.9 U	14.7 U	4.3 J	17.8 J	14.8 U	8.5 J	59.9
Potassium	ug/l	1280 J	288 U	1170 J	2280 J	561 J	2130 J	5600
Selenium	ug/l	1 U	1.8 J	1.1 U	1.6 J	3 J	1.2 J	1 U
Silver	ug/l	9.1 U	3.4 U	3.2 U	6.2 R	3.4 U	3.2 U	9.1 U
Sodium	ug/l	17300	18400	17400	15700	14000	9900	5190
Thallium	ug/l	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U	3.2 U
Vanadium	ug/l	30.5 U	9.5 U	4.3 R	13 J	9.5 U	5.9 J	34.2 J
Zinc	ug/l	27.3 R	8.5 U	11.2 R	41.5 R	8.5 U	21.3 R	133
Cyanide	ug/l	10 U J		10 U	10 U		10 U	10 U J

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE I	PHASE II	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-7	OB	MW-8	MW-8	MW-8A	MW-8	OB
	ES ID	01/10/92	03/01/93	01/15/92	01/15/92	01/15/92	01/15/92	03/01/93
	LAB ID	MW-7 Filtered	MW-7	MW-8	MW-8 Filtered	MW-8A	MW-8A Filtered	MW-8
COMPOUND	UNITS	152219	179430	152578	152596	152579	152597	179432
Volatile Organic Compounds								
Chloromethane	ug/L		0.5 U	10 U		10 U		0.5 U
Bromomethane	ug/L		0.5 U	10 U		10 U		0.5 U
Vinyl Chloride	ug/L		0.5 U	10 U		10 U		0.5 U
Chloroethane	ug/L		0.5 U	10 U		10 U		0.5 U
Methylene Chloride	ug/L		0.5 U	5 U		5 U		0.5 U
Acetone	ug/L		5 U	10 U		10 U		5 U
Carbon Disulfide	ug/L		0.5 U	5 U		5 U		0.5 U
1,1-Dichloroethene	ug/L		0.5 U	5 U		5 U		0.5 U
1,1-Dichloroethane	ug/L		0.5 U	5 U		5 U		0.5 U
trans-1,2-Dichloroethene	ug/L		0.5 U					0.5 U
cis-1,2-Dichloroethene	ug/L		0.5 U					0.5 U
1,2-Dichloroethene (total)	ug/L			5 U		5 U		
Chloroform	ug/L		0.5 U	5 U		5 U		0.5 U
1,2-Dichloroethane	ug/L		0.5 U	5 U		5 U		0.5 U
2-Butanone	ug/L		5 U	10 U		10 U		5 U
1,1,1-Trichloroethane	ug/L		0.5 U	5 U		5 U		0.5 U
Carbon Tetrachloride	ug/L		0.5 U	5 U		5 U		0.5 U
Vinyl Acetate	ug/L			10 U		10 U		
BromodicHoromethane	ug/L		0.5 U	5 U		5 U		0.5 U
1,2-Dichloropropane	ug/L		0.5 U	5 U		5 U		0.5 U
cis-1,3-Dichloropropene	ug/L		0.5 U	5 U		5 U		0.5 U
Trichloroethene	ug/L		0.5 U	5 U		5 U		0.5 U
DibromocHoromethane	ug/L		0.5 U	5 U		5 U		0.5 U
1,1,2-Trichloroethane	ug/L		0.5 U	5 U		5 U		0.5 U
Benzene	ug/L		0.5 U	5 U		5 U		0.5 U
trans-1,3-Dichloropropene	ug/L		0.5 U	5 U		5 U		0.5 U
Bromoform	ug/L		0.5 U	5 U		5 U		0.5 U
4-Methyl-2-Pentanone	ug/L		5 U	10 U		10 U		5 U
2-Hexanone	ug/L		5 U	10 U		10 U		5 U
Tetrachloroethene	ug/L		0.5 U	5 U		5 U		0.5 U
1,1,2,2-Tetrachloroethane	ug/L		0.5 U	5 U		5 U		0.5 U
Toluene	ug/L		0.5 U	5 U		5 U		0.5 U
Chlorobenzene	ug/L		0.5 U	5 U		5 U		0.5 U
Ethylbenzene	ug/L		0.5 U	5 U		5 U		0.5 U
Styrene	ug/L		0.5 U	5 U		5 U		0.5 U
Xylene (total)	ug/L		0.5 U	5 U		5 U		0.5 U
DichlorodifluoromeHane	ug/L		0.5 U					0.5 U
TrichlorofluoromeHane	ug/L		0.5 U					0.5 U
2,2-Dichloropropane	ug/L		0.5 U					0.5 U
BromocHoromethane	ug/L		0.5 U					0.5 U
1,1-Dichloropropene	ug/L		0.5 U					0.5 U
Dibromomethane	ug/L		0.5 U					0.5 U
1,3-Dichloropropane	ug/L		0.5 U					0.5 U
1,2-Dibromoethane	ug/L		0.5 U					0.5 U
1,1,1,2-Tetrachloroethane	ug/L		0.5 U					0.5 U
Isopropylbenzene	ug/L		0.5 U					0.5 U
Bromobenzene	ug/L		0.5 U					0.5 U
1,2,3-Trichloropropane	ug/L		0.5 U					0.5 U
n-Propylbenzene	ug/L		0.5 U					0.5 U
2-Chlorotoluene	ug/L		0.5 U					0.5 U
4-Chlorotoluene	ug/L		0.5 U					0.5 U
1,3,5-Trimethylbenzene	ug/L		0.5 U					0.5 U
tert-Butylbenzene	ug/L		0.5 U					0.5 U
1,2,4-Trimethylbenzene	ug/L		0.5 U					0.5 U
sec-Butylbenzene	ug/L		0.5 U					0.5 U
1,3-Dichlorobenzene	ug/L		0.5 U					0.5 U
1,4-Dichlorobenzene	ug/L		0.5 U					0.5 U
p-Isopropyltoluene	ug/L		0.5 U					0.5 U
1,2-Dichlorobenzene	ug/L		0.5 U					0.5 U
n-Butylbenzene	ug/L		0.5 U					0.5 U
1,2-Dibromo-3-Chloropropane	ug/L		0.5 U					0.5 U
1,2,4-Trichlorobenzene	ug/L		0.5 U					0.5 U
Hexachlorobutadiene	ug/L		0.5 U					0.5 U
Naphthalene	ug/L		0.5 U					0.5 U
1,2,3-Trichlorobenzene	ug/L		0.5 U					0.5 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE II	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-7	OB	MW-8	MW-8	MW-8A	MW-8	OB
	ES ID	01/10/92	03/01/93	01/15/92	01/15/92	01/15/92	01/15/92	03/01/93
	LAB ID	MW-7 Filtered	MW-7	MW-8	MW-8 Filtered	MW-8A	MW-8A Filtered	MW-8
	UNITS	152219	179430	152578	152596	152579	152597	179432
Semivolatiles								
Phenol	ug/L		10 U	11 U		11 U		10 U
bis(2-Chloroethyl) ether	ug/L		10 U	11 U		11 U		10 U
2-Chlorophenol	ug/L		10 U	11 U		11 U		10 U
1,3-Dichlorobenzene	ug/L		10 U	11 U		11 U		10 U
1,4-Dichlorobenzene	ug/L		10 U	11 U		11 U		10 U
Benzyl Alcohol	ug/L			11 U		11 U		
1,2-Dichlorobenzene	ug/L		10 U	11 U		11 U		10 U
2-Methylphenol	ug/L		10 U	11 U		11 U		10 U
2,2'-oxybis(1-Chloropropane)	ug/L		10 U	11 U		11 U		10 U
4-Methylphenol	ug/L		10 U	11 U		11 U		10 U
N-Nitroso-di-n-propylamine	ug/L		10 U	11 U		11 U		10 U
Hexachloroethane	ug/L		10 U	11 U		11 U		10 U
Nitrobenzene	ug/L		10 U	11 U		11 U		10 U
Isophorone	ug/L		10 U	11 U		11 U		10 U
2-Nitrophenol	ug/L		10 U	11 U		11 U		10 U
2,4-Dimethylphenol	ug/L		10 U	11 U		11 U		10 U
Benzoic acid	ug/L			54 U		55 U		
bis(2-Chloroethoxy) methane	ug/L		10 U	11 U		11 U		10 U
2,4-Dichlorophenol	ug/L		10 U	11 U		11 U		10 U
1,2,4-Trichlorobenzene	ug/L		10 U	11 U		11 U		10 U
Naphthalene	ug/L		10 U	11 U		11 U		10 U
4-Chloroaniline	ug/L		10 U	11 U		11 U		10 U
Hexachlorobutadiene	ug/L		10 U	11 U		11 U		10 U
4-Chloro-3-methylphenol	ug/L		10 U	11 U		11 U		10 U
2-Methylnaphthalene	ug/L		10 U	11 U		11 U		10 U
Hexachlorocyclopentadiene	ug/L		10 U	11 U		11 U		10 U
2,4,6-Trichlorophenol	ug/L		10 U	11 U		11 U		10 U
2,4,5-Trichlorophenol	ug/L		25 U	54 U		55 U		25 U
2-Chloronaphthalene	ug/L		10 U	11 U		11 U		10 U
2-Nitroaniline	ug/L		25 U	54 U		55 U		25 U
Dimethylphthalate	ug/L		10 U	11 U		11 U		10 U
Acenaphthylene	ug/L		10 U	11 U		11 U		10 U
2,6-Dinitrotoluene	ug/L		10 U	11 U		11 U		10 U
3-Nitroaniline	ug/L		25 U	54 U		55 U		25 U
Acenaphthene	ug/L		10 U	11 U		11 U		10 U
2,4-Dinitrophenol	ug/L		25 U	54 U		55 U		25 U
4-Nitrophenol	ug/L		25 U	54 U		55 U		25 U
Dibenzofuran	ug/L		10 U	11 U		11 U		10 U
2,4-Dinitrotoluene	ug/L		10 U	11 U		11 U		10 U
Diethylphthalate	ug/L		10 U	11 U		11 U		10 U
4-Chlorophenyl-phenylether	ug/L		10 U	11 U		11 U		10 U
Fluorene	ug/L		10 U	11 U		11 U		10 U
4-Nitroaniline	ug/L		25 U	54 U		55 U		25 U
4,6-Dinitro-2-methylphenol	ug/L		25 U	54 U		55 U		25 U
N-Nitrosodiphenylamine	ug/L		10 U	11 U		11 U		10 U
4-Bromophenyl-phenylether	ug/L		10 U	11 U		11 U		10 U
Hexachlorobenzene	ug/L		10 U	11 U		11 U		10 U
Pentachlorophenol	ug/L		25 U	54 U		55 U		25 U
Phenanthrene	ug/L		10 U	11 U		11 U		10 U
Anthracene	ug/L		10 U	11 U		11 U		10 U
Carbazole	ug/L		10 U					10 U
Di-n-butylphthalate	ug/L		10 U	11 U		11 U		10 U
Fluoranthene	ug/L		10 U	11 U		11 U		10 U
Pyrene	ug/L		10 U	11 U		11 U		10 U
Butylbenzylphthalate	ug/L		10 U	11 U		11 U		10 U
3,3'-Dichlorobenzidine	ug/L		10 U	22 U		22 U		10 U
Benzo(a)anthracene	ug/L		10 U	11 U		11 U		10 U
Chrysene	ug/L		10 U	11 U		11 U		10 U
bis(2-Ethylhexyl)phthalate	ug/L		10 U	11 U		11 U		19 U
Di-n-octylphthalate	ug/L		10 U	11 U		11 U		10 U
Benzo(b)fluoranthene	ug/L		10 U	11 U		11 U		10 U
Benzo(k)fluoranthene	ug/L		10 U	11 U		11 U		10 U
Benzo(a)pyrene	ug/L		10 U	11 U		11 U		10 U
Indeno(1,2,3-cd)pyrene	ug/L		10 U	11 U		11 U		10 U
Dibenz(a,h)anthracene	ug/L		10 U	11 U		11 U		10 U
Benzo(g,h,i)perylene	ug/L		10 U	11 U		11 U		10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE II	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-7	OB	MW-8	MW-8	MW-8A	MW-8	OB
	ES ID	01/10/92	03/01/93	01/15/92	01/15/92	01/15/92	01/15/92	03/01/93
	LAB ID	MW-7 Filtered	MW-7	MW-8	MW-8 Filtered	MW-8A	MW-8A Filtered	MW-8
	UNITS	152219	179430	152578	152596	152579	152597	179432
Pesticides/PCBs								
alpha-BHC	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
beta-BHC	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
delta-BHC	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
gamma-BHC (Lindane)	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
Heptachlor	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
Aldrin	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
Heptachlor epoxide	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
Endosulfan I	ug/L		0.054 U	0.056 U		0.058 U		0.051 U
Dieldrin	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
4,4'-DDE	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
Endrin	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
Endosulfan II	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
4,4'-DDD	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
Endosulfan sulfate	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
4,4'-DDT	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
Methoxychlor	ug/L		0.54 U	0.56 U		0.58 U		0.51 U
Endrin ketone	ug/L		0.11 U	0.11 U		0.12 U		0.1 U
Endrin aldehyde	ug/L		0.11 U					0.1 U
alpha-Chlordane	ug/L		0.054 U	0.56 U		0.58 U		0.051 U
gamma-Chlordane	ug/L		0.054 U	0.56 U		0.58 U		0.051 U
Toxaphene	ug/L		5.4 U	1.1 U		1.2 U		5.1 U
Aroclor-1016	ug/L		1.1 U	0.56 U		0.58 U		1 U
Aroclor-1221	ug/L		2.2 U	0.56 U		0.58 U		2 U
Aroclor-1232	ug/L		1.1 U	0.56 U		0.58 U		1 U
Aroclor-1242	ug/L		1.1 U	0.56 U		0.58 U		1 U
Aroclor-1248	ug/L		1.1 U	0.56 U		0.58 U		1 U
Aroclor-1254	ug/L		1.1 U	1.1 U		1.2 U		1 U
Aroclor-1260	ug/L		1.1 U	1.1 U		1.2 U		1 U
Explosives								
HMX	ug/L		0.12 U	1 U		1 U		0.12 U
RDX	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
1,3,5-Trinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
1,3-Dinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
Tetryl	ug/L		0.12 U	0.4 U		0.4 U		0.12 U
2,4,6-Trinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
4-amino-2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
2-amino-4,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U
2,4-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U		0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	UNITS																							
MATRIX		PHASE I WATER			PHASE II WATER		PHASE I WATER			PHASE I WATER			PHASE I WATER			PHASE I WATER			PHASE II WATER		
LOCATION		MW-7			OB		MW-8			MW-8			MW-8A			MW-8			OB		
DATE		01/10/92			03/01/93		01/15/92			01/15/92			01/15/92			01/15/92			03/01/93		
ES ID		MW-7 Filtered			MW-7		MW-8			MW-8 Filtered			MW-8A			MW-8A Filtered			MW-8		
LAB ID		152219			179430		152578			152596			152579			152597			179432		
Metals																								
Aluminum	ug/l	24.4	U		1130		52800	J		97.9	U		82500	J		97.6	U		564				
Antimony	ug/l	53	U		53.8	U	52.9	U		53.2	U		53	U		53	U		53.8	U			
Arsenic	ug/l	3.5	U		1.7	U	11.3			3.5	U		15.8			3.5	U		1.7	U			
Barium	ug/l	43.6		R	58.3	J	827	J		14.8		J	1410	J		16.1		J	20.3	J			
Beryllium	ug/l	1.1	U	R	0.3	U	2.6	R		1.2	U		3.7	R		1.2	U		0.3	U			
Cadmium	ug/l	3	U		3.1	U	10.7	R		3	U		15.5	R		3	U		3.1	U			
Calcium	ug/l	84900			74500		454000	J		355000			510000	J		331000			295000				
Chromium	ug/l	6.3		R	2.9	R	81	J		6.2	U		133	J		6.2	U		2	U			
Cobalt	ug/l	20.4	U		5	U	65			19.9	U		83.1			19.9	U		5	U			
Copper	ug/l	10.1	U		1.9	U	53.1	J		14.4	U		87.7	J		14.4	U		1.9	U			
Iron	ug/l	6.9	U	R	1970		83100	J		17	U		137000	J		17	U		688				
Lead	ug/l	1.2	U		2.3	J	86.3	J		1.2	U		147	J		1.2	U		0.89	U			
Magnesium	ug/l	17600			17500		98200	J		74100			110000	J		66900			67700				
Manganese	ug/l	4.8	U		52.9		1780	J		10.3		J	2330	J		10.8		J	17.7				
Mercury	ug/l	0.16		R	0.06	U	0.19	R		0.03	U		0.22	R		0.03	U		0.06	U			
Nickel	ug/l	14.7	U		3.5	U	148	J		15.9	U		232	J		15.9	U		7	J			
Potassium	ug/l	287	U		455	J	12000			2850		J	14600			2500		J	1310	J			
Selenium	ug/l	1		J	1.1	U	5	U		1	U		5	U		1	U		1.1	U			
Silver	ug/l	3.4	U		3.2	U	6.5	R		9.1	U		5.9	R		9	U		3.2	U			
Sodium	ug/l	5490			3650	J	18200			18900			17900			17700			17900				
Thallium	ug/l	3.2	U		2.6	U	3.2	U		3.2	U		3.2	U		3.2	U		2.6	U			
Vanadium	ug/l	9.4	U		2.5	R	75.8			30.5	U		115			30.4	U		2.2	R			
Zinc	ug/l	8.4	U		10.9	R	179	J		13.4	U		302	J		13.4	U		7.4	R			
Cyanide	ug/l				10	U	10	U					10	U					10	U			

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE II
	LOCATION	WATER MW-9	WATER MW-9	WATER MW-10	WATER MW-10	WATER OB	WATER MW-11	WATER OB
	DATE	01/09/92	01/09/92	01/10/92	01/10/92	03/03/93	01/15/92	03/10/93
	ES ID	MW-9	MW-9 Filtered	MW-10	MW-10 Filtered	MW-10	MW-11	MW-11
	LAB ID	152139	152169	152212	152220	179542	152580	179858
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/L	10 U		10 U		0.5 U	10 U	0.5 U
Bromomethane	ug/L	10 U		10 U		0.5 U	10 U	0.5 U
Vinyl Chloride	ug/L	10 U		10 U		0.5 U	10 U	0.5 U
Chloroethane	ug/L	10 U		10 U		0.5 U	10 U	0.5 U
Methylene Chloride	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Acetone	ug/L	10 U		10 U		5 U	10 U	5 U
Carbon Disulfide	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,1-Dichloroethene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,1-Dichloroethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
trans-1,2-Dichloroethene	ug/L					0.5 U		0.5 U
cis-1,2-Dichloroethene	ug/L					0.5 U		0.5 U
1,2-Dichloroethene (total)	ug/L	5 U		5 U			5 U	
Chloroform	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,2-Dichloroethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
2-Butanone	ug/L	10 U		10 U		5 U	10 U	5 U
1,1,1-Trichloroethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Carbon Tetrachloride	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Vinyl Acetate	ug/L	10 U		10 U			10 U	
Bromodichloromethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,2-Dichloropropane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
cis-1,3-Dichloropropene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Trichloroethene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Dibromochloromethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,1,2-Trichloroethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Benzene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
trans-1,3-Dichloropropene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Bromoform	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
4-Methyl-2-Pentanone	ug/L	10 U		10 U		5 U	10 U	5 U
2-Hexanone	ug/L	10 U		10 U		5 U	10 U	5 U
Tetrachloroethene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Toluene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Chlorobenzene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Ethylbenzene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Styrene	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Xylene (total)	ug/L	5 U		5 U		0.5 U	5 U	0.5 U
Dichlorodifluoromethane	ug/L					0.5 U		0.5 U
Trichlorofluoromethane	ug/L					0.5 U		0.5 U
2,2-Dichloropropane	ug/L					0.5 U		0.5 U
Bromochloromethane	ug/L					0.5 U		0.5 U
1,1-Dichloropropene	ug/L					0.5 U		0.5 U
Dibromomethane	ug/L					0.5 U		0.5 U
1,3-Dichloropropane	ug/L					0.5 U		0.5 U
1,2-Dibromoethane	ug/L					0.5 U		0.5 U
1,1,1,2-Tetrachloroethane	ug/L					0.5 U		0.5 U
Isopropylbenzene	ug/L					0.5 U		0.5 U
Bromobenzene	ug/L					0.5 U		0.5 U
1,2,3-Trichloropropane	ug/L					0.5 U		0.5 U
n-Propylbenzene	ug/L					0.5 U		0.5 U
2-Chlorotoluene	ug/L					0.5 U		0.5 U
4-Chlorotoluene	ug/L					0.5 U		0.5 U
1,3,5-Trimethylbenzene	ug/L					0.5 U		0.5 U
tert-Butylbenzene	ug/L					0.5 U		0.5 U
1,2,4-Trimethylbenzene	ug/L					0.5 U		0.5 U
sec-Butylbenzene	ug/L					0.5 U		0.5 U
1,3-Dichlorobenzene	ug/L					0.5 U		0.5 U
1,4-Dichlorobenzene	ug/L					0.5 U		0.5 U
p-Isopropyltoluene	ug/L					0.5 U		0.5 U
1,2-Dichlorobenzene	ug/L					0.5 U		0.5 U
n-Butylbenzene	ug/L					0.5 U		0.5 U
1,2-Dibromo-3-Chloropropane	ug/L					0.5 U		0.5 U
1,2,4-Trichlorobenzene	ug/L					0.5 U		0.5 U
Hexachlorobutadiene	ug/L					0.5 U		0.5 U
Naphthalene	ug/L					0.5 U		0.5 U
1,2,3-Trichlorobenzene	ug/L					0.5 U		0.5 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-9	MW-9	MW-10	MW-10	OB	MW-11	OB
	ES ID	01/09/92	01/09/92	01/10/92	01/10/92	03/03/93	01/15/92	03/10/93
	LAB ID	MW-9	MW-9 Filtered	MW-10	MW-10 Filtered	MW-10	MW-11	MW-11
	UNITS	152139	152169	152212	152220	179542	152580	179858
Semivolatiles								
Phenol	ug/L	10 U		11 U		10 U	11 U	10 U
bis(2-Chloroethyl) ether	ug/L	10 U		11 U		10 U	11 U	10 U
2-Chlorophenol	ug/L	10 U		11 U		10 U	11 U	10 U
1,3-Dichlorobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
1,4-Dichlorobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
Benzyl Alcohol	ug/L	10 U		11 U			11 U	
1,2-Dichlorobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
2-Methylphenol	ug/L	10 U		11 U		10 U	11 U	10 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U		11 U		10 U	11 U	10 U
4-Methylphenol	ug/L	10 U		11 U		10 U	11 U	10 U
N-Nitroso-di-n-propylamine	ug/L	10 U		11 U		10 U	11 U	10 U
Hexachloroethane	ug/L	10 U		11 U		10 U	11 U	10 U
Nitrobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
Isophorone	ug/L	10 U		11 U		10 U	11 U	10 U
2-Nitrophenol	ug/L	10 U		11 U		10 U	11 U	10 U
2,4-Dimethylphenol	ug/L	10 U		11 U		10 U	11 U	10 U
Benzoic acid	ug/L	52 U		55 U			55 U	
bis(2-Chloroethoxy) methane	ug/L	10 U		11 U		10 U	11 U	10 U
2,4-Dichlorophenol	ug/L	10 U		11 U		10 U	11 U	10 U
1,2,4-Trichlorobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
Naphthalene	ug/L	10 U		11 U		10 U	11 U	10 U
4-Chloroaniline	ug/L	10 U		11 U		10 U	11 U	10 U
Hexachlorobutadiene	ug/L	10 U		11 U		10 U	11 U	10 U
4-Chloro-3-methylphenol	ug/L	10 U		11 U		10 U	11 U	10 U
2-Methylnaphthalene	ug/L	10 U		11 U		10 U	11 U	10 U
Hexachlorocyclopentadiene	ug/L	10 U		11 U		10 U	11 U	10 U
2,4,6-Trichlorophenol	ug/L	10 U		11 U		10 U	11 U	10 U
2,4,5-Trichlorophenol	ug/L	52 U		55 U		25 U	55 U	25 U
2-Chloronaphthalene	ug/L	10 U		11 U		10 U	11 U	10 U
2-Nitroaniline	ug/L	52 U		55 U		25 U	55 U	25 U
Dimethylphthalate	ug/L	10 U		11 U		10 U	11 U	10 U
Acenaphthylene	ug/L	10 U		11 U		10 U	11 U	10 U
2,6-Dinitrotoluene	ug/L	10 U		11 U		10 U	11 U	10 U
3-Nitroaniline	ug/L	52 U		55 U		25 U	55 U	25 U
Acenaphthene	ug/L	10 U		11 U		10 U	11 U	10 U
2,4-Dinitrophenol	ug/L	52 U		55 U		25 U	55 U	25 U
4-Nitrophenol	ug/L	52 U		55 U		25 U	55 U	25 U
Dibenzofuran	ug/L	10 U		11 U		10 U	11 U	10 U
2,4-Dinitrotoluene	ug/L	10 U		11 U		10 U	11 U	10 U
Diethylphthalate	ug/L	10 U		11 U		10 U	11 U	10 U
4-Chlorophenyl-phenylether	ug/L	10 U		11 U		10 U	11 U	10 U
Fluorene	ug/L	10 U		11 U		10 U	11 U	10 U
4-Nitroaniline	ug/L	52 U		55 U		25 U	55 U	25 U
4,6-Dinitro-2-methylphenol	ug/L	52 U		55 U		25 U	55 U	25 U
N-Nitrosodiphenylamine	ug/L	10 U		11 U		10 U	11 U	10 U
4-Bromophenyl-phenylether	ug/L	10 U		11 U		10 U	11 U	10 U
Hexachlorobenzene	ug/L	10 U		11 U		10 U	11 U	10 U
Pentachlorophenol	ug/L	52 U		55 U		25 U	55 U	25 U
Phenanthrene	ug/L	10 U		11 U		10 U	11 U	10 U
Anthracene	ug/L	10 U		11 U		10 U	11 U	10 U
Carbazole	ug/L					10 U		10 U
Di-n-butylphthalate	ug/L	10 U		11 U		10 U	11 U	10 U
Fluoranthene	ug/L	10 U		11 U		10 U	11 U	10 U
Pyrene	ug/L	10 U		11 U		10 U	11 U	10 U
Butylbenzylphthalate	ug/L	10 U		11 U		10 U	11 U	10 U
3,3'-Dichlorobenzidine	ug/L	21 U		22 U		10 U	22 U	10 U
Benzo(a)anthracene	ug/L	10 U		11 U		10 U	11 U	10 U
Chrysene	ug/L	10 U		11 U		10 U	11 U	10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U		11 U		10 U	11 U	13 U
Di-n-octylphthalate	ug/L	10 U		11 U		10 U	11 U	10 U
Benzo(b)fluoranthene	ug/L	10 U		11 U		10 U	11 U	10 U
Benzo(k)fluoranthene	ug/L	10 U		11 U		10 U	11 U	10 U
Benzo(a)pyrene	ug/L	10 U		11 U		10 U	11 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U		11 U		10 U	11 U	10 U
Dibenz(a,h)anthracene	ug/L	10 U		11 U		10 U	11 U	10 U
Benzo(g,h,i)perylene	ug/L	10 U		11 U		10 U	11 U	10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-9	MW-9	MW-10	MW-10	OB	MW-11	OB
	ES ID	01/09/92	01/09/92	01/10/92	01/10/92	03/03/93	01/15/92	03/10/93
	LAB ID	MW-9	MW-9 Filtered	MW-10	MW-10 Filtered	MW-10	MW-11	MW-11
	UNITS	152139	152169	152212	152220	179542	152580	179858
Pesticides/PCBs								
alpha-BHC	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
beta-BHC	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
delta-BHC	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
gamma-BHC (Lindane)	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
Heptachlor	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
Aldrin	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
Heptachlor epoxide	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
Endosulfan I	ug/L	0.054 U		0.062 U		0.05 U	0.05 U	0.052 U
Dieldrin	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
Endrin	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
Endosulfan II	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
4,4'-DDD	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
Methoxychlor	ug/L	0.54 U		0.62 U		0.5 U	0.5 U	0.52 U
Endrin ketone	ug/L	0.11 U		0.12 U		0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/L					0.1 U		0.1 U
alpha-Chlordane	ug/L	0.54 U		0.62 U		0.05 U	0.5 U	0.052 U
gamma-Chlordane	ug/L	0.54 U		0.62 U		0.05 U	0.5 U	0.052 U
Toxaphene	ug/L	1.1 U		1.2 U		5 U	1 U	5.2 U
Aroclor-1016	ug/L	0.54 U		0.62 U		1 U	0.5 U	1 U
Aroclor-1221	ug/L	0.54 U		0.62 U		2 U	0.5 U	2.1 U
Aroclor-1232	ug/L	0.54 U		0.62 U		1 U	0.5 U	1 U
Aroclor-1242	ug/L	0.54 U		0.62 U		1 U	0.5 U	1 U
Aroclor-1248	ug/L	0.54 U		0.62 U		1 U	0.5 U	1 U
Aroclor-1254	ug/L	1.1 U		1.2 U		1 U	1 U	1 U
Aroclor-1260	ug/L	1.1 U		1.2 U		1 U	1 U	1 U
Explosives								
HMX	ug/L	1 U		1 U		0.12 U	1 U	0.12 U
RDX	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
Tetryl	ug/L	0.4 U		0.4 U		0.12 U	0.4 U	0.12 U
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-9	MW-9	MW-10	MW-10	OB	MW-11	OB
	ES ID	01/09/92	01/09/92	01/10/92	01/10/92	03/03/93	01/15/92	03/10/93
	LAB ID	MW-9	MW-9 Filtered	MW-10	MW-10 Filtered	MW-10	MW-11	MW-11
	UNITS	152139	152169	152212	152220	179542	152580	179858
Metals								
Aluminum	ug/l	5880 J	24.5 U	72200	24.5 U	7350	222 J	75.2 J
Antimony	ug/l	55.7 U	53.3 U	55.6 U	53.2 U	53.8 U	53.1 U	54 U
Arsenic	ug/l	3.5 U	3.5 U	3.5 U	3.5 U	1.7 U	3.5 U	1.7 U
Barium	ug/l	181 J	46.5 R	638	53.1 R	86.1 J	124 J	92.4 J
Beryllium	ug/l	1.9 R	1.1 U R	4.3 R	1.1 U R	0.3 U	1.1 U	0.3 U
Cadmium	ug/l	2.9 U	3 U	7.1	3 U	3.1 U	3 U	3.1 U
Calcium	ug/l	169000	168000	223000	172000	162000	198000	186000
Chromium	ug/l	9.4 R	6.2 U R	96.7	6.2 U R	9.6 J	6.2 U	2.1 J
Cobalt	ug/l	19.9 U	20.5 U	98.6	20.4 U	5.8 J	20.4 U	5 U
Copper	ug/l	14.4 U	10.2 U	80.3	10.2 U	7 J	10.1 U	4 R
Iron	ug/l	7640	7 U R	108000	7 U R	8830	486 J	151 R
Lead	ug/l	4.6	1.2 U	57.9	1.2 U	4.9	1.2 U	0.9 U
Magnesium	ug/l	40800	41000	36800	19300	20100	32400	30000
Manganese	ug/l	200 J	14.8 J	3970 J	15.7	160	23.8	73.1
Mercury	ug/l	0.19 R	0.17 R	0.27 R	0.16 R	0.07 R	0.18 R	0.06 U
Nickel	ug/l	16.7 J	14.8 U	139	14.7 U	12.9 J	14.7 U	4.5 J
Potassium	ug/l	2570 J	1690 J	11000	1330 J	2440 J	1470 J	935 J
Selenium	ug/l	1 U	2 J	10 U	1 U	1.1 U	1 U	1.1 U
Silver	ug/l	9.1 U	3.4 U	9 U	3.4 U	3.2 U	7.4 R	3.2 U
Sodium	ug/l	13000	14000	13700	13100	10000	33200	30700
Thallium	ug/l	3.2 U	3.2 U	3.2 U	3.2 U	2.6 U	3.2 U	2.6 U
Vanadium	ug/l	30.4 U	9.5 U	103	9.5 U	10.2 J	9.4 U	2.1 U
Zinc	ug/l	29.3 R	8.5 U	291	8.5 U	32.8	8.4 U	3.8 R
Cyanide	ug/l	10 U J		10 U J		10 U	10 U	14.5

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE I	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-12	MW-12	OB	MW-13	MW-13	MW-14	MW-14
	ES ID	01/15/92	01/15/92	03/08/93	01/09/92	01/09/92	01/15/92	01/15/92
	LAB ID	MW-12	MW-12 Filtered	MW-12	MW-13	MW-13 Filtered	MW-14	MW-14 Filtered
	UNITS	152581	152598	179724	152140	152170	152582	152599
Volatile Organic Compounds								
Chloromethane	ug/L	10 U		0.5 U	10 U		10 U	
Bromomethane	ug/L	10 U		0.5 U	10 U		10 U	
Vinyl Chloride	ug/L	10 U		0.5 U	10 U		10 U	
Chloroethane	ug/L	10 U		0.5 U	10 U		10 U	
Methylene Chloride	ug/L	5 U		0.5 U	5 U		5 U	
Acetone	ug/L	10 U		5 U	10 U		10 U	
Carbon Disulfide	ug/L	5 U		0.5 U	5 U		5 U	
1,1-Dichloroethene	ug/L	5 U		0.5 U	5 U		5 U	
1,1-Dichloroethane	ug/L	5 U		0.5 U	5 U		5 U	
trans-1,2-Dichloroethene	ug/L			0.5 U				
cis-1,2-Dichloroethene	ug/L			0.5 U				
1,2-Dichloroethene (total)	ug/L	5 U			5 U		5 U	
Chloroform	ug/L	5 U		0.5 U	5 U		5 U	
1,2-Dichloroethane	ug/L	5 U		0.5 U	5 U		5 U	
2-Butanone	ug/L	10 U		5 U	10 U		10 U	
1,1,1-Trichloroethane	ug/L	5 U		0.5 U	5 U		5 U	
Carbon Tetrachloride	ug/L	5 U		0.5 U	5 U		5 U	
Vinyl Acetate	ug/L	10 U			10 U		10 U	
Bromodichloromethane	ug/L	5 U		0.5 U	5 U		5 U	
1,2-Dichloropropane	ug/L	5 U		0.5 U	5 U		5 U	
cis-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		5 U	
Trichloroethene	ug/L	5 U		0.5 U	5 U		5 U	
Dibromochloromethane	ug/L	5 U		0.5 U	5 U		5 U	
1,1,2-Trichloroethane	ug/L	5 U		0.5 U	5 U		5 U	
Benzene	ug/L	5 U		0.5 U	5 U		5 U	
trans-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		5 U	
Bromoform	ug/L	5 U		0.5 U	5 U		5 U	
4-Methyl-2-Pentanone	ug/L	10 U		5 U	10 U		10 U	
2-Hexanone	ug/L	10 U		5 U	10 U		10 U	
Tetrachloroethene	ug/L	5 U		0.5 U	5 U		5 U	
1,1,2,2-Tetrachloroethane	ug/L	5 U		0.5 U	5 U		5 U	
Toluene	ug/L	5 U		0.5 U	5 U		5 U	
Chlorobenzene	ug/L	5 U		0.5 U	5 U		5 U	
Ethylbenzene	ug/L	5 U		0.5 U	5 U		5 U	
Styrene	ug/L	5 U		0.5 U	5 U		5 U	
Xylene (total)	ug/L	5 U		0.5 U	5 U		5 U	
Dichlorodifluoromethane	ug/L			0.5 U				
Trichlorofluoromethane	ug/L			0.5 U				
2,2-Dichloropropane	ug/L			0.5 U				
Bromochloromethane	ug/L			0.5 U				
1,1-Dichloropropene	ug/L			0.5 U				
Dibromomethane	ug/L			0.5 U				
1,3-Dichloropropane	ug/L			0.5 U				
1,2-Dibromoethane	ug/L			0.5 U				
1,1,1,2-Tetrachloroethane	ug/L			0.5 U				
Isopropylbenzene	ug/L			0.5 U				
Bromobenzene	ug/L			0.5 U				
1,2,3-Trichloropropane	ug/L			0.5 U				
n-Propylbenzene	ug/L			0.5 U				
2-Chlorotoluene	ug/L			0.5 U				
4-Chlorotoluene	ug/L			0.5 U				
1,3,5-Trimethylbenzene	ug/L			0.5 U				
tert-Butylbenzene	ug/L			0.5 U				
1,2,4-Trimethylbenzene	ug/L			0.5 U				
sec-Butylbenzene	ug/L			0.5 U				
1,3-Dichlorobenzene	ug/L			0.5 U				
1,4-Dichlorobenzene	ug/L			0.5 U				
p-Isopropyltoluene	ug/L			0.5 U				
1,2-Dichlorobenzene	ug/L			0.5 U				
n-Butylbenzene	ug/L			0.5 U				
1,2-Dibromo-3-Chloropropane	ug/L			0.5 U				
1,2,4-Trichlorobenzene	ug/L			0.5 U				
Hexachlorobutadiene	ug/L			0.5 U				
Naphthalene	ug/L			0.5 U				
1,2,3-Trichlorobenzene	ug/L			0.5 U				

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	MW-12	MW-12	OB	MW-13	MW-13	MW-14	MW-14
	DATE	01/15/92	01/15/92	03/08/93	01/09/92	01/09/92	01/15/92	01/15/92
	ES ID	MW-12	MW-12 Filtered	MW-12	MW-13	MW-13 Filtered	MW-14	MW-14 Filtered
	LAB ID	152581	152598	179724	152140	152170	152582	152599
	UNITS							
Semivolatiles								
Phenol	ug/L	11 U		10 U	10 U		10 U	
bis(2-Chloroethyl) ether	ug/L	11 U		10 U	10 U		10 U	
2-Chlorophenol	ug/L	11 U		10 U	10 U		10 U	
1,3-Dichlorobenzene	ug/L	11 U		10 U	10 U		10 U	
1,4-Dichlorobenzene	ug/L	11 U		10 U	10 U		10 U	
Benzyl Alcohol	ug/L	11 U			10 U		10 U	
1,2-Dichlorobenzene	ug/L	11 U		10 U	10 U		10 U	
2-Methylphenol	ug/L	11 U		10 U	10 U		10 U	
2,2'-oxybis(1-Chloropropane)	ug/L	11 U		10 U	10 U		10 U	
4-Methylphenol	ug/L	11 U		10 U	10 U		10 U	
N-Nitroso-di-n-propylamine	ug/L	11 U		10 U	10 U		10 U	
Hexachloroethane	ug/L	11 U		10 U	10 U		10 U	
Nitrobenzene	ug/L	11 U		10 U	10 U		10 U	
Isophorone	ug/L	11 U		10 U	10 U		10 U	
2-Nitrophenol	ug/L	11 U		10 U	10 U		10 U	
2,4-Dimethylphenol	ug/L	11 U		10 U	10 U		10 U	
Benzoic acid	ug/L	56 U			51 U		51 U	
bis(2-Chloroethoxy) methane	ug/L	11 U		10 U	10 U		10 U	
2,4-Dichlorophenol	ug/L	11 U		10 U	10 U		10 U	
1,2,4-Trichlorobenzene	ug/L	11 U		10 U	10 U		10 U	
Naphthalene	ug/L	11 U		10 U	10 U		10 U	
4-Chloroaniline	ug/L	11 U		10 U	10 U		10 U	
Hexachlorobutadiene	ug/L	11 U		10 U	10 U		10 U	
4-Chloro-3-methylphenol	ug/L	11 U		10 U	10 U		10 U	
2-Methylnaphthalene	ug/L	11 U		10 U	10 U		10 U	
Hexachlorocyclopentadiene	ug/L	11 U		10 U	10 U		10 U	
2,4,6-Trichlorophenol	ug/L	11 U		10 U	10 U		10 U	
2,4,5-Trichlorophenol	ug/L	56 U		25 U	51 U		51 U	
2-Chloronaphthalene	ug/L	11 U		10 U	10 U		10 U	
2-Nitroaniline	ug/L	56 U		25 U	51 U		51 U	
Dimethylphthalate	ug/L	11 U		10 U	10 U		10 U	
Acenaphthylene	ug/L	11 U		10 U	10 U		10 U	
2,6-Dinitrotoluene	ug/L	11 U		10 U	10 U		10 U	
3-Nitroaniline	ug/L	56 U		25 U	51 U		51 U	
Acenaphthene	ug/L	11 U		10 U	10 U		10 U	
2,4-Dinitrophenol	ug/L	56 U		25 U	51 U		51 U	
4-Nitrophenol	ug/L	56 U		25 U	51 U		51 U	
Dibenzofuran	ug/L	11 U		10 U	10 U		10 U	
2,4-Dinitrotoluene	ug/L	11 U		10 U	10 U		10 U	
Diethylphthalate	ug/L	11 U		10 U	10 U		10 U	
4-Chlorophenyl-phenylether	ug/L	11 U		10 U	10 U		10 U	
Fluorene	ug/L	11 U		10 U	10 U		10 U	
4-Nitroaniline	ug/L	56 U		25 U	51 U		51 U	
4,6-Dinitro-2-methylphenol	ug/L	56 U		25 U	51 U		51 U	
N-Nitrosodiphenylamine	ug/L	11 U		10 U	10 U		10 U	
4-Bromophenyl-phenylether	ug/L	11 U		10 U	10 U		10 U	
Hexachlorobenzene	ug/L	11 U		10 U	10 U		10 U	
Pentachlorophenol	ug/L	56 U		25 U	51 U		51 U	
Phenanthrene	ug/L	11 U		10 U	10 U		10 U	
Anthracene	ug/L	11 U		10 U	10 U		10 U	
Carbazole	ug/L			10 U				
Di-n-butylphthalate	ug/L	11 U		10 U	10 U		10 U	
Fluoranthene	ug/L	11 U		10 U	10 U		10 U	
Pyrene	ug/L	11 U		10 U	10 U		10 U	
Butylbenzylphthalate	ug/L	11 U		10 U	10 U		10 U	
3,3'-Dichlorobenzidine	ug/L	23 U		10 U	20 U		21 U	
Benzo(a)anthracene	ug/L	11 U		10 U	10 U		10 U	
Chrysene	ug/L	11 U		10 U	10 U		10 U	
bis(2-Ethylhexyl)phthalate	ug/L	11 U		10 U	10 U		10 U	
Di-n-octylphthalate	ug/L	11 U		10 U	10 U		10 U	
Benzo(b)fluoranthene	ug/L	11 U		10 U	10 U		10 U	
Benzo(k)fluoranthene	ug/L	11 U		10 U	10 U		10 U	
Benzo(a)pyrene	ug/L	11 U		10 U	10 U		10 U	
Indeno(1,2,3-cd)pyrene	ug/L	11 U		10 U	10 U		10 U	
Dibenz(a,h)anthracene	ug/L	11 U		10 U	10 U		10 U	
Benzo(g,h,i)perylene	ug/L	11 U		10 U	10 U		10 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE I	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-12	MW-12	OB	MW-13	MW-13	MW-14	MW-14
	ES ID	01/15/92	01/15/92	03/08/93	01/09/92	01/09/92	01/15/92	01/15/92
	LAB ID	MW-12	MW-12 Filtered	MW-12	MW-13	MW-13 Filtered	MW-14	MW-14 Filtered
COMPOUND	UNITS	152581	152598	179724	152140	152170	152582	152599
Pesticides/PCBs								
alpha-BHC	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
beta-BHC	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
delta-BHC	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
gamma-BHC (Lindane)	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
Heptachlor	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
Aldrin	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
Heptachlor epoxide	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
Endosulfan I	ug/L	0.058 U		0.05 U	0.058 U		0.056 U	
Dieldrin	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
4,4'-DDE	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
Endrin	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
Endosulfan II	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
4,4'-DDD	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
Endosulfan sulfate	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
4,4'-DDT	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
Methoxychlor	ug/L	0.58 U		0.5 U	0.58 U		0.56 U	
Endrin ketone	ug/L	0.12 U		0.1 U	0.12 U		0.11 U	
Endrin aldehyde	ug/L			0.1 U				
alpha-Chlordane	ug/L	0.58 U		0.05 U	0.58 U		0.56 U	
gamma-Chlordane	ug/L	0.58 U		0.05 U	0.58 U		0.56 U	
Toxaphene	ug/L	1.2 U		5 U	1.2 U		1.1 U	
Aroclor-1016	ug/L	0.58 U		1 U	0.58 U		0.56 U	
Aroclor-1221	ug/L	0.58 U		2 U	0.58 U		0.56 U	
Aroclor-1232	ug/L	0.58 U		1 U	0.58 U		0.56 U	
Aroclor-1242	ug/L	0.58 U		1 U	0.58 U		0.56 U	
Aroclor-1248	ug/L	0.58 U		1 U	0.58 U		0.56 U	
Aroclor-1254	ug/L	1.2 U		1 U	1.2 U		1.1 U	
Aroclor-1260	ug/L	1.2 U		1 U	1.2 U		1.1 U	
Explosives								
HMX	ug/L	1 U		0.12 U	1 U		1 U	
RDX	ug/L	0.12 U		0.12 U	0.6		0.12 U	
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
Tetryl	ug/L	0.4 U		0.12 U	0.4 U		0.4 U	
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	MW-12	MW-12	OB	MW-13	MW-13	MW-14	MW-14
	DATE	01/15/92	01/15/92	03/08/93	01/09/92	01/09/92	01/15/92	01/15/92
	ES ID	MW-12	MW-12 Filtered	MW-12	MW-13	MW-13 Filtered	MW-14	MW-14 Filtered
	LAB ID	152581	152598	179724	152140	152170	152582	152599
	UNITS							
Metals								
Aluminum	ug/l	37400	97.5 U	574	12200	24.4 U	29100 J	118 J
Antimony	ug/l	53 U	52.9 U	54 U	55.5 U	52.9 U	53.3 U	53.1 U
Arsenic	ug/l	3.5 J	3.5 U	1.7 U	3.5 U	3.5 U	6.2 J	3.5 U
Barium	ug/l	361	107 J	105 J	160 J	68.2 J	801	51 J
Beryllium	ug/l	2.1 R	1.2 U	0.3 U	2.2 R	1.1 U R	1.1 U	1.2 U
Cadmium	ug/l	6.3 R	3 U	3.1 U	2.9 U	3 U	5.8 R	3 U
Calcium	ug/l	97400	85600	95000	142000	140000	188000	167000
Chromium	ug/l	53.4	6.1 U	2 U	13.8 R	6.1 U R	43.8	6.2 U
Cobalt	ug/l	48.2 J	19.8 U	5 U	19.8 U	20.3 U	32.2 J	19.9 U
Copper	ug/l	64.8	16.5 J	2.1 R	25.4	10.1 U	57.9	14.4 U
Iron	ug/l	55200 J	17 U	827	13700	6.9 U R	46300 J	17 U
Lead	ug/l	46	1.2 U	0.97 J	32	1.2 U	60.1	1.2 U
Magnesium	ug/l	69100	51500	74400	27100	25000	43800 J	32700
Manganese	ug/l	1030	3.2 U	17.5	175 J	4.8 U	765	3.2 U
Mercury	ug/l	0.26 R	0.03 U	0.06 U	0.22 R	0.16 R	0.26 R	0.03 U
Nickel	ug/l	90.3	15.9 U	3.5 U	22.4 J	14.7 U	67.5	15.9 U
Potassium	ug/l	11300	6160	6670	3330 J	714 J	6170	697 J
Selenium	ug/l	1 U	2.8 J	1.1 U	1 U	1.5 J	4.4 J	1 U
Silver	ug/l	6.1 R	9 U	3.2 U	9 U	3.4 U	6 R	9 U
Sodium	ug/l	23800	23200	18100	16000	16700	36100	40400
Thallium	ug/l	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U	3.2 U	3.2 U
Vanadium	ug/l	44.9 J	30.3 U	2.1 U	31.1 J	9.4 U	42.3 J	30.4 U
Zinc	ug/l	194	13.4 U	41.3	86.1	8.4 U	163	13.4 U
Cyanide	ug/l	10 U		10 U	10 U J		10 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-14A	MW-14	OB	MW-15	MW-15	OB	MW-16
	ES ID	01/15/92	01/15/92	03/10/93	01/09/92	01/09/92	03/02/93	01/14/92
	LAB ID	MW-14A	MW-14A Filtered	MW-14	MW-15	MW-15 Filtered	MW-15	MW-16
	UNITS	152583	152600	179873	152141	152171	179507	152489
Volatile Organic Compounds								
Chloromethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Bromomethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Vinyl Chloride	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Chloroethane	ug/L	10 U		0.5 U	10 U		0.5 U	10 U
Methylene Chloride	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Acetone	ug/L	10 U		5 U	10 U		5 U	10 U
Carbon Disulfide	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
trans-1,2-Dichloroethene	ug/L			0.5 U			0.5 U	
cis-1,2-Dichloroethene	ug/L			0.5 U			0.5 U	
1,2-Dichloroethene (total)	ug/L	5 U			5 U			5 U
Chloroform	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
2-Butanone	ug/L	10 U		5 U	10 U		5 U	10 U
1,1,1-Trichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Carbon Tetrachloride	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Vinyl Acetate	ug/L	10 U			10 U			10 U
Bromodichloromethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloropropane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Trichloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Dibromochloromethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1,2-Trichloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Benzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Bromoform	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
4-Methyl-2-Pentanone	ug/L	10 U		5 U	10 U		5 U	10 U
2-Hexanone	ug/L	10 U		5 U	10 U		5 U	10 U
Tetrachloroethene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Toluene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Chlorobenzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Ethylbenzene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Styrene	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Xylene (total)	ug/L	5 U		0.5 U	5 U		0.5 U	5 U
Dichlorodifluoromethane	ug/L			0.5 U			0.5 U	
Trichlorofluoromethane	ug/L			0.5 U			0.5 U	
2,2-Dichloropropane	ug/L			0.5 U			0.5 U	
Bromochloromethane	ug/L			0.5 U			0.5 U	
1,1-Dichloropropene	ug/L			0.5 U			0.5 U	
Dibromomethane	ug/L			0.5 U			0.5 U	
1,3-Dichloropropane	ug/L			0.5 U			0.5 U	
1,2-Dibromoethane	ug/L			0.5 U			0.5 U	
1,1,1,2-Tetrachloroethane	ug/L			0.5 U			0.5 U	
Isopropylbenzene	ug/L			0.5 U			0.5 U	
Bromobenzene	ug/L			0.5 U			0.5 U	
1,2,3-Trichloropropane	ug/L			0.5 U			0.5 U	
n-Propylbenzene	ug/L			0.5 U			0.5 U	
2-Chlorotoluene	ug/L			0.5 U			0.5 U	
4-Chlorotoluene	ug/L			0.5 U			0.5 U	
1,3,5-Trimethylbenzene	ug/L			0.5 U			0.5 U	
tert-Butylbenzene	ug/L			0.5 U			0.5 U	
1,2,4-Trimethylbenzene	ug/L			0.5 U			0.5 U	
sec-Butylbenzene	ug/L			0.5 U			0.5 U	
1,3-Dichlorobenzene	ug/L			0.5 U			0.5 U	
1,4-Dichlorobenzene	ug/L			0.5 U			0.5 U	
p-Isopropyltoluene	ug/L			0.5 U			0.5 U	
1,2-Dichlorobenzene	ug/L			0.5 U			0.5 U	
n-Butylbenzene	ug/L			0.5 U			0.5 U	
1,2-Dibromo-3-Chloropropane	ug/L			0.5 U			0.5 U	
1,2,4-Trichlorobenzene	ug/L			0.5 U			0.5 U	
Hexachlorobutadiene	ug/L			0.5 U			0.5 U	
Naphthalene	ug/L			0.5 U			0.5 U	
1,2,3-Trichlorobenzene	ug/L			0.5 U			0.5 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-14A	MW-14	OB	MW-15	MW-15	OB	MW-16
	ES ID	01/15/92	01/15/92	03/10/93	01/09/92	01/09/92	03/02/93	01/14/92
	LAB ID	MW-14A	MW-14A Filtered	MW-14	MW-15	MW-15 Filtered	MW-15	MW-16
	UNITS	152583	152600	179873	152141	152171	179507	152489
Semivolatiles								
Phenol	ug/L	11 U		10 U	11 U		10 U	11 U
bis(2-Chloroethyl) ether	ug/L	11 U		10 U	11 U		10 U	11 U
2-Chlorophenol	ug/L	11 U		10 U	11 U		10 U	11 U
1,3-Dichlorobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
1,4-Dichlorobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
Benzyl Alcohol	ug/L	11 U			11 U			11 U
1,2-Dichlorobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
2-Methylphenol	ug/L	11 U		10 U	11 U		10 U	11 U
2,2'-oxybis(1-Chloropropane)	ug/L	11 U		10 U	11 U		10 U	11 U
4-Methylphenol	ug/L	11 U		10 U	11 U		10 U	11 U
N-Nitroso-di-n-propylamine	ug/L	11 U		10 U	11 U		10 U	11 U
Hexachloroethane	ug/L	11 U		10 U	11 U		10 U	11 U
Nitrobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
Isophorone	ug/L	11 U		10 U	11 U		10 U	11 U
2-Nitrophenol	ug/L	11 U		10 U	11 U		10 U	11 U
2,4-Dimethylphenol	ug/L	11 U		10 U	11 U		10 U	11 U
Benzoic acid	ug/L	55 U			56 U			54 U
bis(2-Chloroethoxy) methane	ug/L	11 U		10 U	11 U		10 U	11 U
2,4-Dichlorophenol	ug/L	11 U		10 U	11 U		10 U	11 U
1,2,4-Trichlorobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
Naphthalene	ug/L	11 U		10 U	11 U		10 U	11 U
4-Chloroaniline	ug/L	11 U		10 U	11 U		10 U	11 U
Hexachlorobutadiene	ug/L	11 U		10 U	11 U		10 U	11 U
4-Chloro-3-methylphenol	ug/L	11 U		10 U	11 U		10 U	11 U
2-Methylnaphthalene	ug/L	11 U		10 U	11 U		10 U	11 U
Hexachlorocyclopentadiene	ug/L	11 U		10 U	11 U		10 U	11 U
2,4,6-Trichlorophenol	ug/L	11 U		10 U	11 U		10 U	11 U
2,4,5-Trichlorophenol	ug/L	55 U		25 U	56 U		25 U	54 U
2-Chloronaphthalene	ug/L	11 U		10 U	11 U		10 U	11 U
2-Nitroaniline	ug/L	55 U		25 U	56 U		25 U	54 U
Dimethylphthalate	ug/L	11 U		10 U	11 U		10 U	11 U
Acenaphthylene	ug/L	11 U		10 U	11 U		10 U	11 U
2,6-Dinitrotoluene	ug/L	11 U		10 U	11 U		10 U	11 U
3-Nitroaniline	ug/L	55 U		25 U	56 U		25 U	54 U
Acenaphthene	ug/L	11 U		10 U	11 U		10 U	11 U
2,4-Dinitrophenol	ug/L	55 U		25 U	56 U		25 U	54 U
4-Nitrophenol	ug/L	55 U		25 U	56 U		25 U	54 U
Dibenzofuran	ug/L	11 U		10 U	11 U		10 U	11 U
2,4-Dinitrotoluene	ug/L	11 U		10 U	11 U		10 U	11 U
Diethylphthalate	ug/L	11 U		10 U	11 U		10 U	11 U
4-Chlorophenyl-phenylether	ug/L	11 U		10 U	11 U		10 U	11 U
Fluorene	ug/L	11 U		10 U	11 U		10 U	11 U
4-Nitroaniline	ug/L	55 U		25 U	56 U		25 U	54 U
4,6-Dinitro-2-methylphenol	ug/L	55 U		25 U	56 U		25 U	54 U
N-Nitrosodiphenylamine	ug/L	11 U		10 U	11 U		10 U	11 U
4-Bromophenyl-phenylether	ug/L	11 U		10 U	11 U		10 U	11 U
Hexachlorobenzene	ug/L	11 U		10 U	11 U		10 U	11 U
Pentachlorophenol	ug/L	55 U		25 U	56 U		25 U	54 U
Phenanthrene	ug/L	11 U		10 U	11 U		10 U	11 U
Anthracene	ug/L	11 U		10 U	11 U		10 U	11 U
Carbazole	ug/L			10 U			10 U	
Di-n-butylphthalate	ug/L	11 U		0.5 J	11 U		10 U	11 U
Fluoranthene	ug/L	11 U		10 U	11 U		10 U	11 U
Pyrene	ug/L	11 U		10 U	11 U		10 U	11 U
Butylbenzylphthalate	ug/L	11 U		10 U	11 U		10 U	11 U
3,3'-Dichlorobenzidine	ug/L	22 U		10 U	22 U		10 U	22 U
Benzo(a)anthracene	ug/L	11 U		10 U	11 U		10 U	11 U
Chrysene	ug/L	11 U		10 U	11 U		10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	11 U		28 U	11 U		10 U	11 U
Di-n-octylphthalate	ug/L	11 U		0.9 J	11 U		10 U	11 U
Benzo(b)fluoranthene	ug/L	11 U		10 U	11 U		10 U	11 U
Benzo(k)fluoranthene	ug/L	11 U		10 U	11 U		10 U	11 U
Benzo(a)pyrene	ug/L	11 U		10 U	11 U		10 U	11 U
Indeno(1,2,3-cd)pyrene	ug/L	11 U		10 U	11 U		10 U	11 U
Dibenz(a,h)anthracene	ug/L	11 U		10 U	11 U		10 U	11 U
Benzo(g,h,i)perylene	ug/L	11 U		10 U	11 U		10 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER MW-14A	WATER MW-14	WATER OB	WATER MW-15	WATER MW-15	WATER OB	WATER MW-16
	DATE	01/15/92	01/15/92	03/10/93	01/09/92	01/09/92	03/02/93	01/14/92
	ES ID	MW-14A	MW-14A Filtered	MW-14	MW-15	MW-15 Filtered	MW-15	MW-16
	LAB ID	152583	152600	179873	152141	152171	179507	152489
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
beta-BHC	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
delta-BHC	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
gamma-BHC (Lindane)	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
Heptachlor	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
Aldrin	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
Heptachlor epoxide	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
Endosulfan I	ug/L	0.052 U	0.054 U	0.06 U	0.05 U	0.056 U		
Dieldrin	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
4,4'-DDE	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
Endrin	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
Endosulfan II	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
4,4'-DDD	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
Endosulfan sulfate	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
4,4'-DDT	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
Methoxychlor	ug/L	0.52 U	0.54 U	0.6 U	0.5 U	0.56 U		
Endrin ketone	ug/L	0.1 U	0.11 U	0.12 U	0.1 U	0.11 U		
Endrin aldehyde	ug/L		0.11 U		0.1 U			
alpha-Chlordane	ug/L	0.52 U	0.054 U	0.6 U	0.05 U	0.56 U		
gamma-Chlordane	ug/L	0.52 U	0.054 U	0.6 U	0.05 U	0.56 U		
Toxaphene	ug/L	1 U	5.4 U	1.2 U	5 U	1.1 U		
Aroclor-1016	ug/L	0.52 U	1.1 U	0.6 U	1 U	0.56 U		
Aroclor-1221	ug/L	0.52 U	2.1 U	0.6 U	2 U	0.56 U		
Aroclor-1232	ug/L	0.52 U	1.1 U	0.6 U	1 U	0.56 U		
Aroclor-1242	ug/L	0.52 U	1.1 U	0.6 U	1 U	0.56 U		
Aroclor-1248	ug/L	0.52 U	1.1 U	0.6 U	1 U	0.56 U		
Aroclor-1254	ug/L	1 U	1.1 U	1.2 U	1 U	1.1 U		
Aroclor-1260	ug/L	1 U	1.1 U	1.2 U	1 U	1.1 U		
Explosives								
HMX	ug/L	1 U	0.12 U	1 U	0.12 U	1 U		
RDX	ug/L	0.12 U	0.12 U	0.082 J	0.12 U	0.12 U		
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
Tetryl	ug/L	0.4 U	0.12 U	0.4 U	0.12 U	0.4 U		
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	UNITS	MATRIX	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER
		LOCATION	MW-14A	MW-14	OB	MW-15	MW-15	OB	MW-16
		DATE	01/15/92	01/15/92	03/10/93	01/09/92	01/09/92	03/02/93	01/14/92
		ES ID	MW-14A	MW-14A Filtered	MW-14	MW-15	MW-15 Filtered	MW-15	MW-16
		LAB ID	152583	152600	179873	152141	152171	179507	152489
Metals									
Aluminum	ug/l		32000 J	97.5 U	5590 J	30700	24.4 U	4440	6170 J
Antimony	ug/l		52.9 U	53 U	53.9 U	55.5 U	52.9 U	53.8 U	53 U
Arsenic	ug/l		4.9 J	3.5 U	1.7 U	6.2 J	3.5 U	1.7 U	3.5 U
Barium	ug/l		768	51.8 J	93.2 J	481	39.7 R	145 J	86.9 J
Beryllium	ug/l		1.4 R	1.2 U	0.91 J	2.5 R	1.1 U R	0.3 U	1.1 U
Cadmium	ug/l		5.7 R	3 U	3.1 U	3.4 J	3 U	3.1 U	3 U
Calcium	ug/l		189000	175000	169000	293000	248000	241000	126000
Chromium	ug/l		46.1	6.2 U	5.6 J	50 R	7.7 R	5.9 J	7.9 J
Cobalt	ug/l		32.3 J	19.8 U	5 U	28.6 J	20.3 U	5 U	20.3 U
Copper	ug/l		61.6	15.2 J	12.7 J	67.4	10.1 U	10.8 J	10.1 U
Iron	ug/l		50500 J	17 U	7380 J	49600	6.9 U R	5880	7930 J
Lead	ug/l		63.5	1.2 U	85.6	123	1.2 U	10.5	9.1
Magnesium	ug/l		44200 J	32800	36200	54900	47900	48900	26900
Manganese	ug/l		807	3.2 U	87.1	564 J	19.9	66.2	146
Mercury	ug/l		0.25 R	0.05 J	0.12 R	0.25 R	0.15 R	0.06 U	0.15 R
Nickel	ug/l		85.5	15.9 U	9.1 J	71.8	14.7 U	10.3 J	14.7 U
Potassium	ug/l		7430	889 J	2930 J	7100	1450 J	2060 J	2890 J
Selenium	ug/l		4.2 J	1 U	2.3 J	1.5 J	1.7 J	1.1 U	4.8 J
Silver	ug/l		4.9 R	9 U	3.2 U	9 U	3.4 U	3.2 U	5.3 R
Sodium	ug/l		38400	40700	35900	31600	30700	23700	9920
Thallium	ug/l		3.2 U	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U	3.2 U
Vanadium	ug/l		51.4	30.4 U	7.8 J	34.1 J	9.4 U	6.9 J	10.7 J
Zinc	ug/l		154	13.4 U	39.1	169	10.3 J	38.3	41.4 R
Cyanide	ug/l		10 U		10 U	10 U J		10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-16	MW-16A	MW-16	OB	MW-17	MW-17	OB
	ES ID	01/14/92	01/14/92	01/14/92	03/10/93	01/17/92	01/17/92	03/09/93
	LAB ID	MW-16 Filtered	MW-16A	MW-16A Filtered	MW-16	MW-17	MW-17 Filtered	MW-17
	UNITS	152497	152490	152498	179874	152681	152701	179812
Volatile Organic Compounds								
Chloromethane	ug/L		10 U		0.5 U	10 U		0.5 U
Bromomethane	ug/L		10 U		0.5 U	10 U		0.5 U
Vinyl Chloride	ug/L		10 U		0.5 U	10 U		0.5 U
Chloroethane	ug/L		10 U		0.5 U	10 U		0.5 U
Methylene Chloride	ug/L		5 U		0.5 U	5 U		0.5 U
Acetone	ug/L		10 U		5 U	10 U		5 U
Carbon Disulfide	ug/L		5 U		0.5 U	5 U		0.5 U
1,1-Dichloroethene	ug/L		5 U		0.5 U	5 U		0.5 U
1,1-Dichloroethane	ug/L		5 U		0.5 U	5 U		0.5 U
trans-1,2-Dichloroethene	ug/L				0.5 U			0.5 U
cis-1,2-Dichloroethene	ug/L				0.5 U			0.5 U
1,2-Dichloroethene (total)	ug/L		5 U			5 U		
Chloroform	ug/L		5 U		0.5 U	5 U		0.5 U
1,2-Dichloroethane	ug/L		5 U		0.5 U	5 U		0.5 U
2-Butanone	ug/L		10 U		5 U	10 U		5 U
1,1,1-Trichloroethane	ug/L		5 U		0.5 U	5 U		0.5 U
Carbon Tetrachloride	ug/L		5 U		0.5 U	5 U		0.5 U
Vinyl Acetate	ug/L		10 U			10 U		
Bromodichloromethane	ug/L		5 U		0.5 U	5 U		0.5 U
1,2-Dichloropropane	ug/L		5 U		0.5 U	5 U		0.5 U
cis-1,3-Dichloropropene	ug/L		5 U		0.5 U	5 U		0.5 U
Trichloroethene	ug/L		5 U		0.5 U	5 U		0.5 U
Dibromochloromethane	ug/L		5 U		0.5 U	5 U		0.5 U
1,1,2-Trichloroethane	ug/L		5 U		0.5 U	5 U		0.5 U
Benzene	ug/L		5 U		0.5 U	5 U		0.5 U
trans-1,3-Dichloropropene	ug/L		5 U		0.5 U	5 U		0.5 U
Bromoform	ug/L		5 U		0.5 U	5 U		0.5 U
4-Methyl-2-Pentanone	ug/L		10 U		5 U	10 U		5 U
2-Hexanone	ug/L		10 U		5 U	10 U		5 U
Tetrachloroethene	ug/L		5 U		0.5 U	5 U		0.5 U
1,1,2,2-Tetrachloroethane	ug/L		5 U		0.5 U	5 U		0.5 U
Toluene	ug/L		5 U		0.5 U	5 U		0.5 U
Chlorobenzene	ug/L		5 U		0.5 U	5 U		0.5 U
Ethylbenzene	ug/L		5 U		0.5 U	5 U		0.5 U
Styrene	ug/L		5 U		0.5 U	5 U		0.5 U
Xylene (total)	ug/L		5 U		0.5 U	5 U		0.5 U
Dichlorodifluoromethane	ug/L				0.5 U			0.5 U
Trichlorofluoromethane	ug/L				0.5 U			0.5 U
2,2-Dichloropropane	ug/L				0.5 U			0.5 U
Bromochloromethane	ug/L				0.5 U			0.5 U
1,1-Dichloropropene	ug/L				0.5 U			0.5 U
Dibromomethane	ug/L				0.5 U			0.5 U
1,3-Dichloropropane	ug/L				0.5 U			0.5 U
1,2-Dibromoethane	ug/L				0.5 U			0.5 U
1,1,1,2-Tetrachloroethane	ug/L				0.5 U			0.5 U
Isopropylbenzene	ug/L				0.5 U			0.5 U
Bromobenzene	ug/L				0.5 U			0.5 U
1,2,3-Trichloropropane	ug/L				0.5 U			0.5 U
n-Propylbenzene	ug/L				0.5 U			0.5 U
2-Chlorotoluene	ug/L				0.5 U			0.5 U
4-Chlorotoluene	ug/L				0.5 U			0.5 U
1,3,5-Trimethylbenzene	ug/L				0.5 U			0.5 U
tert-Butylbenzene	ug/L				0.5 U			0.5 U
1,2,4-Trimethylbenzene	ug/L				0.5 U			0.5 U
sec-Butylbenzene	ug/L				0.5 U			0.5 U
1,3-Dichlorobenzene	ug/L				0.5 U			0.5 U
1,4-Dichlorobenzene	ug/L				0.5 U			0.5 U
p-Isopropyltoluene	ug/L				0.5 U			0.5 U
1,2-Dichlorobenzene	ug/L				0.5 U			0.5 U
n-Butylbenzene	ug/L				0.5 U			0.5 U
1,2-Dibromo-3-Chloropropane	ug/L				0.5 U			0.5 U
1,2,4-Trichlorobenzene	ug/L				0.5 U			0.5 U
Hexachlorobutadiene	ug/L				0.5 U			0.5 U
Naphthalene	ug/L				0.5 U			0.5 U
1,2,3-Trichlorobenzene	ug/L				0.5 U			0.5 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

		PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II
	MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	LOCATION	MW-16	MW-16A	MW-16	OB	MW-17	MW-17	OB
	DATE	01/14/92	01/14/92	01/14/92	03/10/93	01/17/92	01/17/92	03/09/93
	ES ID	MW-16 Filtered	MW-16A	MW-16A Filtered	MW-16	MW-17	MW-17 Filtered	MW-17
	LAB ID	152497	152490	152498	179874	152681	152701	179812
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/L		11 U		10 U	11 U		10 U
bis(2-Chloroethyl) ether	ug/L		11 U		10 U	11 U		10 U
2-Chlorophenol	ug/L		11 U		10 U	11 U		10 U
1,3-Dichlorobenzene	ug/L		11 U		10 U	11 U		10 U
1,4-Dichlorobenzene	ug/L		11 U		10 U	11 U		10 U
Benzyl Alcohol	ug/L		11 U			11 U		
1,2-Dichlorobenzene	ug/L		11 U		10 U	11 U		10 U
2-Methylphenol	ug/L		11 U		10 U	11 U		10 U
2,2'-oxybis(1-Chloropropane)	ug/L		11 U		10 U	11 U		10 U
4-Methylphenol	ug/L		11 U		10 U	11 U		10 U
N-Nitroso-di-n-propylamine	ug/L		11 U		10 U	11 U		10 U
Hexachloroethane	ug/L		11 U		10 U	11 U		10 U
Nitrobenzene	ug/L		11 U		10 U	11 U		10 U
Isophorone	ug/L		11 U		10 U	11 U		10 U
2-Nitrophenol	ug/L		11 U		10 U	11 U		10 U
2,4-Dimethylphenol	ug/L		11 U		10 U	11 U		10 U
Benzoic acid	ug/L		54 U			53 U		
bis(2-Chloroethoxy) methane	ug/L		11 U		10 U	11 U		10 U
2,4-Dichlorophenol	ug/L		11 U		10 U	11 U		10 U
1,2,4-Trichlorobenzene	ug/L		11 U		10 U	11 U		10 U
Naphthalene	ug/L		11 U		10 U	11 U		10 U
4-Chloroaniline	ug/L		11 U		10 U	11 U		10 U
Hexachlorobutadiene	ug/L		11 U		10 U	11 U		10 U
4-Chloro-3-methylphenol	ug/L		11 U		10 U	11 U		10 U
2-Methylnaphthalene	ug/L		11 U		10 U	11 U		10 U
Hexachlorocyclopentadiene	ug/L		11 U		10 U	11 U		10 U
2,4,6-Trichlorophenol	ug/L		11 U		10 U	11 U		10 U
2,4,5-Trichlorophenol	ug/L		54 U		25 U	53 U		25 U
2-Chloronaphthalene	ug/L		11 U		10 U	11 U		10 U
2-Nitroaniline	ug/L		54 U		25 U	53 U		25 U
Dimethylphthalate	ug/L		11 U		10 U	11 U		10 U
Acenaphthylene	ug/L		11 U		10 U	11 U		10 U
2,6-Dinitrotoluene	ug/L		11 U		10 U	11 U		10 U
3-Nitroaniline	ug/L		54 U		25 U	53 U		25 U
Acenaphthene	ug/L		11 U		10 U	11 U		10 U
2,4-Dinitrophenol	ug/L		54 U		25 U	53 U		25 U
4-Nitrophenol	ug/L		54 U		25 U	53 U		25 U
Dibenzofuran	ug/L		11 U		10 U	11 U		10 U
2,4-Dinitrotoluene	ug/L		11 U		10 U	11 U		10 U
Diethylphthalate	ug/L		11 U		10 U	11 U		1 J
4-Chlorophenyl-phenylether	ug/L		11 U		10 U	11 U		10 U
Fluorene	ug/L		11 U		10 U	11 U		10 U
4-Nitroaniline	ug/L		54 U		25 U	53 U		25 U
4,6-Dinitro-2-methylphenol	ug/L		54 U		25 U	53 U		25 U
N-Nitrosodiphenylamine	ug/L		11 U		10 U	11 U		10 U
4-Bromophenyl-phenylether	ug/L		11 U		10 U	11 U		10 U
Hexachlorobenzene	ug/L		11 U		10 U	11 U		10 U
Pentachlorophenol	ug/L		54 U		25 U	53 U		25 U
Phenanthrene	ug/L		11 U		10 U	11 U		10 U
Anthracene	ug/L		11 U		10 U	11 U		10 U
Carbazole	ug/L				10 U			10 U
Di-n-butylphthalate	ug/L		11 U		10 U	11 U		10 U
Fluoranthene	ug/L		11 U		10 U	11 U		10 U
Pyrene	ug/L		11 U		10 U	11 U		10 U
Butylbenzylphthalate	ug/L		11 U		10 U	11 U		10 U
3,3'-Dichlorobenzidine	ug/L		22 U		10 U	21 U		10 U
Benzo(a)anthracene	ug/L		11 U		10 U	11 U		10 U
Chrysene	ug/L		11 U		10 U	11 U		10 U
bis(2-Ethylhexyl)phthalate	ug/L		11 U		22 U	11 U		21 U
Di-n-octylphthalate	ug/L		11 U		10 U	11 U		10 U
Benzo(b)fluoranthene	ug/L		11 U		10 U	11 U		10 U
Benzo(k)fluoranthene	ug/L		11 U		10 U	11 U		10 U
Benzo(a)pyrene	ug/L		11 U		10 U	11 U		10 U
Indeno(1,2,3-cd)pyrene	ug/L		11 U		10 U	11 U		10 U
Dibenz(a,h)anthracene	ug/L		11 U		10 U	11 U		10 U
Benzo(g,h,i)perylene	ug/L		11 U		10 U	11 U		10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE I	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-16	MW-16A	MW-16	OB	MW-17	MW-17	OB
	ES ID	01/14/92	01/14/92	01/14/92	03/10/93	01/17/92	01/17/92	03/09/93
	LAB ID	MW-16 Filtered	MW-16A	MW-16A Filtered	MW-16	MW-17	MW-17 Filtered	MW-17
COMPOUND	UNITS	152497	152490	152498	179874	152681	152701	179812
Pesticides/PCBs								
alpha-BHC	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
beta-BHC	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
delta-BHC	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
gamma-BHC (Lindane)	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
Heptachlor	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
Aldrin	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
Heptachlor epoxide	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
Endosulfan I	ug/L	0.057 U		0.051 U		0.052 U		0.056 U
Dieldrin	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
4,4'-DDE	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
Endrin	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
Endosulfan II	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
4,4'-DDD	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
Endosulfan sulfate	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
4,4'-DDT	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
Methoxychlor	ug/L	0.57 U		0.51 U		0.52 U		0.56 U
Endrin ketone	ug/L	0.11 U		0.1 U		0.1 U		0.11 U
Endrin aldehyde	ug/L			0.1 U				0.11 U
alpha-Chlordane	ug/L	0.57 U		0.051 U		0.52 U		0.056 U
gamma-Chlordane	ug/L	0.57 U		0.051 U		0.52 U		0.056 U
Toxaphene	ug/L	1.1 U		5.1 U		1 U		5.6 U
Aroclor-1016	ug/L	0.57 U		1 U		0.52 U		1.1 U
Aroclor-1221	ug/L	0.57 U		2 U		0.52 U		2.3 U
Aroclor-1232	ug/L	0.57 U		1 U		0.52 U		1.1 U
Aroclor-1242	ug/L	0.57 U		1 U		0.52 U		1.1 U
Aroclor-1248	ug/L	0.57 U		1 U		0.52 U		1.1 U
Aroclor-1254	ug/L	1.1 U		1 U		1 U		1.1 U
Aroclor-1260	ug/L	1.1 U		1 U		1 U		1.1 U
Explosives								
HMX	ug/L	1 U		0.12 U		1 U		0.12 U
RDX	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
Tetryl	ug/L	0.4 U		0.12 U		0.4 U		0.12 U
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U		0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER
	LOCATION	MW-16	MW-16A	MW-16	OB	MW-17	MW-17	OB
	DATE	01/14/92	01/14/92	01/14/92	03/10/93	01/17/92	01/17/92	03/09/93
	ES ID	MW-16 Filtered	MW-16A	MW-16A Filtered	MW-16	MW-17	MW-17 Filtered	MW-17
	LAB ID	152497	152490	152498	179874	152681	152701	179812
	UNITS							
Metals								
Aluminum	ug/l	24.5 U	5960 J	24.5 U	930 J	28200	97.3 U	5000
Antimony	ug/l	53.2 U	53.1 U	53.3 U	54 U	65.7	52.9 U	54 U
Arsenic	ug/l	3.5 U	3.5 U	3.5 U	1.7 U	3.5 U	3.5 U	1.7 U
Barium	ug/l	33.9 R	87.5 J	32.4 R	34.4 J	355	78 J	104 J
Beryllium	ug/l	1.4 R	1.1 U	1.5 R	0.3 U	2.8 R	1.2 U	0.37 J
Cadmium	ug/l	3 U	3 U	3 U	3.1 U	3.6 J	3 U	3.1 U
Calcium	ug/l	129000	123000	122000	132000	126000	103000	79500
Chromium	ug/l	6.2 U R	7.8 J	6.2 U R	3.2 J	40.7	6.1 U	7.9 J
Cobalt	ug/l	20.4 U	20.4 U	20.5 U	5 U	37.2 J	19.8 U	5 U
Copper	ug/l	10.2 U	10.1 U	10.2 U	2.7 J	66.9	16.2 J	7.6 R
Iron	ug/l	7 U R	8130 J	7 U R	1290 J	42200	16.9 U	5640
Lead	ug/l	1.2 U	11.3	1.2 U	1.6 J	42.5	1.2 U	5.3
Magnesium	ug/l	23200	26900	22700	24900	25400	14900	13600
Manganese	ug/l	9.5 J	146	8.3 J	31.1	2240	3.2 U	198
Mercury	ug/l	0.2 R	0.15 R	0.3 R	0.08 R	0.03 U	0.04 J	0.06 U
Nickel	ug/l	14.8 U	19.7 J	14.8 U	4.8 J	109	15.8 U	13.1 J
Potassium	ug/l	970 J	2530 J	883 J	1270 J	6360	629 U	1410 J
Selenium	ug/l	4.2 J	4.6 J	4.8 J	1.4 J	0.99 U	1.3 J	1.1 U
Silver	ug/l	3.4 U	4.4 R	3.4 U	3.2 U	3.4 U	9 U	3.2 U
Sodium	ug/l	10400	9830	10500	4830 J	7840	6450	3720 J
Thallium	ug/l	3.2 U	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U
Vanadium	ug/l	9.5 U	11 J	9.5 U	3.1 J	37.3 J	30.3 U	8.9 J
Zinc	ug/l	8.5 U	39.8 R	8.5 U	14.3 R	154	13.4 U	53.1
Cyanide	ug/l		10 U		10 U	10 U		10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-18 01/13/92 MW-18 152393	PHASE I WATER MW-18 01/13/92 MW-18 Filtered 152412	PHASE I WATER MW-18A 01/13/92 MW-18A 152394	PHASE I WATER MW-18 01/13/92 MW-18A Filtered 152413	PHASE II WATER OB 03/09/93 MW-18 179813	PHASE II WATER OB 03/09/93 MW-18D 179814 DUP MW-18	PHASE I WATER MW-19 01/16/92 MW 19 152630
Volatile Organic Compounds								
Chloromethane	ug/L	10 U		10 U		0.5 U	0.5 U	10 U
Bromomethane	ug/L	10 U		10 U		0.5 U	0.5 U	10 U
Vinyl Chloride	ug/L	10 U		10 U		0.5 U	0.5 U	10 U
Chloroethane	ug/L	10 U		10 U		0.5 U	0.5 U	10 U
Methylene Chloride	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Acetone	ug/L	10 U		10 U		5 U	5 U	10 U
Carbon Disulfide	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,1-Dichloroethene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,1-Dichloroethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
trans-1,2-Dichloroethene	ug/L					0.5 U	0.5 U	
cis-1,2-Dichloroethene	ug/L					0.5 U	0.5 U	
1,2-Dichloroethene (total)	ug/L	5 U		5 U				5 U
Chloroform	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,2-Dichloroethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
2-Butanone	ug/L	10 U		10 U		5 U	5 U	10 U
1,1,1-Trichloroethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Carbon Tetrachloride	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Vinyl Acetate	ug/L	10 U		10 U				10 U
Bromodichloromethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,2-Dichloropropane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Trichloroethene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Dibromochloromethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,1,2-Trichloroethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Benzene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Bromoform	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
4-Methyl-2-Pentanone	ug/L	10 U		10 U		5 U	5 U	10 U
2-Hexanone	ug/L	10 U		10 U		5 U	5 U	10 U
Tetrachloroethene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Toluene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Chlorobenzene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Ethylbenzene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Styrene	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Xylene (total)	ug/L	5 U		5 U		0.5 U	0.5 U	5 U
Dichlorodifluoromethane	ug/L					0.5 U	0.5 U	
Trichlorofluoromethane	ug/L					0.5 U	0.5 U	
2,2-Dichloropropane	ug/L					0.5 U	0.5 U	
Bromochloromethane	ug/L					0.5 U	0.5 U	
1,1-Dichloropropene	ug/L					0.5 U	0.5 U	
Dibromomethane	ug/L					0.5 U	0.5 U	
1,3-Dichloropropane	ug/L					0.5 U	0.5 U	
1,2-Dibromoethane	ug/L					0.5 U	0.5 U	
1,1,1,2-Tetrachloroethane	ug/L					0.5 U	0.5 U	
Isopropylbenzene	ug/L					0.5 U	0.5 U	
Bromobenzene	ug/L					0.5 U	0.5 U	
1,2,3-Trichloropropane	ug/L					0.5 U	0.5 U	
n-Propylbenzene	ug/L					0.5 U	0.5 U	
2-Chlorotoluene	ug/L					0.5 U	0.5 U	
4-Chlorotoluene	ug/L					0.5 U	0.5 U	
1,3,5-Trimethylbenzene	ug/L					0.5 U	0.5 U	
tert-Butylbenzene	ug/L					0.5 U	0.5 U	
1,2,4-Trimethylbenzene	ug/L					0.5 U	0.5 U	
sec-Butylbenzene	ug/L					0.5 U	0.5 U	
1,3-Dichlorobenzene	ug/L					0.5 U	0.5 U	
1,4-Dichlorobenzene	ug/L					0.5 U	0.5 U	
p-Isopropyltoluene	ug/L					0.5 U	0.5 U	
1,2-Dichlorobenzene	ug/L					0.5 U	0.5 U	
n-Butylbenzene	ug/L					0.5 U	0.5 U	
1,2-Dibromo-3-Chloropropane	ug/L					0.5 U	0.5 U	
1,2,4-Trichlorobenzene	ug/L					0.5 U	0.5 U	
Hexachlorobutadiene	ug/L					0.5 U	0.5 U	
Naphthalene	ug/L					0.5 U	0.5 U	
1,2,3-Trichlorobenzene	ug/L					0.5 U	0.5 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-18 01/13/92 MW-18 152393	PHASE I WATER MW-18 01/13/92 MW-18 Filtered 152412	PHASE I WATER MW-18A 01/13/92 MW-18A 152394	PHASE I WATER MW-18 01/13/92 MW-18A Filtered 152413	PHASE II WATER OB 03/09/93 MW-18 179813	PHASE II WATER OB 03/09/93 MW-18D 179814 DUP MW-18	PHASE I WATER MW-19 01/16/92 MW 19 152630
Semivolatiles								
Phenol	ug/L	10 U		10 U		10 U	10 U	11 U
bis(2-Chloroethyl) ether	ug/L	10 U		10 U		10 U	10 U	11 U
2-Chlorophenol	ug/L	10 U		10 U		10 U	10 U	11 U
1,3-Dichlorobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
1,4-Dichlorobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
Benzyl Alcohol	ug/L	10 U		10 U				11 U
1,2-Dichlorobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
2-Methylphenol	ug/L	10 U		10 U		10 U	10 U	11 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U		10 U		10 U	10 U	11 U
4-Methylphenol	ug/L	10 U		10 U		10 U	10 U	11 U
N-Nitroso-di-n-propylamine	ug/L	10 U		10 U		10 U	10 U	11 U
Hexachloroethane	ug/L	10 U		10 U		10 U	10 U	11 U
Nitrobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
Isophorone	ug/L	10 U		10 U		10 U	10 U	11 U
2-Nitrophenol	ug/L	10 U		10 U		10 U	10 U	11 U
2,4-Dimethylphenol	ug/L	10 U		10 U		10 U	10 U	11 U
Benzoic acid	ug/L	51 U		51 U				55 U
bis(2-Chloroethoxy) methane	ug/L	10 U		10 U		10 U	10 U	11 U
2,4-Dichlorophenol	ug/L	10 U		10 U		10 U	10 U	11 U
1,2,4-Trichlorobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
Naphthalene	ug/L	10 U		10 U		10 U	10 U	11 U
4-Chloroaniline	ug/L	10 U		10 U		10 U	10 U	11 U
Hexachlorobutadiene	ug/L	10 U		10 U		10 U	10 U	11 U
4-Chloro-3-methylphenol	ug/L	10 U		10 U		10 U	10 U	11 U
2-Methylnaphthalene	ug/L	10 U		10 U		10 U	10 U	11 U
Hexachlorocyclopentadiene	ug/L	10 U		10 U		10 U	10 U	11 U
2,4,6-Trichlorophenol	ug/L	10 U		10 U		10 U	10 U	11 U
2,4,5-Trichlorophenol	ug/L	51 U		51 U		25 U	25 U	55 U
2-Chloronaphthalene	ug/L	10 U		10 U		10 U	10 U	11 U
2-Nitroaniline	ug/L	51 U		51 U		25 U	25 U	55 U
Dimethylphthalate	ug/L	10 U		10 U		10 U	10 U	11 U
Acenaphthylene	ug/L	10 U		10 U		10 U	10 U	11 U
2,6-Dinitrotoluene	ug/L	10 U		10 U		10 U	10 U	11 U
3-Nitroaniline	ug/L	51 U		51 U		25 U	25 U	55 U
Acenaphthene	ug/L	10 U		10 U		10 U	10 U	11 U
2,4-Dinitrophenol	ug/L	51 U		51 U		25 U	25 U	55 U
4-Nitrophenol	ug/L	51 U		51 U		25 U	25 U	55 U
Dibenzofuran	ug/L	10 U		10 U		10 U	10 U	11 U
2,4-Dinitrotoluene	ug/L	10 U		10 U		10 U	10 U	11 U
Diethylphthalate	ug/L	10 U		10 U		10 U	10 U	11 U
4-Chlorophenyl-phenylether	ug/L	10 U		10 U		10 U	10 U	11 U
Fluorene	ug/L	10 U		10 U		10 U	10 U	11 U
4-Nitroaniline	ug/L	51 U		51 U		25 U	25 U	55 U
4,6-Dinitro-2-methylphenol	ug/L	51 U		51 U		25 U	25 U	55 U
N-Nitrosodiphenylamine	ug/L	10 U		10 U		10 U	10 U	11 U
4-Bromophenyl-phenylether	ug/L	10 U		10 U		10 U	10 U	11 U
Hexachlorobenzene	ug/L	10 U		10 U		10 U	10 U	11 U
Pentachlorophenol	ug/L	51 U		51 U		25 U	25 U	55 U
Phenanthrene	ug/L	10 U		10 U		10 U	10 U	11 U
Anthracene	ug/L	10 U		10 U		10 U	10 U	11 U
Carbazole	ug/L					10 U	10 U	
Di-n-butylphthalate	ug/L	10 U		10 U		2 J	10 U	11 U
Fluoranthene	ug/L	10 U		10 U		10 U	10 U	11 U
Pyrene	ug/L	10 U		10 U		10 U	10 U	11 U
Butylbenzylphthalate	ug/L	10 U		10 U		10 U	10 U	11 U
3,3'-Dichlorobenzidine	ug/L	21 U		21 U		10 U	10 U	22 U
Benzo(a)anthracene	ug/L	10 U		10 U		10 U	10 U	11 U
Chrysene	ug/L	10 U		10 U		10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U		10 U		20 U	10 U	11 U
Di-n-octylphthalate	ug/L	10 U		10 U		10 U	10 U	11 U
Benzo(b)fluoranthene	ug/L	10 U		10 U		10 U	10 U	11 U
Benzo(k)fluoranthene	ug/L	10 U		10 U		10 U	10 U	11 U
Benzo(a)pyrene	ug/L	10 U		10 U		10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U		10 U		10 U	10 U	11 U
Dibenz(a,h)anthracene	ug/L	10 U		10 U		10 U	10 U	11 U
Benzo(g,h,i)perylene	ug/L	10 U		10 U		10 U	10 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-18 01/13/92 MW-18 152393	PHASE I WATER MW-18 01/13/92 MW-18 Filtered 152412	PHASE I WATER MW-18A 01/13/92 MW-18A 152394	PHASE I WATER MW-18 01/13/92 MW-18A Filtered 152413	PHASE II WATER OB 03/09/93 MW-18 179813	PHASE II WATER OB 03/09/93 MW-18D 179814 DUP MW-18	PHASE I WATER MW-19 01/16/92 MW 19 152630
Pesticides/PCBs								
alpha-BHC	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
beta-BHC	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
delta-BHC	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
gamma-BHC (Lindane)	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
Heptachlor	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
Aldrin	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
Heptachlor epoxide	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
Endosulfan I	ug/L	0.051 U		0.052 U		0.056 U	0.054 U	0.056 U
Dieldrin	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
4,4'-DDE	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
Endrin	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
Endosulfan II	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
4,4'-DDD	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
Endosulfan sulfate	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
4,4'-DDT	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
Methoxychlor	ug/L	0.51 U		0.52 U		0.56 U	0.54 U	0.56 U
Endrin ketone	ug/L	0.1 U		0.1 U		0.11 U	0.11 U	0.11 U
Endrin aldehyde	ug/L					0.11 U	0.11 U	
alpha-Chlordane	ug/L	0.51 U		0.52 U		0.056 U	0.054 U	0.56 U
gamma-Chlordane	ug/L	0.51 U		0.52 U		0.056 U	0.054 U	0.56 U
Toxaphene	ug/L	1 U		1 U		5.6 U	5.4 U	1.1 U
Aroclor-1016	ug/L	0.51 U		0.52 U		1.1 U	1.1 U	0.56 U
Aroclor-1221	ug/L	0.51 U		0.52 U		2.3 U	2.2 U	0.56 U
Aroclor-1232	ug/L	0.51 U		0.52 U		1.1 U	1.1 U	0.56 U
Aroclor-1242	ug/L	0.51 U		0.52 U		1.1 U	1.1 U	0.56 U
Aroclor-1248	ug/L	0.51 U		0.52 U		1.1 U	1.1 U	0.56 U
Aroclor-1254	ug/L	1 U		1 U		1.1 U	1.1 U	1.1 U
Aroclor-1260	ug/L	1 U		1 U		1.1 U	1.1 U	1.1 U
Explosives								
HMX	ug/L	1 U		1 U		0.12 U	0.12 U	1 U
RDX	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
Tetryl	ug/L	0.4 U		0.4 U		0.12 U	0.12 U	0.4 U
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U		0.12 U	0.12 U	0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE II WATER	PHASE I WATER
	LOCATION	MW-18	MW-18	MW-18A	MW-18	OB	OB	MW-19
	DATE	01/13/92	01/13/92	01/13/92	01/13/92	03/09/93	03/09/93	01/16/92
	ES ID	MW-18	MW-18 Filtered	MW-18A	MW-18A Filtered	MW-18	MW-18D	MW 19
	LAB ID	152393	152412	152394	152413	179813	179814	152630
	UNITS						DUP MW-18	
Metals								
Aluminum	ug/l	9100 J	24.4 U	8660 J	24.6 U	1400	1210	243000
Antimony	ug/l	56.8 J	52.9 U	55.8 U	61.3	53.9 U	53.7 U	52.9 U
Arsenic	ug/l	3.5 U	3.5 U	3.5 U	3.5 U	1.7 U	1.7 U	4.1 J
Barium	ug/l	195 J	15.9 R	182 J	14.6 R	39.9 J	36.5 J	2230
Beryllium	ug/l	2 R	1.1 U R	2.1 R	1.1 U R	0.3 U	0.3 U	12.8 R
Cadmium	ug/l	2.9 U	3 U	2.9 U	3 U	3.1 U	3.1 U	51.9
Calcium	ug/l	143000	131000	140000	130000	107000	113000	1780000
Chromium	ug/l	11.8 R	6.1 U R	10.9 R	8 R	2 U	2 U	408
Cobalt	ug/l	19.9 U	20.3 U	19.9 U	20.5 U	5 U	5 U	208
Copper	ug/l	14.4 U	10.1 U	14.4 U	10.2 U	2.7 R	4.1 R	525
Iron	ug/l	13000 J	6.9 U R	11700 J	7 U R	1550	1110	469000 J
Lead	ug/l	11.4	1.2 U	10.6	1.2 U	1.5 J	1 J	141
Magnesium	ug/l	27000	24500	26500	24500	21200	22200	227000
Manganese	ug/l	289 J	110	271 J	108	155	148	6980
Mercury	ug/l	0.16 R	0.16 R	0.16 R	0.17 R	0.06 U	0.06 U	0.49 R
Nickel	ug/l	22.9 J	14.7 U	17.1 J	14.8 U	5.2 J	3.5 U	642
Potassium	ug/l	4130 J	1470 J	3870 J	1670 J	753 J	702 J	25400
Selenium	ug/l	1.5 J	1 U	2.9 J	1.6 J	1.2 J	1.1 U	10 U
Silver	ug/l	9 U	3.4 U	9.1 U	3.4 U	3.2 U	3.2 U	5.7 R
Sodium	ug/l	28300	28100	28500	27500	19100	20200	107000
Thallium	ug/l	3.2 U	3.2 U	3.2 U	3.2 U	2.6 U	2.6 U	31.7 U
Vanadium	ug/l	30.4 U	9.4 U	30.5 U	9.5 U	2.6 J	2.1 U	324
Zinc	ug/l	45.5	8.4 U	46.6	10.5 J	19.6 R	21.1 R	3260
Cyanide	ug/l	10 U J		10 U J		10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-19	OB	MW-21	MW-21	OB	MW-22	MW-22
	ES ID	01/16/92	03/04/93	01/08/92	01/08/92	03/01/93	01/13/92	01/13/92
	LAB ID	MW-19 Filt	MW-19	MW-21	MW-21 Filt	MW-21	MW-22	MW-22 Filtered
	UNITS	152663	179601	152142	152172	179435	152395	152414
Volatile Organic Compounds								
Chloromethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Bromomethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Vinyl Chloride	ug/L		0.5 U	10 U		0.5 U	10 U	
Chloroethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Methylene Chloride	ug/L		0.5 U	5 U		0.5 U	5 U	
Acetone	ug/L		5 U	10 U		5 U	10 U	
Carbon Disulfide	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
trans-1,2-Dichloroethene	ug/L		0.5 U			0.5 U		
cis-1,2-Dichloroethene	ug/L		0.5 U			0.5 U		
1,2-Dichloroethene (total)	ug/L			5 U			5 U	
Chloroform	ug/L		0.5 U	5 U		0.5 U	5 U	
1,2-Dichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
2-Butanone	ug/L		5 U	10 U		5 U	10 U	
1,1,1-Trichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Carbon Tetrachloride	ug/L		0.5 U	5 U		0.5 U	5 U	
Vinyl Acetate	ug/L			10 U			10 U	
Bromodichloromethane	ug/L		0.5 U	5 U		0.5 U	5 U	
1,2-Dichloropropane	ug/L		0.5 U	5 U		0.5 U	5 U	
cis-1,3-Dichloropropene	ug/L		0.5 U	5 U		0.5 U	5 U	
Trichloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
Dibromochloromethane	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1,2-Trichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Benzene	ug/L		0.5 U	5 U		0.5 U	5 U	
trans-1,3-Dichloropropene	ug/L		0.5 U	5 U		0.5 U	5 U	
Bromoform	ug/L		0.5 U	5 U		0.5 U	5 U	
4-Methyl-2-Pentanone	ug/L		5 U	10 U		5 U	10 U	
2-Hexanone	ug/L		5 U	10 U		5 U	10 U	
Tetrachloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1,2,2-Tetrachloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Toluene	ug/L		0.5 U	5 U		0.5 U	5 U	
Chlorobenzene	ug/L		0.5 U	5 U		0.5 U	5 U	
Ethylbenzene	ug/L		0.5 U	5 U		0.5 U	5 U	
Styrene	ug/L		0.5 U	5 U		0.5 U	5 U	
Xylene (total)	ug/L		0.5 U	5 U		0.5 U	5 U	
Dichlorodifluoromethane	ug/L		0.5 U			0.5 U		
Trichlorofluoromethane	ug/L		0.5 U			0.5 U		
2,2-Dichloropropane	ug/L		0.5 U			0.5 U		
Bromochloromethane	ug/L		0.5 U			0.5 U		
1,1-Dichloropropene	ug/L		0.5 U			0.5 U		
Dibromomethane	ug/L		0.5 U			0.5 U		
1,3-Dichloropropane	ug/L		0.5 U			0.5 U		
1,2-Dibromoethane	ug/L		0.5 U			0.5 U		
1,1,1,2-Tetrachloroethane	ug/L		0.5 U			0.5 U		
Isopropylbenzene	ug/L		0.5 U			0.5 U		
Bromobenzene	ug/L		0.5 U			0.5 U		
1,2,3-Trichloropropane	ug/L		0.5 U			0.5 U		
n-Propylbenzene	ug/L		0.5 U			0.5 U		
2-Chlorotoluene	ug/L		0.5 U			0.5 U		
4-Chlorotoluene	ug/L		0.5 U			0.5 U		
1,3,5-Trimethylbenzene	ug/L		0.5 U			0.5 U		
tert-Butylbenzene	ug/L		0.5 U			0.5 U		
1,2,4-Trimethylbenzene	ug/L		0.5 U			0.5 U		
sec-Butylbenzene	ug/L		0.5 U			0.5 U		
1,3-Dichlorobenzene	ug/L		0.5 U			0.5 U		
1,4-Dichlorobenzene	ug/L		0.5 U			0.5 U		
p-Isopropyltoluene	ug/L		0.5 U			0.5 U		
1,2-Dichlorobenzene	ug/L		0.5 U			0.5 U		
n-Butylbenzene	ug/L		0.5 U			0.5 U		
1,2-Dibromo-3-Chloropropane	ug/L		0.5 U			0.5 U		
1,2,4-Trichlorobenzene	ug/L		0.5 U			0.5 U		
Hexachlorobutadiene	ug/L		0.5 U			0.5 U		
Naphthalene	ug/L		0.5 U			0.5 U		
1,2,3-Trichlorobenzene	ug/L		0.5 U			0.5 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-19 01/16/92 MW-19 Filt 152663	PHASE II WATER OB 03/04/93 MW-19 179601	PHASE I WATER MW-21 01/08/92 MW-21 152142	PHASE I WATER MW-21 01/08/92 MW-21 Filt 152172	PHASE II WATER OB 03/01/93 MW-21 179435	PHASE I WATER MW-22 01/13/92 MW-22 152395	PHASE I WATER MW-22 01/13/92 MW-22 Filtered 152414
Semivolatiles								
Phenol	ug/L		10 U	10 U		10 U	10 U	
bis(2-Chloroethyl) ether	ug/L		10 U	10 U		10 U	10 U	
2-Chlorophenol	ug/L		10 U	10 U		10 U	10 U	
1,3-Dichlorobenzene	ug/L		10 U	10 U		10 U	10 U	
1,4-Dichlorobenzene	ug/L		10 U	10 U		10 U	10 U	
Benzyl Alcohol	ug/L			10 U			10 U	
1,2-Dichlorobenzene	ug/L		10 U	10 U		10 U	10 U	
2-Methylphenol	ug/L		10 U	10 U		10 U	10 U	
2,2'-oxybis(1-Chloropropane)	ug/L		10 U	10 U		10 U	10 U	
4-Methylphenol	ug/L		10 U	10 U		10 U	10 U	
N-Nitroso-di-n-propylamine	ug/L		10 U	10 U		10 U	10 U	
Hexachloroethane	ug/L		10 U	10 U		10 U	10 U	
Nitrobenzene	ug/L		10 U	10 U		10 U	10 U	
Isophorone	ug/L		10 U	10 U		10 U	10 U	
2-Nitrophenol	ug/L		10 U	10 U		10 U	10 U	
2,4-Dimethylphenol	ug/L		10 U	10 U		10 U	10 U	
Benzoic acid	ug/L			52 U			50 U	
bis(2-Chloroethoxy) methane	ug/L		10 U	10 U		10 U	10 U	
2,4-Dichlorophenol	ug/L		10 U	10 U		10 U	10 U	
1,2,4-Trichlorobenzene	ug/L		10 U	10 U		10 U	10 U	
Naphthalene	ug/L		10 U	10 U		10 U	10 U	
4-Chloroaniline	ug/L		10 U	10 U		10 U	10 U	
Hexachlorobutadiene	ug/L		10 U	10 U		10 U	10 U	
4-Chloro-3-methylphenol	ug/L		10 U	10 U		10 U	10 U	
2-Methylnaphthalene	ug/L		10 U	10 U		10 U	10 U	
Hexachlorocyclopentadiene	ug/L		10 U	10 U		10 U	10 U	
2,4,6-Trichlorophenol	ug/L		10 U	10 U		10 U	10 U	
2,4,5-Trichlorophenol	ug/L		25 U	52 U		25 U	50 U	
2-Chloronaphthalene	ug/L		10 U	10 U		10 U	10 U	
2-Nitroaniline	ug/L		25 U	52 U		25 U	50 U	
Dimethylphthalate	ug/L		10 U	10 U		10 U	10 U	
Acenaphthylene	ug/L		10 U	10 U		10 U	10 U	
2,6-Dinitrotoluene	ug/L		10 U	10 U		10 U	10 U	
3-Nitroaniline	ug/L		25 U	52 U		25 U	50 U	
Acenaphthene	ug/L		10 U	10 U		10 U	10 U	
2,4-Dinitrophenol	ug/L		25 U	52 U		25 U	50 U	
4-Nitrophenol	ug/L		25 U	52 U		25 U	50 U	
Dibenzofuran	ug/L		10 U	10 U		10 U	10 U	
2,4-Dinitrotoluene	ug/L		10 U	10 U		10 U	10 U	
Diethylphthalate	ug/L		10 U	10 U		10 U	10 U	
4-Chlorophenyl-phenylether	ug/L		10 U	10 U		10 U	10 U	
Fluorene	ug/L		10 U	10 U		10 U	10 U	
4-Nitroaniline	ug/L		25 U	52 U		25 U	50 U	
4,6-Dinitro-2-methylphenol	ug/L		25 U	52 U		25 U	50 U	
N-Nitrosodiphenylamine	ug/L		10 U	10 U		10 U	10 U	
4-Bromophenyl-phenylether	ug/L		10 U	10 U		10 U	10 U	
Hexachlorobenzene	ug/L		10 U	10 U		10 U	10 U	
Pentachlorophenol	ug/L		25 U	52 U		25 U	50 U	
Phenanthrene	ug/L		10 U	10 U		10 U	10 U	
Anthracene	ug/L		10 U	10 U		10 U	10 U	
Carbazole	ug/L		10 U			10 U		
Di-n-butylphthalate	ug/L		10 U	10 U		10 U	10 U	
Fluoranthene	ug/L		10 U	10 U		10 U	10 U	
Pyrene	ug/L		10 U	10 U		10 U	10 U	
Butylbenzylphthalate	ug/L		10 U	10 U		10 U	10 U	
3,3'-Dichlorobenzidine	ug/L		10 U	21 U		10 U	20 U	
Benzo(a)anthracene	ug/L		10 U	10 U		10 U	10 U	
Chrysene	ug/L		10 U	10 U		10 U	10 U	
bis(2-Ethylhexyl)phthalate	ug/L		10 U	10 U		14 U	10 U	
Di-n-octylphthalate	ug/L		10 U	10 U		10 U	10 U	
Benzo(b)fluoranthene	ug/L		10 U	10 U		10 U	10 U	
Benzo(k)fluoranthene	ug/L		10 U	10 U		10 U	10 U	
Benzo(a)pyrene	ug/L		10 U	10 U		10 U	10 U	
Indeno(1,2,3-cd)pyrene	ug/L		10 U	10 U		10 U	10 U	
Dibenz(a,h)anthracene	ug/L		10 U	10 U		10 U	10 U	
Benzo(g,h,i)perylene	ug/L		10 U	10 U		10 U	10 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-19 01/16/92 MW-19 Filt. 152663	PHASE II WATER OB 03/04/93 MW-19 179601	PHASE I WATER MW-21 01/08/92 MW-21 152142	PHASE I WATER MW-21 01/08/92 MW-21 Filt. 152172	PHASE II WATER OB 03/01/93 MW-21 179435	PHASE I WATER MW-22 01/13/92 MW-22 152395	PHASE I WATER MW-22 01/13/92 MW-22 Filtered 152414
Pesticides/PCBs								
alpha-BHC	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
beta-BHC	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
delta-BHC	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
gamma-BHC (Lindane)	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
Heptachlor	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
Aldrin	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
Heptachlor epoxide	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
Endosulfan I	ug/L		0.052 U	0.052 U		0.05 U	0.053 U	
Dieldrin	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
4,4'-DDE	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
Endrin	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
Endosulfan II	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
4,4'-DDD	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
Endosulfan sulfate	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
4,4'-DDT	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
Methoxychlor	ug/L		0.52 U	0.52 U		0.5 U	0.53 U	
Endrin ketone	ug/L		0.1 U	0.1 U		0.1 U	0.11 U	
Endrin aldehyde	ug/L		0.1 U			0.1 U		
alpha-Chlordane	ug/L		0.052 U	0.52 U		0.05 U	0.53 U	
gamma-Chlordane	ug/L		0.052 U	0.52 U		0.05 U	0.53 U	
Toxaphene	ug/L		5.2 U	1 U		5 U	1.1 U	
Aroclor-1016	ug/L		1 U	0.52 U		1 U	0.53 U	
Aroclor-1221	ug/L		2.1 U	0.52 U		2 U	0.53 U	
Aroclor-1232	ug/L		1 U	0.52 U		1 U	0.53 U	
Aroclor-1242	ug/L		1 U	0.52 U		1 U	0.53 U	
Aroclor-1248	ug/L		1 U	0.52 U		1 U	0.53 U	
Aroclor-1254	ug/L		1 U	1 U		1 U	1.1 U	
Aroclor-1260	ug/L		1 U	1 U		1 U	1.1 U	
Explosives								
HMX	ug/L		0.12 U	1 U		0.12 U	1 U	
RDX	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
1,3,5-Trinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
1,3-Dinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
Tetryl	ug/L		0.12 U	0.4 U		0.12 U	0.4 U	
2,4,6-Trinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
4-amino-2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2-amino-4,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2,4-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-19	OB	MW-21	MW-21	OB	MW-22	MW-22
	ES ID	01/16/92	03/04/93	01/08/92	01/08/92	03/01/93	01/13/92	01/13/92
	LAB ID	MW-19 Filt	MW-19	MW-21	MW-21 Filt	MW-21	MW-22	MW-22 Filtered
	UNITS	152663	179601	152142	152172	179435	152395	152414
Metals								
Aluminum	ug/l	97.5 U	40200	1880 J	24.4 U	62.5 U	13100	24.4 U
Antimony	ug/l	53 U	53.9 U	55.9 U	52.9 U	54 U	55.8 U	53 U
Arsenic	ug/l	3.5 U	8 J	3.5 U	3.5 U	1.7 U	3.5 U	3.5 U
Barium	ug/l	40.6 J	348	47.5 J	25.4 R	32.6 J	154 J	22.5 R
Beryllium	ug/l	1.2 U	2.4 J	1.6 R	1.1 U R	0.3 U	2 R	1.1 U R
Cadmium	ug/l	3 U	3.1 U	2.9 U	3 U	3.1 U	2.9 U	3 U
Calcium	ug/l	183000	279000	94100	91900	92100	121000	106000
Chromium	ug/l	6.1 U	58.9	6.2 U	6.4 R	2 U	18.7 R	6.2 U R
Cobalt	ug/l	19.8 U	28 J	20 U	20.3 U	5 U	19.9 U	20.4 U
Copper	ug/l	15.2 J	69.5	14.5 U	10.1 U	1.9 U	30	10.1 U
Iron	ug/l	17 U	58000	2720	6.9 U R	39.7 R	19100	7 U R
Lead	ug/l	1.2 U	35.7	1.8 J	1.2 U	0.9 U	14.1	1.2 U
Magnesium	ug/l	54500	80300	12200	12800	12900	18800	15400
Manganese	ug/l	105	949	232 J	196	10.1 J	239 J	29.6
Mercury	ug/l	0.03 U	0.15 J	0.15 R	0.15 R	0.06 U	0.17 R	0.17 R
Nickel	ug/l	15.9 U	98	16 U	14.7 U	3.5 U	33.2 J	14.7 U
Potassium	ug/l	4660 J	8450	3050 J	2530 J	1370 J	4250 J	541 J
Selenium	ug/l	1.1 J	1.1 U	1 U	1.2 J	1.2 J	4.4 J	3.6 J
Silver	ug/l	9 U	3.2 U	9.1 U	3.4 U	3.2 U	9.1 U	3.4 U
Sodium	ug/l	112000	80100	18400	17900	21500	4400 J	4330 J
Thallium	ug/l	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U
Vanadium	ug/l	30.3 U	57.5	30.6 U	9.4 U	2.1 U	30.5 U	9.4 U
Zinc	ug/l	67.4	627	15.1 R	8.4 U	4 R	67.8	9.1 J
Cyanide	ug/l		10 U	10 U J		10 U	10 U J	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/09/93 MW-22 179815	PHASE I WATER MW-23 01/14/92 MW-23 152491	PHASE I WATER MW-23 01/14/92 MW-23 Filt. 152499	PHASE II WATER OB 03/08/93 MW-23 179725	PHASE I WATER MW-23 01/14/92 MW-23RE 152491R1	PHASE I WATER MW-24 01/15/92 MW-24 152585	PHASE I WATER MW-24 01/15/92 MW-24 Filt. 152601
Volatile Organic Compounds								
Chloromethane	ug/L	0.5 U	10 U J		0.5 U	10 U J	10 U	
Bromomethane	ug/L	0.5 U	10 U J		0.5 U	10 U J	10 U	
Vinyl Chloride	ug/L	0.5 U	10 U J		0.5 U	10 U J	10 U	
Chloroethane	ug/L	0.5 U	10 U J		0.5 U	10 U J	10 U	
Methylene Chloride	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Acetone	ug/L	5 U	10 U J		5 U	10 U J	10 U	
Carbon Disulfide	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,1-Dichloroethene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,1-Dichloroethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U			0.5 U			
cis-1,2-Dichloroethene	ug/L	0.5 U			0.5 U			
1,2-Dichloroethene (total)	ug/L		5 U J			5 U J	5 U	
Chloroform	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,2-Dichloroethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
2-Butanone	ug/L	5 U	10 U J		5 U	10 U J	10 U	
1,1,1-Trichloroethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Carbon Tetrachloride	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Vinyl Acetate	ug/L		10 U J			10 U J	10 U	
Bromodichloromethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,2-Dichloropropane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Trichloroethene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Dibromochloromethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,1,2-Trichloroethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Benzene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Bromoform	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
4-Methyl-2-Pentanone	ug/L	5 U	10 U J		5 U	10 U J	10 U	
2-Hexanone	ug/L	5 U	10 U J		5 U	10 U J	10 U	
Tetrachloroethene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Toluene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Chlorobenzene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Ethylbenzene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Styrene	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Xylene (total)	ug/L	0.5 U	5 U J		0.5 U	5 U J	5 U	
Dichlorodifluoromethane	ug/L	0.5 U			0.5 U			
Trichlorofluoromethane	ug/L	0.5 U			0.5 U			
2,2-Dichloropropane	ug/L	0.5 U			0.5 U			
Bromochloromethane	ug/L	0.5 U			0.5 U			
1,1-Dichloropropene	ug/L	0.5 U			0.5 U			
Dibromomethane	ug/L	0.5 U			0.5 U			
1,3-Dichloropropane	ug/L	0.5 U			0.5 U			
1,2-Dibromoethane	ug/L	0.5 U			0.5 U			
1,1,1,2-Tetrachloroethane	ug/L	0.5 U			0.5 U			
Isopropylbenzene	ug/L	0.5 U			0.5 U			
Bromobenzene	ug/L	0.5 U			0.5 U			
1,2,3-Trichloropropane	ug/L	0.5 U			0.5 U			
n-Propylbenzene	ug/L	0.5 U			0.5 U			
2-Chlorotoluene	ug/L	0.5 U			0.5 U			
4-Chlorotoluene	ug/L	0.5 U			0.5 U			
1,3,5-Trimethylbenzene	ug/L	0.5 U			0.5 U			
tert-Butylbenzene	ug/L	0.5 U			0.5 U			
1,2,4-Trimethylbenzene	ug/L	0.5 U			0.5 U			
sec-Butylbenzene	ug/L	0.5 U			0.5 U			
1,3-Dichlorobenzene	ug/L	0.5 U			0.5 U			
1,4-Dichlorobenzene	ug/L	0.5 U			0.5 U			
p-Isopropyltoluene	ug/L	0.5 U			0.5 U			
1,2-Dichlorobenzene	ug/L	0.5 U			0.5 U			
n-Butylbenzene	ug/L	0.5 U			0.5 U			
1,2-Dibromo-3-Chloropropane	ug/L	0.5 U			0.5 U			
1,2,4-Trichlorobenzene	ug/L	0.5 U			0.5 U			
Hexachlorobutadiene	ug/L	0.5 U			0.5 U			
Naphthalene	ug/L	0.5 U			0.5 U			
1,2,3-Trichlorobenzene	ug/L	0.5 U			0.5 U			

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/09/93 MW-22 179815	PHASE I WATER MW-23 01/14/92 MW-23 152491	PHASE I WATER MW-23 01/14/92 MW-23 Filt 152499	PHASE II WATER OB 03/08/93 MW-23 179725	PHASE I WATER MW-23 01/14/92 MW-23RE 152491R1	PHASE I WATER MW-24 01/15/92 MW-24 152585	PHASE I WATER MW-24 01/15/92 MW-24 Filt 152601
Semivolatiles								
Phenol	ug/L	10 U	11 U		10 U		11 U	
bis(2-Chloroethyl) ether	ug/L	10 U	11 U		10 U		11 U	
2-Chlorophenol	ug/L	10 U	11 U		10 U		11 U	
1,3-Dichlorobenzene	ug/L	10 U	11 U		10 U		11 U	
1,4-Dichlorobenzene	ug/L	10 U	11 U		10 U		11 U	
Benzyl Alcohol	ug/L		11 U				11 U	
1,2-Dichlorobenzene	ug/L	10 U	11 U		10 U		11 U	
2-Methylphenol	ug/L	10 U	11 U		10 U		11 U	
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	11 U		10 U		11 U	
4-Methylphenol	ug/L	10 U	11 U		10 U		11 U	
N-Nitroso-di-n-propylamine	ug/L	10 U	11 U		10 U		11 U	
Hexachloroethane	ug/L	10 U	11 U		10 U		11 U	
Nitrobenzene	ug/L	10 U	11 U		10 U		11 U	
Isophorone	ug/L	10 U	11 U		10 U		11 U	
2-Nitrophenol	ug/L	10 U	11 U		10 U		11 U	
2,4-Dimethylphenol	ug/L	10 U	11 U		10 U		11 U	
Benzoic acid	ug/L		55 U				55 U	
bis(2-Chloroethoxy) methane	ug/L	10 U	11 U		10 U		11 U	
2,4-Dichlorophenol	ug/L	10 U	11 U		10 U		11 U	
1,2,4-Trichlorobenzene	ug/L	10 U	11 U		10 U		11 U	
Naphthalene	ug/L	10 U	11 U		10 U		11 U	
4-Chloroaniline	ug/L	10 U	11 U		10 U		11 U	
Hexachlorobutadiene	ug/L	10 U	11 U		10 U		11 U	
4-Chloro-3-methylphenol	ug/L	10 U	11 U		10 U		11 U	
2-Methylnaphthalene	ug/L	10 U	11 U		10 U		11 U	
Hexachlorocyclopentadiene	ug/L	10 U	11 U		10 U		11 U	
2,4,6-Trichlorophenol	ug/L	10 U	11 U		10 U		11 U	
2,4,5-Trichlorophenol	ug/L	25 U	55 U		25 U		55 U	
2-Chloronaphthalene	ug/L	10 U	11 U		10 U		11 U	
2-Nitroaniline	ug/L	25 U	55 U		25 U		55 U	
Dimethylphthalate	ug/L	10 U	11 U		10 U		11 U	
Acenaphthylene	ug/L	10 U	11 U		10 U		11 U	
2,6-Dinitrotoluene	ug/L	10 U	11 U		10 U		11 U	
3-Nitroaniline	ug/L	25 U	55 U		25 U		55 U	
Acenaphthene	ug/L	10 U	11 U		10 U		11 U	
2,4-Dinitrophenol	ug/L	25 U	55 U		25 U		55 U	
4-Nitrophenol	ug/L	25 U	55 U		25 U		55 U	
Dibenzofuran	ug/L	10 U	11 U		10 U		11 U	
2,4-Dinitrotoluene	ug/L	10 U	11 U		10 U		11 U	
Diethylphthalate	ug/L	10 U	11 U		10 U		11 U	
4-Chlorophenyl-phenylether	ug/L	10 U	11 U		10 U		11 U	
Fluorene	ug/L	10 U	11 U		10 U		11 U	
4-Nitroaniline	ug/L	25 U	55 U		25 U		55 U	
4,6-Dinitro-2-methylphenol	ug/L	25 U	55 U		25 U		55 U	
N-Nitrosodiphenylamine	ug/L	10 U	11 U		10 U		11 U	
4-Bromophenyl-phenylether	ug/L	10 U	11 U		10 U		11 U	
Hexachlorobenzene	ug/L	10 U	11 U		10 U		11 U	
Pentachlorophenol	ug/L	25 U	55 U		25 U		55 U	
Phenanthrene	ug/L	10 U	11 U		10 U		11 U	
Anthracene	ug/L	10 U	11 U		10 U		11 U	
Carbazole	ug/L	10 U			10 U			
Di-n-butylphthalate	ug/L	10 U	11 U		10 U		11 U	
Fluoranthene	ug/L	10 U	11 U		10 U		11 U	
Pyrene	ug/L	10 U	11 U		10 U		11 U	
Butylbenzylphthalate	ug/L	10 U	11 U		10 U		11 U	
3,3'-Dichlorobenzidine	ug/L	10 U	22 U		10 U		22 U	
Benzo(a)anthracene	ug/L	10 U	11 U		10 U		11 U	
Chrysene	ug/L	10 U	11 U		10 U		11 U	
bis(2-Ethylhexyl)phthalate	ug/L	10 U	11 U		10 U		11 U	
Di-n-octylphthalate	ug/L	10 U	11 U		10 U		11 U	
Benzo(b)fluoranthene	ug/L	10 U	11 U		10 U		11 U	
Benzo(k)fluoranthene	ug/L	10 U	11 U		10 U		11 U	
Benzo(a)pyrene	ug/L	10 U	11 U		10 U		11 U	
Indeno(1,2,3-cd)pyrene	ug/L	10 U	11 U		10 U		11 U	
Dibenz(a,h)anthracene	ug/L	10 U	11 U		10 U		11 U	
Benzo(g,h,i)perylene	ug/L	10 U	11 U		10 U		11 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/09/93 MW-22 179815	PHASE I WATER MW-23 01/14/92 MW-23 152491	PHASE I WATER MW-23 01/14/92 MW-23 Filt 152499	PHASE II WATER OB 03/08/93 MW-23 179725	PHASE I WATER MW-23 01/14/92 MW-23RE 152491R1	PHASE I WATER MW-24 01/15/92 MW-24 152585	PHASE I WATER MW-24 01/15/92 MW-24 Filt 152601
Pesticides/PCBs								
alpha-BHC	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
beta-BHC	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
delta-BHC	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
gamma-BHC (Lindane)	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
Heptachlor	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
Aldrin	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
Heptachlor epoxide	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
Endosulfan I	ug/L	0.051 U	0.056 U		0.05 U		0.052 U	
Dieldrin	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
4,4'-DDE	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
Endrin	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
Endosulfan II	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
4,4'-DDD	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
Endosulfan sulfate	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
4,4'-DDT	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
Methoxychlor	ug/L	0.51 U	0.56 U		0.5 U		0.52 U	
Endrin ketone	ug/L	0.1 U	0.11 U		0.1 U		0.1 U	
Endrin aldehyde	ug/L	0.1 U			0.1 U			
alpha-Chlordane	ug/L	0.051 U	0.56 U		0.05 U		0.52 U	
gamma-Chlordane	ug/L	0.051 U	0.56 U		0.05 U		0.52 U	
Toxaphene	ug/L	5.1 U	1.1 U		5 U		1 U	
Aroclor-1016	ug/L	1 U	0.56 U		1 U		0.52 U	
Aroclor-1221	ug/L	2 U	0.56 U		2 U		0.52 U	
Aroclor-1232	ug/L	1 U	0.56 U		1 U		0.52 U	
Aroclor-1242	ug/L	1 U	0.56 U		1 U		0.52 U	
Aroclor-1248	ug/L	1 U	0.56 U		1 U		0.52 U	
Aroclor-1254	ug/L	1 U	1.1 U		1 U		1 U	
Aroclor-1260	ug/L	1 U	1.1 U		1 U		1 U	
Explosives								
HMX	ug/L	0.12 U	1 U		0.12 U		1 U	
RDX	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
Tetryl	ug/L	0.12 U	0.4 U		0.12 U		0.4 U	
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U		0.21	
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U		0.12 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	OB	MW-23	MW-23	OB	MW-23	MW-24	MW-24
	DATE	03/09/93	01/14/92	01/14/92	03/08/93	01/14/92	01/15/92	01/15/92
	ES ID	MW-22	MW-23	MW-23 Filt	MW-23	MW-23RE	MW-24	MW-24 Filt
	LAB ID	179815	152491	152499	179725	152491R1	152585	152601
	UNITS							
Metals								
Aluminum	ug/l	111 J	3350 J	24.5 U	98.2 J		23500	97.4 U
Antimony	ug/l	54.1 U	53 U	53.2 U	53.9 U		53.1 U	52.9 U
Arsenic	ug/l	1.7 U	3.5 U	3.5 U	1.7 U		3.5 U	3.5 U
Barium	ug/l	37.1 J	104 J	44.2 R	36.6 J		507	96.5 J
Beryllium	ug/l	0.3 U	1.1 U	1.4 R	0.3 U		1.2 R	1.2 U
Cadmium	ug/l	3.1 U	3 U	3 U	3.1 U		6 R	3 U
Calcium	ug/l	115000	126000	123000	154000		153000	156000
Chromium	ug/l	2 U	6.2 U	6.2 U R	2 U		39.3	6.1
Cobalt	ug/l	5 U	20.3 U	20.4 U	5 U		27.6 J	19.8 U
Copper	ug/l	2.3 R	10.1 U	10.2 U	1.9 U		257	14.4 U
Iron	ug/l	150 R	4960 J	7 U R	555		38900 J	16.9 U
Lead	ug/l	0.9 U	5.2	1.2 U	0.89 U		275	1.2 U
Magnesium	ug/l	16600	29000	25000	29500		57600	46300
Manganese	ug/l	28.6	141	79.9	80.7		472	3.2 U
Mercury	ug/l	0.06 U	0.16 R	0.16 R	0.06 U		0.31 R	0.04 J
Nickel	ug/l	4.5 J	17.8 J	14.7 U	3.5 U		70.7	15.9 U
Potassium	ug/l	446 U	2500 J	1260 J	808 J		6840	3120 J
Selenium	ug/l	1.1 U	1 U	1.3 J	1.1 U		2.9 J	3.5 J
Silver	ug/l	3.2 U	4.7 R	3.4 U	3.2 U		8.2 R	9 U
Sodium	ug/l	4900 J	13900	134000	16100		39700	39900
Thallium	ug/l	2.6 U	3.2 U	3.2 U	2.6 U		3.2 U	3.2 U
Vanadium	ug/l	2.1 U	9.4 U	9.5 U	2.4 J		30.7 J	30.3 U
Zinc	ug/l	7.4 R	18.4 R	8.5 U	5.3 R		423	13.4 U
Cyanide	ug/l	10 U	10 U		10 U		10 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/03/93 MW-24 179544	PHASE II WATER OB 03/03/93 MW-24D 179545 DUP MW-24	PHASE I WATER MW-25 01/13/92 MW-25 152396	PHASE I WATER MW-25 01/13/92 MW-25 Flt 152415	PHASE II WATER OB 03/03/93 MW-25 179546	PHASE I WATER MW-27 01/15/92 MW-27 152586	PHASE I WATER MW-27 01/15/92 MW-27 Flt 152602
Volatile Organic Compounds								
Chloromethane	ug/L	0.5 U	0.5 U	10 U		0.5 U	10 U	
Bromomethane	ug/L	0.5 U	0.5 U	10 U		0.5 U	10 U	
Vinyl Chloride	ug/L	0.5 U	0.5 U	10 U		0.5 U	10 U	
Chloroethane	ug/L	0.5 U	0.5 U	10 U		0.5 U	10 U	
Methylene Chloride	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Acetone	ug/L	5 U	5 U	10 U		5 U	10 U	
Carbon Disulfide	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U	0.5 U			0.5 U		
cis-1,2-Dichloroethene	ug/L	0.5 U	0.5 U			0.5 U		
1,2-Dichloroethene (total)	ug/L			5 U			5 U	
Chloroform	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,2-Dichloroethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
2-Butanone	ug/L	5 U	5 U	10 U		5 U	10 U	
1,1,1-Trichloroethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Carbon Tetrachloride	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Vinyl Acetate	ug/L			10 U			10 U	
Bromodichloromethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,2-Dichloropropane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Trichloroethene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Dibromochloromethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,1,2-Trichloroethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Benzene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Bromoform	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
4-Methyl-2-Pentanone	ug/L	5 U	5 U	10 U		5 U	10 U	
2-Hexanone	ug/L	5 U	5 U	10 U		5 U	10 U	
Tetrachloroethene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Toluene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Chlorobenzene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Ethylbenzene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Styrene	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Xylene (total)	ug/L	0.5 U	0.5 U	5 U		0.5 U	5 U	
Dichlorodifluoromethane	ug/L	0.5 U	0.5 U			0.5 U		
Trichlorofluoromethane	ug/L	0.5 U	0.5 U			0.5 U		
2,2-Dichloropropane	ug/L	0.5 U	0.5 U			0.5 U		
Bromochloromethane	ug/L	0.5 U	0.5 U			0.5 U		
1,1-Dichloropropene	ug/L	0.5 U	0.5 U			0.5 U		
Dibromomethane	ug/L	0.5 U	0.5 U			0.5 U		
1,3-Dichloropropane	ug/L	0.5 U	0.5 U			0.5 U		
1,2-Dibromoethane	ug/L	0.5 U	0.5 U			0.5 U		
1,1,1,2-Tetrachloroethane	ug/L	0.5 U	0.5 U			0.5 U		
Isopropylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
Bromobenzene	ug/L	0.5 U	0.5 U			0.5 U		
1,2,3-Trichloropropane	ug/L	0.5 U	0.5 U			0.5 U		
n-Propylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
2-Chlorotoluene	ug/L	0.5 U	0.5 U			0.5 U		
4-Chlorotoluene	ug/L	0.5 U	0.5 U			0.5 U		
1,3,5-Trimethylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
tert-Butylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
1,2,4-Trimethylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
sec-Butylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
1,3-Dichlorobenzene	ug/L	0.5 U	0.5 U			0.5 U		
1,4-Dichlorobenzene	ug/L	0.5 U	0.5 U			0.5 U		
p-Isopropyltoluene	ug/L	0.5 U	0.5 U			0.5 U		
1,2-Dichlorobenzene	ug/L	0.5 U	0.5 U			0.5 U		
n-Butylbenzene	ug/L	0.5 U	0.5 U			0.5 U		
1,2-Dibromo-3-Chloropropane	ug/L	0.5 U	0.5 U			0.5 U		
1,2,4-Trichlorobenzene	ug/L	0.5 U	0.5 U			0.5 U		
Hexachlorobutadiene	ug/L	0.5 U	0.5 U			0.5 U		
Naphthalene	ug/L	0.5 U	0.5 U			0.5 U		
1,2,3-Trichlorobenzene	ug/L	0.5 U	0.5 U			0.5 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/03/93 MW-24 179544	PHASE II WATER OB 03/03/93 MW-24D 179545 DUP MW-24	PHASE I WATER MW-25 01/13/92 MW-25 152396	PHASE I WATER MW-25 01/13/92 MW-25 Filt 152415	PHASE II WATER OB 03/03/93 MW-25 179546	PHASE I WATER MW-27 01/15/92 MW-27 152586	PHASE I WATER MW-27 01/15/92 MW-27 Filt 152602
Semivolatiles								
Phenol	ug/L	10 U	10 U	11 U		10 U	11 U	
bis(2-Chloroethyl) ether	ug/L	10 U	10 U	11 U		10 U	11 U	
2-Chlorophenol	ug/L	10 U	10 U	11 U		10 U	11 U	
1,3-Dichlorobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
1,4-Dichlorobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzyl Alcohol	ug/L			11 U			11 U	
1,2-Dichlorobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
2-Methylphenol	ug/L	10 U	10 U	11 U		10 U	11 U	
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Methylphenol	ug/L	10 U	10 U	11 U		10 U	11 U	
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U	11 U		10 U	11 U	
Hexachloroethane	ug/L	10 U	10 U	11 U		10 U	11 U	
Nitrobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
Isophorone	ug/L	10 U	10 U	11 U		10 U	11 U	
2-Nitrophenol	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4-Dimethylphenol	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzoic acid	ug/L			53 U			55 U	
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4-Dichlorophenol	ug/L	10 U	10 U	11 U		10 U	11 U	
1,2,4-Trichlorobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
Naphthalene	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Chloroaniline	ug/L	10 U	10 U	11 U		10 U	11 U	
Hexachlorobutadiene	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Chloro-3-methylphenol	ug/L	10 U	10 U	11 U		10 U	11 U	
2-Methylnaphthalene	ug/L	10 U	10 U	11 U		10 U	11 U	
Hexachlorocyclopentadiene	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4,6-Trichlorophenol	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4,5-Trichlorophenol	ug/L	25 U	25 U	53 U		25 U	55 U	
2-Chloronaphthalene	ug/L	10 U	10 U	11 U		10 U	11 U	
2-Nitroaniline	ug/L	25 U	25 U	53 U		25 U	55 U	
Dimethylphthalate	ug/L	10 U	10 U	11 U		10 U	11 U	
Acenaphthylene	ug/L	10 U	10 U	11 U		10 U	11 U	
2,6-Dinitrotoluene	ug/L	10 U	10 U	11 U		10 U	11 U	
3-Nitroaniline	ug/L	25 U	25 U	53 U		25 U	55 U	
Acenaphthene	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4-Dinitrophenol	ug/L	25 U	25 U	53 U		25 U	55 U	
4-Nitrophenol	ug/L	25 U	25 U	53 U		25 U	55 U	
Dibenzofuran	ug/L	10 U	10 U	11 U		10 U	11 U	
2,4-Dinitrotoluene	ug/L	10 U	10 U	11 U		10 U	11 U	
Diethylphthalate	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Chlorophenyl-phenylether	ug/L	10 U	10 U	11 U		10 U	11 U	
Fluorene	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Nitroaniline	ug/L	25 U	25 U	53 U		25 U	55 U	
4,6-Dinitro-2-methylphenol	ug/L	25 U	25 U	53 U		25 U	55 U	
N-Nitrosodiphenylamine	ug/L	10 U	10 U	11 U		10 U	11 U	
4-Bromophenyl-phenylether	ug/L	10 U	10 U	11 U		10 U	11 U	
Hexachlorobenzene	ug/L	10 U	10 U	11 U		10 U	11 U	
Pentachlorophenol	ug/L	25 U	25 U	53 U		25 U	55 U	
Phenanthrene	ug/L	10 U	10 U	11 U		10 U	11 U	
Anthracene	ug/L	10 U	10 U	11 U		10 U	11 U	
Carbazole	ug/L	10 U	10 U			10 U		
Di-n-butylphthalate	ug/L	10 U	10 U	11 U		10 U	11 U	
Fluoranthene	ug/L	10 U	10 U	11 U		10 U	11 U	
Pyrene	ug/L	10 U	10 U	11 U		10 U	11 U	
Butylbenzylphthalate	ug/L	10 U	10 U	11 U		10 U	11 U	
3,3'-Dichlorobenzidine	ug/L	10 U	10 U	21 U		10 U	22 U	
Benzo(a)anthracene	ug/L	10 U	10 U	11 U		10 U	11 U	
Chrysene	ug/L	10 U	10 U	11 U		10 U	11 U	
bis(2-Ethylhexyl)phthalate	ug/L	13 U	10 U	11 U		10 U	11 U	
Di-n-octylphthalate	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzo(b)fluoranthene	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzo(k)fluoranthene	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzo(a)pyrene	ug/L	10 U	10 U	11 U		10 U	11 U	
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U	11 U		10 U	11 U	
Dibenz(a,h)anthracene	ug/L	10 U	10 U	11 U		10 U	11 U	
Benzo(g,h,i)perylene	ug/L	10 U	10 U	11 U		10 U	11 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/03/93 MW-24 179544	PHASE II WATER OB 03/03/93 MW-24D 179545 DUP MW-24	PHASE I WATER MW-25 01/13/92 MW-25 152396	PHASE I WATER MW-25 01/13/92 MW-25 Filt 152415	PHASE II WATER OB 03/03/93 MW-25 179546	PHASE I WATER MW-27 01/15/92 MW-27 152586	PHASE I WATER MW-27 01/15/92 MW-27 Filt 152602
Pesticides/PCBs								
alpha-BHC	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
beta-BHC	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
delta-BHC	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
gamma-BHC (Lindane)	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
Heptachlor	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
Aldrin	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
Heptachlor epoxide	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
Endosulfan I	ug/L	0.057 U	0.05 U	0.053 U		0.05 U	0.053 U	
Dieldrin	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
4,4'-DDE	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
Endrin	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
Endosulfan II	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
4,4'-DDD	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
Endosulfan sulfate	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
4,4'-DDT	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
Methoxychlor	ug/L	0.57 U	0.5 U	0.53 U		0.5 U	0.53 U	
Endrin ketone	ug/L	0.11 U	0.1 U	0.11 U		0.1 U	0.11 U	
Endrin aldehyde	ug/L	0.11 U	0.1 U			0.1 U		
alpha-Chlordane	ug/L	0.057 U	0.05 U	0.53 U		0.05 U	0.53 U	
gamma-Chlordane	ug/L	0.057 U	0.05 U	0.53 U		0.05 U	0.53 U	
Toxaphene	ug/L	5.7 U	5 U	1.1 U		5 U	1.1 U	
Aroclor-1016	ug/L	1.1 U	1 U	0.53 U		1 U	0.53 U	
Aroclor-1221	ug/L	2.3 U	2 U	0.53 U		2 U	0.53 U	
Aroclor-1232	ug/L	1.1 U	1 U	0.53 U		1 U	0.53 U	
Aroclor-1242	ug/L	1.1 U	1 U	0.53 U		1 U	0.53 U	
Aroclor-1248	ug/L	1.1 U	1 U	0.53 U		1 U	0.53 U	
Aroclor-1254	ug/L	1.1 U	1 U	1.1 U		1 U	1.1 U	
Aroclor-1260	ug/L	1.1 U	1 U	1.1 U		1 U	1.1 U	
Explosives								
HMX	ug/L	0.12 U	0.12 U	1 U		0.12 U	1 U	
RDX	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
Tetryl	ug/L	0.12 U	0.12 U	0.4 U		0.12 U	0.4 U	
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U		0.12 U	0.12 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE II WATER		PHASE II WATER		PHASE I WATER		PHASE I WATER		PHASE II WATER		PHASE I WATER		PHASE I WATER	
	LOCATION	OB		OB		MW-25		MW-25		OB		MW-27		MW-27	
	DATE	03/03/93		03/03/93		01/13/92		01/13/92		03/03/93		01/15/92		01/15/92	
	ES ID	MW-24		MW-24D		MW-25		MW-25 Filt		MW-25		MW-27		MW-27 Filt	
	LAB ID	179544		179545		152396		152415		179546		152586		152602	
	UNITS			DUP MW-24											
Metals															
Aluminum	ug/l	508		484		15200		24.5	U	622		68400		98.1	U
Antimony	ug/l	53.9	U	54	U	55.4	U	53.2	U	53.6	U	53.2	U	53.3	U
Arsenic	ug/l	1.7	U	1.7	U	3.5	U	3.5	U	1.7	U	11.5		3.5	U
Barium	ug/l	93.5	J	90.5	J	206		36.5	R	56.7	J	734		75.5	J
Beryllium	ug/l	0.3	U	0.3	U	2.2	R	1.1	U R	0.3	U	2.8	R	1.2	U
Cadmium	ug/l	3.1	U	3.1	U	2.9	U	3	U	3.1	U	14.1	R	3	U
Calcium	ug/l	155000		152000		130000		106000		86900		208000		97400	
Chromium	ug/l	2	U	2	U	18	R	6.2	U R	2	U	118		6.2	U
Cobalt	ug/l	5	U	5	U	19.8	U	20.4	U	5	U	58.1		20	U
Copper	ug/l	2.8	J	2.8	J	19.3	J	10.2	U	1.9	U	128		16.1	J
Iron	ug/l	659		676		23000		7	U R	701		127000	J	17.1	U
Lead	ug/l	2.5	J	2.8	J	18		1.2	U	0.9	U	118		1.2	U
Magnesium	ug/l	56000		54900		25000		18600		16400		93800		60700	
Manganese	ug/l	8.8	J	11.3	J	281	J	34.3		28.7		1470	J	93.7	
Mercury	ug/l	0.06	U	0.06	U	0.19	R	0.15	R	0.06	U	0.24	R	0.03	U
Nickel	ug/l	4.4	J	3.5	U	28.4	J	14.8	U	3.5	U	196		16	U
Potassium	ug/l	3660	J	3560	J	4400	J	658	J	921	J	18100		8440	
Selenium	ug/l	1.4	J	1.6	J	1.9	J	1	U	1.1	U	5	U	3.4	J
Silver	ug/l	3.2	U	3.2	U	9	U	3.4	U	3.2	U	5.2	R	9.1	U
Sodium	ug/l	39700		38800		3900	J	3760	J	2860	J	17900		18300	
Thallium	ug/l	2.6	U	2.6	U	3.2	U	3.2	U	2.6	U	3.2	U	3.2	U
Vanadium	ug/l	2.1	U	2.1	U	30.3	U	9.5	U	2.3	J	107		30.5	U
Zinc	ug/l	18.9	R	9.7	R	55.3		8.5	U	5.5	R	274		13.5	U
Cyanide	ug/l	10	U	10	U	10	U J			10	U	10	U J		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	OB	MW-28	MW-28	OB	MW-29	MW-29	OB
	ES ID	03/08/93	01/14/92	01/14/92	03/02/93	01/14/92	01/14/92	03/02/93
	LAB ID	MW-27	MW-28	MW-28 Filt	MW-28	MW-29	MW-29 Filt	MW-29
	UNITS	179726	152492	152500	179509	152493	152501	179510
Volatile Organic Compounds								
Chloromethane	ug/L	0.5 U	10 U		0.5 U	10 U		0.5 U
Bromomethane	ug/L	0.5 U	10 U		0.5 U	10 U		0.5 U
Vinyl Chloride	ug/L	0.5 U	10 U		0.5 U	10 U		0.5 U
Chloroethane	ug/L	0.5 U	10 U		0.5 U	10 U		0.5 U
Methylene Chloride	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Acetone	ug/L	5 U	10 U		15	10 U		5 U
Carbon Disulfide	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,1-Dichloroethene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,1-Dichloroethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
trans-1,2-Dichloroethene	ug/L	0.5 U			0.5 U			0.5 U
cis-1,2-Dichloroethene	ug/L	0.5 U			0.5 U			0.5 U
1,2-Dichloroethene (total)	ug/L		5 U			5 U		
Chloroform	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,2-Dichloroethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
2-Butanone	ug/L	5 U	10 U		5 U	10 U		5 U
1,1,1-Trichloroethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Carbon Tetrachloride	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Vinyl Acetate	ug/L		10 U			10 U		
Bromodichloromethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,2-Dichloropropane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
cis-1,3-Dichloropropene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Trichloroethene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Dibromochloromethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,1,2-Trichloroethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Benzene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
trans-1,3-Dichloropropene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Bromoform	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
4-Methyl-2-Pentanone	ug/L	5 U	10 U		5 U	10 U		5 U
2-Hexanone	ug/L	5 U	10 U		5 U	10 U		5 U
Tetrachloroethene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
1,1,2,2-Tetrachloroethane	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Toluene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Chlorobenzene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Ethylbenzene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Styrene	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Xylene (total)	ug/L	0.5 U	5 U		0.5 U	5 U		0.5 U
Dichlorodifluoromethane	ug/L	0.5 U			0.5 U			0.5 U
Trichlorofluoromethane	ug/L	0.5 U			0.5 U			0.5 U
2,2-Dichloropropane	ug/L	0.5 U			0.5 U			0.5 U
Bromochloromethane	ug/L	0.5 U			0.5 U			0.5 U
1,1-Dichloropropene	ug/L	0.5 U			0.5 U			0.5 U
Dibromomethane	ug/L	0.5 U			0.5 U			0.5 U
1,3-Dichloropropane	ug/L	0.5 U			0.5 U			0.5 U
1,2-Dibromoethane	ug/L	0.5 U			0.5 U			0.5 U
1,1,1,2-Tetrachloroethane	ug/L	0.5 U			0.5 U			0.5 U
Isopropylbenzene	ug/L	0.5 U			0.5 U			0.5 U
Bromobenzene	ug/L	0.5 U			0.5 U			0.5 U
1,2,3-Trichloropropane	ug/L	0.5 U			0.5 U			0.5 U
n-Propylbenzene	ug/L	0.5 U			0.5 U			0.5 U
2-Chlorotoluene	ug/L	0.5 U			0.5 U			0.5 U
4-Chlorotoluene	ug/L	0.5 U			0.5 U			0.5 U
1,3,5-Trimethylbenzene	ug/L	0.5 U			0.5 U			0.5 U
tert-Butylbenzene	ug/L	0.5 U			0.5 U			0.5 U
1,2,4-Trimethylbenzene	ug/L	0.5 U			0.5 U			0.5 U
sec-Butylbenzene	ug/L	0.5 U			0.5 U			0.5 U
1,3-Dichlorobenzene	ug/L	0.5 U			0.5 U			0.5 U
1,4-Dichlorobenzene	ug/L	0.5 U			0.5 U			0.5 U
p-Isopropyltoluene	ug/L	0.5 U			0.5 U			0.5 U
1,2-Dichlorobenzene	ug/L	0.5 U			0.5 U			0.5 U
n-Butylbenzene	ug/L	0.5 U			0.5 U			0.5 U
1,2-Dibromo-3-Chloropropane	ug/L	0.5 U			0.5 U			0.5 U
1,2,4-Trichlorobenzene	ug/L	0.5 U			0.5 U			0.5 U
Hexachlorobutadiene	ug/L	0.5 U			0.5 U			0.5 U
Naphthalene	ug/L	0.5 U			0.5 U			0.5 U
1,2,3-Trichlorobenzene	ug/L	0.5 U			0.5 U			0.5 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/08/93 MW-27 179726	PHASE I WATER MW-28 01/14/92 MW-28 152492	PHASE I WATER MW-28 01/14/92 MW-28 Filt 152500	PHASE II WATER OB 03/02/93 MW-28 179509	PHASE I WATER MW-29 01/14/92 MW-29 152493	PHASE I WATER MW-29 01/14/92 MW-29 Filt 152501	PHASE II WATER OB 03/02/93 MW-29 179510
Semivolatiles								
Phenol	ug/L	10 U	10 U		10 U	11 U		10 U
bis(2-Chloroethyl) ether	ug/L	10 U	10 U		10 U	11 U		10 U
2-Chlorophenol	ug/L	10 U	10 U		10 U	11 U		10 U
1,3-Dichlorobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
1,4-Dichlorobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
Benzyl Alcohol	ug/L		10 U			11 U		
1,2-Dichlorobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
2-Methylphenol	ug/L	10 U	10 U		10 U	11 U		10 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U		10 U	11 U		10 U
4-Methylphenol	ug/L	10 U	10 U		10 U	11 U		10 U
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U		10 U	11 U		10 U
Hexachloroethane	ug/L	10 U	10 U		10 U	11 U		10 U
Nitrobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
Isophorone	ug/L	10 U	10 U		10 U	11 U		10 U
2-Nitrophenol	ug/L	10 U	10 U		10 U	11 U		10 U
2,4-Dimethylphenol	ug/L	10 U	10 U		10 U	11 U		10 U
Benzoic acid	ug/L		50 U			54 U		
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U		10 U	11 U		10 U
2,4-Dichlorophenol	ug/L	10 U	10 U		10 U	11 U		10 U
1,2,4-Trichlorobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
Naphthalene	ug/L	10 U	10 U		10 U	11 U		10 U
4-Chloroaniline	ug/L	10 U	10 U		10 U	11 U		10 U
Hexachlorobutadiene	ug/L	10 U	10 U		10 U	11 U		10 U
4-Chloro-3-methylphenol	ug/L	10 U	10 U		10 U	11 U		10 U
2-Methylnaphthalene	ug/L	10 U	10 U		10 U	11 U		10 U
Hexachlorocyclopentadiene	ug/L	10 U	10 U		10 U	11 U		10 U
2,4,6-Trichlorophenol	ug/L	10 U	10 U		10 U	11 U		10 U
2,4,5-Trichlorophenol	ug/L	25 U	50 U		25 U	54 U		25 U
2-Chloronaphthalene	ug/L	10 U	10 U		10 U	11 U		10 U
2-Nitroaniline	ug/L	25 U	50 U		25 U	54 U		25 U
Dimethylphthalate	ug/L	10 U	10 U		10 U	11 U		10 U
Acenaphthylene	ug/L	10 U	10 U		10 U	11 U		10 U
2,6-Dinitrotoluene	ug/L	10 U	10 U		10 U	11 U		10 U
3-Nitroaniline	ug/L	25 U	50 U		25 U	54 U		25 U
Acenaphthene	ug/L	10 U	10 U		10 U	11 U		10 U
2,4-Dinitrophenol	ug/L	25 U	50 U		25 U	54 U		25 U
4-Nitrophenol	ug/L	25 U	50 U		25 U	54 U		25 U
Dibenzofuran	ug/L	10 U	10 U		10 U	11 U		10 U
2,4-Dinitrotoluene	ug/L	10 U	10 U		10 U	11 U		10 U
Diethylphthalate	ug/L	10 U	10 U		10 U	11 U		10 U
4-Chlorophenyl-phenylether	ug/L	10 U	10 U		10 U	11 U		10 U
Fluorene	ug/L	10 U	10 U		10 U	11 U		10 U
4-Nitroaniline	ug/L	25 U	50 U		25 U	54 U		25 U
4,6-Dinitro-2-methylphenol	ug/L	25 U	50 U		25 U	54 U		25 U
N-Nitrosodiphenylamine	ug/L	10 U	10 U		10 U	11 U		10 U
4-Bromophenyl-phenylether	ug/L	10 U	10 U		10 U	11 U		10 U
Hexachlorobenzene	ug/L	10 U	10 U		10 U	11 U		10 U
Pentachlorophenol	ug/L	25 U	50 U		25 U	54 U		25 U
Phenanthrene	ug/L	10 U	10 U		10 U	11 U		10 U
Anthracene	ug/L	10 U	10 U		10 U	11 U		10 U
Carbazole	ug/L	10 U			10 U			10 U
Di-n-butylphthalate	ug/L	10 U	10 U		10 U	11 U		10 U
Fluoranthene	ug/L	10 U	10 U		10 U	11 U		10 U
Pyrene	ug/L	10 U	10 U		10 U	11 U		10 U
Butylbenzylphthalate	ug/L	10 U	10 U		10 U	11 U		10 U
3,3'-Dichlorobenzidine	ug/L	10 U	20 U		10 U	22 U		10 U
Benzo(a)anthracene	ug/L	10 U	10 U		10 U	11 U		10 U
Chrysene	ug/L	10 U	10 U		10 U	11 U		10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U	10 U		10 U	11 U		19 U
Di-n-octylphthalate	ug/L	10 U	10 U		10 U	11 U		10 U
Benzo(b)fluoranthene	ug/L	10 U	10 U		10 U	11 U		10 U
Benzo(k)fluoranthene	ug/L	10 U	10 U		10 U	11 U		10 U
Benzo(a)pyrene	ug/L	10 U	10 U		10 U	11 U		10 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U		10 U	11 U		10 U
Dibenz(a,h)anthracene	ug/L	10 U	10 U		10 U	11 U		10 U
Benzo(g,h,i)perylene	ug/L	10 U	10 U		10 U	11 U		10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX							
	LOCATION	PHASE II WATER OB	PHASE I WATER MW-28	PHASE I WATER MW-28	PHASE II WATER OB	PHASE I WATER MW-29	PHASE I WATER MW-29	PHASE II WATER OB
	DATE	03/08/93	01/14/92	01/14/92	03/02/93	01/14/92	01/14/92	03/02/93
	ES ID	MW-27	MW-28	MW-28 Filt	MW-28	MW-29	MW-29 Filt	MW-29
	LAB ID	179726	152492	152500	179509	152493	152501	179510
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
beta-BHC	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
delta-BHC	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
gamma-BHC (Lindane)	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
Heptachlor	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
Aldrin	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
Heptachlor epoxide	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
Endosulfan I	ug/L	0.052 U	0.05 U		0.05 U	0.054 U		0.05 U
Dieldrin	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
4,4'-DDE	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
Endrin	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
Endosulfan II	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
4,4'-DDD	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
Endosulfan sulfate	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
4,4'-DDT	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
Methoxychlor	ug/L	0.52 U	0.5 U		0.5 U	0.54 U		0.5 U
Endrin ketone	ug/L	0.1 U	0.1 U		0.1 U	0.11 U		0.1 U
Endrin aldehyde	ug/L	0.1 U			0.1 U			0.1 U
alpha-Chlordane	ug/L	0.052 U	0.5 U		0.05 U	0.54 U		0.05 U
gamma-Chlordane	ug/L	0.052 U	0.5 U		0.05 U	0.54 U		0.05 U
Toxaphene	ug/L	5.2 U	1 U		5 U	1.1 U		5 U
Aroclor-1016	ug/L	1 U	0.5 U		1 U	0.54 U		1 U
Aroclor-1221	ug/L	2.1 U	0.5 U		2 U	0.54 U		2 U
Aroclor-1232	ug/L	1 U	0.5 U		1 U	0.54 U		1 U
Aroclor-1242	ug/L	1 U	0.5 U		1 U	0.54 U		1 U
Aroclor-1248	ug/L	1 U	0.5 U		1 U	0.54 U		1 U
Aroclor-1254	ug/L	1 U	1 U		1 U	1.1 U		1 U
Aroclor-1260	ug/L	1 U	1 U		1 U	1.1 U		1 U
Explosives								
HMX	ug/L	0.12 U	1 U		0.12 U	1 U		0.12 U
RDX	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
Tetryl	ug/L	0.12 U	0.4 U		0.12 U	0.4 U		0.12 U
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U	0.087 J		0.12 U	0.12 U		0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U		0.12 U	0.12 U		0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	OB	MW-28	MW-28	OB	MW-29	MW-29	OB
	ES ID	03/08/93	01/14/92	01/14/92	03/02/93	01/14/92	01/14/92	03/02/93
	LAB ID	MW-27	MW-28	MW-28 Filt	MW-28	MW-29	MW-29 Filt	MW-29
	UNITS	179726	152492	152500	179509	152493	152501	179510
Metals								
Aluminum	ug/l	68.7 J	34700	24.5 U	598	12600	24.4 U	529
Antimony	ug/l	53.6 U	53.2 U	53.3 U	54.1 U	53 U	52.9 U	53.6 U
Arsenic	ug/l	1.7 U	4.2 J	3.5 U	1.7 U	3.5 U	3.5 U	1.7 U
Barium	ug/l	80.8 J	411	53.9 R	59.5 J	166 J	78.1 J	76.8 J
Beryllium	ug/l	0.3 U	1.8 R	1.2 R	0.3 U	1.1 U	1.5 R	0.3 U
Cadmium	ug/l	3.1 U	6 R	3 U	3.1 U	3 U	3 U	3.1 U
Calcium	ug/l	92400	172000	116000	53900	137000	116000	108000
Chromium	ug/l	2 U	53.9	6.2 U R	2 U	18.5	6.1 U R	2 U
Cobalt	ug/l	5 U	24.6 J	20.4 U	5 U	20.3 U	20.3 U	5 U
Copper	ug/l	1.9 U	37.9	10.2 U	1.9 U	27.2	10.1 U	1.9 U
Iron	ug/l	82.4 R	50800 J	7 U R	56.8 J	19400 J	6.9 U R	609
Lead	ug/l	0.89 U	34.9	1.2 U	0.9 U	9.2	1.2 U	0.9 U
Magnesium	ug/l	70600	44600	24500	2040 J	39800	29700	29000
Manganese	ug/l	84.3	700 J	85.9	1.5 J	432 J	4.8 U	16.1
Mercury	ug/l	0.06 U	0.18 R	0.2 R	0.06 U	0.16 R	0.17 R	0.06 U
Nickel	ug/l	3.5 U	81.6	14.8 U	3.5 U	35.3 J	14.7 U	3.5 U
Potassium	ug/l	7420	10200	2220 J	11000	3700 J	592 J	966 J
Selenium	ug/l	1.1 U	5 U	2 J	1.1 U	2 J	1.9 J	1.1 U
Silver	ug/l	3.2 U	6.8 R	5.7 J	3.2 U	6.1 R	3.4 U	3.2 U
Sodium	ug/l	18300	15300	15000	56800	14900	14000	11200
Thallium	ug/l	2.6 U	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U
Vanadium	ug/l	2.1 U	45.3 J	9.5 U	5.1 J	19.5 J	9.4 U	2.1 U
Zinc	ug/l	4.3 R	108 R	8.5 U	5.4 R	84.3 R	8.4 U	5.8 R
Cyanide	ug/l	10 U	10 U J		10 U	10 U J		10 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-30 01/09/92 MW-30 152143 ug/L	PHASE I WATER MW-30 01/09/92 MW-30 Filt 152173 ug/L	PHASE II WATER OB 03/10/93 MW-30 179859 ug/L	PHASE I WATER MW-31 01/16/92 MW 31 152631 ug/L	PHASE I WATER MW-31 01/16/92 MW-31 Filt 152664 ug/L	PHASE II WATER OB 03/04/93 MW-31 179603 ug/L	PHASE I WATER MW-32 01/16/92 MW 32 152632 ug/L
Volatile Organic Compounds								
Chloromethane		10 U		0.5 U	10 U		0.5 U	10 U
Bromomethane		10 U		0.5 U	10 U		0.5 U	10 U
Vinyl Chloride		10 U		0.5 U	10 U		0.5 U	10 U
Chloroethane		10 U		0.5 U	10 U		0.5 U	10 U
Methylene Chloride		5 U		0.5 U	**6 U**		0.5 U	5 U
Acetone		10 U		5 U	**10 U**		5 U	**10 U**
Carbon Disulfide		5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethene		5 U		0.5 U	5 U		0.5 U	5 U
1,1-Dichloroethane		5 U		0.5 U	5 U		0.5 U	5 U
trans-1,2-Dichloroethene				0.5 U			0.5 U	
cis-1,2-Dichloroethene				0.5 U			0.5 U	
1,2-Dichloroethene (total)		5 U			5 U			5 U
Chloroform		5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloroethane		5 U		0.5 U	5 U		0.5 U	5 U
2-Butanone		10 U		5 U	10 U		5 U	10 U
1,1,1-Trichloroethane		5 U		0.5 U	5 U		0.5 U	5 U
Carbon Tetrachloride		5 U		0.5 U	5 U		0.5 U	5 U
Vinyl Acetate		10 U			10 U			10 U
Bromodichloromethane		5 U		0.5 U	5 U		0.5 U	5 U
1,2-Dichloropropane		5 U		0.5 U	5 U		0.5 U	5 U
cis-1,3-Dichloropropene		5 U		0.5 U	5 U		0.5 U	5 U
Trichloroethene		5 U		0.5 U	5 U		0.5 U	5 U
Dibromochloromethane		5 U		0.5 U	5 U		0.5 U	5 U
1,1,2-Trichloroethane		5 U		0.5 U	5 U		0.5 U	5 U
Benzene		5 U		0.5 U	5 U		0.5 U	5 U
trans-1,3-Dichloropropene		5 U		0.5 U	5 U		0.5 U	5 U
Bromoform		5 U		0.5 U	5 U		0.5 U	5 U
4-Methyl-2-Pentanone		10 U		5 U	10 U		5 U	10 U
2-Hexanone		10 U		5 U	10 U		5 U	10 U
Tetrachloroethene		5 U		0.5 U	5 U		0.5 U	5 U
1,1,2,2-Tetrachloroethane		5 U		0.5 U	5 U		0.5 U	5 U
Toluene		5 U		0.5 U	5 U		0.5 U	5 U
Chlorobenzene		5 U		0.5 U	5 U		0.5 U	5 U
Ethylbenzene		5 U		0.5 U	5 U		0.5 U	5 U
Styrene		5 U		0.5 U	5 U		0.5 U	5 U
Xylene (total)		5 U		0.5 U	5 U		0.5 U	5 U
Dichlorodifluoromethane				0.5 U			0.5 U	
Trichlorofluoromethane				0.5 U			0.5 U	
2,2-Dichloropropane				0.5 U			0.5 U	
Bromochloromethane				0.5 U			0.5 U	
1,1-Dichloropropene				0.5 U			0.5 U	
Dibromomethane				0.5 U			0.5 U	
1,3-Dichloropropane				0.5 U			0.5 U	
1,2-Dibromoethane				0.5 U			0.5 U	
1,1,1,2-Tetrachloroethane				0.5 U			0.5 U	
Isopropylbenzene				0.5 U			0.5 U	
Bromobenzene				0.5 U			0.5 U	
1,2,3-Trichloropropane				0.5 U			0.5 U	
n-Propylbenzene				0.5 U			0.5 U	
2-Chlorotoluene				0.5 U			0.5 U	
4-Chlorotoluene				0.5 U			0.5 U	
1,3,5-Trimethylbenzene				0.5 U			0.5 U	
tert-Butylbenzene				0.5 U			0.5 U	
1,2,4-Trimethylbenzene				0.5 U			0.5 U	
sec-Butylbenzene				0.5 U			0.5 U	
1,3-Dichlorobenzene				0.5 U			0.5 U	
1,4-Dichlorobenzene				0.5 U			0.5 U	
p-Isopropyltoluene				0.5 U			0.5 U	
1,2-Dichlorobenzene				0.5 U			0.5 U	
n-Butylbenzene				0.5 U			0.5 U	
1,2-Dibromo-3-Chloropropane				0.5 U			0.5 U	
1,2,4-Trichlorobenzene				0.5 U			0.5 U	
Hexachlorobutadiene				0.5 U			0.5 U	
Naphthalene				0.5 U			0.5 U	
1,2,3-Trichlorobenzene				0.5 U			0.5 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-30 01/09/92 MW-30 152143	PHASE I WATER MW-30 01/09/92 MW-30 Filt 152173	PHASE II WATER OB 03/10/93 MW-30 179859	PHASE I WATER MW-31 01/16/92 MW 31 152631	PHASE I WATER MW-31 01/16/92 MW-31 Filt 152664	PHASE II WATER OB 03/04/93 MW-31 179603	PHASE I WATER MW-32 01/16/92 MW 32 152632
Semivolatiles								
Phenol	ug/L	10 U		10 U	11 U		10 U	11 U
bis(2-Chloroethyl) ether	ug/L	10 U		10 U	11 U		10 U	11 U
2-Chlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
1,3-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
1,4-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzyl Alcohol	ug/L	10 U			11 U			11 U
1,2-Dichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
2-Methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U		10 U	11 U		10 U	11 U
4-Methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
N-Nitroso-di-n-propylamine	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachloroethane	ug/L	10 U		10 U	11 U		10 U	11 U
Nitrobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Isophorone	ug/L	10 U		10 U	11 U		10 U	11 U
2-Nitrophenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dimethylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
Benzoic acid	ug/L	52 U			55 U			54 U
bis(2-Chloroethoxy) methane	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dichlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
1,2,4-Trichlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Naphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chloroaniline	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorobutadiene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chloro-3-methylphenol	ug/L	10 U		10 U	11 U		10 U	11 U
2-Methylnaphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorocyclopentadiene	ug/L	10 U		10 U	11 U		10 U	11 U
2,4,6-Trichlorophenol	ug/L	10 U		10 U	11 U		10 U	11 U
2,4,5-Trichlorophenol	ug/L	52 U		25 U	55 U		25 U	54 U
2-Chloronaphthalene	ug/L	10 U		10 U	11 U		10 U	11 U
2-Nitroaniline	ug/L	52 U		25 U	55 U		25 U	54 U
Dimethylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Acenaphthylene	ug/L	10 U		10 U	11 U		10 U	11 U
2,6-Dinitrotoluene	ug/L	10 U		10 U	11 U		10 U	11 U
3-Nitroaniline	ug/L	52 U		25 U	55 U		25 U	54 U
Acenaphthene	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dinitrophenol	ug/L	52 U		25 U	55 U		25 U	54 U
4-Nitrophenol	ug/L	52 U		25 U	55 U		25 U	54 U
Dibenzofuran	ug/L	10 U		10 U	11 U		10 U	11 U
2,4-Dinitrotoluene	ug/L	10 U		10 U	11 U		10 U	11 U
Diethylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
4-Chlorophenyl-phenylether	ug/L	10 U		10 U	11 U		10 U	11 U
Fluorene	ug/L	10 U		10 U	11 U		10 U	11 U
4-Nitroaniline	ug/L	52 U		25 U	55 U		25 U	54 U
4,6-Dinitro-2-methylphenol	ug/L	52 U		25 U	55 U		25 U	54 U
N-Nitrosodiphenylamine	ug/L	10 U		10 U	11 U		10 U	11 U
4-Bromophenyl-phenylether	ug/L	10 U		10 U	11 U		10 U	11 U
Hexachlorobenzene	ug/L	10 U		10 U	11 U		10 U	11 U
Pentachlorophenol	ug/L	52 U		25 U	55 U		25 U	54 U
Phenanthrene	ug/L	10 U		10 U	11 U		10 U	11 U
Anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Carbazole	ug/L			10 U			10 U	
Di-n-butylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Butylbenzylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
3,3'-Dichlorobenzidine	ug/L	21 U		10 U	22 U		10 U	22 U
Benzo(a)anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Chrysene	ug/L	10 U		10 U	11 U		10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Di-n-octylphthalate	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(b)fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(k)fluoranthene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(a)pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U		10 U	11 U		10 U	11 U
Dibenz(a,h)anthracene	ug/L	10 U		10 U	11 U		10 U	11 U
Benzo(g,h,i)perylene	ug/L	10 U		10 U	11 U		10 U	11 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I	PHASE I	PHASE II	PHASE I	PHASE I	PHASE II	PHASE I
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	MW-30	MW-30	OB	MW-31	MW-31	OB	MW-32
	ES ID	01/09/92	01/09/92	03/10/93	01/16/92	01/16/92	03/04/93	01/16/92
	LAB ID	MW-30	MW-30 Filt	MW-30	MW 31	MW-31 Filt	MW-31	MW 32
	UNITS	152143	152173	179859	152631	152664	179603	152632
Pesticides/PCBs								
alpha-BHC	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
beta-BHC	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
delta-BHC	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
gamma-BHC (Lindane)	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
Heptachlor	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
Aldrin	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
Heptachlor epoxide	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
Endosulfan I	ug/L	0.05 U		0.05 U	0.052 U		0.05 U	0.05 U
Dieldrin	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
4,4'-DDE	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
Endrin	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
Endosulfan II	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
4,4'-DDD	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
Endosulfan sulfate	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
4,4'-DDT	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
Methoxychlor	ug/L	0.5 U		0.5 U	0.52 U		0.5 U	0.5 U
Endrin ketone	ug/L	0.099 U		0.1 U	0.1 U		0.1 U	0.1 U
Endrin aldehyde	ug/L			0.1 U			0.1 U	
alpha-Chlordane	ug/L	0.5 U		0.05 U	0.52 U		0.05 U	0.5 U
gamma-Chlordane	ug/L	0.5 U		0.05 U	0.52 U		0.05 U	0.5 U
Toxaphene	ug/L	0.99 U		5 U	1 U		5 U	1 U
Aroclor-1016	ug/L	0.5 U		1 U	0.52 U		1 U	0.5 U
Aroclor-1221	ug/L	0.5 U		2 U	0.52 U		2 U	0.5 U
Aroclor-1232	ug/L	0.5 U		1 U	0.52 U		1 U	0.5 U
Aroclor-1242	ug/L	0.5 U		1 U	0.52 U		1 U	0.5 U
Aroclor-1248	ug/L	0.5 U		1 U	0.52 U		1 U	0.5 U
Aroclor-1254	ug/L	0.99 U		1 U	1 U		1 U	1 U
Aroclor-1260	ug/L	0.99 U		1 U	1 U		1 U	1 U
Explosives								
HMX	ug/L	1 U		0.12 U	1 U		0.12 U	1 U
RDX	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
Tetryl	ug/L	0.4 U		0.12 U	0.4 U		0.12 U	0.4 U
2,4,6-Trinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U		0.12 U	0.12 U		0.12 U	0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	UNITS	PHASE I WATER MW-30 01/09/92 MW-30 152143		PHASE I WATER MW-30 01/09/92 MW-30 Filt 152173		PHASE II WATER OB 03/10/93 MW-30 179859		PHASE I WATER MW-31 01/16/92 MW 31 152631		PHASE I WATER MW-31 01/16/92 MW-31 Filt 152664		PHASE II WATER OB 03/04/93 MW-31 179603		PHASE I WATER MW-32 01/16/92 MW 32 152632	
Metals																
Aluminum	LOCATION	ug/l	1440	J	24.5	U	62.1	U	120000		97.4	U	1830		35200	
Antimony	DATE	ug/l	58.3	J	53.1	U	53.7	U	53.3	U	52.9	U	54	U	54.4	J
Arsenic	ES ID	ug/l	3.5	U	3.5	U	1.7	U	8.3	J	3.5	U	1.7	U	5.5	J
Barium	LAB ID	ug/l	94.2	J	74.9	J	81.4	J	955		21.2	J	55.7	J	347	
Beryllium		ug/l	1.8	R	1.1	U R	0.3	U	6.6	R	1.2	U	0.34	J	2.8	R
Cadmium		ug/l	2.9	U	3	U	3.1	U	20	R	3	U	3.1	U	3.3	R
Calcium		ug/l	164000		159000		161000		407000		149000		130000		151000	
Chromium		ug/l	6.2	U	6.2	U R	2	U	202		6.1	U	2.8	J	62.6	
Cobalt		ug/l	19.9	U	20.4	U	5	U	78.8		19.8	U	5	U	20.5	U
Copper		ug/l	14.4	U	10.1	U	1.9	U	176		14.4	U	1.9	U	43.1	
Iron		ug/l	1870		7	U R	21.7	U	176000	J	17	U	2010		52100	J
Lead		ug/l	1.3	J	1.2	U	0.89	U	159		1.2	U	1.2	J	41.6	
Magnesium		ug/l	23800		24200		25200		95500		38900		34100		41000	
Manganese		ug/l	39.8	R	16.8		7.2	J	2400	J	77.7		33		734	J
Mercury		ug/l	0.15	R	0.3	R	0.06	U	0.21	R	0.03	U	0.06	U	0.17	R
Nickel		ug/l	15.9	U	14.7	U	3.5	U	282		15.9	U	9.3	J	83.3	
Potassium		ug/l	996	J	697	J	443	U	22300		2520	J	1210	J	9900	
Selenium		ug/l	1.1	J	1.3	J	1.1	U	10	U	1.7	J	1.1	U	10	U
Silver		ug/l	9	U	3.4	U	3.2	U	3.4	U	9	U	3.2	U	3.4	U
Sodium		ug/l	17500		17800		17800		12500		10800		17100		9100	
Thallium		ug/l	3.2	U	3.2	U	2.6	U	3.2	U	3.2	U	2.6	U	3.2	U
Vanadium		ug/l	30.4	U	9.5	U	2.1	U	180		30.3	U	4.3	J	54	
Zinc		ug/l	21.1	R	11.1	J	2.6	R	433		13.4	U	24.9	R	135	
Cyanide		ug/l	10	U J			10	U	10	U J			10	U	10	U J

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-32 01/16/92 MW-32 Filt 152665	PHASE II WATER OB 03/11/93 MW-32 179898	PHASE I WATER MW-34 01/08/92 MW-34 152145	PHASE I WATER MW-34 01/08/92 MW-34 Filt 152174	PHASE II WATER OB 03/12/93 MW-34 179962	PHASE I WATER MW-35 01/08/92 MW-35 152146	PHASE I WATER MW-35 01/08/92 MW-35 Filt 152175
Volatile Organic Compounds								
Chloromethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Bromomethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Vinyl Chloride	ug/L		0.5 U	10 U		0.5 U	10 U	
Chloroethane	ug/L		0.5 U	10 U		0.5 U	10 U	
Methylene Chloride	ug/L		0.5 U	5 U		0.5 U	5 U	
Acetone	ug/L		5 U	**10 U**		5 U	**10 U**	
Carbon Disulfide	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1-Dichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
trans-1,2-Dichloroethene	ug/L		0.5 U			0.5 U		
cis-1,2-Dichloroethene	ug/L		0.5 U			0.5 U		
1,2-Dichloroethene (total)	ug/L			5 U			5 U	
Chloroform	ug/L		0.5 U	5 U		0.5 U	5 U	
1,2-Dichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
2-Butanone	ug/L		5 U	10 U		5 U	10 U	
1,1,1-Trichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Carbon Tetrachloride	ug/L		0.5 U	5 U		0.5 U	5 U	
Vinyl Acetate	ug/L			10 U			10 U	
Bromodichloromethane	ug/L		0.5 U	5 U		0.5 U	5 U	
1,2-Dichloropropane	ug/L		0.5 U	5 U		0.5 U	5 U	
cis-1,3-Dichloropropene	ug/L		0.5 U	5 U		0.5 U	5 U	
Trichloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
Dibromochloromethane	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1,2-Trichloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Benzene	ug/L		0.5 U	5 U		0.5 U	5 U	
trans-1,3-Dichloropropene	ug/L		0.5 U	5 U		0.5 U	5 U	
Bromoform	ug/L		0.5 U	5 U		0.5 U	5 U	
4-Methyl-2-Pentanone	ug/L		5 U	10 U		5 U	10 U	
2-Hexanone	ug/L		5 U	10 U		5 U	10 U	
Tetrachloroethene	ug/L		0.5 U	5 U		0.5 U	5 U	
1,1,2,2-Tetrachloroethane	ug/L		0.5 U	5 U		0.5 U	5 U	
Toluene	ug/L		0.5 U	5 U		0.5 U	5 U	
Chlorobenzene	ug/L		0.5 U	5 U		0.5 U	5 U	
Ethylbenzene	ug/L		0.5 U	5 U		0.5 U	5 U	
Styrene	ug/L		0.5 U	5 U		0.5 U	5 U	
Xylene (total)	ug/L		0.5 U	5 U		0.5 U	5 U	
Dichlorodifluoromethane	ug/L		0.5 U			0.5 U		
Trichlorofluoromethane	ug/L		0.5 U			0.5 U		
2,2-Dichloropropane	ug/L		0.5 U			0.5 U		
Bromochloromethane	ug/L		0.5 U			0.5 U		
1,1-Dichloropropene	ug/L		0.5 U			0.5 U		
Dibromomethane	ug/L		0.5 U			0.5 U		
1,3-Dichloropropane	ug/L		0.5 U			0.5 U		
1,2-Dibromoethane	ug/L		0.5 U			0.5 U		
1,1,1,2-Tetrachloroethane	ug/L		0.5 U			0.5 U		
Isopropylbenzene	ug/L		0.5 U			0.5 U		
Bromobenzene	ug/L		0.5 U			0.5 U		
1,2,3-Trichloropropane	ug/L		0.5 U			0.5 U		
n-Propylbenzene	ug/L		0.5 U			0.5 U		
2-Chlorotoluene	ug/L		0.5 U			0.5 U		
4-Chlorotoluene	ug/L		0.5 U			0.5 U		
1,3,5-Trimethylbenzene	ug/L		0.5 U			0.5 U		
tert-Butylbenzene	ug/L		0.5 U			0.5 U		
1,2,4-Trimethylbenzene	ug/L		0.5 U			0.5 U		
sec-Butylbenzene	ug/L		0.5 U			0.5 U		
1,3-Dichlorobenzene	ug/L		0.5 U			0.5 U		
1,4-Dichlorobenzene	ug/L		0.5 U			0.5 U		
p-Isopropyltoluene	ug/L		0.5 U			0.5 U		
1,2-Dichlorobenzene	ug/L		0.5 U			0.5 U		
n-Butylbenzene	ug/L		0.5 U			0.5 U		
1,2-Dibromo-3-Chloropropane	ug/L		0.5 U			0.5 U		
1,2,4-Trichlorobenzene	ug/L		0.5 U			0.5 U		
Hexachlorobutadiene	ug/L		0.5 U			0.5 U		
Naphthalene	ug/L		0.5 U			0.5 U		
1,2,3-Trichlorobenzene	ug/L		0.5 U			0.5 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-32 01/16/92 MW-32 Filt 152665	PHASE II WATER OB 03/11/93 MW-32 179898	PHASE I WATER MW-34 01/08/92 MW-34 152145	PHASE I WATER MW-34 01/08/92 MW-34 Filt 152174	PHASE II WATER OB 03/12/93 MW-34 179962	PHASE I WATER MW-35 01/08/92 MW-35 152146	PHASE I WATER MW-35 01/08/92 MW-35 Filt 152175
Semivolatiles								
Phenol	ug/L		10 U	10 U		10 U	11 U	
bis(2-Chloroethyl) ether	ug/L		10 U	10 U		10 U	11 U	
2-Chlorophenol	ug/L		10 U	10 U		10 U	11 U	
1,3-Dichlorobenzene	ug/L		10 U	10 U		10 U	11 U	
1,4-Dichlorobenzene	ug/L		10 U	10 U		10 U	11 U	
Benzyl Alcohol	ug/L			10 U			11 U	
1,2-Dichlorobenzene	ug/L		10 U	10 U		10 U	11 U	
2-Methylphenol	ug/L		10 U	10 U		10 U	11 U	
2,2'-oxybis(1-Chloropropane)	ug/L		10 U	10 U		10 U	11 U	
4-Methylphenol	ug/L		10 U	10 U		10 U	11 U	
N-Nitroso-di-n-propylamine	ug/L		10 U	10 U		10 U	11 U	
Hexachloroethane	ug/L		10 U	10 U		10 U	11 U	
Nitrobenzene	ug/L		10 U	10 U		10 U	11 U	
Isophorone	ug/L		10 U	10 U		10 U	11 U	
2-Nitrophenol	ug/L		10 U	10 U		10 U	11 U	
2,4-Dimethylphenol	ug/L		10 U	10 U		10 U	11 U	
Benzoic acid	ug/L			50 U			53 U	
bis(2-Chloroethoxy) methane	ug/L		10 U	10 U		10 U	11 U	
2,4-Dichlorophenol	ug/L		10 U	10 U		10 U	11 U	
1,2,4-Trichlorobenzene	ug/L		10 U	10 U		10 U	11 U	
Naphthalene	ug/L		10 U	10 U		10 U	11 U	
4-Chloroaniline	ug/L		10 U	10 U		10 U	11 U	
Hexachlorobutadiene	ug/L		10 U	10 U		10 U	11 U	
4-Chloro-3-methylphenol	ug/L		10 U	10 U		10 U	11 U	
2-Methylnaphthalene	ug/L		10 U	10 U		10 U	11 U	
Hexachlorocyclopentadiene	ug/L		10 U	10 U		10 U	11 U	
2,4,6-Trichlorophenol	ug/L		10 U	10 U		10 U	11 U	
2,4,5-Trichlorophenol	ug/L		25 U	50 U		25 U	53 U	
2-Chloronaphthalene	ug/L		10 U	10 U		10 U	11 U	
2-Nitroaniline	ug/L		25 U	50 U		25 U	53 U	
Dimethylphthalate	ug/L		10 U	10 U		10 U	11 U	
Acenaphthylene	ug/L		10 U	10 U		10 U	11 U	
2,6-Dinitrotoluene	ug/L		10 U	10 U		10 U	11 U	
3-Nitroaniline	ug/L		25 U	50 U		25 U	53 U	
Acenaphthene	ug/L		10 U	10 U		10 U	11 U	
2,4-Dinitrophenol	ug/L		25 U	50 U		25 U	53 U	
4-Nitrophenol	ug/L		25 U	50 U		25 U	53 U	
Dibenzofuran	ug/L		10 U	10 U		10 U	11 U	
2,4-Dinitrotoluene	ug/L		10 U	10 U		10 U	11 U	
Diethylphthalate	ug/L		10 U	10 U		10 U	11 U	
4-Chlorophenyl-phenylether	ug/L		10 U	10 U		10 U	11 U	
Fluorene	ug/L		10 U	10 U		10 U	11 U	
4-Nitroaniline	ug/L		25 U	50 U		25 U	53 U	
4,6-Dinitro-2-methylphenol	ug/L		25 U	50 U		25 U	53 U	
N-Nitrosodiphenylamine	ug/L		10 U	10 U		10 U	11 U	
4-Bromophenyl-phenylether	ug/L		10 U	10 U		10 U	11 U	
Hexachlorobenzene	ug/L		10 U	10 U		10 U	11 U	
Pentachlorophenol	ug/L		25 U	50 U		25 U	53 U	
Phenanthrene	ug/L		10 U	10 U		10 U	11 U	
Anthracene	ug/L		10 U	10 U		10 U	11 U	
Carbazole	ug/L		10 U			10 U		
Di-n-butylphthalate	ug/L		10 U	10 U		2 J	11 U	
Fluoranthene	ug/L		10 U	10 U		10 U	11 U	
Pyrene	ug/L		10 U	10 U		10 U	11 U	
Butylbenzylphthalate	ug/L		10 U	10 U		10 U	11 U	
3,3'-Dichlorobenzidine	ug/L		10 U	20 U		10 U	21 U	
Benzo(a)anthracene	ug/L		10 U	10 U		10 U	11 U	
Chrysene	ug/L		10 U	10 U		10 U	11 U	
bis(2-Ethylhexyl)phthalate	ug/L		10 U	10 U		24 U	11 U	
Di-n-octylphthalate	ug/L		10 U	10 U		10 U	11 U	
Benzo(b)fluoranthene	ug/L		10 U	10 U		10 U	11 U	
Benzo(k)fluoranthene	ug/L		10 U	10 U		10 U	11 U	
Benzo(a)pyrene	ug/L		10 U	10 U		10 U	11 U	
Indeno(1,2,3-cd)pyrene	ug/L		10 U	10 U		10 U	11 U	
Dibenz(a,h)anthracene	ug/L		10 U	10 U		10 U	11 U	
Benzo(g,h,i)perylene	ug/L		10 U	10 U		10 U	11 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER MW-32 01/16/92 MW-32 Filt 152665	PHASE II WATER OB 03/11/93 MW-32 179898	PHASE I WATER MW-34 01/08/92 MW-34 152145	PHASE I WATER MW-34 01/08/92 MW-34 Filt 152174	PHASE II WATER OB 03/12/93 MW-34 179962	PHASE I WATER MW-35 01/08/92 MW-35 152146	PHASE I WATER MW-35 01/08/92 MW-35 Filt 152175
Pesticides/PCBs								
alpha-BHC	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
beta-BHC	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
delta-BHC	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
gamma-BHC (Lindane)	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
Heptachlor	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
Aldrin	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
Heptachlor epoxide	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
Endosulfan I	ug/L		0.053 U	0.053 U		0.058 U	0.054 U	
Dieldrin	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
4,4'-DDE	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
Endrin	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
Endosulfan II	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
4,4'-DDD	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
Endosulfan sulfate	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
4,4'-DDT	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
Methoxychlor	ug/L		0.53 U	0.53 U		0.58 U	0.54 U	
Endrin ketone	ug/L		0.11 U	0.11 U		0.12 U	0.11 U	
Endrin aldehyde	ug/L		0.11 U			0.12 U		
alpha-Chlordane	ug/L		0.053 U	0.53 U		0.058 U	0.54 U	
gamma-Chlordane	ug/L		0.053 U	0.53 U		0.058 U	0.54 U	
Toxaphene	ug/L		5.3 U	1.1 U		5.8 U	1.1 U	
Aroclor-1016	ug/L		1.1 U	0.53 U		1.2 U	0.54 U	
Aroclor-1221	ug/L		2.1 U	0.53 U		2.3 U	0.54 U	
Aroclor-1232	ug/L		1.1 U	0.53 U		1.2 U	0.54 U	
Aroclor-1242	ug/L		1.1 U	0.53 U		1.2 U	0.54 U	
Aroclor-1248	ug/L		1.1 U	0.53 U		1.2 U	0.54 U	
Aroclor-1254	ug/L		1.1 U	1.1 U		1.2 U	1.1 U	
Aroclor-1260	ug/L		1.1 U	1.1 U		1.2 U	1.1 U	
Explosives								
HMX	ug/L		0.12 U	1 U		0.12 U	1 U	
RDX	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
1,3,5-Trinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
1,3-Dinitrobenzene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
Tetryl	ug/L		0.12 U	0.4 U		0.12 U	0.4 U	
2,4,6-Trinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
4-amino-2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2-amino-4,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	
2,4-Dinitrotoluene	ug/L		0.12 U	0.12 U		0.12 U	0.12 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER	PHASE II WATER	PHASE I WATER	PHASE I WATER
	LOCATION	MW-32	OB	MW-34	MW-34	OB	MW-35	MW-35
	DATE	01/16/92	03/11/93	01/08/92	01/08/92	03/12/93	01/08/92	01/08/92
	ES ID	MW-32 Filt	MW-32	MW-34	MW-34 Filt	MW-34	MW-35	MW-35 Filt
	LAB ID	152665	179898	152145	152174	179962	152146	152175
	UNITS							
Metals								
Aluminum	ug/l	97.9 U	884 J	131000	24.5 U	13000 J	7550 J	24.5 U
Antimony	ug/l	53.2 U	54 U	55.8 U	53.2 U	53.9 U	55.5 U	53.1 U
Arsenic	ug/l	3.5 U	1.7 U	3.5 U	3.5 U	3.3 J	3.5 U	3.5 U
Barium	ug/l	41.6 J	53.9 J	779	10.7 R	103 J	103 J	37.5 R
Beryllium	ug/l	1.2 U	0.3 U	7.8 R	1.1 U R	0.89 J	1.8 R	1.1 U R
Cadmium	ug/l	3 U	3.1 U	13.2	3 U	3.1 U	2.9 U	3 U
Calcium	ug/l	95400	93400	538000	66900	117000	94700	87800
Chromium	ug/l	6.2 U	2.2 J	200	6.2 U R	21.5	15.3 R	6.2 U R
Cobalt	ug/l	19.9 U	5 U	152	20.4 U	11.1 J	19.9 J	20.4 U
Copper	ug/l	14.4 U	3.7 R	233	10.2 U	21.1 J	14.4 U	10.1 U
Iron	ug/l	17 U	957 J	254000	7 U R	19700 J	10500	7 U R
Lead	ug/l	1.2 U	1.5 J	62.4	1.2 U	7.2	3.3	1.2 U
Magnesium	ug/l	23500	23000	76500	7510	15100	14600	12900
Manganese	ug/l	153	38.4	5610 J	18	403	557 J	306
Mercury	ug/l	0.04 J	0.06 U	0.3 R	0.16 R	0.08 R	0.18 R	0.18 R
Nickel	ug/l	15.9 U	3.5 U	362	14.7 U	30.1 J	15.9 U	14.7 U
Potassium	ug/l	2360 J	1360 J	16200	418 J	3220 J	4180 J	2790 J
Selenium	ug/l	1 U	1.1 U	10 U	2.3 J	1.1 U	1.1 J	1.2 J
Silver	ug/l	9.1 U	3.2 U	9.1 U	3.4 U	3.2 U	9 U	3.4 U
Sodium	ug/l	7960	7140	4750 J	3590 J	3560 J	44100	39600
Thallium	ug/l	3.2 U	2.6 U	3.2 U	3.2 U	2.6 U	3.2 U	3.2 U
Vanadium	ug/l	30.5 U	3.4 J	167	9.5 U	20.1 J	30.3 U	9.5 U
Zinc	ug/l	13.4 U	10.2 R	734	12.9 J	76	58.2	13.8 J
Cyanide	ug/l		10 U	10 U J		10 U	10 U J	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DATE	03/12/93	03/12/93	03/11/93	03/12/93	03/04/93	03/09/93	03/10/93
	ES ID	MW-35	MW-35D	MW-36	MW-38	MW-39	MW-40	MW-40
	LAB ID	179963	179964	179965	179966	179605	179848	179875
COMPOUND	UNITS		DUP MW-35					
Volatile Organic Compounds								
Chloromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Bromomethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Vinyl Chloride	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Chloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Methylene Chloride	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Acetone	ug/L	5 U	5 U	5 U	5 U	5 U		
Carbon Disulfide	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1-Dichloroethene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1-Dichloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
trans-1,2-Dichloroethene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
cis-1,2-Dichloroethene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dichloroethene (total)	ug/L							
Chloroform	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dichloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
2-Butanone	ug/L	5 U	5 U	5 U	5 U	5 U		
1,1,1-Trichloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Carbon Tetrachloride	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Vinyl Acetate	ug/L							
Bromodichloromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dichloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
cis-1,3-Dichloropropene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Trichloroethene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Dibromochloromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1,2-Trichloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Benzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
trans-1,3-Dichloropropene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Bromoform	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
4-Methyl-2-Pentanone	ug/L	5 U	5 U	5 U	5 U	5 U		
2-Hexanone	ug/L	5 U	5 U	5 U	5 U	5 U		
Tetrachloroethene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1,2,2-Tetrachloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Toluene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Chlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Ethylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Styrene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Xylene (total)	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Dichlorodifluoromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Trichlorofluoromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
2,2-Dichloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Bromochloromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1-Dichloropropene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Dibromomethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,3-Dichloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dibromoethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,1,1,2-Tetrachloroethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Isopropylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Bromobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2,3-Trichloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
n-Propylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
2-Chlorotoluene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
4-Chlorotoluene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,3,5-Trimethylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
tert-Butylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2,4-Trimethylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
sec-Butylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,3-Dichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,4-Dichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
p-Isopropyltoluene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
n-Butylbenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2-Dibromo-3-Chloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2,4-Trichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Hexachlorobutadiene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
Naphthalene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
1,2,3-Trichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	OB	OB	OB	OB	OB	OB	OB
	ES ID	03/12/93	03/12/93	03/11/93	03/12/93	03/04/93	03/09/93	03/10/93
	LAB ID	MW-35	MW-35D	MW-36	MW-38	MW-39	MW-40	MW-40
	UNITS	179963	179964	179965	179966	179605	179848	179875
			DUP MW-35					
Semivolatiles								
Phenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
bis(2-Chloroethyl) ether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2-Chlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
1,3-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
1,4-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzyl Alcohol	ug/L							
1,2-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Hexachloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Nitrobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Isophorone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2-Nitrophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4-Dimethylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzoic acid	ug/L							
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
1,2,4-Trichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Naphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Chloroaniline	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Hexachlorobutadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Chloro-3-methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2-Methylnaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Hexachlorocyclopentadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4,6-Trichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4,5-Trichlorophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
2-Chloronaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
Dimethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Acenaphthylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,6-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
3-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
Acenaphthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4-Dinitrophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
4-Nitrophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
Dibenzofuran	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
2,4-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Diethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Chlorophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Fluorene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
4,6-Dinitro-2-methylphenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
N-Nitrosodiphenylamine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
4-Bromophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Hexachlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Pentachlorophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	
Phenanthrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Carbazole	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Di-n-butylphthalate	ug/L	0.7 J	2 J	10 U	10 U	10 U	10 U	
Fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Butylbenzylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
3,3'-Dichlorobenzidine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(a)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Chrysene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
bis(2-Ethylhexyl)phthalate	ug/L	10 U	10 U	10 U	10 U	13 U	10 U	
Di-n-octylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(b)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(k)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(a)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Dibenz(a,h)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	
Benzo(g,h,i)perylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	UNITS	PHASE II WATER OB 03/12/93 MW-35 179963	PHASE II WATER OB 03/12/93 MW-35D 179964 DUP MW-35	PHASE II WATER OB 03/11/93 MW-36 179965	PHASE II WATER OB 03/12/93 MW-38 179966	PHASE II WATER OB 03/04/93 MW-39 179605	PHASE II WATER OB 03/09/93 MW-40 179848	PHASE II WATER OB 03/10/93 MW-40 179875
Pesticides/PCBs								
alpha-BHC	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
beta-BHC	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
delta-BHC	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
gamma-BHC (Lindane)	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Heptachlor	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Aldrin	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Heptachlor epoxide	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Endosulfan I	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Dieldrin	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
4,4'-DDE	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
Endrin	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
Endosulfan II	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
4,4'-DDD	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
Endosulfan sulfate	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
4,4'-DDT	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
Methoxychlor	ug/L	0.6 U	0.56 U	0.56 U	0.55 U	0.52 U		0.62 U
Endrin ketone	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
Endrin aldehyde	ug/L	0.12 U	0.11 U	0.11 U	0.11 U	0.1 U		0.12 U
alpha-Chlordane	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
gamma-Chlordane	ug/L	0.06 U	0.056 U	0.056 U	0.055 U	0.052 U		0.062 U
Toxaphene	ug/L	6 U	5.6 U	5.6 U	5.5 U	5.2 U		6.2 U
Aroclor-1016	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Aroclor-1221	ug/L	2.4 U	2.2 U	2.2 U	2.2 U	2.1 U		2.5 U
Aroclor-1232	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Aroclor-1242	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Aroclor-1248	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Aroclor-1254	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Aroclor-1260	ug/L	1.2 U	1.1 U	1.1 U	1.1 U	1 U		1.2 U
Explosives								
HMX	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
RDX	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
Tetryl	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U		0.12 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DATE	03/12/93	03/12/93	03/11/93	03/12/93	03/04/93	03/09/93	03/10/93
	ES ID	MW-35	MW-35D	MW-36	MW-38	MW-39	MW-40	MW-40
	LAB ID	179963	179964	179965	179966	179605	179848	179875
COMPOUND	UNITS		DUP MW-35					
Metals								
Aluminum	ug/l	600 J	1100 J	103 J	246 J	473		
Antimony	ug/l	53.9 U	54.1 U	53.7 U	53.8 U	53.8 U		
Arsenic	ug/l	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U		
Barium	ug/l	80.2 J	86.7 J	64.3 J	33.5 J	58.1 J		
Beryllium	ug/l	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
Cadmium	ug/l	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U		
Calcium	ug/l	88700	93200	84700	91100	113000		
Chromium	ug/l	2 U	2.2 J	2 U	2 U	2 U		
Cobalt	ug/l	5 U	5 U	5 U	5 U	5 U		
Copper	ug/l	1.9 U	2.7 R	1.9 U	2.2 R	2.4 R		
Iron	ug/l	501 J	1130 J	155 J	221 J	746		
Lead	ug/l	0.91 J	1.1 J	0.89 U	0.9 U	0.9 U		
Magnesium	ug/l	14200	15000	11500	11600	33800		
Manganese	ug/l	46.6	49.4	166	171	122		
Mercury	ug/l	0.07 R	0.1 R	0.06 U	0.09 R	0.06 U		
Nickel	ug/l	3.5 U	3.5 U	3.5 U	3.5 U	4.6 J		
Potassium	ug/l	1290 J	1240 J	2240 J	2930 J	4800 J		
Selenium	ug/l	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U		
Silver	ug/l	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U		
Sodium	ug/l	7390	7880	6600	9870	33900		
Thallium	ug/l	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U		
Vanadium	ug/l	2.1 U	2.6 J	2.1 U	2.1 J	2.1 U		
Zinc	ug/l	84.2	86.3	4.3 R	4.4 R	6.8 R		
Cyanide	ug/l	10 U	10 U	10 U	10 U	10 U		

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 03/08/93 MW-40 179727	PHASE II WATER OB 03/10/93 MW-40 179899	PHASE II WATER OB 03/04/93 MW-40 179606	PHASE II WATER OB 03/03/93 MW-41 179547
Volatile Organic Compounds					
Chloromethane	ug/L			0.5 U	0.5 U
Bromomethane	ug/L			0.5 U	0.5 U
Vinyl Chloride	ug/L			0.5 U	0.5 U
Chloroethane	ug/L			0.5 U	0.5 U
Methylene Chloride	ug/L			0.5 U	0.5 U
Acetone	ug/L			5 U	5 U
Carbon Disulfide	ug/L			0.5 U	0.5 U
1,1-Dichloroethene	ug/L			0.5 U	0.5 U
1,1-Dichloroethane	ug/L			0.5 U	0.5 U
trans-1,2-Dichloroethene	ug/L			0.5 U	0.5 U
cis-1,2-Dichloroethene	ug/L			0.5 U	0.5 U
1,2-Dichloroethene (total)	ug/L				
Chloroform	ug/L			0.5 U	0.5 U
1,2-Dichloroethane	ug/L			0.5 U	0.5 U
2-Butanone	ug/L			5 U	5 U
1,1,1-Trichloroethane	ug/L			0.5 U	0.5 U
Carbon Tetrachloride	ug/L			0.5 U	0.5 U
Vinyl Acetate	ug/L				
Bromodichloromethane	ug/L			0.5 U	0.5 U
1,2-Dichloropropane	ug/L			0.5 U	0.5 U
cis-1,3-Dichloropropene	ug/L			0.5 U	0.5 U
Trichloroethene	ug/L			0.5 U	0.5 U
Dibromochloromethane	ug/L			0.5 U	0.5 U
1,1,2-Trichloroethane	ug/L			0.5 U	0.5 U
Benzene	ug/L			0.5 U	0.5 U
trans-1,3-Dichloropropene	ug/L			0.5 U	0.5 U
Bromoform	ug/L			0.5 U	0.5 U
4-Methyl-2-Pentanone	ug/L			5 U	5 U
2-Hexanone	ug/L			5 U	5 U
Tetrachloroethene	ug/L			0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	ug/L			0.5 U	0.5 U
Toluene	ug/L			0.5 U	0.5 U
Chlorobenzene	ug/L			0.5 U	0.5 U
Ethylbenzene	ug/L			0.5 U	0.5 U
Styrene	ug/L			0.5 U	0.5 U
Xylene (total)	ug/L			0.5 U	0.5 U
Dichlorodifluoromethane	ug/L			0.5 U	0.5 U
Trichlorofluoromethane	ug/L			0.5 U	0.5 U
2,2-Dichloropropane	ug/L			0.5 U	0.5 U
Bromochloromethane	ug/L			0.5 U	0.5 U
1,1-Dichloropropene	ug/L			0.5 U	0.5 U
Dibromomethane	ug/L			0.5 U	0.5 U
1,3-Dichloropropane	ug/L			0.5 U	0.5 U
1,2-Dibromoethane	ug/L			0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	ug/L			0.5 U	0.5 U
Isopropylbenzene	ug/L			0.5 U	0.5 U
Bromobenzene	ug/L			0.5 U	0.5 U
1,2,3-Trichloropropane	ug/L			0.5 U	0.5 U
n-Propylbenzene	ug/L			0.5 U	0.5 U
2-Chlorotoluene	ug/L			0.5 U	0.5 U
4-Chlorotoluene	ug/L			0.5 U	0.5 U
1,3,5-Trimethylbenzene	ug/L			0.5 U	0.5 U
tert-Butylbenzene	ug/L			0.5 U	0.5 U
1,2,4-Trimethylbenzene	ug/L			0.5 U	0.5 U
sec-Butylbenzene	ug/L			0.5 U	0.5 U
1,3-Dichlorobenzene	ug/L			0.5 U	0.5 U
1,4-Dichlorobenzene	ug/L			0.5 U	0.5 U
p-Isopropyltoluene	ug/L			0.5 U	0.5 U
1,2-Dichlorobenzene	ug/L			0.5 U	0.5 U
n-Butylbenzene	ug/L			0.5 U	0.5 U
1,2-Dibromo-3-Chloropropane	ug/L			0.5 U	0.5 U
1,2,4-Trichlorobenzene	ug/L			0.5 U	0.5 U
Hexachlorobutadiene	ug/L			0.5 U	0.5 U
Naphthalene	ug/L			0.5 U	0.5 U
1,2,3-Trichlorobenzene	ug/L			0.5 U	0.5 U

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER
	LOCATION	OB	OB	OB	OB
	DATE	03/08/93	03/10/93	03/04/93	03/03/93
	ES ID	MW-40	MW-40	MW-40	MW-41
	LAB ID	179727	179899	179606	179547
COMPOUND	UNITS				
Semivolatiles					
Phenol	ug/L				
bis(2-Chloroethyl) ether	ug/L				
2-Chlorophenol	ug/L				
1,3-Dichlorobenzene	ug/L				
1,4-Dichlorobenzene	ug/L				
Benzyl Alcohol	ug/L				
1,2-Dichlorobenzene	ug/L				
2-Methylphenol	ug/L				
2,2'-oxybis(1-Chloropropane)	ug/L				
4-Methylphenol	ug/L				
N-Nitroso-di-n-propylamine	ug/L				
Hexachloroethane	ug/L				
Nitrobenzene	ug/L				
Isophorone	ug/L				
2-Nitrophenol	ug/L				
2,4-Dimethylphenol	ug/L				
Benzoic acid	ug/L				
bis(2-Chloroethoxy) methane	ug/L				
2,4-Dichlorophenol	ug/L				
1,2,4-Trichlorobenzene	ug/L				
Naphthalene	ug/L				
4-Chloroaniline	ug/L				
Hexachlorobutadiene	ug/L				
4-Chloro-3-methylphenol	ug/L				
2-Methylnaphthalene	ug/L				
Hexachlorocyclopentadiene	ug/L				
2,4,6-Trichlorophenol	ug/L				
2,4,5-Trichlorophenol	ug/L				
2-Chloronaphthalene	ug/L				
2-Nitroaniline	ug/L				
Dimethylphthalate	ug/L				
Acenaphthylene	ug/L				
2,6-Dinitrotoluene	ug/L				
3-Nitroaniline	ug/L				
Acenaphthene	ug/L				
2,4-Dinitrophenol	ug/L				
4-Nitrophenol	ug/L				
Dibenzofuran	ug/L				
2,4-Dinitrotoluene	ug/L				
Diethylphthalate	ug/L				
4-Chlorophenyl-phenylether	ug/L				
Fluorene	ug/L				
4-Nitroaniline	ug/L				
4,6-Dinitro-2-methylphenol	ug/L				
N-Nitrosodiphenylamine	ug/L				
4-Bromophenyl-phenylether	ug/L				
Hexachlorobenzene	ug/L				
Pentachlorophenol	ug/L				
Phenanthrene	ug/L				
Anthracene	ug/L				
Carbazole	ug/L				
Di-n-butylphthalate	ug/L				
Fluoranthene	ug/L				
Pyrene	ug/L				
Butylbenzylphthalate	ug/L				
3,3'-Dichlorobenzidine	ug/L				
Benzo(a)anthracene	ug/L				
Chrysene	ug/L				
bis(2-Ethylhexyl)phthalate	ug/L				
Di-n-octylphthalate	ug/L				
Benzo(b)fluoranthene	ug/L				
Benzo(k)fluoranthene	ug/L				
Benzo(a)pyrene	ug/L				
Indeno(1,2,3-cd)pyrene	ug/L				
Dibenz(a,h)anthracene	ug/L				
Benzo(g,h,i)perylene	ug/L				

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

COMPOUND	UNITS	PHASE II WATER OB 03/08/93 MW-40 179727	PHASE II WATER OB 03/10/93 MW-40 179899	PHASE II WATER OB 03/04/93 MW-40 179606	PHASE II WATER OB 03/03/93 MW-41 179547
MATRIX					
LOCATION					
DATE					
ES ID					
LAB ID					
Pesticides/PCBs					
alpha-BHC	ug/L				
beta-BHC	ug/L				
delta-BHC	ug/L				
gamma-BHC (Lindane)	ug/L				
Heptachlor	ug/L				
Aldrin	ug/L				
Heptachlor epoxide	ug/L				
Endosulfan I	ug/L				
Dieldrin	ug/L				
4,4'-DDE	ug/L				
Endrin	ug/L				
Endosulfan II	ug/L				
4,4'-DDD	ug/L				
Endosulfan sulfate	ug/L				
4,4'-DDT	ug/L				
Methoxychlor	ug/L				
Endrin ketone	ug/L				
Endrin aldehyde	ug/L				
alpha-Chlordane	ug/L				
gamma-Chlordane	ug/L				
Toxaphene	ug/L				
Aroclor-1016	ug/L				
Aroclor-1221	ug/L				
Aroclor-1232	ug/L				
Aroclor-1242	ug/L				
Aroclor-1248	ug/L				
Aroclor-1254	ug/L				
Aroclor-1260	ug/L				
Explosives					
HMX	ug/L				
RDX	ug/L				
1,3,5-Trinitrobenzene	ug/L				
1,3-Dinitrobenzene	ug/L				
Tetryl	ug/L				
2,4,6-Trinitrotoluene	ug/L				
4-amino-2,6-Dinitrotoluene	ug/L				
2-amino-4,6-Dinitrotoluene	ug/L				
2,6-Dinitrotoluene	ug/L				
2,4-Dinitrotoluene	ug/L				

SENECA ARMY DEPOT
OB GROUNDS

MONITORING WELLS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)

	MATRIX	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER
	LOCATION	OB	OB	OB	OB
	DATE	03/08/93	03/10/93	03/04/93	03/03/93
	ES ID	MW-40	MW-40	MW-40	MW-41
	LAB ID	179727	179899	179606	179547
COMPOUND	UNITS				
Metals					
Aluminum	ug/l	647			
Antimony	ug/l	53.6 U			
Arsenic	ug/l	1.7 U			
Barium	ug/l	53.3 J			
Beryllium	ug/l	0.3 U			
Cadmium	ug/l	3.1 U			
Calcium	ug/l	129000			
Chromium	ug/l	2 U			
Cobalt	ug/l	5 U			
Copper	ug/l	1.9 U			
Iron	ug/l	653			
Lead	ug/l	0.9 U			
Magnesium	ug/l	16100			
Manganese	ug/l	148			
Mercury	ug/l	0.06 U			
Nickel	ug/l	4.7 J			
Potassium	ug/l	442 U			
Selenium	ug/l	1.1 U			
Silver	ug/l	3.2 U			
Sodium	ug/l	6950			
Thallium	ug/l	2.6 U			
Vanadium	ug/l	2.1 U			
Zinc	ug/l	4.4 R			
Cyanide	ug/l	NR	32.5		

SURFACE WATER AND SEDIMENT

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-110 11/07/91 W0711-37 148628	PHASE I WATER SW-120 11/07/91 W0711-44 148635	PHASE I WATER SW-120 12/12/91 W1012118 150997	PHASE I WATER SW-120 11/12/91 W1012118 150997	PHASE I WATER SW-120 12/12/91 W1012118RE 150997	PHASE I WATER SW-130 11/07/91 W0711-53 148641	PHASE I WATER SW-140 11/07/91 W0711-62 148647
Volatile Organic Compounds								
Chloromethane	ug/L	10 U	10 U	10 U			10 U	10 U
Bromomethane	ug/L	10 U	10 U	10 U			10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U	10 U			10 U	10 U
Chloroethane	ug/L	10 U	10 U	10 U			10 U	10 U
Methylene Chloride	ug/L	5 U	5 U	5 U			5 U	5 U
Acetone	ug/L	10 U	10 U	10			10 U	10 U
Carbon Disulfide	ug/L	5 U	5 U	5 U			5 U	5 U
1,1-Dichloroethene	ug/L	5 U	5 U	5 U			5 U	5 U
1,1-Dichloroethane	ug/L	5 U	5 U	5 U			5 U	5 U
1,2-Dichloroethene (total)	ug/L	5 U	5 U	5 U			5 U	5 U
Chloroform	ug/L	5 U	5 U	5 U			5 U	5 U
1,2-Dichloroethane	ug/L	5 U	5 U	5 U			5 U	2 J
2-Butanone	ug/L	10 U	10 U	10 U			10 U	10 U
1,1,1-Trichloroethane	ug/L	5 U	5 U	5 U			5 U	5 U
Carbon Tetrachloride	ug/L	5 U	5 U	5 U			5 U	5 U
Vinyl Acetate	ug/L	10 U	10 U	10 U			10 U	10 U
Bromodichloromethane	ug/L	5 U	5 U	5 U			5 U	5 U
1,2-Dichloropropane	ug/L	5 U	5 U	5 U			5 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U	5 U	5 U			5 U	5 U
Trichloroethene	ug/L	5 U	5 U	5 U			5 U	5 U
Dibromochloromethane	ug/L	5 U	5 U	5 U			5 U	5 U
1,1,2-Trichloroethane	ug/L	5 U	5 U	5 U			5 U	5 U
Benzene	ug/L	5 U	5 U	5 U			5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U	5 U	5 U			5 U	5 U
Bromoform	ug/L	5 U	5 U	5 U			5 U	5 U
4-Methyl-2-Pentanone	ug/L	10 U	10 U	10 U			10 U	10 U
2-Hexanone	ug/L	10 U	10 U	10 U			10 U	10 U
Tetrachloroethene	ug/L	5 U	5 U	5 U			5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U	5 U	5 U			5 U	5 U
Toluene	ug/L	5 U	5 U	5 U			5 U	5 U
Chlorobenzene	ug/L	5 U	5 U	5 U			5 U	5 U
Ethylbenzene	ug/L	5 U	5 U	5 U			5 U	5 U
Styrene	ug/L	5 U	5 U	5 U			5 U	5 U
Xylene (total)	ug/L	5 U	5 U	5 U			5 U	5 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I WATER SW-110 11/07/91 W0711-37 148628	PHASE I WATER SW-120 11/07/91 W0711-44 148635	PHASE I WATER SW-120 12/12/91 W1012118 150997	PHASE I WATER SW-120 11/12/91 W1012118 150997	PHASE I WATER SW-120 12/12/91 W1012118RE 150997	PHASE I WATER SW-130 11/07/91 W0711-53 148641	PHASE I WATER SW-140 11/07/91 W0711-62 148647
Semivolatiles									
Phenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
bis(2-Chloroethyl) ether		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2-Chlorophenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
1,3-Dichlorobenzene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
1,4-Dichlorobenzene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Benzyl Alcohol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
1,2-Dichlorobenzene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2-Methylphenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,2'-oxybis(1-Chloropropane)		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
4-Methylphenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
N-Nitroso-di-n-propylamine		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Hexachloroethane		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Nitrobenzene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Isophorone		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2-Nitrophenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,4-Dimethylphenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Benzoic acid		ug/L	50 U	54 U	50 U	50 U		50 U	51 U
bis(2-Chloroethoxy) methane		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,4-Dichlorophenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
1,2,4-Trichlorobenzene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Naphthalene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
4-Chloroaniline		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Hexachlorobutadiene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
4-Chloro-3-methylphenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2-Methylnaphthalene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Hexachlorocyclopentadiene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,4,6-Trichlorophenol		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,4,5-Trichlorophenol		ug/L	50 U	54 U	50 U	50 U		50 U	51 U
2-Chloronaphthalene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2-Nitroaniline		ug/L	50 U	54 U	50 U	50 U		50 U	51 U
Dimethylphthalate		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
Acenaphthylene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
2,6-Dinitrotoluene		ug/L	10 U	11 U	10 U	10 U		10 U	10 U
3-Nitroaniline		ug/L	50 U	54 U	50 U			50 U	51 U
Acenaphthene		ug/L	10 U	11 U	10 U			10 U	10 U
2,4-Dinitrophenol		ug/L	50 U	54 U	50 U			50 U	51 U
4-Nitrophenol		ug/L	50 U	54 U	50 U			50 U	51 U
Dibenzofuran		ug/L	10 U	11 U	10 U			10 U	10 U
2,4-Dinitrotoluene		ug/L	10 U	11 U	10 U			10 U	10 U
Diethylphthalate		ug/L	10 U	11 U	10 U			10 U	10 U
4-Chlorophenyl-phenylether		ug/L	10 U	11 U	10 U			10 U	10 U
Fluorene		ug/L	10 U	11 U	10 U			10 U	10 U
4-Nitroaniline		ug/L	50 U	54 U	50 U			50 U	51 U
4,6-Dinitro-2-methylphenol		ug/L	50 U	54 U	50 U			50 U	51 U
N-Nitrosodiphenylamine (1)		ug/L	10 U	11 U	10 U			10 U	10 U
4-Bromophenyl-phenylether		ug/L	10 U	11 U	10 U			10 U	10 U
Hexachlorobenzene		ug/L	10 U	11 U	10 U			10 U	10 U
Pentachlorophenol		ug/L	50 U	54 U	50 U			50 U	51 U
Phenanthrene		ug/L	10 U	11 U	10 U			10 U	10 U
Anthracene		ug/L	10 U	11 U	10 U			10 U	10 U
Carbazole		ug/L							
Di-n-butylphthalate		ug/L	10 U	11 U	10 U			10 U	10 U
Fluoranthene		ug/L	10 U	11 U	10 U			10 U	10 U
Pyrene		ug/L	10 U	11 U	10 U			10 U	10 U
Butylbenzylphthalate		ug/L	10 U	11 U	10 U			10 U	10 U
3,3'-Dichlorobenzidine		ug/L	20 U	22 U	20 U			20 U	20 U
Benzo(a)anthracene		ug/L	10 U	11 U	10 U			10 U	10 U
Chrysene		ug/L	10 U	11 U	10 U			10 U	10 U
bis(2-Ethylhexyl)phthalate		ug/L	10 U	11 U	10 U			10 U	10 U
Di-n-octylphthalate		ug/L	10 U	11 U	10 U			10 U	10 U
Benzo(b)fluoranthene		ug/L	10 U	11 U	10 U			10 U	10 U
Benzo(k)fluoranthene		ug/L	10 U	11 U	10 U			10 U	10 U
Benzo(a)pyrene		ug/L	10 U	11 U	10 U			10 U	10 U
Indeno(1,2,3-cd)pyrene		ug/L	10 U	11 U	10 U			10 U	10 U
Dibenz(a,h)anthracene		ug/L	10 U	11 U	10 U			10 U	10 U
Benzo(g,h,i)perylene		ug/L	10 U	11 U	10 U			10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	SW-110	SW-120	SW-120	SW-120	SW-120	SW-130	SW-140
	DATE	11/07/91	11/07/91	12/12/91	11/12/91	12/12/91	11/07/91	11/07/91
	ES ID	W0711-37	W0711-44	W1012118	W1012118	W1012118RE	W0711-53	W0711-62
	LAB ID	148628	148635	150997	150997	150997	148641	148647
	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
beta-BHC	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
delta-BHC	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
gamma-BHC (Lindane)	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
Heptachlor	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
Aldrin	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
Heptachlor epoxide	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
Endosulfan I	ug/L	0.05 U	0.056 U	0.05 U		0.05 U R	0.053 U	0.054 U
Dieldrin	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
4,4'-DDE	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
Endrin	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
Endosulfan II	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
4,4'-DDD	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
Endosulfan sulfate	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
4,4'-DDT	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
Methoxychlor	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Endrin ketone	ug/L	0.099 U	0.11 U	0.1 U		0.1 U R	0.11 U	0.11 U
Endrin aldehyde	ug/L							
alpha-Chlordane	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
gamma-Chlordane	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Toxaphene	ug/L	0.99 U	1.1 U	1 U		1 U R	1.1 U	1.1 U
Aroclor-1016	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Aroclor-1221	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Aroclor-1232	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Aroclor-1242	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Aroclor-1248	ug/L	0.5 U	0.56 U	0.5 U		0.5 U R	0.53 U	0.54 U
Aroclor-1254	ug/L	0.99 U	1.1 U	1 U		1 U R	1.1 U	1.1 U
Aroclor-1260	ug/L	0.99 U	1.1 U	1 U		1 U R	1.1 U	1.1 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I WATER SW-110 11/07/91 W0711-37 148628	PHASE I WATER SW-120 11/07/91 W0711-44 148635	PHASE I WATER SW-120 12/12/91 W1012118 150997	PHASE I WATER SW-120 11/12/91 W1012118 150997	PHASE I WATER SW-120 12/12/91 W1012118RE 150997	PHASE I WATER SW-130 11/07/91 W0711-53 148641	PHASE I WATER SW-140 11/07/91 W0711-62 148647
Explosives									
HMX		ug/L	0.12 U	0.12 U	1 U			0.12 U	0.12 U
RDX		ug/L	0.12 U	0.67	0.12 U			0.12 U	0.12 U
1,3,5-Trinitrobenzene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
1,3-Dinitrobenzene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
Tetryl		ug/L	0.12 U	0.12 U	0.4 U			0.12 U	0.12 U
2,4,6-Trinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
2,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
2,4-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U			0.12 U	0.12 U
Metals									
Aluminum		ug/L	109 U	300	102 J			109 U	109 U
Antimony		ug/L	53.4 U	53 U	55.5 U J			53.1 U	53.4 U
Arsenic		ug/L	2.8 U	2.8 U	2.9 U J			2.8 U	2.8 U
Barium		ug/L	66.6 J	65.7 J	48.9 J			52.3 J	51.2 J
Beryllium		ug/L	3.5 U	3.5 U	1.4 J			3.5 U	3.5 U
Cadmium		ug/L	4.7 U	4.7 U	3 U J			4.7 U	4.7 U
Calcium		ug/L	121000	114000	96000 J			100000	87100
Chromium		ug/L	9.6 U	9.5 U	6.1 U J			9.5 U	9.6 U
Cobalt		ug/L	31.3 U	31.1 U	19.8 U J			31.1 U	31.3 U
Copper		ug/L	19.7 U	19.6 U	14.4 U J			19.6 U	19.7 U
Iron		ug/L	98.4 J	670	142 J			236	314
Lead		ug/L	0.7 U	2.2 J	1.2 U J			0.7 U	0.7 U
Magnesium		ug/L	18700	17300	13700 J			14400	12800
Manganese		ug/L	14.6 J	121	43.7 J			34.5	68.4
Mercury		ug/L	0.08 U	0.08 U	0.08 U J			0.08 U	0.08 U
Nickel		ug/L	35.2 U	34.9 U	15.8 U J			35 U	35.2 U
Potassium		ug/L	3800 J	3800 J	949 J			3070 J	3000 J
Selenium		ug/L	1.7 U	1.7 U	1 U J			1.7 U	1.7 U
Silver		ug/L	8 U	7.9 U	9 U J			8 U	8 U
Sodium		ug/L	26500	24700	21900 J			24100	23100
Thallium		ug/L	2.8 U	2.8 U	2.8 U J			2.8 U	2.8 U
Vanadium		ug/L	30.9 U	30.7 U	30.3 U J			30.7 U	30.9 U
Zinc		ug/L	13.6 U	15.1 R	14.1 R			13.5 U	13.6 U
Cyanide		ug/L	10 U	10 U	10 U J			10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-150 11/08/91 W0811-71 148653	PHASE I WATER SW-150 11/08/91 W0811-80 148659	PHASE I WATER SW-150 11/15/91 W1411-81A 149054	PHASE I WATER SW-160 11/12/91 W1211-96 148903	PHASE I WATER SW-160 DL 1114/91 W1211-96DL 148903	PHASE I WATER SW-170 11/12/91 W1211-97 148904	PHASE I WATER SW-180 12/12/91 W1012117 150996
Volatile Organic Compounds								
Chloromethane	ug/L	10 U	10 U		10 U		10 U	10 U
Bromomethane	ug/L	10 U	10 U		10 U		10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U		10 U		10 U	10 U
Chloroethane	ug/L	10 U	10 U		10 U		10 U	10 U
Methylene Chloride	ug/L	5 U	5 U		5 U		5 U	5 U
Acetone	ug/L	10 U	10 U		10 U		12 U	35
Carbon Disulfide	ug/L	5 U	5 U		5 U		5 U	5 U
1,1-Dichloroethene	ug/L	5 U	5 U		5 U		5 U	5 U
1,1-Dichloroethane	ug/L	5 U	5 U		5 U		5 U	5 U
1,2-Dichloroethene (total)	ug/L	5 U	5 U		5 U		5 U	5 U
Chloroform	ug/L	5 U	5 U		5 U		5 U	5 U
1,2-Dichloroethane	ug/L	5 U	5 U		5 U		5 U	5 U
2-Butanone	ug/L	10 U	10 U		10 U		10 U	10 U
1,1,1-Trichloroethane	ug/L	5 U	5 U		5 U		5 U	5 U
Carbon Tetrachloride	ug/L	5 U	5 U		5 U		5 U	5 U
Vinyl Acetate	ug/L	10 U	10 U		10 U		10 U	10 U
Bromodichloromethane	ug/L	5 U	5 U		5 U		5 U	5 U
1,2-Dichloropropane	ug/L	5 U	5 U		5 U		5 U	5 U
cis-1,3-Dichloropropene	ug/L	5 U	5 U		5 U		5 U	5 U
Trichloroethene	ug/L	5 U	5 U		5 U		5 U	5 U
Dibromochloromethane	ug/L	5 U	5 U		5 U		5 U	5 U
1,1,2-Trichloroethane	ug/L	5 U	5 U		5 U		5 U	5 U
Benzene	ug/L	5 U	5 U		5 U		5 U	5 U
trans-1,3-Dichloropropene	ug/L	5 U	5 U		5 U		5 U	5 U
Bromoform	ug/L	5 U	5 U		5 U		5 U	5 U
4-Methyl-2-Pentanone	ug/L	10 U	10 U		10 U		10 U	10 U
2-Hexanone	ug/L	10 U	10 U		10 U		10 U	10 U
Tetrachloroethene	ug/L	5 U	5 U		5 U		5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L	5 U	5 U		5 U		5 U	5 U
Toluene	ug/L	5 U	5 U		5 U		5 U	5 U
Chlorobenzene	ug/L	5 U	5 U		5 U		5 U	5 U
Ethylberzene	ug/L	5 U	5 U		5 U		5 U	5 U
Styrene	ug/L	5 U	5 U		5 U		5 U	5 U
Xylene (total)	ug/L	5 U	5 U		5 U		5 U	5 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-150 11/08/91 W0811-71 148653	PHASE I WATER SW-150 11/08/91 W0811-80 148659	PHASE I WATER SW-150 11/15/91 W1411-81A 149064	PHASE I WATER SW-160 11/12/91 W1211-96 148903	PHASE I WATER SW-160 DL 1114/91 W1211-96DL 148903	PHASE I WATER SW-170 11/12/91 W1211-97 148904	PHASE I WATER SW-180 12/12/91 W1012117 150996
Semivolatiles								
Phenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
bis(2-Chloroethyl) ether	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2-Chlorophenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
1,3-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
1,4-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzyl Alcohol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
1,2-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2-Methylphenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Methylphenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Hexachloroethane	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Nitrobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Isophorone	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2-Nitrophenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4-Dimethylphenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzoic acid	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
1,2,4-Trichlorobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Naphthalene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Chloroaniline	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Hexachlorobutadiene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Chloro-3-methylphenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2-Methylnaphthalene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Hexachlorocyclopentadiene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4,6-Trichlorophenol	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4,5-Trichlorophenol	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
2-Chloronaphthalene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2-Nitroaniline	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
Dimethylphthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Acenaphthylene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,6-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
3-Nitroaniline	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
Acenaphthene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4-Dinitrophenol	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
4-Nitrophenol	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
Dibenzofuran	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
2,4-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Diethylphthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Chlorophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Fluorene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Nitroaniline	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
4,6-Dinitro-2-methylphenol	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
N-Nitrosodiphenylamine (1)	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
4-Bromophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Hexachlorobenzene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Pentachlorophenol	ug/L	50 U	50 U	51 U	50 U		50 U	50 U
Phenanthrene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Anthracene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Carbazole	ug/L							
Di-n-butylphthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Fluoranthene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Pyrene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Butylbenzylphthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
3,3'-Dichlorobenzidine	ug/L	20 U	20 U	20 U	20 U		20 U	20 U
Benzo(a)anthracene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Chrysene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Di-n-octylphthalate	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzo(b)fluoranthene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzo(k)fluoranthene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzo(a)pyrene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Dibenz(a,h)anthracene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U
Benzo(g,h,i)perylene	ug/L	10 U	10 U	10 U	10 U		10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

	MATRIX	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	SW-150	SW-150	SW-150	SW-160	SW-160 DL	SW-170	SW-180
	DATE	11/08/91	11/08/91	11/15/91	11/12/91	1114/91	11/12/91	12/12/91
	ES ID	W0811-71	W0811-80	W1411-81A	W1211-96	W1211-96DL	W1211-97	W1012117
	LAB ID	148653	148659	149064	148903	148903	148904	150996
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
beta-BHC	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
delta-BHC	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
gamma-BHC (Lindane)	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
Heptachlor	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
Aldrin	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
Heptachlor epoxide	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
Endosulfan I	ug/L	0.051 U	0.05 U		0.05 U		0.05 U	0.05 U
Dieldrin	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
4,4'-DDE	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
Endrin	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
Endosulfan II	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
4,4'-DDD	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
Endosulfan sulfate	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
4,4'-DDT	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
Methoxychlor	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Endrin ketone	ug/L	0.1 U	0.099 U		0.1 U		0.1 U	0.1 U
Endrin aldehyde	ug/L							
alpha-Chlordane	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
gamma-Chlordane	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Toxaphene	ug/L	1 U	0.99 U		1 U		1 U	1 U
Aroclor-1016	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Aroclor-1221	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Aroclor-1232	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Aroclor-1242	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Aroclor-1248	ug/L	0.51 U	0.5 U		0.5 U		0.5 U	0.5 U
Aroclor-1254	ug/L	1 U	0.99 U		1 U		1 U	1 U
Aroclor-1260	ug/L	1 U	0.99 U		1 U		1 U	1 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX	UNITS	PHASE I WATER SW-150 11/08/91 W0811-71 148653	PHASE I WATER SW-150 11/08/91 W0811-80 148659	PHASE I WATER SW-150 11/15/91 W1411-81A 149064	PHASE I WATER SW-160 11/12/91 W1211-96 148903	PHASE I WATER SW-160 DL 1114/91 W1211-96DL 148903	PHASE I WATER SW-170 11/12/91 W1211-97 148904	PHASE I WATER SW-180 12/12/91 W1012117 150996
Explosives									
HMX	ug/L		0.12 U	0.12 U	1 U	1 U	5 U R	1 U	1 U
RDX	ug/L		0.12 U	0.12 U	0.12 U	9.4 R	9.4	0.67	0.12 U
1,3,5-Trinitrobenzene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
Tetryl	ug/L		0.12 U	0.12 U	0.4 U	0.4 U	2 U R	0.4 U	0.4 U
2,4,6-Trinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.62 U R	0.12 U	0.12 U
Metals									
Aluminum	ug/L		109 U	139 J		98.3 U J		98.3 U J	256 J
Antimony	ug/L		53.4 U	53.4 U		56 U J		56 U J	55.8 U J
Arsenic	ug/L		2.8 U	2.8 U		3.7 U J		3.7 U J	2.9 U J
Barium	ug/L		59.5 J	53.2 J		68.5 R		109 R	83 J
Beryllium	ug/L		3.5 U	3.5 U		1.2 U J		1.2 U J	1.2 U J
Cadmium	ug/L		4.7 U	4.7 U		3 U J		3 U J	3 U J
Calcium	ug/L		85600	83800		93300 J		78600 J	34000 J
Chromium	ug/L		9.6 U	9.5 U		6.2 U J		6.2 U J	6.2 U J
Cobalt	ug/L		31.3 U	31.1 U		20.5 U J		20.5 U J	19.9 U J
Copper	ug/L		19.7 U	19.6 U		14.5 U J		14.5 U J	19.8 J
Iron	ug/L		737	737		189 J		181 J	213 J
Lead	ug/L		1 J	1.2 J		1.4 J		3.6 J	2.1 J
Magnesium	ug/L		12900	12700		9320 J		10400 J	10900 J
Manganese	ug/L		236	230		14.9 R		12.6 R	38.5 J
Mercury	ug/L		0.11 J	0.08 U		0.08 U J		0.08 U J	0.08 U J
Nickel	ug/L		35.2 U	35 U		16 U J		16 U J	15.9 U J
Potassium	ug/L		3470 J	2800 J		1860 J		4590 J	5720 J
Selenium	ug/L		1.7 U	1.7 U		1.7 U J		1.7 U J	1 U J
Silver	ug/L		8 U	8 U		9.1 U J		9.1 U J	9.1 U J
Sodium	ug/L		22900 U	22500		4170 J		4850 U J	618 J
Thallium	ug/L		2.8 U	2.8 U		2.8 U J		2.8 U J	2.8 U J
Vanadium	ug/L		30.9 U	30.7 U		37.2 J		33 J	30.5 U J
Zinc	ug/L		13.6 U	13.5 U		13.5 U J		13.5 U J	13.4 U J
Cyanide	ug/L		10 U	10 U		10 U		10 U	10 U J

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

	MATRIX	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	SW-180	SW-191	SW-192	SW-193	SW-194	SW-195	SW-196
	DATE	12/12/91	11/08/91	11/13/91	11/13/91	11/13/91	11/13/91	11/12/91
	ES ID	W1012117RE	W0611-13	W1311-103	W1311-100	W1311-101	W1311-102	W1211-98
	LAB ID	150996R1	148595	149062	149059	149060	149061	148905
COMPOUND	UNITS							
Volatile Organic Compounds								
Chloromethane	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Acetone	ug/L		10 U	14 U	14 U	13 U	11 U	10 U
Carbon Disulfide	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Benzene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Toluene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Styrene	ug/L		5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	ug/L		5 U	5 U	5 U	5 U	5 U	5 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-180 12/12/91 W1012117RE 150996R1	PHASE I WATER SW-191 11/08/91 W0611-13 148595	PHASE I WATER SW-192 11/13/91 W1311-103 149062	PHASE I WATER SW-193 11/13/91 W1311-100 149059	PHASE I WATER SW-194 11/13/91 W1311-101 149060	PHASE I WATER SW-195 11/13/91 W1311-102 149061	PHASE I WATER SW-196 11/12/91 W1211-98 148905
Semivolatiles								
Phenol	ug/L			10 U	10 U	11 U	10 U	10 U
bis(2-Chloroethyl) ether	ug/L			10 U	10 U	11 U	10 U	10 U
2-Chlorophenol	ug/L			10 U	10 U	11 U	10 U	10 U
1,3-Dichlorobenzene	ug/L			10 U	10 U	11 U	10 U	10 U
1,4-Dichlorobenzene	ug/L			10 U	10 U	11 U	10 U	10 U
Benzyl Alcohol	ug/L			10 U	10 U	11 U	10 U	10 U
1,2-Dichlorobenzene	ug/L			10 U	10 U	11 U	10 U	10 U
2-Methylphenol	ug/L			10 U	10 U	11 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	ug/L			10 U	10 U	11 U	10 U	10 U
4-Methylphenol	ug/L			10 U	10 U	11 U	10 U	10 U
N-Nitroso-di-n-propylamine	ug/L			10 U	10 U	11 U	10 U	10 U
Hexachloroethane	ug/L			10 U	10 U	11 U	10 U	10 U
Nitrobenzene	ug/L			10 U	10 U	11 U	10 U	10 U
Isophorone	ug/L			10 U	10 U	11 U	10 U	10 U
2-Nitrophenol	ug/L			10 U	10 U	11 U	10 U	10 U
2,4-Dimethylphenol	ug/L			10 U	10 U	11 U	10 U	10 U
Benzoic acid	ug/L			50 U	52 U	54 U	50 U	50 U
bis(2-Chloroethoxy) methane	ug/L			10 U	10 U	11 U	10 U	10 U
2,4-Dichlorophenol	ug/L			10 U	10 U	11 U	10 U	10 U
1,2,4-Trichlorobenzene	ug/L			10 U	10 U	11 U	10 U	10 U
Naphthalene	ug/L			10 U	10 U	11 U	10 U	10 U
4-Chloroaniline	ug/L			10 U	10 U	11 U	10 U	10 U
Hexachlorobutadiene	ug/L			10 U	10 U	11 U	10 U	10 U
4-Chloro-3-methylphenol	ug/L			10 U	10 U	11 U	10 U	10 U
2-Methylnaphthalene	ug/L			10 U	10 U	11 U	10 U	10 U
Hexachlorocyclopentadiene	ug/L			10 U	10 U	11 U	10 U	10 U
2,4,6-Trichlorophenol	ug/L			10 U	10 U	11 U	10 U	10 U
2,4,5-Trichlorophenol	ug/L			50 U	52 U	54 U	50 U	50 U
2-Chloronaphthalene	ug/L			10 U	10 U	11 U	10 U	10 U
2-Nitroaniline	ug/L			50 U	52 U	54 U	50 U	50 U
Dimethylphthalate	ug/L			10 U	10 U	11 U	10 U	10 U
Acenaphthylene	ug/L			10 U	10 U	11 U	10 U	10 U
2,6-Dinitrotoluene	ug/L			10 U	10 U	11 U	10 U	10 U
3-Nitroaniline	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
Acenaphthene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
2,4-Dinitrophenol	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
4-Nitrophenol	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
Dibenzofuran	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
2,4-Dinitrotoluene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Diethylphthalate	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
4-Chlorophenyl-phenylether	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Fluorene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
4-Nitroaniline	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
4,6-Dinitro-2-methylphenol	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
N-Nitrosodiphenylamine (1)	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
4-Bromophenyl-phenylether	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Hexachlorobenzene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Pentachlorophenol	ug/L		51 U	50 U	52 U	54 U	50 U	50 U
Phenanthrene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Anthracene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Carbazole	ug/L							
Di-n-butylphthalate	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Fluoranthene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Pyrene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Butylbenzylphthalate	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
3,3'-Dichlorobenzidine	ug/L		20 U	20 U	21 U	21 U	20 U	20 U
Benzo(a)anthracene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Chrysene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	ug/L		10 U	71	10 U	11 U	10 U	10 U
Di-n-octylphthalate	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Benzo(b)fluoranthene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Benzo(k)fluoranthene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Benzo(a)pyrene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Dibenz(a,h)anthracene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U
Benzo(g,h,i)perylene	ug/L		10 U	10 U	10 U	11 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

	MATRIX	PHASE I WATER		PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER	PHASE I WATER
	LOCATION	SW-180		SW-191	SW-192	SW-193	SW-194	SW-195	SW-196
	DATE	12/12/91		11/08/91	11/13/91	11/13/91	11/13/91	11/13/91	11/12/91
	ES ID	W1012117RE		W0611-13	W1311-103	W1311-100	W1311-101	W1311-102	W1211-98
	LAB ID	150996R1		148595	149062	149059	149060	149061	148905
COMPOUND	UNITS								
Pesticides/PCBs									
alpha-BHC	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
beta-BHC	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
delta-BHC	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
gamma-BHC (Lindane)	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
Heptachlor	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
Aldrin	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
Heptachlor epoxide	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
Endosulfan I	ug/L	0.071 U	R	0.065 U	0.05 U	0.052 U	0.056 U	0.05 U	0.05 U
Dieldrin	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
4,4'-DDE	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
Endrin	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
Endosulfan II	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
4,4'-DDD	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
Endosulfan sulfate	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
4,4'-DDT	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
Methoxychlor	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Endrin ketone	ug/L	0.14 U	R	0.13 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U
Endrin aldehyde	ug/L								
alpha-Chlordane	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
gamma-Chlordane	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Toxaphene	ug/L	1.4 U	R	1.3 U	1 U	1 U	1.1 U	1 U	1 U
Aroclor-1016	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Aroclor-1221	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Aroclor-1232	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Aroclor-1242	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Aroclor-1248	ug/L	0.071 U	R	0.65 U	0.5 U	0.52 U	0.56 U	0.5 U	0.5 U
Aroclor-1254	ug/L	1.4 U	R	1.3 U	1 U	1 U	1.1 U	1 U	1 U
Aroclor-1260	ug/L	1.4 U	R	1.3 U	1 U	1 U	1.1 U	1 U	1 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID / UNITS	PHASE I WATER SW-180 12/12/91 W1012117RE 150996R1	PHASE I WATER SW-191 11/08/91 W0611-13 148595	PHASE I WATER SW-192 11/13/91 W1311-103 149062	PHASE I WATER SW-193 11/13/91 W1311-100 149059	PHASE I WATER SW-194 11/13/91 W1311-101 149060	PHASE I WATER SW-195 11/13/91 W1311-102 149061	PHASE I WATER SW-196 11/12/91 W1211-98 148905
Explosives								
HMX	ug/L		0.12 U	1 U	1 U	1 U	1 U	1 U
RDX	ug/L		0.12 U	0.12 U	1.3	4.6	0.44	0.12 U
1,3,5-Trinitrobenzene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Tetryl	ug/L		0.12 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-Trinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L		0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Metals								
Aluminum	ug/L		1430	74.8 R	269 J	481	5220	97.5 U J
Antimony	ug/L		53 U	53.3 U	55.7 U J	53 U	53 U	55.5 U J
Arsenic	ug/L		2.8 U	3.7 U	4.4 J	3.9 J	3.9 J	3.7 U J
Barium	ug/L		196 J	111 J	43.5 R	69.8 J	98.7 J	52.2 U J
Beryllium	ug/L		3.5 U	1.1 U	1.2 J	1.1 U	1.3 J	1.2 U J
Cadmium	ug/L		4.7 U	3 U	3 U J	3 U	3 U	3 U J
Calcium	ug/L		183000	106000	66200 J	78000	42000	65800 J
Chromium	ug/L		9.5 U	6.2 U	6.2 U J	6.2 U	8.6 J	6.1 U J
Cobalt	ug/L		31.1 U	20.5 U	20.4 U J	20.3 U	20.4 U	20.3 U J
Copper	ug/L		24 J	20.9 J	14.4 U J	28.1	37.2	14.4 U J
Iron	ug/L		3190	152 R	319 J	741	6730	75.3 J
Lead	ug/L		74.2	6.6	0.7 U J	8.3	37.9	0.7 U J
Magnesium	ug/L		34700	16000	7290 J	7900	7340	8980 J
Manganese	ug/L		240	13.5 J	31 R	29.9	297	16.8 R
Mercury	ug/L		0.08 U	0.08 U	0.08 U J	0.09 J	0.08 U	0.08 U J
Nickel	ug/L		35 U	14.8 U	15.9 U J	14.7 U	14.7 U	15.9 U J
Potassium	ug/L		6050	2700 J	1840 J	2360 J	5960	2420 J
Selenium	ug/L		2 J	0.99 J	1.7 U J	1 U	1 U	1.7 U J
Silver	ug/L		7.9 U	3.4 U	9.1 U J	3.4 U	3.4 U	9 U J
Sodium	ug/L		13800	7720	7400 J	5250	6010	59100 J
Thallium	ug/L		2.8 U	2.8 U	2.8 U J	2.8 U	2.8 U	2.8 U J
Vanadium	ug/L		30.7 U	11.2 J	30.4 U J	11 J	19.5 J	39.2 J
Zinc	ug/L		98 R	52.3 R	13.4 U J	26.6 R	154 R	13.4 J
Cyanide	ug/L		10 U	10 U	10 U	10 U	10 U	10 J

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX	PHASE I	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	SW-197	OB	OB	OB	OB	OB	OB
	ES ID	11/13/91	12/03/92	12/03/92	12/03/92	12/03/92	12/04/92	12/04/92
	LAB ID	W1311-104	SW-200	SW-210	SW-220	SW-230	SW-240	SW-250
	UNITS	149063	175329	175330	175331	175332	175333	175334
Volatile Organic Compounds								
Chloromethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	ug/L	16 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	ug/L	3 J	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Acetate	ug/L	10 U						
Bromodichloromethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	ug/L	5 U	10 U	10 U	10 U	17	10 U	10 U
Dibromochloromethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	ug/L	5 U	10 U	10 U	10 U	10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-197 11/13/91 W1311-10 149063	PHASE II WATER OB 12/03/92 SW-200 175329	PHASE II WATER OB 12/03/92 SW-210 175330	PHASE II WATER OB 12/03/92 SW-220 175331	PHASE II WATER OB 12/03/92 SW-230 175332	PHASE II WATER OB 12/04/92 SW-240 175333	PHASE II WATER OB 12/04/92 SW-250 175334
Semivolatiles								
Phenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl) ether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	ug/L	10 U						
1,2-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic acid	ug/L	50 U						
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
Dimethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine (1)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	ug/L	50 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	ug/L		10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	ug/L	20 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE I WATER SW-197 11/13/91 W1311-10 149063	PHASE II WATER OB 12/03/92 SW-200 175329	PHASE II WATER OB 12/03/92 SW-210 175330	PHASE II WATER OB 12/03/92 SW-220 175331	PHASE II WATER OB 12/03/92 SW-230 175332	PHASE II WATER OB 12/04/92 SW-240 175333	PHASE II WATER OB 12/04/92 SW-250 175334
Pesticides/PCBs								
alpha-BHC	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
beta-BHC	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
delta-BHC	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
gamma-BHC (Lindane)	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Heptachlor	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Aldrin	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Heptachlor epoxide	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Endosulfan I	ug/L	0.05 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Dieldrin	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
4,4'-DDE	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
Endrin	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
Endosulfan II	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
4,4'-DDD	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
Endosulfan sulfate	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
4,4'-DDT	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
Methoxychlor	ug/L	0.5 U	0.59 U	0.69 U	0.72 U	0.56 U	0.62 U	0.64 U
Endrin ketone	ug/L	0.1 U	0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
Endrin aldehyde	ug/L		0.12 U	0.14 U	0.14 U	0.11 U	0.12 U	0.13 U
alpha-Chlordane	ug/L	0.5 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
gamma-Chlordane	ug/L	0.5 U	0.059 U	0.069 U	0.072 U	0.056 U	0.062 U	0.064 U
Toxaphene	ug/L	1 U	5.9 U	6.9 U	7.2 U	5.6 U	6.2 U	6.4 U
Aroclor-1016	ug/L	0.5 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U
Aroclor-1221	ug/L	0.5 U	2.4 U	2.8 U	2.9 U	2.2 U	2.5 U	2.6 U
Aroclor-1232	ug/L	0.5 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U
Aroclor-1242	ug/L	0.5 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U
Aroclor-1248	ug/L	0.5 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U
Aroclor-1254	ug/L	1 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U
Aroclor-1260	ug/L	1 U	1.2 U	1.4 U	1.4 U	1.1 U	1.2 U	1.3 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I WATER SW-197 11/13/91 W1311-104 149063	PHASE II WATER OB 12/03/92 SW-200 175329	PHASE II WATER OB 12/03/92 SW-210 175330	PHASE II WATER OB 12/03/92 SW-220 175331	PHASE II WATER OB 12/03/92 SW-230 175332	PHASE II WATER OB 12/04/92 SW-240 175333	PHASE II WATER OB 12/04/92 SW-250 175334
Explosives									
HMX		ug/L	1 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
RDX		ug/L	0.12 U	0.24 U	0.26 U	0.17 U	0.19 U	0.22 U	0.18 U
1,3,5-Trinitrobenzene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
1,3-Dinitrobenzene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Tetryl		ug/L	0.52	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4,6-Trinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,6-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4-Dinitrotoluene		ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Metals									
Aluminum		ug/L	1490	273 R	62.3 U	219 R	62.3 U	62.1 U	188 R
Antimony		ug/L	53 U	53.9 U	53.9 U	53.6 U	53.8 U	53.7 U	53.8 U
Arsenic		ug/L	3.7 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Barium		ug/L	35.5 J	523	148 J	182 J	228	21.7 J	42.3 J
Beryllium		ug/L	1.1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium		ug/L	3 U	3.1 U	3.4 R	3.4 R	3.1 U	3.1 U	3.1 U
Calcium		ug/L	24800	53400	66700	123000	151000	58000	117000
Chromium		ug/L	6.2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cobalt		ug/L	20.4 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper		ug/L	10.5 J	33.5	1.9 U	22.3 J	7.8 J	1.9 U	1.9 U
Iron		ug/L	2210	307 R	43.7 R	8550	130 R	82.5 R	652
Lead		ug/L	3	28.8	0.9 U	19.5	2.4 J	0.89 U	0.9 U
Magnesium		ug/L	4340 J	33600	11300	27500	59900	10700	15200
Manganese		ug/L	247	25.5	3.7 J	608	19.9	32.6	291
Mercury		ug/L	0.08 U	0.06 U	0.06 U	0.06 U	0.06 U	0.17 J	0.06 U
Nickel		ug/L	14.7 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
Potassium		ug/L	5610	3580 R	1690 R	4040 R	5050 R	894 R	988 R
Selenium		ug/L	1 U	1.4 J	1.3 J	2 J	3.2 J	1.1 J	1.5 J
Silver		ug/L	3.4 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U
Sodium		ug/L	1830 J	6720	2660 J	12900	34200	13100	2180 J
Thallium		ug/L	2.8 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
Vanadium		ug/L	9.4 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Zinc		ug/L	39.3 R	29.5 R	4.5 R	65.8 R	17.2 R	8.1 R	21.6 R
Cyanide		ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 12/07/92 SW-260 175603	PHASE II WATER OB 12/07/92 SW-261 175604 DUP SW-260	PHASE II WATER OB 12/07/92 SW-270 175605	PHASE II WATER OB 12/07/92 SW-290 175606	PHASE II WATER OB 12/08/92 SW-300 175892	PHASE II WATER OB 12/08/92 SW-310 175740	PHASE II WATER OB 12/08/92 SW-320 175741
Volatile Organic Compounds								
Chloromethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	ug/L	10 U	10 U	10 U	10 U	8 J	10 U	10 U
Acetone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Acetate	ug/L							
Bromodichloromethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

	MATRIX	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	WATER	WATER	WATER	WATER	WATER	WATER	WATER
	DATE	OB	OB	OB	OB	OB	OB	OB
	ES ID	12/07/92	12/07/92	12/07/92	12/07/92	12/08/92	12/08/92	12/08/92
	LAB ID	SW-260	SW-261	SW-270	SW-290	SW-300	SW-310	SW-320
COMPOUND	UNITS	175603	175604 DUP SW-260	175605	175606	175892	175740	175741
Semivolatiles								
Phenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl) ether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl Alcohol	ug/L							
1,2-Dichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic acid	ug/L							
bis(2-Chloroethoxy) methane	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Dimethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine (1)	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	ug/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	ug/L	10 U	10 U	10 U	10 U	21 U	10 U	14 U
Di-n-octylphthalate	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II WATER OB 12/07/92 SW-260 175603	PHASE II WATER OB 12/07/92 SW-261 175604 DUP SW-260	PHASE II WATER OB 12/07/92 SW-270 175605	PHASE II WATER OB 12/07/92 SW-290 175606	PHASE II WATER OB 12/08/92 SW-300 175892	PHASE II WATER OB 12/08/92 SW-310 175740	PHASE II WATER OB 12/08/92 SW-320 175741
Pesticides/PCBs								
alpha-BHC	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
beta-BHC	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
delta-BHC	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
gamma-BHC (Lindane)	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Heptachlor	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Aldrin	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Heptachlor epoxide	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Endosulfan I	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Dieldrin	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
4,4'-DDE	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
Endrin	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
Endosulfan II	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
4,4'-DDD	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
Endosulfan sulfate	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
4,4'-DDT	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
Methoxychlor	ug/L	0.61 U	0.58 U	0.55 U	0.56 U	0.49 U	0.51 U	0.53 U
Endrin ketone	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
Endrin aldehyde	ug/L	0.12 U	0.12 U	0.11 U	0.11 U	0.099 U	0.1 U	0.11 U
alpha-Chlordane	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
gamma-Chlordane	ug/L	0.061 U	0.058 U	0.055 U	0.056 U	0.049 U	0.051 U	0.053 U
Toxaphene	ug/L	6.1 U	5.8 U	5.5 U	5.6 U	4.9 U	5.1 U	5.3 U
Aroclor-1016	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U
Aroclor-1221	ug/L	2.4 U	2.3 U	2.2 U	2.2 U	2 U	2 U	2.1 U
Aroclor-1232	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U
Aroclor-1242	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U
Aroclor-1248	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U
Aroclor-1254	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U
Aroclor-1260	ug/L	1.2 U	1.2 U	1.1 U	1.1 U	0.99 U	1 U	1.1 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SURFACE WATER

	MATRIX	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER	PHASE II WATER
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DATE	12/07/92	12/07/92	12/07/92	12/07/92	12/08/92	12/08/92	12/08/92
	ES ID	SW-260	SW-261	SW-270	SW-290	SW-300	SW-310	SW-320
	LAB ID	175603	175604	175605	175606	175892	175740	175741
COMPOUND	UNITS		DUP SW-260					
Explosives								
HMX	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
RDX	ug/L	0.21 U	0.2 U	0.19 U	0.24 U	0.21 U	0.15 U	0.14 U
1,3,5-Trinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
1,3-Dinitrobenzene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Tetryl	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4,6-Trinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
4-amino-2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2-amino-4,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,6-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
2,4-Dinitrotoluene	ug/L	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Metals								
Aluminum	ug/L	553 R	665 R	62.4 U	2100	126 R	62.6 U	130 R
Antimony	ug/L	54 U	54.1 U	53.9 U	53.6 U	53.6 U	54.1 U	54.1 U
Arsenic	ug/L	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Barium	ug/L	181 J	176 J	57.7 J	112 J	51.7 J	47.2 J	51.3 J
Beryllium	ug/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium	ug/L	3.1 U	3.1 U	4.9 R	5.6 R	3.7 R	3.1 U	3.1 U
Calcium	ug/L	137000	134000	111000	138000	93800	93100	97800
Chromium	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cobalt	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Copper	ug/L	1.9 U	1.9 U	1.9 U	59.8	1.9 U	1.9 U	1.9 U
Iron	ug/L	751	1070	4730	2310	276 R	170 R	326 R
Lead	ug/L	1 J	1.5 J	0.89 U	10.8	0.9 U	0.9 U	0.89 U
Magnesium	ug/L	37600	36500	28500	33800	15500	15500	16400
Manganese	ug/L	28.4	39.6	1080	186	47	32	53
Mercury	ug/L	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Nickel	ug/L	3.5 U	3.5 U	3.5 U	5.6 J	3.5 U	3.5 U	3.5 U
Potassium	ug/L	1920 R	2280 R	499 R	2100 R	1890 R	1780 R	1300 R
Selenium	ug/L	2.4 J	2.5 J	2.1 J	2.7 J	1.2 J	1.6 J	1.4 J
Silver	ug/L	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U
Sodium	ug/L	25700	24400	4240 J	7290	11900	10300	10600
Thallium	ug/L	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
Vanadium	ug/L	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Zinc	ug/L	6.2 R	7.4 R	1.8 U	97.4 R	3 R	3 R	5.3 R
Cyanide	ug/L	10 U	10 U	10 U	10 U	14.9	10 U	10 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I	PHASE I
	LOCATION	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	DATE	SW-120	SW-120	SW-120	SW-130	SW-140	SW-150
	ES ID	12/10/91	12/10/91	11/07/91	11/07/91	11/08/91	11/15/91
	LAB ID	S1012118	S1012118	S0711-50	S0711-59	S0811-68	S1411-78A
COMPOUND	UNITS	150995	150995	148614	148617	148618	149056
Volatile Organic Compounds							
Chloromethane	ug/Kg	13 U		19 U	19 U	23 U	17 U
Bromomethane	ug/Kg	13 U		19 U	19 U	23 U	17 U
Vinyl Chloride	ug/Kg	13 U		19 U	19 U	23 U	17 U
Chloroethane	ug/Kg	13 U		19 U	19 U	23 U	17 U
Methylene Chloride	ug/Kg	6 U		9 U	9 U	11 U	9 U
Acetone	ug/Kg	10 J		19 U	19 U	23 U	17 U
Carbon Disulfide	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,1-Dichloroethene	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,1-Dichloroethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,2-Dichloroethene (total)	ug/Kg	6 U		9 U	9 U	11 U	9 U
Chloroform	ug/Kg	2 J		9 U	9 U	11 U	9 J
1,2-Dichloroethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
2-Butanone	ug/Kg	13 U		19 U	19 U	23 U	17 U
1,1,1-Trichloroethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
Carbon Tetrachloride	ug/Kg	6 U		9 U	9 U	11 U	9 U
Vinyl Acetate	ug/Kg	13 U		19 U	19 U	23 U	17 U
Bromodichloromethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,2-Dichloropropane	ug/Kg	6 U		9 U	9 U	11 U	9 U
cis-1,3-Dichloropropene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Trichloroethene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Dibromochloromethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,1,2-Trichloroethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
Benzene	ug/Kg	6 U		9 U	9 U	11 U	9 U
trans-1,3-Dichloropropene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Bromoform	ug/Kg	6 U		9 U	9 U	11 U	9 U
4-Methyl-2-Pentanone	ug/Kg	13 U		19 U	19 U	23 U	17 U
2-Hexanone	ug/Kg	13 U		19 U	19 U	23 U	17 U
Tetrachloroethene	ug/Kg	6 U		9 U	9 U	11 U	9 U
1,1,2,2-Tetrachloroethane	ug/Kg	6 U		9 U	9 U	11 U	9 U
Toluene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Chlorobenzene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Ethylbenzene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Styrene	ug/Kg	6 U		9 U	9 U	11 U	9 U
Xylene (total)	ug/Kg	6 U		9 U	9 U	11 U	9 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-120	SW-120	SW-120	SW-130	SW-140	SW-150
	DATE	12/10/91	12/10/91	11/07/91	11/07/91	11/08/91	11/15/91
	ES ID	S1012118	S1012118	S0711-50	S0711-59	S0811-68	S1411-78A
	LAB ID	150995	150995	148614	148617	148618	149056
COMPOUND	UNITS						
Semivolatiles							
Phenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
bis(2-Chloroethyl) ether	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2-Chlorophenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
1,3-Dichlorobenzene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
1,4-Dichlorobenzene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Benzyl Alcohol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
1,2-Dichlorobenzene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2-Methylphenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
4-Methylphenol	ug/Kg	350 J	350 J	810 U	3100 U	790 U	980 U
N-Nitroso-di-n-propylamine	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Hexachloroethane	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Nitrobenzene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Isophorone	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2-Nitrophenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,4-Dimethylphenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Benzoic acid	ug/Kg	3900 U	3900 U	3900 U	15000 U	3800 U	4800 U
bis(2-Chloroethoxy) methane	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,4-Dichlorophenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
1,2,4-Trichlorobenzene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Naphthalene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
4-Chloroaniline	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Hexachlorobutadiene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
4-Chloro-3-methylphenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2-Methylnaphthalene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Hexachlorocyclopentadiene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,4,6-Trichlorophenol	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,4,5-Trichlorophenol	ug/Kg	3900 U	3900 U	3900 U	15000 U	3800 U	4800 U
2-Chloronaphthalene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2-Nitroaniline	ug/Kg	3900 U	3900 U	3900 U	15000 U	3800 U	4800 U
Dimethylphthalate	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
Acenaphthylene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
2,6-Dinitrotoluene	ug/Kg	800 U	800 U	810 U	3100 U	790 U	980 U
3-Nitroaniline	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
Acenaphthene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
2,4-Dinitrophenol	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
4-Nitrophenol	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
Dibenzofuran	ug/Kg	800 U		810 U	3100 U	790 U	980 U
2,4-Dinitrotoluene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Diethylphthalate	ug/Kg	800 U		810 U	3100 U	790 U	980 U
4-Chlorophenyl-phenylether	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Fluorene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
4-Nitroaniline	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
4,6-Dinitro-2-methylphenol	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
N-Nitrosodiphenylamine (1)	ug/Kg	800 U		810 U	3100 U	790 U	980 U
4-Bromophenyl-phenylether	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Hexachlorobenzene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Pentachlorophenol	ug/Kg	3900 U		3900 U	15000 U	3800 U	4800 U
Phenanthrene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Anthracene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Carbazole	ug/Kg						
Di-n-butylphthalate	ug/Kg	250 J		810 U	3100 U	790 U	980 U
Fluoranthene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Pyrene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Butylbenzylphthalate	ug/Kg	800 U		810 U	3100 U	790 U	980 U
3,3'-Dichlorobenzidine	ug/Kg	1600 U		1600 U	6200 U	1600 U	2000 U
Benzo(a)anthracene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Chrysene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
bis(2-Ethylhexyl)phthalate	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Di-n-octylphthalate	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Benzo(b)fluoranthene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Benzo(k)fluoranthene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Benzo(a)pyrene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Indeno(1,2,3-cd)pyrene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Dibenz(a,h)anthracene	ug/Kg	800 U		810 U	3100 U	790 U	980 U
Benzo(g,h,i)perylene	ug/Kg	800 U		810 U	3100 U	790 U	980 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX	UNITS	PHASE I SOIL SW-120 12/10/91 S1012118 150995	PHASE I SOIL SW-120 12/10/91 S1012118 150995	PHASE I SOIL SW-120 11/07/91 S0711-50 148614	PHASE I SOIL SW-130 11/07/91 S0711-59 148617	PHASE I SOIL SW-140 11/08/91 S0811-68 148618	PHASE I SOIL SW-150 11/15/91 S1411-78A 149056
Pesticides/PCBs								
alpha-BHC		ug/Kg	19 U		20 U	19 U	19 U	21 U
beta-BHC		ug/Kg	19 U		20 U	19 U	19 U	21 U
delta-BHC		ug/Kg	19 U		20 U	19 U	19 U	21 U
gamma-BHC (Lindane)		ug/Kg	19 U		20 U	19 U	19 U	21 U
Heptachlor		ug/Kg	19 U		20 U	19 U	19 U	21 U
Aldrin		ug/Kg	19 U		20 U	19 U	19 U	21 U
Heptachlor epoxide		ug/Kg	19 U		20 U	19 U	19 U	21 U
Endosulfan I		ug/Kg	19 U		20 U	19 U	19 U	21 U
Dieldrin		ug/Kg	39 U		39 U	38 U	38 U	43 U
4,4'-DDE		ug/Kg	39 U		39 U	38 U	38 U	43 U
Endrin		ug/Kg	39 U		39 U	38 U	38 U	43 U
Endosulfan II		ug/Kg	39 U		39 U	38 U	38 U	43 U
4,4'-DDD		ug/Kg	39 U		39 U	38 U	38 U	43 U
Endosulfan sulfate		ug/Kg	39 U		39 U	38 U	38 U	43 U
4,4'-DDT		ug/Kg	39 U		39 U	38 U	38 U	43 U
Methoxychlor		ug/Kg	190 U		200 U	190 U	190 U	210 U
Endrin ketone		ug/Kg	39 U		39 U	38 U	38 U	43 U
Endrin aldehyde		ug/Kg						
alpha-Chlordane		ug/Kg	190 U		200 U	190 U	190 U	210 U
gamma-Chlordane		ug/Kg	190 U		200 U	190 U	190 U	210 U
Toxaphene		ug/Kg	390 U		390 U	380 U	380 U	430 U
Aroclor-1016		ug/Kg	190 U		200 U	190 U	190 U	210 U
Aroclor-1221		ug/Kg	190 U		200 U	190 U	190 U	210 U
Aroclor-1232		ug/Kg	190 U		200 U	190 U	190 U	210 U
Aroclor-1242		ug/Kg	190 U		200 U	190 U	190 U	210 U
Aroclor-1248		ug/Kg	190 U		200 U	190 U	190 U	210 U
Aroclor-1254		ug/Kg	390 U		390 U	380 U	380 U	430 U
Aroclor-1260		ug/Kg	390 U		390 U	380 U	380 U	430 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL		PHASE I SOIL		PHASE I SOIL		PHASE I SOIL		PHASE I SOIL	
	LOCATION	SW-120		SW-120		SW-120		SW-130		SW-140		SW-150	
	DATE	12/10/91		12/10/91		11/07/91		11/07/91		11/08/91		11/15/91	
	ES ID	S1012118		S1012118		S0711-50		S0711-59		S0811-68		S1411-78A	
	LAB ID	150995		150995		148614		148617		148618		149056	
COMPOUND	UNITS												
Explosives													
HMX	ug/Kg	1000	U			120	U	1000	U	120	U	1000	U
RDX	ug/Kg	120	U			120	U	120	U	120	U	120	U
1,3,5-Trinitrobenzene	ug/Kg	120	U			120	U	120	U	120	U	120	U
1,3-Dinitrobenzene	ug/Kg	120	U			120	U	120	U	120	U	120	U
Tetryl	ug/Kg	400	U			120	U	400	U	120	U	400	U
2,4,6-Trinitrotoluene	ug/Kg	120	U			120	U	120	U	120	U	120	U
4-amino-2,6-Dinitrotoluene	ug/Kg	120	U			120	U	120	U	120	U	120	U
2-amino-4,6-Dinitrotoluene	ug/Kg	120	U			120	U	120	U	120	U	120	U
2,6-Dinitrotoluene	ug/Kg	120	U			120	U	120	U	120	U	120	U
2,4-Dinitrotoluene	ug/Kg	120	U			120	U	120	U	120	U	120	U
Metals													
Aluminum	mg/Kg	10700		J		10600		6450	U	15600			
Antimony	mg/Kg	8.4	U	J		8	U R	7.5	U R	7	U R		
Arsenic	mg/Kg	7.4		J		3.9	R	5	U	3.9	R		
Barium	mg/Kg	53.9		J		39.3	R	23.6	J	55.3	R		
Beryllium	mg/Kg	0.68		R		0.64	R	0.45	U	0.81	R		
Cadmium	mg/Kg	2.3		J		2.7	J	1.8	U	3.4	J		
Calcium	mg/Kg	24200		J		27700		31100		28900			
Chromium	mg/Kg	21.5		J		20.2	R	14.4	U	28.1	R		
Cobalt	mg/Kg	10.2		J		8	R	6.5	U	11	R		
Copper	mg/Kg	49.7		J		25.3	J	18.7	U	31.6	J		
Iron	mg/Kg	24400		J		27500		24200		38500			
Lead	mg/Kg	311		J		28.3		21	U	20.3			
Magnesium	mg/Kg	6030		J		5660		3720		7930			
Manganese	mg/Kg	339		J		540		346	J	596			
Mercury	mg/Kg	0.69		J		0.12	R	0.04	U	0.04	R		
Nickel	mg/Kg	35.7		J		33.5	R	22.1	U	44	R		
Potassium	mg/Kg	1010		J		1030		574	J	1510			
Selenium	mg/Kg	0.22	U	J		0.22	R	0.37	U J	0.16	U R		
Silver	mg/Kg	1	U	J		1.2	U R	1.2	U	1	U R		
Sodium	mg/Kg	63.9		J		64.5	J	70.4		96	J		
Thallium	mg/Kg	0.61	U	J		0.52	U J	0.61	U	0.46	U R		
Vanadium	mg/Kg	17.1		J		17.3	R	10.4	U	23.4	R		
Zinc	mg/Kg	122		J		90.3	R	39.6	U	108	R		
Cyanide	mg/Kg	0.66	U	J		0.72	U	0.62		0.66	U		

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I SOIL SW-150 11/08/91 S0811-77 148621	PHASE I SOIL SW-150 11/08/91 S0811-86 148623	PHASE I SOIL SW-160 11/12/91 S1211-96 148898	PHASE I SOIL SW-170 11/12/91 S1211-97 148899	PHASE I SOIL SW-180 11/08/91 S0811-89 148625	PHASE I SOIL SW-180 12/12/91 S1012117 150725	PHASE I SOIL SW-190 11/06/91 S0611-22 148585
Volatile Organic Compounds									
Chloromethane		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Bromomethane		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Vinyl Chloride		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Chloroethane		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Methylene Chloride		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Acetone		ug/Kg	21 U	20 U	16 U	18 U	13 U	25 U	11 U
Carbon Disulfide		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,1-Dichloroethene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,1-Dichloroethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,2-Dichloroethene (total)		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Chloroform		ug/Kg	20 J	9 J	2 J	9 U	3 J	10 U	6 U
1,2-Dichloroethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
2-Butanone		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
1,1,1-Trichloroethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Carbon Tetrachloride		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Vinyl Acetate		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Bromodichloromethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,2-Dichloropropane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
cis-1,3-Dichloropropene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Trichloroethene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Dibromochloromethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,1,2-Trichloroethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Benzene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
trans-1,3-Dichloropropene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Bromoform		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
4-Methyl-2-Pentanone		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
2-Hexanone		ug/Kg	21 U	20 U	16 U	18 U	13 U	20 U	11 U
Tetrachloroethene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
1,1,2,2-Tetrachloroethane		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Toluene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Chlorobenzene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Ethylbenzene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Styrene		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U
Xylene (total)		ug/Kg	10 U	10 U	8 U	9 U	7 U	10 U	6 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-150	SW-150	SW-160	SW-170	SW-180	SW-180	SW-190
	DATE	11/08/91	11/08/91	11/12/91	11/12/91	11/08/91	12/12/91	11/06/91
	ES ID	S0811-77	S0811-86	S1211-96	S1211-97	S0811-89	S1012117	S0611-22
	LAB ID	148621	148623	148898	148899	148625	150725	148585
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg			1000 U	1000 U	900 U		740 U
bis(2-Chloroethyl) ether	ug/Kg			1000 U	1000 U	900 U		740 U
2-Chlorophenol	ug/Kg			1000 U	1000 U	900 U		740 U
1,3-Dichlorobenzene	ug/Kg			1000 U	1000 U	900 U		740 U
1,4-Dichlorobenzene	ug/Kg			1000 U	1000 U	900 U		740 U
Benzyl Alcohol	ug/Kg			1000 U	1000 U	900 U		740 U
1,2-Dichlorobenzene	ug/Kg			1000 U	1000 U	900 U		740 U
2-Methylphenol	ug/Kg			1000 U	1000 U	900 U		740 U
2,2'-oxybis(1-Chloropropane)	ug/Kg			1000 U	1000 U	900 U		740 U
4-Methylphenol	ug/Kg			1000 U	1000 U	900 U		740 U
N-Nitroso-di-n-propylamine	ug/Kg			1000 U	1000 U	900 U		740 U
Hexachloroethane	ug/Kg			1000 U	1000 U	900 U		740 U
Nitrobenzene	ug/Kg			1000 U	1000 U	900 U		740 U
Isophorone	ug/Kg			1000 U	1000 U	900 U		740 U
2-Nitrophenol	ug/Kg			1000 U	1000 U	900 U		740 U
2,4-Dimethylphenol	ug/Kg			1000 U	1000 U	900 U		740 U
Benzoic acid	ug/Kg			4900 U	4900 U	4400 U		3600 U
bis(2-Chloroethoxy) methane	ug/Kg			1000 U	1000 U	900 U		740 U
2,4-Dichlorophenol	ug/Kg			1000 U	1000 U	900 U		740 U
1,2,4-Trichlorobenzene	ug/Kg			1000 U	1000 U	900 U		740 U
Naphthalene	ug/Kg			1000 U	1000 U	900 U		740 U
4-Chloroaniline	ug/Kg			1000 U	1000 U	900 U		740 U
Hexachlorobutadiene	ug/Kg			1000 U	1000 U	900 U		740 U
4-Chloro-3-methylphenol	ug/Kg			1000 U	1000 U	900 U		740 U
2-Methylnaphthalene	ug/Kg			1000 U	1000 U	900 U		740 U
Hexachlorocyclopentadiene	ug/Kg			1000 U	1000 U	900 U		740 U
2,4,6-Trichlorophenol	ug/Kg			1000 U	1000 U	900 U		740 U
2,4,5-Trichlorophenol	ug/Kg			4900 U	4900 U	4400 U		3600 U
2-Chloronaphthalene	ug/Kg			1000 U	1000 U	900 U		740 U
2-Nitroaniline	ug/Kg			4900 U	4900 U	4400 U		3600 U
Dimethylphthalate	ug/Kg			1000 U	1000 U	900 U		740 U
Acenaphthylene	ug/Kg			1000 U	1000 U	900 U		740 U
2,6-Dinitrotoluene	ug/Kg			1000 U	1000 U	900 U		740 U
3-Nitroaniline	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
Acenaphthene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
2,4-Dinitrophenol	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
4-Nitrophenol	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
Dibenzofuran	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
2,4-Dinitrotoluene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Diethylphthalate	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
4-Chlorophenyl-phenylether	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Fluorene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
4-Nitroaniline	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
4,6-Dinitro-2-methylphenol	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
N-Nitrosodiphenylamine (1)	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
4-Bromophenyl-phenylether	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Hexachlorobenzene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Pentachlorophenol	ug/Kg			4900 U	4900 U	4400 U	4700 U	3600 U
Phenanthrene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Anthracene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Fluoranthene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Pyrene	ug/Kg			1000 U	1000 U	900 U	960 U	100 J
Butylbenzylphthalate	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
3,3'-Dichlorobenzidine	ug/Kg			2000 U	2000 U	1800 U	1900 U	1500 U
Benzo(a)anthracene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Chrysene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
bis(2-Ethylhexyl)phthalate	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Di-n-octylphthalate	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Benzo(b)fluoranthene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Benzo(k)fluoranthene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Benzo(a)pyrene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Indeno(1,2,3-cd)pyrene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Dibenz(a,h)anthracene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U
Benzo(g,h,i)perylene	ug/Kg			1000 U	1000 U	900 U	960 U	740 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-150	SW-150	SW-160	SW-170	SW-180	SW-180	SW-190
	DATE	11/08/91	11/08/91	11/12/91	11/12/91	11/08/91	12/12/91	11/06/91
	ES ID	S0811-77	S0811-86	S1211-96	S1211-97	S0811-89	S1012117	S0611-22
	LAB ID	148621	148623	148898	148899	148625	150725	148585
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg			25 U	25 U	22 U	23 U	18 U
beta-BHC	ug/Kg			25 U	25 U	22 U	23 U	18 U
delta-BHC	ug/Kg			25 U	25 U	22 U	23 U	18 U
gamma-BHC (Lindane)	ug/Kg			25 U	25 U	22 U	23 U	18 U
Heptachlor	ug/Kg			25 U	25 U	22 U	23 U	18 U
Aldrin	ug/Kg			25 U	25 U	22 U	23 U	18 U
Heptachlor epoxide	ug/Kg			25 U	25 U	22 U	23 U	18 U
Endosulfan I	ug/Kg			25 U	25 U	22 U	23 U	18 U
Dieldrin	ug/Kg			49 U	49 U	44 U	47 U	36 U
4,4'-DDE	ug/Kg			49 U	49 U	44 U	47 U	36 U
Endrin	ug/Kg			49 U	49 U	44 U	47 U	36 U
Endosulfan II	ug/Kg			49 U	49 U	44 U	47 U	36 U
4,4'-DDD	ug/Kg			49 U	49 U	44 U	47 U	36 U
Endosulfan sulfate	ug/Kg			49 U	49 U	44 U	47 U	36 U
4,4'-DDT	ug/Kg			49 U	49 U	44 U	47 U	36 U
Methoxychlor	ug/Kg			250 U	250 U	220 U	230 U	180 U
Endrin ketone	ug/Kg			49 U	49 U	44 U	47 U	36 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/Kg			250 U	250 U	220 U	230 U	180 U
gamma-Chlordane	ug/Kg			250 U	250 U	220 U	230 U	180 U
Toxaphene	ug/Kg			490 U	490 U	440 U	470 U	360 U
Aroclor-1016	ug/Kg			250 U	250 U	220 U	230 U	180 U
Aroclor-1221	ug/Kg			250 U	250 U	220 U	230 U	180 U
Aroclor-1232	ug/Kg			250 U	250 U	220 U	230 U	180 U
Aroclor-1242	ug/Kg			250 U	250 U	220 U	230 U	180 U
Aroclor-1248	ug/Kg			250 U	250 U	220 U	230 U	180 U
Aroclor-1254	ug/Kg			490 U	490 U	440 U	470 U	360 U
Aroclor-1260	ug/Kg			490 U	490 U	440 U	470 U	360 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-150	SW-150	SW-160	SW-170	SW-180	SW-180	SW-190
	DATE	11/08/91	11/08/91	11/12/91	11/12/91	11/08/91	12/12/91	11/06/91
	ES ID	S0811-77	S0811-86	S1211-96	S1211-97	S0811-89	S1012117	S0611-22
	LAB ID	148621	148623	148898	148899	148625	150725	148585
	UNITS							
Explosives								
HMX	ug/Kg			1000 U	1000 U	120 U	1000 U	120 J
RDX	ug/Kg			120 U	120 U	120 U	120 U	500
1,3,5-Trinitrobenzene	ug/Kg			120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg			120 U	120 U	120 U	120 U	120 U
Tetryl	ug/Kg			400 U	400 U	120 U	400 U	120 U
2,4,6-Trinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	100 J
4-amino-2,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	160
2-amino-4,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	180
2,6-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg			120 U	120 U	120 U	120 U	98 J
Metals								
Aluminum	mg/Kg	11900 U	13700	17300	19000	25800	17500 J	18700
Antimony	mg/Kg	8.8 U R	13.7 U R	10.7 U R	15 U R	10.4 U R	8.3 J	9.5 U R
Arsenic	mg/Kg	3.4 U R	3.7 R	4.8	7.1	5.1 R	2.5 J	4.9 R
Barium	mg/Kg	35.6 R	47 R	158	245	385 R	149 J	183 R
Beryllium	mg/Kg	0.67 U R	0.94 R	1	1.1 J	1.2 R	0.9 R	1 R
Cadmium	mg/Kg	2.7 U J	2.4 J	4.1	4.2	3.3 J	2 J	9.7 J
Calcium	mg/Kg	28200	17800	9500	12100	2420	2020 J	28700
Chromium	mg/Kg	21.7 U R	26.5 R	27.1	28.5	35.5 R	24.3 J	27.4 R
Cobalt	mg/Kg	10 U R	10.8 R	14.6	11 J	11.6 R	10.9 J	12.8 R
Copper	mg/Kg	31.4 U J	32.6 J	88 J	158 J	105 J	84.5 J	416
Iron	mg/Kg	28300	32800	32900	31300	37100	24100 J	34300
Lead	mg/Kg	49.9 J	24.6	66	131	274	36.5 J	59.3
Magnesium	mg/Kg	6260	7020	6260	6270	7010	4690 J	7860
Manganese	mg/Kg	373 J	367	1520 J	362 J	468	383 J	659
Mercury	mg/Kg	0.15 U	0.07 R	1.1	0.91	0.13 R	0.09 J	2
Nickel	mg/Kg	39.9 U R	43 R	43	45.3	41.6 R	29.8 J	39.1 R
Potassium	mg/Kg	1120 J	1750	2000	2660	3340	1460 J	2940
Selenium	mg/Kg	0.23 U R	0.29 R	3 U J	0.4 U J	0.22 U R	0.13 U J	0.12 U R
Silver	mg/Kg	1.3 U R	2 U R	1.7 U	2.4 U	1.6 U R	1.2 U J	1.8 R
Sodium	mg/Kg	67.8 J	105 U	97.9 J	107 J	79.8 U	43.9 U J	73 U
Thallium	mg/Kg	0.58 U R	0.51 U R	0.5 U	0.66 U	0.61 U R	0.36 U J	0.34 U R
Vanadium	mg/Kg	19.7 R	23.4 R	24	30.8	39.8 R	26.3 J	30.3 R
Zinc	mg/Kg	60.2 U R	87.1 R	233	272	131 R	107 J	360
Cyanide	mg/Kg	0.77	0.79 U	0.91 U	0.88 U	0.77 U	0.81 U J	0.67 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I SOIL SW-191 11/06/91 S0611-19 148582		PHASE I SOIL SW-192 11/13/91 S1311-103 149052		PHASE I SOIL SW-192 11/13/91 S1311-103RE 149052		PHASE I SOIL SW-193 11/13/91 S1311-100 149049	PHASE I SOIL SW-194 11/13/91 S1311-101 149050	PHASE I SOIL SW-195 11/13/91 S1311-102 149051	PHASE I SOIL SW-196 11/12/91 S1211-98 148900
Volatile Organic Compounds												
Chloromethane		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Bromomethane		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Vinyl Chloride		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Chloroethane		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Methylene Chloride		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Acetone		ug/Kg	25 B		28 U	R	20 U	R	16 U	14 U	19 U	12 U
Carbon Disulfide		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,1-Dichloroethene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,1-Dichloroethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,2-Dichloroethene (total)		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Chloroform		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,2-Dichloroethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
2-Butanone		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
1,1,1-Trichloroethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Carbon Tetrachloride		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Vinyl Acetate		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Bromodichloromethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,2-Dichloropropane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
cis-1,3-Dichloropropene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Trichloroethene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Dibromochloromethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,1,2-Trichloroethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Benzene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
trans-1,3-Dichloropropene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Bromoform		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
4-Methyl-2-Pentanone		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
2-Hexanone		ug/Kg	20 U		20 U	R	20 U	R	16 U	14 U	19 U	12 U
Tetrachloroethene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
1,1,2,2-Tetrachloroethane		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Toluene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Chlorobenzene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Ethylbenzene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Styrene		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U
Xylene (total)		ug/Kg	10 U		10 U	R	10 U	R	8 U	7 U	9 U	6 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-191	SW-192	SW-192	SW-193	SW-194	SW-195	SW-196
	DATE	11/06/91	11/13/91	11/13/91	11/13/91	11/13/91	11/13/91	11/12/91
	ES ID	S0611-19	S1311-103	S1311-103RE	S1311-100	S1311-101	S1311-102	S1211-98
	LAB ID	148582	149052	149052	149049	149050	149051	148900
COMPOUND	UNITS							
Semivolatiles								
Phenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
bis(2-Chloroethyl) ether	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2-Chlorophenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
1,3-Dichlorobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
1,4-Dichlorobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzyl Alcohol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
1,2-Dichlorobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2-Methylphenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Methylphenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
N-Nitroso-di-n-propylamine	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Hexachloroethane	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Nitrobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Isophorone	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2-Nitrophenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4-Dimethylphenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzoic acid	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
bis(2-Chloroethoxy) methane	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4-Dichlorophenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
1,2,4-Trichlorobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Naphthalene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Chloroaniline	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Hexachlorobutadiene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Chloro-3-methylphenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2-Methylnaphthalene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Hexachlorocyclopentadiene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4,6-Trichlorophenol	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4,5-Trichlorophenol	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
2-Chloronaphthalene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2-Nitroaniline	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
Dimethylphthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Acenaphthylene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,6-Dinitrotoluene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
3-Nitroaniline	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
Acenaphthene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4-Dinitrophenol	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
4-Nitrophenol	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
Dibenzofuran	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
2,4-Dinitrotoluene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Diethylphthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Chlorophenyl-phenylether	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Fluorene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Nitroaniline	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
4,6-Dinitro-2-methylphenol	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
N-Nitrosodiphenylamine (1)	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
4-Bromophenyl-phenylether	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Hexachlorobenzene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Pentachlorophenol	ug/Kg	13000 U	8000 U		4600 U	5100 U	5900 U	3800 U
Phenanthrene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Anthracene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Carbazole	ug/Kg							
Di-n-butylphthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Fluoranthene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Pyrene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Butylbenzylphthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
3,3'-Dichlorobenzidine	ug/Kg	5300 U	3300 U		1900 U	2100 U	2400 U	1600 U
Benzo(a)anthracene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Chrysene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Di-n-octylphthalate	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzo(b)fluoranthene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzo(k)fluoranthene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzo(a)pyrene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Indeno(1,2,3-cd)pyrene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Dibenz(a,h)anthracene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U
Benzo(g,h,i)perylene	ug/Kg	2600 U	1700 U		960 U	1000 U	1200 U	780 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-191	SW-192	SW-192	SW-193	SW-194	SW-195	SW-196
	DATE	11/06/91	11/13/91	11/13/91	11/13/91	11/13/91	11/13/91	11/12/91
	ES ID	S0611-19	S1311-103	S1311-103RE	S1311-100	S1311-101	S1311-102	S1211-98
	LAB ID	146582	149052	149052	149049	149050	149051	148900
COMPOUND	UNITS							
Pesticides/PCBs								
alpha-BHC	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
beta-BHC	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
delta-BHC	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
gamma-BHC (Lindane)	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
Heptachlor	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
Aldrin	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
Heptachlor epoxide	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
Endosulfan I	ug/Kg	64 U	40 U		23 U	25 U	30 U	19 U
Dieldrin	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
4,4'-DDE	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
Endrin	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
Endosulfan II	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
4,4'-DDD	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
Endosulfan sulfate	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
4,4'-DDT	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
Methoxychlor	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Endrin ketone	ug/Kg	130 U	80 U		46 U	51 U	59 U	38 U
Endrin aldehyde	ug/Kg							
alpha-Chlordane	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
gamma-Chlordane	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Toxaphene	ug/Kg	1300 U	800 U		460 U	510 U	590 U	380 U
Aroclor-1016	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Aroclor-1221	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Aroclor-1232	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Aroclor-1242	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Aroclor-1246	ug/Kg	640 U	400 U		230 U	250 U	300 U	190 U
Aroclor-1254	ug/Kg	1300 U	800 U		460 U	510 U	590 U	380 U
Aroclor-1260	ug/Kg	1300 U	800 U		460 U	510 U	590 U	380 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL	PHASE I SOIL
	LOCATION	SW-191	SW-192	SW-192	SW-193	SW-194	SW-195	SW-196
	DATE	11/06/91	11/13/91	11/13/91	11/13/91	11/13/91	11/13/91	11/12/91
	ES ID	S0611-19	S1311-103	S1311-103RE	S1311-100	S1311-101	S1311-102	S1211-98
	LAB ID	148582	149052	149052	149049	149050	149051	148900
COMPOUND	UNITS							
Explosives								
HMX	ug/Kg	120 U	1000 U		1000 U	1000 U	1000 U	1000 U
RDX	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	400 U		400 U	400 U	400 U	400 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
Metals								
Aluminum	mg/Kg	19100	22900		16000	15800	14000	8310
Antimony	mg/Kg	37.3 U R	21.2 U R		11.8 U R	12.9 U R	14.1 U R	10.3 U R
Arsenic	mg/Kg	4.7 R	7.4		6	3.8	5.7	4.4
Barium	mg/Kg	701 R	313		106	196	170	44.1
Beryllium	mg/Kg	2.4 U R	1.6 J		0.97 J	0.98 J	1.1 J	0.71 J
Cadmium	mg/Kg	6.3 J	5		2.3	2.8	2.8	2
Calcium	mg/Kg	11900	10100		5720	15100	3130	104000
Chromium	mg/Kg	34.6 R	41.8		25.3	24.6	23.5	15.2
Cobalt	mg/Kg	21.8 U R	17.7 J		16.1	11.3 J	9.5 J	7.5 J
Copper	mg/Kg	259	217 J		21.2 J	82.4 J	69.4 J	22.4 J
Iron	mg/Kg	31700	40900		33000	31100	23700	23900
Lead	mg/Kg	463	280		331.9	268	73.6	15.4
Magnesium	mg/Kg	8100	9900		5410	6500	4430	12000
Manganese	mg/Kg	586	439 J		555 J	532 J	322 J	468 J
Mercury	mg/Kg	0.29 R	0.18 J		0.04 U	0.54	0.1 J	0.17
Nickel	mg/Kg	56.8 R	64.4		40.8	38.2	31.6	23.3
Potassium	mg/Kg	3350 J	3530		2210	1980	1920	938
Selenium	mg/Kg	0.62 R	0.45 U J		0.4 U J	0.49 U J	0.57 U J	0.31 U J
Silver	mg/Kg	5.8 R	3.4 U		1.9 U	2.1 U	2.3 U	1.7 U
Sodium	mg/Kg	285 U	123 U		68.5 U	74.5 U	81.7 U	194 U
Thallium	mg/Kg	1.8 U R	0.74 U		0.66 U	0.81 U	0.93 U	0.51 U
Vanadium	mg/Kg	38.1 R	37.9		24.6	22.6	21.9	10.9
Zinc	mg/Kg	419	655		100	251	281	76
Cyanide	mg/Kg	2 U	1.3 U		0.81 U	0.82 U	1 U	0.71 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	DATE	SW-197	OB	OB	OB	OB	OB	OB
	ES ID	11/15/91	12/03/92	12/03/92	12/03/92	12/03/92	12/03/92	12/04/92
	LAB ID	S1311-104	SD-200	SD-200RE	SD-210	SD-220	SD-230	SD-240
COMPOUND	UNITS	149053	175409	175409R1	175410	175411	175412	175413
Volatile Organic Compounds								
Chloromethane	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
Bromomethane	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
Vinyl Chloride	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
Chloroethane	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
Methylene Chloride	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Acetone	ug/Kg	17 U	14 U		13 U	14 U	13 U	34
Carbon Disulfide	ug/Kg	8 U	14 U		13 U	14 U	13 U	2 J
1,1-Dichloroethene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,1-Dichloroethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,2-Dichloroethene (total)	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Chloroform	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,2-Dichloroethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
2-Butanone	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
1,1,1-Trichloroethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Carbon Tetrachloride	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Vinyl Acetate	ug/Kg	17 U						
Bromodichloromethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,2-Dichloropropane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
cis-1,3-Dichloropropene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Trichloroethene	ug/Kg	8 U	14 U		13 U	14 U	18	13 U
Dibromochloromethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,1,2-Trichloroethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Benzene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
trans-1,3-Dichloropropene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Bromoform	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
4-Methyl-2-Pentanone	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
2-Hexanone	ug/Kg	17 U	14 U		13 U	14 U	13 U	13 U
Tetrachloroethene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
1,1,2,2-Tetrachloroethane	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Toluene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Chlorobenzene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Ethylbenzene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Styrene	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U
Xylene (total)	ug/Kg	8 U	14 U		13 U	14 U	13 U	13 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX	UNITS	PHASE I	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			SW-197	OB	OB	OB	OB	OB	OB
	DATE		11/15/91	12/03/92	12/03/92	12/03/92	12/03/92	12/03/92	12/04/92
	ES ID		S1311-104	SD-200	SD-200RE	SD-210	SD-220	SD-230	SD-240
	LAB ID		149053	175409	175409R1	175410	175411	175412	175413
Semivolatiles									
Phenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
bis(2-Chloroethyl) ether	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2-Chlorophenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
1,3-Dichlorobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
1,4-Dichlorobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Benzyl Alcohol	ug/Kg		1200 U						
1,2-Dichlorobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2-Methylphenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,2'-oxybis(1-Chloropropane)	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
4-Methylphenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
N-Nitroso-di-n-propylamine	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Hexachloroethane	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Nitrobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Isophorone	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2-Nitrophenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4-Dimethylphenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Benzoic acid	ug/Kg		5700 U						
bis(2-Chloroethoxy) methane	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4-Dichlorophenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
1,2,4-Trichlorobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Naphthalene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
4-Chloroaniline	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Hexachlorobutadiene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
4-Chloro-3-methylphenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2-Methylnaphthalene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Hexachlorocyclopentadiene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4,6-Trichlorophenol	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4,5-Trichlorophenol	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
2-Chloronaphthalene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2-Nitroaniline	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
Dimethylphthalate	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Acenaphthylene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,6-Dinitrotoluene	ug/Kg		1200 U	470 U	470 U	440 U	120 J	450 U	470 U
3-Nitroaniline	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
Acenaphthene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4-Dinitrophenol	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
4-Nitrophenol	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
Dibenzofuran	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
2,4-Dinitrotoluene	ug/Kg		1200 U	130 J	140 J	440 U	1600	450 U	470 U
Diethylphthalate	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
4-Chlorophenyl-phenylether	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Fluorene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
4-Nitroaniline	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
4,6-Dinitro-2-methylphenol	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
N-Nitrosodiphenylamine (1)	ug/Kg		1200 U	87 J	80 J	440 U	120 J	450 U	470 U
4-Bromophenyl-phenylether	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Hexachlorobenzene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Pentachlorophenol	ug/Kg		5700 U	1100 U	1100 U	1000 U	1200 U	1100 U	1100 U
Phenanthrene	ug/Kg		1200 U	470 U	76 J	440 U	26 J	450 U	470 U
Anthracene	ug/Kg		1200 U	470 U	77 J	440 U	480 U	450 U	470 U
Carbazole	ug/Kg			470 U	27 J	440 U	480 U	450 U	470 U
Di-n-butylphthalate	ug/Kg		1200 U	730 J	460 J	210 J	510	450 U	15 J
Fluoranthene	ug/Kg		1200 U	470 U	140 J	440 U	22 J	450 U	470 U
Pyrene	ug/Kg		1200 U	470 U	110 J	440 U	25 J	450 U	470 U
Butylbenzylphthalate	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
3,3'-Dichlorobenzidine	ug/Kg		2300 U	470 U	470 U	440 U	480 U	450 U	470 U
Benzo(a)anthracene	ug/Kg		1200 U	470 U	48 J	440 U	480 U	450 U	470 U
Chrysene	ug/Kg		1200 U	470 U	62 J	440 U	480 U	450 U	470 U
bis(2-Ethylhexyl)phthalate	ug/Kg		1200 U	54 J	61 J	57 J	96 J	91 J	49 J
Di-n-octylphthalate	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Benzo(b)fluoranthene	ug/Kg		1200 U	470 U	52 J	440 U	480 U	450 U	470 U
Benzo(k)fluoranthene	ug/Kg		1200 U	470 U	54 J	440 U	480 U	450 U	470 U
Benzo(a)pyrene	ug/Kg		1200 U	470 U	38 J	440 U	480 U	450 U	470 U
Indeno(1,2,3-cd)pyrene	ug/Kg		1200 U	470 U	37 J	440 U	480 U	450 U	470 U
Dibenz(a,h)anthracene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U
Benzo(g,h,i)perylene	ug/Kg		1200 U	470 U	470 U	440 U	480 U	450 U	470 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE I	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	DATE	SW-197	OB	OB	OB	OB	OB	OB
	ES ID	11/15/91	12/03/92	12/03/92	12/03/92	12/03/92	12/03/92	12/04/92
	LAB ID	S1311-104	SD-200	SD-200RE	SD-210	SD-220	SD-230	SD-240
COMPOUND	UNITS	149053	175409	175409R1	175410	175411	175412	175413
Pesticides/PCBs								
alpha-BHC	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
beta-BHC	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
delta-BHC	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
gamma-BHC (Lindane)	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Heptachlor	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Aldrin	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Heptachlor epoxide	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Endosulfan I	ug/Kg	28 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Dieldrin	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
4,4'-DDE	ug/Kg	57 U	2.8 J		2.8 J	10	4.5 U	4.7 U
Endrin	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
Endosulfan II	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
4,4'-DDD	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
Endosulfan sulfate	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
4,4'-DDT	ug/Kg	57 U	4.7 U		13	2.3 J	4.5 U	4.7 U
Methoxychlor	ug/Kg	280 U	24 U		23 U	25 U	23 U	24 U
Endrin ketone	ug/Kg	57 U	4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
Endrin aldehyde	ug/Kg		4.7 U		4.4 U	4.8 U	4.5 U	4.7 U
alpha-Chlordane	ug/Kg	280 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
gamma-Chlordane	ug/Kg	280 U	2.4 U		2.3 U	2.5 U	2.3 U	2.4 U
Toxaphene	ug/Kg	570 U	240 U		230 U	250 U	230 U	240 U
Aroclor-1016	ug/Kg	280 U	47 U		44 U	48 U	45 U	47 U
Aroclor-1221	ug/Kg	280 U	95 U		89 U	98 U	92 U	95 U
Aroclor-1232	ug/Kg	280 U	47 U		44 U	48 U	45 U	47 U
Aroclor-1242	ug/Kg	280 U	47 U		44 U	48 U	45 U	47 U
Aroclor-1248	ug/Kg	280 U	47 U		44 U	48 U	45 U	47 U
Aroclor-1254	ug/Kg	570 U	47 U		44 U	48 U	45 U	47 U
Aroclor-1260	ug/Kg	570 U	47 U		44 U	48 U	45 U	47 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX / LOCATION / DATE / ES ID / LAB ID	UNITS	PHASE I SOIL SW-197 11/15/91 S1311-104 149053	PHASE II SOIL OB 12/03/92 SD-200 175409	PHASE II SOIL OB 12/03/92 SD-200RE 175409R1	PHASE II SOIL OB 12/03/92 SD-210 175410	PHASE II SOIL OB 12/03/92 SD-220 175411	PHASE II SOIL OB 12/03/92 SD-230 175412	PHASE II SOIL OB 12/04/92 SD-240 175413
Explosives									
HMX		ug/Kg	1000 U	120 U		120 U	120 U	120 U	120 U
RDX		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
1,3,5-Trinitrobenzene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
1,3-Dinitrobenzene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
Tetryl		ug/Kg	400 U	120 U		120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2,6-Dinitrotoluene		ug/Kg	120 U	120 U		120 U	120 U	120 U	120 U
2,4-Dinitrotoluene		ug/Kg	120 U	120 U		93 J	86 J	120 U	120 U
Metals									
Aluminum		mg/Kg	15400	18000		14300	17500	16000	16300
Antimony		mg/Kg	11.4 U R	28.3 J		8.8 UJ	10 UJ	12 UJ	8.2 UJ
Arsenic		mg/Kg	6.6	5.1		4.2	5	9.5	4
Barium		mg/Kg	106	1780		373	637	156	120
Beryllium		mg/Kg	1	0.93 J		0.8	1.5	1.1	0.82
Cadmium		mg/Kg	2	2.3		2.6	2.3	0.74 J	0.47 U
Calcium		mg/Kg	2840	5640		12300	8690	4330	3030
Chromium		mg/Kg	21.7	30.3		25.2	28.7	22.4	22.1
Cobalt		mg/Kg	11.3	14.3		13.6	13.7	7.7 J	12.5
Copper		mg/Kg	24.4 J	3790		301	445	40.5	24.2
Iron		mg/Kg	28600	35800		31800	36400	29600	28100
Lead		mg/Kg	31.7	7400		829	1120	62.4	38.6
Magnesium		mg/Kg	4310	6700		5760	6240	4700	4170
Manganese		mg/Kg	338 J	530		598	619	196	775
Mercury		mg/Kg	0.06 U	0.14		0.08 J	0.07 J	0.06 J	0.04 J
Nickel		mg/Kg	30.2	42.2		43	44.6	32	28.8
Potassium		mg/Kg	1540	1990		1180	1840	1840	1220
Selenium		mg/Kg	0.35 U J	1.6 J		0.74 J	0.76 J	1.2 J	0.84 J
Silver		mg/Kg	1.8 U	0.9 J		1.9	0.59 U	0.71 U	0.49 U
Sodium		mg/Kg	65.8 U	159 J		59.3 J	81.7 J	93.9 J	70.7 J
Thallium		mg/Kg	0.57 U	0.58 U		0.4 U	0.43 U	0.6 U	0.46 U
Vanadium		mg/Kg	27.2	28.7		23	28.2	27.7	26.7
Zinc		mg/Kg	89	1200		386	647	86.3	71.9
Cyanide		mg/Kg	0.98 U	0.51 U		0.59 U	0.72 U	0.66 U	0.7 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DATE	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	SD-250	SD-260	SD-261	SD-261RE	SD-270	SD-280	SD-290
	LAB ID	175414	175631	175632	175632	175633	175634	175635
COMPOUND	UNITS			DUP SD-260	DUP SD-260			
Volatile Organic Compounds								
Chloromethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Bromomethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Vinyl Chloride	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Chloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Methylene Chloride	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Acetone	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Carbon Disulfide	ug/Kg	6 J	13 U	13 U		14 U	13 U	14 U
1,1-Dichloroethene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,1-Dichloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,2-Dichloroethene (total)	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Chloroform	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,2-Dichloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
2-Butanone	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,1,1-Trichloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Carbon Tetrachloride	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Vinyl Acetate	ug/Kg							
Bromodichloromethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,2-Dichloropropane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
cis-1,3-Dichloropropene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Trichloroethene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Dibromochloromethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,1,2-Trichloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Benzene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
trans-1,3-Dichloropropene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Bromoform	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
4-Methyl-2-Pentanone	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
2-Hexanone	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Tetrachloroethene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
1,1,2,2-Tetrachloroethane	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Toluene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Chlorobenzene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Ethylbenzene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Styrene	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U
Xylene (total)	ug/Kg	13 U	13 U	13 U		14 U	13 U	14 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	DATE	OB	OB	OB	OB	OB	OB	OB
	ES ID	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	LAB ID	SD-250	SD-260	SD-261	SD-261RE	SD-270	SD-280	SD-290
COMPOUND	UNITS	175414	175631	175632	175632	175633	175634	175635
				DUP SD-260	DUP SD-260			
Semivolatiles								
Phenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
bis(2-Chloroethyl) ether	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2-Chlorophenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
1,3-Dichlorobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
1,4-Dichlorobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzyl Alcohol	ug/Kg							
1,2-Dichlorobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2-Methylphenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Methylphenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
N-Nitroso-di-n-propylamine	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Hexachloroethane	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Nitrobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Isophorone	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2-Nitrophenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4-Dimethylphenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzoic acid	ug/Kg							
bis(2-Chloroethoxy) methane	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4-Dichlorophenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
1,2,4-Trichlorobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Naphthalene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Chloroaniline	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Hexachlorobutadiene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Chloro-3-methylphenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2-Methylnaphthalene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Hexachlorocyclopentadiene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4,6-Trichlorophenol	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4,5-Trichlorophenol	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
2-Chloronaphthalene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2-Nitroaniline	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
Dimethylphthalate	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Acenaphthylene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,6-Dinitrotoluene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
3-Nitroaniline	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
Acenaphthene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4-Dinitrophenol	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
4-Nitrophenol	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
Dibenzofuran	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
2,4-Dinitrotoluene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Diethylphthalate	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Chlorophenyl-phenylether	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Fluorene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Nitroaniline	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
4,6-Dinitro-2-methylphenol	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
N-Nitrosodiphenylamine (1)	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
4-Bromophenyl-phenylether	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Hexachlorobenzene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Pentachlorophenol	ug/Kg	1100 U	1000 U	960 U		1300 U	990 U	1200 U
Phenanthrene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Anthracene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Carbazole	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Di-n-butylphthalate	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Fluoranthene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Pyrene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Butylbenzylphthalate	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
3,3'-Dichlorobenzidine	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzo(a)anthracene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Chrysene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
bis(2-Ethylhexyl)phthalate	ug/Kg	37 J	22 J	20 J		35 J	39 J	36 J
Di-n-octylphthalate	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzo(b)fluoranthene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzo(k)fluoranthene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzo(a)pyrene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Indeno(1,2,3-cd)pyrene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Dibenz(a,h)anthracene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U
Benzo(g,h,i)perylene	ug/Kg	460 U	420 U	390 U		540 U	410 U	490 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	DATE	OB	OB	OB	OB	OB	OB	OB
	ES ID	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	LAB ID	SD-250	SD-260	SD-261	SD-261RE	SD-270	SD-280	SD-290
COMPOUND	UNITS	175414	175631	175632	175632	175633	175634	175635
				DUP SD-260	DUP SD-260			
Pesticides/PCBs								
alpha-BHC	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
beta-BHC	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
delta-BHC	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
gamma-BHC (Lindane)	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Heptachlor	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Aldrin	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Heptachlor epoxide	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Endosulfan I	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Dieldrin	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
4,4'-DDE	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
Endrin	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
Endosulfan II	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
4,4'-DDD	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
Endosulfan sulfate	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
4,4'-DDT	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
Methoxychlor	ug/Kg	24 U	22 U	23 U	23 U	24 U	21 U	25 U
Endrin ketone	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
Endrin aldehyde	ug/Kg	4.6 U	4.3 U	4.5 U	4.5 U	4.6 U	4.2 U	4.9 U
alpha-Chlordane	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
gamma-Chlordane	ug/Kg	2.4 U	2.2 U	2.3 U	2.3 U	2.4 U	2.1 U	2.5 U
Toxaphene	ug/Kg	240 U	220 U	230 U	230 U	240 U	210 U	250 U
Aroclor-1016	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U
Aroclor-1221	ug/Kg	94 U	86 U	91 U	91 U	94 U	85 U	100 U
Aroclor-1232	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U
Aroclor-1242	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U
Aroclor-1248	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U
Aroclor-1254	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U
Aroclor-1260	ug/Kg	46 U	43 U	45 U	45 U	46 U	42 U	49 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL	PHASE II SOIL
	LOCATION	OB	OB	OB	OB	OB	OB	OB
	DATE	12/04/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92	12/07/92
	ES ID	SD-250	SD-260	SD-261	SD-261RE	SD-270	SD-280	SD-290
	LAB ID	175414	175631	175632	175632	175633	175634	175635
COMPOUND	UNITS			DUP SD-260	DUP SD-260			
Explosives								
HMX	ug/Kg	120 U	120 U	120 U		120 U	120 U	130
RDX	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	85 J
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U		120 U	120 U	120 U
Metals								
Aluminum	mg/Kg	12900	10800	10500		15900	15900	13100
Antimony	mg/Kg	10.8 UJ	10.7 UJ	9.9 UJ		13.7 UJ	7.1 UJ	9.7 UJ
Arsenic	mg/Kg	2.5	3.4	2.1		7.2	3.2	2.1 J
Barium	mg/Kg	138	92.7	91		142	96.5	98.5
Beryllium	mg/Kg	0.51 J	0.86 J	0.5 J		1.1 J	0.6 J	1.1
Cadmium	mg/Kg	0.62 U	0.61 U	0.57 U		0.78 U	0.41 U	2
Calcium	mg/Kg	5680	85500	83000		3500	34500	10500
Chromium	mg/Kg	18.7	17.6	16.8		21.5	25.6	21
Cobalt	mg/Kg	8.6 J	9.8 J	9.3		10.4 J	8.2	10.6
Copper	mg/Kg	22.9	25.7	19.3		23.7	31	88.7
Iron	mg/Kg	26000	23300	21600		29200	28600	24900
Lead	mg/Kg	32.3	11	6.6		22.4	12.5	24.1
Magnesium	mg/Kg	4110	10800	9830		4110	7280	4920
Manganese	mg/Kg	313	378	410		365	340	357
Mercury	mg/Kg	0.06 J	0.03 U	0.03 J		0.1 J	0.07 J	0.83
Nickel	mg/Kg	24.7	32.8	29.6		22.9	35.7	34.9
Potassium	mg/Kg	1010	1040	1140		1500	1390	1370
Selenium	mg/Kg	0.52 J	1.2 J	1.8 J		1.5 J	0.96 J	0.71 J
Silver	mg/Kg	0.64 U	0.63 U	0.58 U		0.81 U	0.42 U	1.3 J
Sodium	mg/Kg	59.6 U	191 J	189 J		75.6 U	105 J	85.5 J
Thallium	mg/Kg	0.5 U	0.56 U	0.52 U		0.59 U	0.42 U	0.68 U
Vanadium	mg/Kg	22.2	17.2	16.1		31.2	23.2	19.9
Zinc	mg/Kg	68.9	68.3	61		60.2	113	208
Cyanide	mg/Kg	0.87 U	0.78 U	0.65 U		0.97 U	0.7 U	0.85 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II SOIL OB 12/08/92 SD-300 175902	PHASE II SOIL OB 12/08/92 SD-310 175757	PHASE II SOIL OB 12/08/92 SD-320 175758
Volatile Organic Compounds				
Chloromethane	ug/Kg	13 U	11 U	13 U
Bromomethane	ug/Kg	13 U	11 U	13 U
Vinyl Chloride	ug/Kg	13 U	11 U	13 U
Chloroethane	ug/Kg	13 U	11 U	13 U
Methylene Chloride	ug/Kg	13 U	11 U	13 U
Acetone	ug/Kg	13 U	11 U	22 U
Carbon Disulfide	ug/Kg	13 U	11 U	13 U
1,1-Dichloroethene	ug/Kg	13 U	11 U	13 U
1,1-Dichloroethane	ug/Kg	13 U	11 U	13 U
1,2-Dichloroethene (total)	ug/Kg	13 U	11 U	13 U
Chloroform	ug/Kg	13 U	11 U	13 U
1,2-Dichloroethane	ug/Kg	13 U	11 U	13 U
2-Butanone	ug/Kg	13 U	11 U	13 U
1,1,1-Trichloroethane	ug/Kg	13 U	11 U	13 U
Carbon Tetrachloride	ug/Kg	13 U	11 U	13 U
Vinyl Acetate	ug/Kg			
Bromodichloromethane	ug/Kg	13 U	11 U	13 U
1,2-Dichloropropane	ug/Kg	13 U	11 U	13 U
cis-1,3-Dichloropropene	ug/Kg	13 U	11 U	13 U
Trichloroethene	ug/Kg	13 U	11 U	13 U
Dibromochloromethane	ug/Kg	13 U	11 U	13 U
1,1,2-Trichloroethane	ug/Kg	13 U	11 U	13 U
Benzene	ug/Kg	13 U	11 U	13 U
trans-1,3-Dichloropropene	ug/Kg	13 U	11 U	13 U
Bromoform	ug/Kg	13 U	11 U	13 U
4-Methyl-2-Pentanone	ug/Kg	13 U	11 U	13 U
2-Hexanone	ug/Kg	13 U	11 U	13 U
Tetrachloroethene	ug/Kg	13 U	11 U	13 U
1,1,2,2-Tetrachloroethane	ug/Kg	13 U	11 U	13 U
Toluene	ug/Kg	13 U	11 U	13 U
Chlorobenzene	ug/Kg	13 U	11 U	13 U
Ethylbenzene	ug/Kg	13 U	11 U	13 U
Styrene	ug/Kg	13 U	11 U	13 U
Xylene (total)	ug/Kg	13 U	11 U	13 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

COMPOUND	MATRIX LOCATION DATE ES ID LAB ID UNITS	PHASE II SOIL OB 12/08/92 SD-300 175902	PHASE II SOIL OB 12/08/92 SD-310 175757	PHASE II SOIL OB 12/08/92 SD-320 175758
Semivolatiles				
Phenol	ug/Kg	370 U	400 U	450 U
bis(2-Chloroethyl) ether	ug/Kg	370 U	400 U	450 U
2-Chlorophenol	ug/Kg	370 U	400 U	450 U
1,3-Dichlorobenzene	ug/Kg	370 U	400 U	450 U
1,4-Dichlorobenzene	ug/Kg	370 U	400 U	450 U
Benzyl Alcohol	ug/Kg			
1,2-Dichlorobenzene	ug/Kg	370 U	400 U	450 U
2-Methylphenol	ug/Kg	370 U	400 U	450 U
2,2'-oxybis(1-Chloropropane)	ug/Kg	370 U	400 U	450 U
4-Methylphenol	ug/Kg	370 U	400 U	130 J
N-Nitroso-di-n-propylamine	ug/Kg	370 U	400 U	450 U
Hexachloroethane	ug/Kg	370 U	400 U	450 U
Nitrobenzene	ug/Kg	370 U	400 U	450 U
Isophorone	ug/Kg	370 U	400 U	450 U
2-Nitrophenol	ug/Kg	370 U	400 U	450 U
2,4-Dimethylphenol	ug/Kg	370 U	400 U	450 U
Benzoic acid	ug/Kg			
bis(2-Chloroethoxy) methane	ug/Kg	370 U	400 U	450 U
2,4-Dichlorophenol	ug/Kg	370 U	400 U	450 U
1,2,4-Trichlorobenzene	ug/Kg	370 U	400 U	450 U
Naphthalene	ug/Kg	370 U	18 J	24 J
4-Chloroaniline	ug/Kg	370 U	400 U	450 U
Hexachlorobutadiene	ug/Kg	370 U	400 U	450 U
4-Chloro-3-methylphenol	ug/Kg	370 U	400 U	450 U
2-Methylnaphthalene	ug/Kg	12 J	400 U	450 U
Hexachlorocyclopentadiene	ug/Kg	370 U	400 U	450 U
2,4,6-Trichlorophenol	ug/Kg	370 U	400 U	450 U
2,4,5-Trichlorophenol	ug/Kg	900 U	970 U	1100 U
2-Chloronaphthalene	ug/Kg	370 U	400 U	450 U
2-Nitroaniline	ug/Kg	900 U	970 U	1100 U
Dimethylphthalate	ug/Kg	370 U	400 U	450 U
Acenaphthylene	ug/Kg	370 U	400 U	450 U
2,6-Dinitrotoluene	ug/Kg	370 U	400 U	450 U
3-Nitroaniline	ug/Kg	900 U	970 U	1100 U
Acenaphthene	ug/Kg	370 U	400 U	450 U
2,4-Dinitrophenol	ug/Kg	900 U	970 U	1100 U
4-Nitrophenol	ug/Kg	900 U	970 U	1100 U
Dibenzofuran	ug/Kg	370 U	400 U	450 U
2,4-Dinitrotoluene	ug/Kg	42 J	400 U	450 U
Diethylphthalate	ug/Kg	370 U	400 U	450 U
4-Chlorophenyl-phenyl ether	ug/Kg	370 U	400 U	450 U
Fluorene	ug/Kg	370 U	400 U	450 U
4-Nitroaniline	ug/Kg	900 U	970 U	1100 U
4,6-Dinitro-2-methylphenol	ug/Kg	900 U	970 U	1100 U
N-Nitrosodiphenylamine (1)	ug/Kg	100 J	400 U	450 U
4-Bromophenyl-phenyl ether	ug/Kg	370 U	400 U	450 U
Hexachlorobenzene	ug/Kg	370 U	400 U	450 U
Pentachlorophenol	ug/Kg	900 U	970 U	1100 U
Phenanthrene	ug/Kg	19 J	20 J	36 J
Anthracene	ug/Kg	370 U	400 U	450 U
Carbazole	ug/Kg	370 U	400 U	450 U
Di-n-butylphthalate	ug/Kg	370 U	400 U	450 U
Fluoranthene	ug/Kg	370 U	400 U	29 J
Pyrene	ug/Kg	370 U	400 U	21 J
Butylbenzylphthalate	ug/Kg	370 U	400 U	450 U
3,3'-Dichlorobenzidine	ug/Kg	370 U	400 U	450 U
Benzo(a)anthracene	ug/Kg	370 U	400 U	450 U
Chrysene	ug/Kg	370 U	400 U	18 J
bis(2-Ethylhexyl)phthalate	ug/Kg	15 J	24 J	39 J
Di-n-octylphthalate	ug/Kg	370 U	400 U	450 U
Benzo(b)fluoranthene	ug/Kg	370 U	400 U	450 U
Benzo(k)fluoranthene	ug/Kg	370 U	400 U	450 U
Benzo(a)pyrene	ug/Kg	370 U	400 U	450 U
Indeno(1,2,3-cd)pyrene	ug/Kg	370 U	400 U	450 U
Dibenz(a,h)anthracene	ug/Kg	370 U	400 U	450 U
Benzo(g,h,i)perylene	ug/Kg	370 U	400 U	450 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL
	DATE	OB	OB	OB
	ES ID	12/08/92	12/08/92	12/08/92
	LAB ID	SD-300	SD-310	SD-320
COMPOUND	UNITS	175902	175757	175758
Pesticides/PCBs				
alpha-BHC	ug/Kg	1.9 U	2.1 U	2.3 U
beta-BHC	ug/Kg	1.9 U	2.1 U	2.3 U
delta-BHC	ug/Kg	1.9 U	2.1 U	2.3 U
gamma-BHC (Lindane)	ug/Kg	1.9 U	2.1 U	2.3 U
Heptachlor	ug/Kg	1.9 U	2.1 U	2.3 U
Aldrin	ug/Kg	1.9 U	2.1 U	2.3 U
Heptachlor epoxide	ug/Kg	1.9 U	2.1 U	2.3 U
Endosulfan I	ug/Kg	1.9 U	2.1 U	2.3 U
Dieldrin	ug/Kg	3.6 U	4 U	4.4 U
4,4'-DDE	ug/Kg	3.6 U	4 U	4.4 U
Endrin	ug/Kg	3.6 U	4 U	4.4 U
Endosulfan II	ug/Kg	3.6 U	4 U	4.4 U
4,4'-DDD	ug/Kg	3.6 U	4 U	4.4 U
Endosulfan sulfate	ug/Kg	3.6 U	4 U	4.4 U
4,4'-DDT	ug/Kg	3.6 U	4 U	4.4 U
Methoxychlor	ug/Kg	19 U	21 U	23 U
Endrin ketone	ug/Kg	3.6 U	4 U	4.4 U
Endrin aldehyde	ug/Kg	3.6 U	4 U	4.4 U
alpha-Chlordane	ug/Kg	1.9 U	2.1 U	2.3 U
gamma-Chlordane	ug/Kg	1.9 U	2.1 U	2.3 U
Toxaphene	ug/Kg	190 U	210 U	230 U
Aroclor-1016	ug/Kg	36 U	40 U	44 U
Aroclor-1221	ug/Kg	74 U	82 U	90 U
Aroclor-1232	ug/Kg	36 U	40 U	44 U
Aroclor-1242	ug/Kg	36 U	40 U	44 U
Aroclor-1248	ug/Kg	36 U	40 U	44 U
Aroclor-1254	ug/Kg	36 U	40 U	44 U
Aroclor-1260	ug/Kg	36 U	40 U	44 U

SENECA ARMY DEPOT
OB GROUNDS
SUMMARY OF VALIDATED RESULTS (PHASE I and II)
SEDIMENTS

	MATRIX	PHASE II	PHASE II	PHASE II
	LOCATION	SOIL	SOIL	SOIL
	DATE	OB	OB	OB
	ES ID	12/08/92	12/08/92	12/08/92
	LAB ID	SD-300	SD-310	SD-320
COMPOUND	UNITS	175902	175757	175758
Explosives				
HMX	ug/Kg	120 U	120 U	120 U
RDX	ug/Kg	120 U	120 U	120 U
1,3,5-Trinitrobenzene	ug/Kg	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/Kg	120 U	120 U	120 U
Tetryl	ug/Kg	120 U	120 U	120 U
2,4,6-Trinitrotoluene	ug/Kg	120 U	120 U	120 U
4-amino-2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U
2-amino-4,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/Kg	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/Kg	120 U	120 U	120 U
Metals				
Aluminum	mg/Kg	13100	12300	7560
Antimony	mg/Kg	8.1 UJ	7.6 UJ	7.6 UJ
Arsenic	mg/Kg	7.2	5.7	4.5
Barium	mg/Kg	94.8	39.5	28.1 J
Beryllium	mg/Kg	0.48 J	0.67	0.28 J
Cadmium	mg/Kg	1.3	0.55 J	0.44 U
Calcium	mg/Kg	18400	30300	14300
Chromium	mg/Kg	24.5	23.4	16.7
Cobalt	mg/Kg	11.2	9.9	6.1 J
Copper	mg/Kg	2380	35.2	23.2
Iron	mg/Kg	36600	33100	21300
Lead	mg/Kg	332	34.7	115
Magnesium	mg/Kg	6720	7150	3930
Manganese	mg/Kg	420	477	274
Mercury	mg/Kg	0.1 J	0.07 J	0.27
Nickel	mg/Kg	42.3	37.3	28.1
Potassium	mg/Kg	1280	1070	533 J
Selenium	mg/Kg	1.4 J	1.1 J	0.76 J
Silver	mg/Kg	0.68 J	0.45 U	0.49 J
Sodium	mg/Kg	112 J	112 J	70.2 J
Thallium	mg/Kg	0.48 U	0.38 U	0.43 U
Vanadium	mg/Kg	20.1	18.3	11.8
Zinc	mg/Kg	497	106	68.5
Cyanide	mg/Kg	0.5 U	0.72 U	0.88 U

APPENDIX H

RISK ASSESSMENT
TOXICITY PROFILES

VOLATILE ORGANIC COMPOUNDS
TOXICITY PROFILES

ACETONE

CAS NUMBER

67-64-1

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Miscible [1]
Vapor Pressure: 231 mm Hg at 25°C [1]
Henry's Law Constant: 3.67 x 10^{-5} atm-m^3/mole [1]
Specific Gravity: 0.788 at 25/25°C [2]
Organic Carbon Partition Coefficient: 0.28 [3]

FATE DATA: HALF-LIVES

Soil: 1 - 7 days [4]
Air: 11.6 - 116 days [4]
Surface Water: 1 - 7 days [4]
Groundwater: 2 - 14 days [4]

NATURAL SOURCES

Plants, animals, automobile exhaust, volcanoes, forest fires [1].

ARTIFICIAL SOURCES

Chemical industry, wood pulping, air pollution breakdown product, wood-burning fireplaces, tobacco smoke [1].

FATE AND TRANSPORT

Acetone evaporates rapidly from solid surfaces, but the miscibility of it retards losses from water. It is highly mobile in the soil/groundwater system, and that which does not volatilize from soil, will be readily dispersed in groundwater and carried to any downgradient discharge zones. Biodegradation occurs in soil, surface water, and groundwater. Adsorption to sediment and bioconcentration should not be significant. Acetone will be washed out of the atmosphere with rain [1,3,4].

HUMAN TOXICITY

General. Acetone acts primarily as an irritant and as a central nervous system depressant. Acetone is not considered to be mutagenic. The USEPA has placed acetone in weight-of-evidence cancer Group D,indicating that it is not classifiable as to human carcinogenicity [5].

Oral Exposure. A chronic oral RfD of 0.1 mg/kg/day is based on a NOEL of 100 mg/kg/day for increased liver and kidney weights and nephrotoxicity in a subchronic oral study in rats [5]. Acetone is readily absorbed following oral exposure. Oral LD_{50} values in animals ranged from 3000 to 9750 mg/kg [3]. Fatal oral doses in humans have not been reported, but oral exposure to 200 ml (2860 mg/kg/day) acetone has resulted in gastroenteritis, narcosis and possible renal injury [3]. Information regarding the effects of acetone on human development are not available, but limited data in animals indicate that acetone is not a developmental toxicant [3]. There is no information regarding the carcinogenicity of acetone in humans or animals following oral exposure, therefore, an oral Slope Factor is not available [5].

Inhalation Exposure. A chronic inhalation RfC is not available for acetone [5]. Acetone is readily absorbed following inhalation exposure. Reported acute inhalation LC_{50} values are 110,000 mg/m^3 for 62 minutes in mice, and 50,100 mg/m^3 for 8 hours in rats [3]. Inhaled acetone has not been reported to be fatal to humans. Human exposure to concentrations of 250 to 1000 ppm acetone has resulted in irritation of the eyes, nose and throat. Exposure to higher levels may result in depression of the central nervous system and narcosis [3]. Long-term inhalation of acetone by humans has resulted in hyperemia (increase in blood) in the conjunctiva and pharynx), lung irritation, rough breathing, dizziness, headaches, insomnia and stomach pain [3]. Information regarding the effects of acetone on human development are not available, but limited data in animals indicate that acetone is not a developmental toxicant [3]. There is no information regarding the carcinogenicity of acetone in humans or animals following inhalation exposure, therefore, an inhalation Unit Risk factor is not available [5].

Dermal Exposure. An acute dermal LD_{50} value of 20,000 mg/kg has been reported in rabbits [3]. Dermal exposure to acetone has not been reported to be fatal to humans. Short-term (90 minutes) application of acetone to the skin of humans has resulted in mild edema and hyperemia of the skin [3]. Animal studies indicate that chronic dermal application of acetone may result in reversible cataracts in guinea pigs, but not rabbits [3].

REFERENCES

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2. Merck, 1989. The Merck Index. Eleventh Edition. Merck & Company, Inc. Rahway, NJ.

3. Arthur D. Little, Inc., 1987. The Installation Restoration Program Toxicology Guide. Volume 3. Cambridge, MA. June 1987.

4. Howard, P.H., R.S. Boethling, W.F. Jarvis, W.M. Meylan, and E.M. Michalenko, 1991. Handbook of Environmental Degradation Rates. Lewis Publishers. Chelsea, Michigan.

5. USEPA, 1992. Integrated Risk Information System (IRIS). Data base. Online. August 3, 1992.

BENZENE

CAS NUMBER

71-43-2

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,791 mg/L [1]
Vapor Pressure: 95.19 mm Hg at 25°C [1]
Henry's Law Constant: 5.43 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 0.879 at 15/5°C [2]
Organic Carbon Partition Coefficient: 31 - 143 [1]

FATE DATA: HALF-LIVES

Soil: 5 - 16 days [3]
Air: 2.09 - 20.9 days [3]
Surface Water: 5 - 16 days [3]
Groundwater: 10 days to 2 years [3]

NATURAL SOURCES

Crude oil, volcanoes, forest fires, plants [1].

ARTIFICIAL SOURCES

Gasoline, fuel oils, chemical industry, coke ovens, mining, manufacturing, cigarette smoke [1].

FATE AND TRANSPORT

Benzene will rapidly volatilize from surface soil and water. That which does not volatilize from permeable surface and subsurface soils will be highly to very highly mobile, and can be expected to leach to nearby groundwater which is not protected by a confining layer. It is fairly soluble, and will be carried with the groundwater to discharge points. It may be subject to biodegradation in soils, shallow groundwater, and surface water. Benzene will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms, or hydrolyze. Photodegradation may be a significant removal mechanism in surface waters

which are not conducive to microbial degradation. Benzene will undergo significant photodegradation in air, but may be washed out with rain [1].

HUMAN TOXICITY

General. Benzene is absorbed into the body following ingestion, inhalation, and dermal contact, and must undergo metabolic transformation to exert its toxic effects. Metabolism occurs primarily in the liver, and to a lesser extent in the bone marrow [4]. The primary targets of benzene toxicity are the central nervous system and the blood [4,5]. Benzene is genotoxic to humans and the USEPA has placed it in weight-of-evidence cancer Group A, indicating that it is a human carcinogen [6].

Oral Exposure. A chronic oral RfD for benzene is currently under review by the USEPA [6]. Benzene is readily absorbed following oral exposure. The lowest reported fatal dose in humans is 50 mg/kg [5]. Acute oral LD_{50} values in animals include 930 to 5600 mg/kg in rats, 2000 mg/kg in dogs and 4700 mg/kg in mice [4,5]. Data regarding the ingestion of benzene in humans are limited to acute overexposure. Ingestion of 2 ml (29 mg/kg) has resulted in depression of the central nervous system, while ingestion of 10 ml (143 mg/kg) has been fatal [5]. The cause of death was usually respiratory arrest, central nervous system depression or cardiac collapse [4]. In animals, longer-term oral exposure has resulted in toxic effects on the blood (cytopenia: decrease in various cellular elements of the blood) and the immunological system (decreased white blood cells) [4]. There is no evidence that oral exposure to benzene causes effects on reproduction and development, but studies in animals suggest that benzene may affect fetal development [4]. There is no information regarding carcinogenic effects in humans following oral exposure to benzene, but studies in animals indicate that benzene ingestion causes cancer in various regions of the body [4]. An oral Slope Factor of 0.029 $(mg/kg/day)^{-1}$ is based on an increase in the incidence of leukemia in occupationally-exposed workers [6]. The oral Slope Factor was extrapolated from the inhalation data.

Inhalation Exposure. A chronic inhalation RfC for benzene is currently under review by the USEPA [6]. Benzene is readily absorbed following inhalation exposure. The lowest reported fatal concentration in humans is 6380 mg/m^3 for a 5 minute exposure [5]. Acute inhalation LC_{50} values in rats ranged from 10,000 ppm for 7 hours to 13,700 ppm for 4 hours [4,5]. Most of the available data regarding benzene exposure involve workers exposed in the workplace. The acute effects of benzene exposure involve the central nervous system. Brief exposure to concentrations of 700 to 3000 ppm can cause drowsiness, dizziness, headaches and unconsciousness, and exposure to concentrations of 10,000 to 20,000 ppm can result in death [4]. In most cases, the effects will end when exposure ceases. The hematopoietic system is the primary target of toxicity following long-term exposure: exposure for several months to years results in pancytopenia

(reduction in red blood cells, platelets and white blood cells), while continued exposure for many years results in anemia or leukemia. The lowest concentration resulting in the hematological effects is approximately 10 to 50 ppm [5]. Benzene has been shown to cause chromosomal aberrations in bone marrow and lymphocytes in workers exposed to concentrations > 100 ppm [5]. Chromosomal damage has been found in animals at concentrations as low as 1 ppm [5]. Benzene is not known to be teratogenic (cause birth defects) in humans, but has been found to cause various problems in the developing fetus of animals (low birth weight, delayed bone formation) [4,5]. Occupational exposure to benzene has resulted in leukemia in exposed workers [4,5]. An inhalation Unit Risk of 8.3 x 10^{-6} $(ug/m^3)^{-1}$ is based on the incidence of leukemia in occupationally-exposed workers [6].

Dermal Exposure. Dermal exposure to benzene may cause redness and dermatitis [4,5]. Systemic effects have not been reported following dermal exposure to benzene.

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5. Arthur D. Little, Inc., 1989. The Installation Restoration Program Toxicology Guide. Volume 2. Cambridge, MA. July 1989.
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2-BUTANONE

CAS NUMBER

78-93-3

COMMON SYNONYMS

Methyl ethyl ketone, MEK.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 239,000 mg/L [1]
Vapor Pressure: 90.6 mm Hg at 25°C [1]
Henry's Law Constant: 1.05 x 10^{-5} atm-m^3/mole [1]
Specific Gravity: 0.805 at 20/4°C [2]
Organic Carbon Partition Coefficient: 34 [1]

FATE DATA: HALF-LIVES

Soil: 1 to 7 days [3]
Air: 2.7 to 26.7 days [3]
Surface Water: 1 to 7 days [3]
Groundwater: 2 to 14 days [3]

NATURAL SOURCES

Volcanoes, forest fires, products of biological degradation, food [1].

ARTIFICIAL SOURCES

Chemical industry, coatings industry, manufacturing, combustion of gasoline, cigarette smoke. Present in smog as the result of natural photooxidation of olefinic hydrocarbons from automobiles and other sources [1].

FATE AND TRANSPORT

Some of the MEK released to soil will partially evaporate into the atmosphere, while some may leach to groundwater, where it may slowly biodegrade. It does not strongly adsorb to soils and sediments. If released to surface water, it will be lost slowly to evaporation or slowly biodegraded. It does not significantly bioconcentrate in aquatic organisms. It photodegrades in the atmosphere at a moderate rate, but may be removed by rainfall first [1].

HUMAN TOXICITY

General. MEK is considered to be of low toxicity. Moderate air concentrations of MEK may cause mild irritation of the nose, throat, eyes, and skin in humans. Serious health effects in animals have been observed only at very high concentrations [4]. The USEPA has placed MEK in weight-of-evidence Group D; that is, it is not classifiable as to human carcinogenicity [5].

Oral Exposure. The chronic RfD of 0.05 mg/kg/day is based on a NOAEL of 693 mg/m^3 determined for subchronic inhalation exposure of rats [6]. MEK is rapidly absorbed following oral exposure. The oral LD_{50} reported for rats was 2,737 mg/kg. Exposure of rats to 1,080 mg/kg caused minor kidney damage. A clinical report of human ingestion of an unknown quantity of MEK indicated some cardiopulmonary distress, but resulted in full recovery within less than a week [4].

Inhalation Exposure. The chronic RfC of 1 mg/m^3 is based on a NOAEL of 2978 mg/m^3 for decreased fetal birth weight in a developmental study in mice [6]. MEK is well absorbed during inhalation exposure. Uptake by humans ranged from 41% to 53% of the inspired quantity. The 4-hour LC_{50} in rats was 11,700 ppm. No rats died within 14 days of exposure to 92,239 ppm for 0.5 hours. Guinea pigs exposed to 10,000 ppm became unconscious within 5 hours. No information was found regarding human deaths following exposure to MEK. Humans exposed to 100 ppm MEK complained of slight nose and throat irritation which became objectionable at 300 ppm. Exposure of pregnant rats to 3,000 ppm during gestation resulted in only a slight increase in the number of malformed fetuses [4].

Dermal Exposure. No information was located regarding the rate or extent of absorption following dermal exposure in humans or animals. The dermal LD_{50} for MEK in rabbits was reported to be 10 mL/kg. Application of 0.1 ml MEK to the forearms of humans once daily for 18 days produced no adverse effects. Application of MEK to rabbits and guinea pigs caused minimal skin irritation, erythema, and/or increase in skin-fold thickness. MEK was found to be moderately irritating to the eyes of rabbits [4].

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CARBON DISULFIDE

CAS NUMBER

75-15-0

COMMON SYNONYMS

Carbon bisulfide, Dithiocarbonic anhydride. [1]

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 2100 mg/L at 20°C [2]
Vapor Pressure: 297 mm Hg at 20°C [2]
Henry's Law Constant: 1.4×10^{-3} atm-m^3/mole [2]
Specific Gravity: 1.2632 at 20/4°C [1]
Organic Carbon Partition Coefficient: 63 [2]

FATE DATA: HALF-LIVES

Soil: ND
Air: ND
Surface Water: ND
Groundwater: ND

NATURAL SOURCES

Oceanic biological activity; microbial reduction of sulfates in soils; volcanic emissions; marshland emissions; coal tar and crude petroleum. [1,2]

ARTIFICIAL SOURCES

Manufacture of viscose rayon, carbon tetrachloride, cellophane, rubber chemicals, and solvents; insecticides; fungicides; electronic vacuum tubes. [1,2]

FATE AND TRANSPORT

Carbon disulfide released to soils will be lost primarily due to volatilization. In addition, that which is not lost directly to volatilization may be expected to leach freely into groundwaters given the low sorptive tendencies (K_{oc} = 63) of this material. Carbon disulfide has been classified as difficult to degrade; experimentation, though, has demonstrated microbial utilization of carbon disulfide in moist, unsterilized soils. Releases of carbon disulfide into surface waters are also expected to volatilize readily, with little

sorption to soils and/or sediments. This material is not expected to show significant bioconcentration in aquatic organisms (BCF = 7.9). In the atmosphere, the primary removal mechanism for carbon disulfide is expected to be reaction with atomic oxygen and/or photochemically-produced hydroxyl radicals. [2]

HUMAN TOXICITY

General. The major targets of carbon disulfide toxicity are the central nervous system, heart, liver and the developing fetus [3]. Carbon disulfide is considered to be nonmutagenic. Carbon disulfide has not been placed in a weight-of-evidence cancer group by the USEPA [4].

Oral Exposure. A chronic oral RfD of 0.1 mg/kg/day is based on the NOEL of 11 mg/kg/day for fetal toxicity and malformations in an inhalation developmental study in rabbits [4]. Carbon disulfide is readily absorbed following oral exposure [4]. An acute oral LD_{50} value of 3020 mg/kg over 24-hours was reported for mice [4]. Oral exposure to carbon disulfide is lethal to humans, but the lethal dose is not known. Information regarding the systemic effects of oral exposure of humans to carbon disulfide are not available. Limited animal studies suggest that the liver is the target of oral exposure to carbon disulfide, with enzymatic disruptions being the primary effect [4]. There is no evidence that the ingestion of carbon disulfide results in effects on reproduction or development or causes cancer in humans or animals. An oral Slope Factor for cancer is not available for carbon disulfide [5].

Inhalation Exposure. A chronic inhalation RfC of 0.01 mg/m^3 is based on a NOAEL of 10 mg/m^3 for fetotoxicity in rats [6]. Carbon disulfide is readily absorbed following inhalation exposure [4]. Inhaled carbon disulfide has not been reported to be fatal to humans or animals. In humans, the cardiovascular and nervous systems are the primary targets of inhaled carbon disulfide [4]. Vascular atherosclerotic changes, leading to coronary heart disease, are the most prevalent cardiac effects [4]. Neurological effects include behavioral changes (anxiety, introversion, depression), neurophysiological changes (decrease in intelligence scores, performance and memory), and neuropathy (cerebral atrophy, encephalopathy). Other effects observed following inhalation exposure of humans include gastrointestinal effects (stomach distress, impaired appetite), and ocular effects (microaneurysms of the retina). The lowest exposure concentration necessary to produce these effects is not known, but it is probably less than 20 ppm [4]. Similar effects have been reported in animals. There is no evidence that inhaled carbon disulfide causes effects on human development, but animal studies suggest that carbon disulfide is embryotoxic, but not teratogenic [4]. Carbon disulfide has been reported to affect reproduction in human males (decreased sperm count and decreased libido) and females (menstrual abnormalities), but the exposure concentrations resulting in these effects are not known [4].

There is no conclusive evidence that inhaled carbon disulfide causes cancer in humans or animals, therefore, an inhalation Unit Risk is not available [5].

Dermal Exposure. Carbon disulfide has not been reported to be lethal in humans or animals following dermal exposure. Dermal contact with carbon disulfide in the workplace may result in serious blisters which progress to hemorrhagic blisters covered by a thin membrane [4]. The blisters may appear in spite of the use of rubber gloves.

ECOLOGICAL TOXICITY

General. Extremely limited information was presented in the technical literatures that indicates carbon disulfide toxicity to vegetation and wildlife.

Vegetation. Released on soils, carbon disulfide will primarily be lost by volatilization. Because it has a low soil adsorptivity, it will readily leach into the groundwater, where there is some evidence that it may biodegrade [6]. Review of the technical literature did not produce information regarding the phytotoxic effects of carbon dissulfide.

Aquatic Life. Released into water, carbon disulfide will primarily be lost by volatilization. Adsorption to sediment is not significant. The half-life in a model river is 2.6 hours [6]. Sax [7] states the aquatic toxicity rating for carbon disulfide is 100 to 1000 ppm. The 1-hour LC_{100} for sunfish is 100 ppm and the 0.1-hour LC_{100} for trout is 5000 ppm [6]. There are no federal water quality criteria protecting aquatic life for carbon disulfide [8].

Wildlife. Carbon disulfide has been shown to cause non-specific liver cell damage in rats. In addition, chronic exposure may result in fetal toxicity and malformation [9]. Micromedex, Inc. [6] states the LD_{50} for rabbits is 300 mg/kg body weight.

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CARBON TETRACHLORIDE

CAS NUMBER

56-23-5

COMMON SYNONYMS

Tetrachloromethane

ANALYTICAL CLASSIFICATION

Volatile Organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 805 mg/L at 20°C [1]
Vapor Pressure: 113.8 mm Hg at 25°C [1]
Henry's Law Constant: 3.04 x 10^{-2} atm-m^3/mole at 24.8°C [1]
Specific Gravity: 1.589 at 25/25°C [2]
Organic Carbon Partition Coefficient: 110 [1]

FATE DATA: HALF-LIVES

Soil: 6 months - 1 year [3]
Air: 1.8 - 18.3 years [3]
Surface Water: 6 months - 1 year [3]
Groundwater: 7 days - 1 year [3]

NATURAL SOURCES

None noted [1].

ARTIFICIAL SOURCES

Iron/steel manufacturing; paint/ink formulations; petroleum refining; non-ferrous metal manufacturing; and, solvent usage in various applications [1, 2].

FATE AND TRANSPORT

Carbon tetrachloride rapidly volatilizes from soil and surface waters. Given the low soil adsorption coefficient (110), carbon tetrachloride will not be expected to adsorb to soils or sediments. In addition, CCl_4 is not expected to bioconcentrate in aquatic organisms, hydrolyze, or photolyze. Biodegredation data is limited, but anaerobic biodegredation is expected to occur within sixteen days [1].

Carbon tetrachloride is likely to be moderately mobile in soil, and exhibit only a slight tendency to adsorb to sediments in water. High values for both vapor pressure and

Henry's Law coefficient suggest rapid volatilization from soil and water (or moist soil surfaces), respectively [1].

HUMAN TOXICITY

General. The major targets of carbon tetrachloride toxicity are the central nervous system following inhalation exposure, and the liver and kidneys following oral exposure [4,5]. There is little evidence that carbon tetrachloride is genotoxic, but it has been found to cause liver cancer in three species of animals (mice, rats, hamsters) following oral exposure [4,5]. The USEPA has placed carbon tetrachloride in weight-of-evidence cancer Group B2, indicating that it is a probable human carcinogen [6].

Oral Exposure. A chronic oral RfD of 0.0007 mg/kg/day is based on a NOAEL of 0.71 mg/kg/day for liver lesions in a subchronic study in rats [6]. Carbon tetrachloride is readily absorbed following oral exposure. Acute oral LD_{50} values of 2800 to 10,000 mg/kg in rats [4,5] and 12,000 mg/kg in mice have been reported [4]. Reported fatal oral doses in humans ranged from 40 to 320 mg/kg with the cause of death being central nervous system depression, cellular necrosis in the liver and/or kidneys, or cardiac arrest [4,5]. Nausea, vomiting and abdominal pain are also symptoms of poisoning [5]. Animal studies indicate that carbon tetrachloride is not likely to affect reproduction or development in humans [4]. The USEPA derived an oral Slope Factor of 0.13 $(mg/kg/day)^{-1}$ based on the incidence of liver tumors in animals [6].

Inhalation Exposure. A chronic inhalation RfC for carbon tetrachloride is not currently available [6]. Carbon tetrachloride is readily absorbed following inhalation exposure [4]. An 8-hour inhalation LC_{50} of 9500 ppm was reported for mice [4,5]. Air concentrations of 250 ppm for 15 minutes have been reported to be fatal to humans [4]. In humans, exposure for several hours to concentrations of 33-124 ppm resulted in fatigue and nausea [5]. Symptoms of acute exposure to lower concentrations include moderate eye irritation, moderate dizziness and headache. These symptoms will disappear when exposure ceases. Long-term human exposure to concentrations ranging from 10-100 ppm (3 days/week) has resulted in gastrointestinal effects (nausea, stomach distress), liver damage (enlargement and fatty degeneration) and kidney injury (painful and decreased urination, lower back pain, edema and weight gain) [5]. Biochemical changes in the liver may be present even when symptoms are absent. Animals studies indicate that carbon tetrachloride is not likely to affect reproduction or development in humans [4]. USEPA derived an inhalation Unit Risk of 1.5×10^{-5} $(ug/m^3)^{-1}$ from the oral Slope Factor.

Dermal Exposure. Acute dermal LD_{50} values of 5070 mg/kg and 15,000 mg/kg were defined for rats and guinea pigs, respectively [4,5]. Carbon tetrachloride is slightly irritating to the eyes. Direct application onto the skin results in a burning and stinging

sensation within 5 minutes [5]. After 11 minutes, redness occurs and blood vessels appear on the skin. It has been estimated that the amount of carbon tetrachloride absorbed through the skin during exposure of both hands for 30 minutes is equivalent to a 3-hour inhalation exposure to 10 ppm [5].

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CHLOROBENZENE

CAS NUMBER

108-90-7

COMMON SYNONYMS

Monochlorobenzene, benzene chloride. [1]

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 471.7 mg/L at 25°C [2]
Vapor Pressure: 11.9 mm Hg at 25°C [2]
Henry's Law Constant: 3.45 x 10^{-3} atm-m^3/mole [2]
Specific Gravity: 1.11 at 20/4°C [1]
Organic Carbon Partition Coefficient: 83 to 389 [2]

FATE DATA: HALF-LIVES

Soil: 68 to 150 days [3]
Air: 3.0 to 30.4 days [3]
Surface Water: 68 to 150 days [3]
Groundwater: 136 to 300 days [3]

NATURAL SOURCES

None noted.

ARTIFICIAL SOURCES

Manufacture of pesticides (i.e., aniline, DDT), phenol; degreaser; solvent; heat transfer medium. [1,2]

FATE AND TRANSPORT

Chlorobenzene released to moist soils will volatilize fairly readily. Releases to sandy or dry soils, however, can be expected to leach to groundwater. Once in groundwater, chlorobenzene will undergo slow biodegradation to 2-chlorophenol and/or 4-chlorophenol (among others). If released to surface water, the primary removal mechanism will be volatilization. Biodegradation of this material will occur in surface waters; rapidity increases with increasing temperature and decreasing salinity. Chlorobenzene is not expected to bioconcentrate at significant levels among most aquatic species, although the

BCF of 447 observed in fathead minnows indicates bioconcentratibility in select species. The K_{oc} value suggests only slight to moderate adsorptive tendencies to soils and sediments in waters. Chlorobenzene is expected to exist almost entirely in the vapor phase in the atmosphere. The dominant mechanism for removal of chlorobenzene from the atmosphere is reaction with hydroxyl radicals, with the resultant production of chlorophenols. Reaction with nitrous oxides (in polluted air) may also occur, with the production of chloronitrobenzenes and chloronitrophenols. Photolysis may occur, but at a rate much slower than previously discussed atmospheric reactions. [2]

HUMAN TOXICITY

General. People exposed to chlorobenzene have experienced headaches, numbness, sleepiness, nausea, and vomiting. Chlorobenzene has been shown to affect the brain, liver, and kidneys in animals [4]. The USEPA has placed chlorobenzene in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [5].

Oral Exposure. A chronic RfD of 0.02 mg/kg/day is based on a NOAEL of 19 mg/kg/day and a LOAEL of 54 mg/kg/day determined for histopathologic changes in liver following subchronic oral (capsule) administration to dogs [5]. The limited data available indicate that chlorobenzene is absorbed from the gastrointestinal tract. A single human subject was found to absorb at least 31% of an administered dose, while rats were found to absorb at least 18% of an administered dose. A single dose of 4,000 mg/kg caused death in rats. A dose rate of 1,000 mg/kg/day for 14 days was lethal to all rats tested. Liver and kidney damage has been noted in animals following oral exposure. There is little information on oral exposures in humans. One case was reported of a 2-year-old child who ingested 5 to 10 ml of chlorobenzene, became unconscious and cyanotic, and had muscle spasms. The child recovered uneventfully [4]. The dose in the latter case can be estimated at approximately 344 to 688 mg/kg.

Inhalation Exposure. A chronic RfC of 0.02 mg/m^3 is based on a LOAEL of 75 ppm determined for liver and kidney effects in a subchronic rat inhalation study [6]. Chlorobenzene is absorbed via inhalation in humans and animals. Humans exposed to 0.5 to 0.84 ppm were found to absorb between 38% and 45% of the administered dose. Exposure to a concentration of 200 mg/m^3 chlorobenzene for 2 hours was lethal to all mice tested. Rabbits died 2 weeks after exposure to a concentration of approximately 2.5 mg/m^3. Some adverse effects on the liver and kidney in animals were noted. Little information was available regarding the health effects of chlorobenzene in humans following inhalation exposure. Humans occupationally exposed for up to 2 years displayed signs of neurotoxicity including numbness, cyanosis, hyperesthesia, and muscle spasms [4].

Dermal Exposure. No information was located regarding dermal exposure to chlorobenzene in humans or animals [4].

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CHLOROFORM

CAS NUMBER

67-66-3

COMMON SYNONYMS

Trichloromethane

ANALYTICAL CLASSIFICATION

Volatile (organic).

PHYSICAL AND CHEMICAL DATA

Water Solubility: 7,950 mg/L [1]
Vapor Pressure: 246 mm Hg at 25°C [1]
Henry's Law Constant: 4.35 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.484 at 20/20°C [2]
Organic Carbon Partition Coefficient: < 34 [1]

FATE DATA: HALF-LIVES

Soil: 1 to 6 months [3]
Air: 26 to 260 days [3]
Surface Water: 1 to 6 months [3]
Groundwater: 2 months to 5 years [3]

NATURAL SOURCES

Plants [1].

ARTIFICIAL SOURCES

Chemical industry, chlorination of drinking water, municipal sewage, power plants, auto exhaust, dry cleaning industry, fumigation, manufacturing [1].

FATE AND TRANSPORT

The majority of chloroform released to the environment ends up in the atmosphere, where it may be transported long distances. It is not adsorbed significantly on soils or sediment. Chloroform in soils will leach to groundwater, where it may remain for long periods of time or until discharged. Since it is substantially denser than water, when it occurs as a separate phase it tends to sink to the bottom of the aquifer. Releases to surface soils and water will be dissipated primarily by evaporation. It is subject to significant biodegradation. It is not expected to bioconcentrate in aquatic organisms [1].

HUMAN TOXICITY

General. Chloroform exerts adverse effects on the central nervous system, liver, and kidneys. It was used as a surgical anesthetic for many years before its harmful effects on the liver and kidney were recognized. High doses of chloroform have also been found to cause liver and kidney cancer in experimental animals [4]. The USEPA has placed chloroform in weight-of-evidence Group B2, indicating that it is a probable human carcinogen [5].

Oral Exposure. A chronic oral RfD of 0.01 mg/kg/day is based on a LOAEL of 12.9 mg/kg/day determined for fatty cyst formation following chronic administration to dogs [5]. Chloroform is readily absorbed following oral exposure, with up to 100% of an administered dose being absorbed by humans. Acute oral LD_{50} values in rats range from 446 to 2,180 mg/kg. Reported fatal oral doses for humans ranged from 212 to 3,755 mg/kg. Long-term exposure by ingestion can adversely affect liver and kidney function. Toxic effects may include jaundice and burning urination. Decreased fetal weight was observed in the offspring of pregnant rats receiving 400 mg/kg/day by gavage. Gonadal atrophy was observed in both sexes of rats treated by gavage at a rate of 410 mg/kg/day [4]. An oral slope factor of 6.1×10^{-3} $(mg/kg/day)^{-1}$ is based on kidney tumors observed in rats following exposure to treated drinking water [5].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for chloroform [5,6]. Chloroform is readily absorbed following inhalation exposure. An LC_{50} of 9,770 ppm was reported for female rats exposed for 4 hours. Breathing air concentrations of 10,000 to 22,500 ppm for less than 30 minutes did not result in increased mortality in human surgical patients. A concentration of about 40,000 ppm for a few minutes may be sufficient to cause death in humans. Deaths resulting from the use of chloroform as a surgical anesthetic were due to acute hepatotoxicity. Short-term inhalation of high concentrations causes tiredness, dizziness, and headache. Long-term exposure by inhalation can adversely affect liver and kidney function. Toxic effects may include jaundice and burning urination. Chloroform has been shown to be fetotoxic and teratogenic in experimental animals. Adverse reproductive effects in male and female rodents have also been reported [4]. An inhalation unit risk of 2.3×10^{-5} $(mg/m^3)^{-1}$ is based on hepatocellular carcinomas observed in female mice following gavage administration [5].

Dermal Exposure. Chloroform is readily absorbed following dermal exposure. No deaths or hepatic effects were observed in rabbits when 3,980 mg/kg was applied to the belly for 24 hours. However, adverse effects to the skin and kidney in rabbits were noted following 24-hour exposure to 1,000 mg/kg [4].

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1,2-DICHLOROETHANE

CAS NUMBER

107-06-2

COMMON SYNONYMS

Ethylene dichloride, ethylene chloride, sym-dichloroethane, Dutch Liquid, 1,2-DCA.

ANALYTICAL CLASSIFICATION

Volatile organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 8,520 mg/L at 25°C [1]
Vapor Pressure: 78.7 mm Hg at 20°C [1]
Henry's Law Constant: 9.77 x 10^{-4} atm-m^3/mole [1]
Specific Gravity: 1.257 at 20/4°C [2]
Organic Carbon Partition Coefficient: 33 to 152 [1]

FATE DATA: HALF-LIVES

Soil: 100 days to 6 months [3]
Air: 12.2 to 122 days [3]
Surface Water: 100 days to 6 months [3]
Groundwater: 100 days to 12 months [3]

NATURAL SOURCES

None noted [1].

ARTIFICIAL SOURCES

Chemical intermediate; lead scavenger; extraction/cleaning solvent; pesticide diluent; grain fumigant; paints, coatings; and adhesives [1,2].

FATE AND TRANSPORT

1,2-Dichloroethane is a readily-volatilized material, releases of which to soils and/or waters will rapidly evaporate to the atmosphere. Once in the atmosphere, this compound will undergo photooxidation with photochemically-produced hydroxyl radicals; products of this photooxidation are CO_2 and HCl. Direct photolysis of this compound is not expected in the atmosphere or in waters. 1,2-Dichloroethane in the atmosphere, which does not undergo photooxidation, may be transported long distances with eventual atmospheric washout via rainfall. That which does not volatilize to the atmosphere shows an ability to

leach through soils to unprotected groundwaters. This compound is not expected to adsorb significantly in either soils or aqueous environs, nor is it expected to hydrolyze, photolyze or bioconcentrate. Chemical and biological degradation may slowly occur in waters, but is not expected in soils. Bioconcentration in aquatic organisms should not be significant [1].

HUMAN TOXICITY

General. 1,2-DCA is known to cause cancer in laboratory animals when administered in large doses. Humans and animals have died from the acute effects of high doses taken in via ingestion or inhalation [4]. The USEPA has placed 1,2-DCA in weight-of-evidence Group B2, indicating that it is a probable human carcinogen [5].

Oral Exposure. The USEPA does not currently provide an oral RfD for 1,2-DCA [5,6]. Clinical evidence indicates that 1,2-DCA is rapidly absorbed by humans following oral intake. Animal studies have shown that oral absorption is rapid, complete, and essentially linear. An acute oral LD_{50} of 680 mg/kg has been reported for rats. Human deaths have resulted from ingestion of as little as 15 ml 1,2-DCA (approximately 270 mg/kg). Death in humans appears to result from cardiac arrhythmia. The symptoms of acute oral exposure in humans include: bronchitis, hemorrhagic gastritis and colitis, hepatocellular damage, central nervous system depression, and histological changes in brain tissue [4]. An oral slope factor of 0.091 $(mg/kg/day)^{-1}$ is based on hemangiosarcomas observed in rats following oral (gavage) exposure [5].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for 1,2-DCA [5,6]. 1,2-DCA is rapidly absorbed in the human lung, and is accumulated in the breast milk of nursing women. The 8-hour LC_{50} reported for rats is 1,000 ppm. One case study reported that a 51-year-old man died within 4 days of a 30-minute exposure to concentrated 1,2-DCA (concentration not specified). The symptoms of acute inhalation exposure in humans include: partial paralysis, clonic jerk, coma, nephrotoxic effects, hepatotoxic effects, nausea, and vomiting [4]. An inhalation unit risk of 2.6×10^{-5} $(mg/m^3)^{-1}$ is based on hemangiosarcomas observed in rats following oral (gavage) exposure [5].

Dermal Exposure. Dermal absorption of 1,2-DCA appears to occur, though somewhat slowly. Limited evidence indicates that 1,2-DCA produces nonmalignant tumors remote from the site of application [4].

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1,2-DICHLOROETHENE

CAS NUMBERS

1,2-Dichloroethene (total)	540-59-0
1,2-trans-Dichloroethene	156-60-5
1,2-cis-Dichloroethene	156-59-2

COMMON SYNONYMS

1,2-Dichloroethylene, acetylene dichloride.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

1,2-trans-Dichloroethene

Water Solubility: 6,300 mg/L at 25°C [1]
Vapor Pressure: 340 mm Hg at 25°C [1]
Henry's Law Constant: 6.72 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.26 [2]
Organic Carbon Partition Coefficient: 36 [1]

1,2-cis-Dichloroethene

Water Solubility: 3,500 mg/L [1]
Vapor Pressure: 200 mm Hg at 35°C [1]
Henry's Law Constant: 3.37 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.28 [2]
Organic Carbon Partition Coefficient: 49 [1]

FATE DATA: HALF-LIVES

1,2-Dichloroethene (Total)

Soil: 1 to 6 months [3]
Air: 1.1 to 11.9 days [3]
Surface Water: 1 to 6 months [3]
Groundwater: 2 months to 7.9 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Chemical industry, manufacturing, breakdown of TCE, tetrachloroethene, and 1,1,2,2-tetrachloroethane [1].

FATE AND TRANSPORT

Both isomers of 1,2-dichloroethene (cis and trans) released on soil should partially evaporate, with the balance leaching into groundwater where very slow biodegradation should occur. If released to surface water they will be lost mainly through volatilization. Adsorption to soil and sediment, as well as biodegradation and bioconcentration in aquatic organisms should not be significant. They will be abiotically degraded in air and scavenged by rainfall. Once in the atmosphere, considerable dispersal from source areas should occur [1].

HUMAN TOXICITY

General. The available toxicity information was very limited, and sometimes did not distinguish between the two forms of 1,2-dichloroethene, that is, cis and trans. Humans exposed to high vapor levels of 1,2-dichloroethene, depending on the form and duration, may experience nausea, drowsiness, and death. In animals, adverse effects to the lung, liver, heart, and blood have been noted [4]. The USEPA has placed 1,2-cis-dichloroethene in weight-of-evidence Group D; that is, it is not classifiable as to human carcinogenicity. 1,2-Trans-dichloroethene has not been placed in a weight-of-evidence group by the USEPA [5].

Oral Exposure. A chronic oral RfD of 0.01 mg/kg/day for 1,2-cis-dichloroethene is based on a NOAEL of 32 mg/kg/day for decreased hematocrit and decreased hemoglobin in a subchronic oral (gavage) study in rats [6]. A chronic oral RfD of 0.02 mg/kg/day [5], and a subchronic oral RfD of 0.2 mg/kg/day [6] for 1,2-trans-dichloroethene are based on a NOAEL of 17 mg/kg/day for increased blood alkaline phosphatase in a subchronic drinking water study in mice. No information on the rate and extent of absorption of 1,2-dichloroethene following oral exposure was located. The acute oral LD_{50} in rats was reported to be 1,275 mg/kg [4]. Oral LD_{50} values in mice ranged from 2,122 to 2,391 mg/kg [7]. Adverse effects to the livers of rats have been reported following oral administration of trans-1,2-dichloroethene. The cis isomer has been associated in rodents with adverse effects to blood, while the trans isomer has not [4].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for either form of 1,2-dichloroethene [5,6]. It has been reported that 72-75% of inhaled trans-1,2-dichloroethene is absorbed through the lungs in humans. A 6-hour LC_{50} of 21,723 ppm was reported for rats exposed to the trans isomer via inhalation. Adverse effects on the lung, liver, heart, and blood have been observed in rats following inhalation exposure to

trans-1,2-dichloroethene [4]. 1,2-dichloroethene vapor is a narcotic and mucous membrane irritant, and was once used as a general anesthetic in humans. Exposure to the trans isomer in air at a level of 2,000 ppm causes burning of the eyes, vertigo, and nausea [7]. A single human death following inhalation exposure to 1,2-dichloroethene was reported [4].

Dermal Exposure. No information on the rate and extent of absorption of 1,2-dichloroethene following dermal exposure was located. Skin contact with 1,2-dichloroethene can induce a primary irritant response [7].

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METHYLENE CHLORIDE

CAS NUMBER

75-09-2

COMMON SYNONYMS

Dichloromethane [1]

ANALYTICAL CLASSIFICATION

Volatile Organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 13,000 mg/L at 25°C [1]
Vapor Pressure: 434.9 mm Hg at 25°C [1]
Henry's Law Constant: 2.68 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.3255 at 20/4°C [2]
Organic Carbon Partition Coefficient: 47.86 [1]

FATE DATA: HALF-LIVES

Soil: 1 - 4 weeks [3]
Air: 19.1 - 191 days [3]
Surface Water: 1 - 4 weeks [3]
Groundwater: 2 - 8 weeks [3]

NATURAL SOURCES

None noted [1].

ARTIFICIAL SOURCES

Aerosol propellant; paint remover; metal degreaser; urethane foam blowing agent; paint/ink industries; aluminum forming; coal mining; photographic equipment; pharmaceutical, organic chemicals/plastics, and rubber processing industries; foundries; and laundries [1,2].

FATE AND TRANSPORT

Methylene chloride released to soil will evaporate quickly from near-surface soils, given its high vapor pressure. That which does not volatilize can be expected to leach through soils to groundwater not protected by a confining layer. Under normal environmental conditions, hydrolysis in soils and/or groundwaters is not predicted. Aerobic biodegredation of methylene chloride is reported to be complete (within 6 hours to 7 days),

and anaerobic biodegradation will proceed after a variable-length acclimation period. The primary removal process of methylene chloride from surface waters is volatilization. Biodegredation of methylene chloride is possible in natural waters, but will be a slow process relative to volatilization. Hydrolysis in surface waters, under normal environmental conditions, is not to be expected. The greater portion of atmospheric methylene chloride will degrade by reaction with hydroxyl radicals; photolysis is not expected. A small portion of the methylene chloride will diffuse to the stratosphere and will subsequently undergo rapid photolytic degradation and reaction with chlorine radicals. The moderate solubility of methylene chloride suggests the probability of atmospheric washout via rainfall.

Given its low, estimated bioconcentration factor of 5 (calculated from the octanol/water partition coefficient [1]), methylene chloride is not expected to bioconcentrate in aquatic biota.

HUMAN TOXICITY

General. The major targets of methylene chloride toxicity are the central nervous system, the liver and the kidneys [4]. Information regarding the mutagenicity of methylene chloride are equivocal. The USEPA has placed methylene chloride in weight-of-evidence cancer Class B2, indicating that it is a probable human carcinogen [5].

Oral Exposure. The chronic oral RfD of 0.06 mg/kg/day is based on a NOAEL of 6 mg/kg/day for liver toxicity in a chronic oral study in rats [5]. Methylene chloride is readily absorbed following oral exposure. An acute oral LD_{50} of 2100 mg/kg was reported for rats [4]. Human fatalities resulting from oral exposure to methylene chloride have not been reported. Limited animal data indicates that effects on the liver and kidneys occur at doses above 55 mg/kg/day [4]. There is no evidence to suggest that methylene chloride affects reproduction or development. There is no evidence that methylene chloride causes cancer in humans, but studies in animals suggest that oral exposure results in liver cancer [4]. An oral slope factor of 7.5×10^{-3} $(mg/kg/day)^{-1}$ was derived based on the incidence of liver cancer in mice [5].

Inhalation Exposure. A chronic inhalation RfC of 3 mg/m^3 is based on a NOAEL of 694.8 mg/m^3 for liver toxicity in a chronic study in rats [6]. Methylene chloride is readily absorbed following inhalation exposure. An acute LC_{50} of 16,189 ppm was reported for mice [4]. The odor threshold is approximately 200 ppm. Case studies have demonstrated that inhaled methylene chloride can be fatal to humans, but exposure levels were not reported [4]. Acute (3-4 hours) exposure to concentrations of 300 ppm or greater results in adverse effects on vision and hearing, while exposure to 800 ppm or greater results in impairment of psychomotor performance (reaction time, hand precision, steadiness) [4]. In

most cases, effects will disappear when exposure ceases. Animal studies indicate that exposure to higher concentrations (1000 ppm) results in unconsciousness or death [4]. Animal studies indicate that methylene chloride is not likely to produce adverse effects on reproduction or development in humans [4]. There is no evidence that methylene chloride causes cancer in humans, but studies in animals suggest that inhalation exposure results in liver cancer [4]. An inhalation unit risk of 4.7×10^{-7} $(\mu g/m^3)^{-1}$ was derived based on the incidence of liver cancer in mice [5].

Dermal Exposure. No information is available regarding the effects of dermal exposure to methylene chloride in humans. Limited animal studies report adverse effects on the eye of rabbits following exposure. The effects were reversed within a few days [4].

ECOLOGICAL TOXICITY

General. Methylene chloride is highly volatile, is weakly absorbed to soil, and has no significant potential for bioaccumulation. It is highly mobile in the soil/ground water system [7]. No information was found regarding biomagnification of methylene chloride.

Vegetation. The sorption of methylene chloride is not well documented. Transformation processes such as hydrolysis and biodegradation are not expected to be important in natural soil systems [7]. Review of the technical literature did not produce information regarding the phytotoxic effects of methylene chloride.

Aquatic Life. CH2M Hill, Inc. [8] states that acute values for fathead minnows and bluegill are 193,000 $\mu g/L$ and 224,000 $\mu g/L$, respectively. The 96-hour LC_{50} of green sunfish is 550 ppm [9]. According to Arthur D. Little, Inc. [7], there is no criterion for acute toxicity in freshwater species, but the LOEL occurs at 11,000 $\mu g/L$ halomethanes. There are no USEPA aquatic life water quality standards for methylene chloride [10].

Wildlife. Methylene chloride is slightly toxic to mammals. CH2M Hill, Inc. [8] states the oral LD_{50} for rats is 2,136 mg/kg and for mice is 1,987 mg/kg. The lowest lethal dose for rabbits is 1,900 mg/kg. Methylene chloride has a low to moderate acute oral toxicity in lab animals. The LD_{50} value for rats and rabbits fed undiluted methylene chloride is about 2,000 mg/kg [7].

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TETRACHLOROETHENE

CAS NUMBER

127-18-4

COMMON SYNONYMS

Tetrachloroethylene, perchloroethylene, PCE.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,503 mg/L at 25°C [1]
Vapor Pressure: 18.49 mm Hg at 25°C [1]
Henry's Law Constant: 1.49 x 10^{-2} atm-m^3/mole [1]
Specific Gravity: 1.6311 at 15/4°C [2]
Organic Carbon Partition Coefficient: 209 to 238 [1]

FATE DATA: HALF-LIVES

Soil: 0.5 - 1 year [3]
Air: 16 - 160 days [3]
Surface Water: 0.5 - 1 year [3]
Groundwater: 1 - 2 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Dry cleaning industry, metal finishing, organic chemical/plastics manufacturing [1].

FATE AND TRANSPORT

PCE released to surface soil will be subject to evaporation into the atmosphere and leaching to the groundwater. It is weakly adsorbed to soil organic material. Since it is only somewhat soluble in water and substantially denser, when it occurs as a separate phase it tends to sink to the bottom of the aquifer. Biodegradation of PCE occurs in soils and, to a lesser extent, in some types of groundwater. PCE released to surface water will be subject to rapid volatilization; it will not be expected to significantly biodegrade, bioconcentrate in aquatic organisms, or adsorb to sediment. Photooxidation degrades PCE in the atmosphere, although some may be washed out in rain before this occurs [1].

HUMAN TOXICITY

General. The primary targets of PCE toxicity are the central nervous system, the liver and the kidneys [4,5]. PCE is not considered to be mutagenic. The USEPA has not adopted a final position on the weight-of-evidence cancer classification for PCE, but an oral Slope Factor and inhalation Unit Risk have been derived [7].

Oral Exposure. A chronic oral RfD of 0.01 mg/kg/day is based on a NOAEL of 14 mg/kg/day for hepatotoxicity in mice and weight gain in rats following subchronic administration of PCE [6]. PCE is readily absorbed following oral exposure. Acute oral LD_{50} values ranged from 3000 to 8850 mg/kg in rats and 5000 to 8100 mg/kg in mice [4,5]. The fatal oral dose to humans is not known. Inebriation was the only reported side effect following treatment of intestinal parasites with doses of 2.8 to 4.0 ml (40-57 mg/kg) PCE [5]. No other data regarding toxic effects in humans following oral exposure are available. PCE has been found to cause liver tumors in mice following both oral and inhalation exposure [4]. An oral Slope Factor of 0.052 $(mg/kg/day)^{-1}$ is based on the incidence of liver cancer in mice [7].

Inhalation Exposure. An inhalation RfC for PCE is not currently available [6]. PCE is rapidly absorbed following inhalation exposure [4]. Acute inhalation LC_{50} values of 5200 ppm (4 hour) and 5040 ppm (8 hour) were identified for mice and rats, respectively [5]. Acute exposure of humans to concentrations of PCE in air above 200 ppm has resulted in depression of the central nervous system characterized by dizziness, impaired memory, confusion, irritability, "inebriation-like" symptoms, tremors and numbness. Long-term exposure of humans to PCE (concentration not reported) has resulted in toxic effects on the liver, including hepatitis, cirrhosis, liver-cell necrosis and enlarged liver. Chronic kidney disease has also been noted [5]. There is no evidence that PCE causes effects on human development or reproduction [4,5]. PCE has been found to cause liver tumors in mice following both oral and inhalation exposure [4]. An inhalation Unit Risk of 5.8×10^{-7} $(ug/m^3)^{-1}$ was derived based on the incidence of liver cancer in mice [7].

Dermal Exposure. A 10-day dermal LD_{50} value of 64,680 mg/kg was defined for mice [5]. Skin contact with PCE causes dryness, irritation, blistering and burns. Mild liver and kidney damage may also occur. The exposure levels that result in these effects are not known.

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TOLUENE

CAS NUMBER

108-43-2

COMMON SYNONYMS

Methylbenzene.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 534.8 mg/L at 25°C [1]
Vapor Pressure: 28.4 mm Hg at 25°C [1]
Henry's Law Constant: 5.94 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 0.866 at 20/4°C [2]
Organic Carbon Partition Coefficient: 37 to 178 [1]

FATE DATA: HALF-LIVES

Soil: 4 to 22 days [3]
Air: 10 hours to 4.3 days [3]
Surface Water: 4 to 22 days [3]
Groundwater: 1 to 4 weeks [3]

NATURAL SOURCES

Volcanoes, forest fires, and crude oil [1].

ARTIFICIAL SOURCES

Gasoline, fuel oils, automobile exhaust, chemical industry, paints and lacquers [1].

FATE AND TRANSPORT

Much of the toluene released to surface soil will be lost to volatilization. It is mobile in soils and will leach to groundwater. Biodegradation occurs slowly in soil and groundwater, but is inhibited by high concentrations. Under ideal conditions of low concentration and acclimated microbial populations, rapid biodegradation may occur. Losses from surface water occur due to volatilization and biodegradation. It will not significantly adsorb to sediment or bioconcentrate in aquatic organisms. In the atmosphere it will degrade or be washed out with rain [1].

HUMAN TOXICITY

General. Toluene acts primarily on the central nervous system [4]. The USEPA has placed toluene in weight-of-evidence Group D; that is, it is not classifiable as to human carcinogenicity [5].

Oral Exposure. A chronic RfD of 0.2 mg/kg/day is based on a NOAEL of 223 mg/kg/day for changes in liver and kidney weights in a subchronic oral study in rats. The LOAEL in this study was a dose of 446 mg/kg/day [5]. Toluene is absorbed more slowly from the gastrointestinal tract than from the lungs [6]. The acute oral LD_{50} for adult rats is in the range of 5,000 to 7,300 mg/kg [4,6]. Brain damage was noted in mice receiving 1,250 mg/kg/day by gavage for 13 weeks [6].

Inhalation Exposure. The RfC of 0.4 mg/m^3 is based on a LOAEL of 88 ppm for central nervous system effects observed in humans following inhalation exposure [7]. Toluene is rapidly absorbed following inhalation by humans and animals [6]. The inhalation LC_{50} in mice is 5,300 ppm for an 8-hour exposure. Exposure of humans by inhalation to 200 ppm for 8 hours produced mild fatigue, weakness, confusion, lacrimation, and tingling of the skin. At 600 ppm, additional effects included euphoria, headache, dizziness, dilated pupils, convulsions, and nausea. After 8 hours at 800 ppm, symptoms were more pronounced; effects included nervousness, muscular fatigue, and insomnia persisting for several days. Exposure to concentrations of 10,000 to 30,000 ppm could lead to narcosis and death. Chronic abusive inhalation of toluene vapors by humans produces central nervous system impairment and emotional and intellectual disturbances. Uptake in the various brain regions is widespread due to the high lipid solubility of toluene and the high lipid content of the brain. Effects on animals following high levels of exposure include hearing loss, kidney effects, and lung lesions. High level oral intake by animals has resulted in weight increases in the liver and kidney, and brain tissue damage [4].

Dermal Exposure. The absorption of toluene through human skin is slow, falling within the range of 14 to 23 mg/cm^2/hour. Dermal contact with toluene by humans may cause skin damage. Application of toluene to the eyes of rabbits reportedly resulted in moderately severe injury [6].

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1,1,1-TRICHLOROETHANE

CAS NUMBER

71-55-6

COMMON SYNONYMS

Methylchloroform, TCA.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,495 mg/L at 25°C [1]
Vapor Pressure: 123.7 mm Hg at 25°C [1]
Henry's Law Constant: 8 x 10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.3376 at 20/4°C [2]
Organic Carbon Partition Coefficient: 183 [1]

FATE DATA: HALF-LIVES

Soil: 20 - 39 weeks [3]
Air: 225 days - 6.2 years [3]
Surface Water: 20 - 39 weeks [3]
Groundwater: 20 weeks - 1.5 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Metal degreasing, solvent, aerosol.

FATE AND TRANSPORT

TCA released to surface soil will be lost primarily to evaporation. It is mobile in soil, and will leach to groundwater. Since it is only somewhat soluble in water and substantially denser, when it occurs as a separate phase it tends to sink to the bottom of the aquifer. Almost all of the TCA present in surface water will be lost to evaporation. Releases to air will be transported long distances and partially returned to earth in rain. Photodegradation in the lower atmosphere is slow, while in the upper atmosphere it is rapid [1].

HUMAN TOXICITY

General. TCA is generally regarded as being of moderate to low toxicity. The primary target of TCA toxicity in humans is the central nervous system [4,5]. TCA is also a skin and eye irritant. Information regarding the mutagenicity of TCA are equivocal. The USEPA has placed TCA in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [6].

Oral Exposure. A chronic oral RfD of 0.09 mg/kg/day is based on a NOAEL of 500 ppm for liver toxicity in a subchronic inhalation study in guinea pigs [7]. The RfD was extrapolated from the chronic inhalation RfC [7]. TCA is absorbed following oral exposure, but the rate and extent of absorption are not known. Acute oral LD_{50} values in animals ranged from 5660 mg/kg in rabbits to 12,300 mg/kg in rats [4,5]. The fatal doses to humans has not been reported. A single, adult human who ingested 30 mL (approximately 570 mg/kg) of TCA showed initial symptoms of CNS depression and gastrointestinal upset. The patient survived and recovered within two weeks [5]. The effects of long-term oral exposure of humans to TCA are not known. In animals, TCA exposure has also resulted in effects on the liver (changes in liver enzymes). Information regarding the possible effects of TCA on the developing fetus in humans are not available, but oral studies in animals suggest that TCA is probably not a developmental toxicant [4]. There is no evidence that ingested TCA causes cancer in humans, and studies in animals are unable to assess the carcinogenic potential of TCA because the quality of the studies are poor [4]. An oral Slope Factor for cancer is not available [6].

Inhalation Exposure. A chronic inhalation RfC of 1 mg/m^3 is based on a NOAEL of 500 ppm for liver toxicity in a subchronic study in guinea pigs [7]. TCA is readily absorbed following inhalation exposure. Acute inhalation LC_{50} values in rats ranged from 10,305 ppm (6 hours) to 38,000 ppm (15 minutes) and in mice ranged from 3911 ppm (2 hours) to 18,358 ppm (1 hour) [4]. TCA inhalation has resulted in human deaths, with fatal concentrations estimated at 6,000 to 20,000 ppm [4]. Death is usually attributed to either depression of the central nervous system, resulting in respiratory arrest, or sensitization of the heart to epinephrine, resulting in severe cardiac arrhythmia [4]. Short-term inhalation of TCA in humans results in neurological effects. Within 20 minutes of exposure to 175 to 350 ppm TCA, deficits in motor performance have been seen [5]. Changes in reaction time, manual dexterity, and equilibrium have been reported following exposure to 350 ppm for 1-3 hours, and eye, nose and throat irritation and impaired perceptive capabilities have been found following exposure to 450 ppm for 8 hours. Exposure to TCA concentrations above 1000 ppm for 15 minutes or 2000 ppm for 5 minutes has resulted in disequilibrium in adults [5]. The effects of long-term inhalation of TCA are not known. Information regarding the possible effects of TCA on the developing fetus in humans are not available, but inhalation studies in animals suggest that TCA is probably not a developmental or

reproductive toxicant [4]. There is no evidence that inhaled TCA causes cancer in humans, and inhalation studies in animals suggest that TCA is not a carcinogen via this route [4]. An inhalation Unit Risk factor for cancer is not available [6].

Dermal Exposure. Dermal exposure to TCA has not been shown to be lethal to humans, and dermal LD_{50} values are not available in animals [4]. Extended dermal contact to high concentrations of TCA results in skin irritation and a burning sensation, but TCA is not considered to be a strong skin irritant [4].

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TRICHLOROETHENE

CAS NUMBER

79-01-6

COMMON SYNONYMS

Trichloroethylene, TCE.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,100 mg/L at 25°C [1]
Vapor Pressure: 69.0 mm Hg at 25°C [1]
Henry's Law Constant: 1.03 x 10^{-2} atm-m^3/mole [1]
Specific Gravity: 1.4695 at 15/4°C [2]
Organic Carbon Partition Coefficient: 87 to 150 [1]

FATE DATA: HALF-LIVES

Soil: 0.5 to 1 year [3]
Air: 1.1 to 11.3 days [3]
Surface Water: 0.5 to 1 year [3]
Groundwater: 10.7 months to 4.5 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Metal degreasing operations, solvent, paint and ink formulations, electronics industry, and rubber processing industry [1].

FATE AND TRANSPORT

TCE released to soil will partially evaporate and partially leach to groundwater, where it may remain for a long time. It is highly mobile in soils, where there is some degradation to other chlorinated alkenes. Since it is only somewhat soluble in water and substantially denser, when it occurs as a separate phase it tends to sink to the bottom of the aquifer. Evaporation is the primary removal mechanism in surface water. Biodegradation, hydrolysis, and photooxidation are extremely slow by comparison. Adsorption to sediment

and bioconcentration in aquatic organisms are insignificant. TCE in the atmosphere is present in the vapor phase and is rapidly degraded [1].

HUMAN TOXICITY

General. TCE has anesthetic properties, and inhalation of high concentrations causes unconsciousness in humans. Links to cancer and birth defects in humans are uncertain [4]. Neither IRIS nor HEAST currently provide toxicity values for TCE [5,6]. The USEPA has not resolved the weight-of-evidence classification of TCE, and currently places it in either Group C (possible human carcinogen) or Group B2 (probable human carcinogen). It has also been described as being on a Group "C-B2 continuum" [7].

Oral Exposure. Although quantitative data are lacking, it is probable that TCE is readily absorbed from the gastrointestinal tract. An acute oral LD_{50} of 4,920 mg/kg/day for a single dose was reported for rats. Hepatotoxicity in mice was noted at a level of 100 mg/kg/day, 5 days/week, for 6 weeks. Symptoms of oral exposure in humans include muscle weakness, vomiting, and unconsciousness. A human death following ingestion was reported to result from hepatorenal failure. There is some evidence in humans of adverse cardiovascular and neurological effects following ingestion of TCE [4]. The July 1985 Health Assessment Document for Trichloroethylene (EPA 600/8-82/006F) provides an oral slope factor of 0.011 $(mg/kg/day)^{-1}$ [7].

Inhalation Exposure. The initial rate of pulmonary uptake in humans is quite high, but levels off after a few hours. An inhalation LC_{50} of 12,500 ppm for a 4-hour exposure was reported for rats. Inhalation of TCE at high concentrations affects the central nervous system, causing effects such as dizziness, headache, slowed reaction times, sleepiness, and facial numbness. Additional effects include eye, nose, and throat irritation. At one time, TCE was used as a surgical anesthetic in humans. Animal studies have shown that prolonged inhalation or oral exposure to high levels of TCE produces liver and kidney damage, effects on the immune system and blood, and that chronic exposure can cause cancer of the liver, kidney, and lung. Consumption of alcohol can make people more susceptible to liver and kidney injury from TCE [4]. The June 1987 Addendum to the Health Assessment Document for Trichloroethylene (EPA 600/8-82/006FA) provides an inhalation unit risk of 1.7×10^{-6} $(mg/m^3)^{-1}$ [7].

Dermal Exposure. Dermal absorption of TCE in humans is rapid. The absorption rate in mice was reported to be 7.82 $mg/min/m^2$. The dermal LD_{50} in rabbits was reported to be 29,000 mg/kg. Humans exposed to 200 ppm TCE vapor for 1-7 hours experienced dry throats and mild eye irritation. Skin irritations, burns, and rashes have been reported for workers who underwent occupational exposure [4].

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XYLENES

CAS NUMBER

1330-20-7

COMMON SYNONYMS

Xylene.

Note: There are three isomers (forms) of xylene: ortho, meta, and para, also known as 1,2-, 1,3-, and 1,4-xylene, respectively.

ANALYTICAL CLASSIFICATION

Volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 146 - 175 mg/L at 25°C [1]
Vapor Pressure: 6.6 - 8.7 mm Hg at 25°C [1]
Henry's Law Constant: 5.1×10^{-3} to 7.7×10^{-3} atm-m^3/mole [1]
Specific Gravity: 0.880 at 20/4°C (*o*-xylene) [2]
Organic Carbon Partition Coefficient: 25.4 - 204 [1]

FATE DATA: HALF-LIVES

Soil: 1 - 4 weeks [3]
Air: 2.6 hours - 1.8 days [3]
Surface Water: 1 - 4 weeks [3]
Groundwater: 2 weeks - 1 year [3]

NATURAL SOURCES

All three isomers of xylene occur in petroleum. 1,2-Xylene is found additionally in coal tar, forest fire products, and plants [1].

ARTIFICIAL SOURCES

Gasoline, fuel oils, and their combustion products. Petroleum refining, chemical industry; aerosols of paints, varnishes, and shellacs. Wood-burning stoves and fireplaces [1].

FATE AND TRANSPORT

Xylenes are moderately mobile in soil and may leach to groundwater where they are known to persist for several years despite evidence of biodegradation in both soil and groundwater. The dominant removal process in surface water is volatilization, but this is

not a rapid process. Some adsorption to sediment will occur. Once released to the atmosphere, xylenes will undergo photochemical degradation at a moderate rate [1].

HUMAN TOXICITY

General. The primary target of xylenes toxicity is the central nervous system [4,5]. Xylenes are considered to be nongenotoxic. The USEPA has placed xylenes in weight-of-evidence cancer Group D, indicating that they are not classifiable as to human carcinogenicity [6].

Oral Exposure. A chronic oral RfD of 2 mg/kg/day is based on a NOAEL of 250 mg/kg/day for hyperactivity, decreased body weight and increased male mortality in a chronic study in rats [6]. Acute oral LD_{50} values for xylenes ranged from 3523 to 8600 mg/kg in rats and 5251 to 5627 mg/kg in mice [4,5]. Death in humans has been reported following the ingestion of xylenes, but the fatal dose is not known [4]. Reports of the ingestion of xylenes in humans are generally lacking. In animals, oral exposure to xylenes results in effects on the liver (increased liver enzymes and weight), the kidenys (increased kidney weight), and the nervous system (impairment of visual function, hyperactivity) [4]. Information is not available regarding the effects of ingested xylene on reproduction or development in humans, and the results of developmental studies in animals are inconclusive [4]. There is no conclusive evidence that oral exposure to xylenes causes cancer in humans or animals, therefore, an oral slope factor is not available [6].

Inhalation Exposure. An inhalation RfC for mixed xylenes is considered non-verifiable by the USEPA [7]. Xylenes are readily absorbed following inhalation exposure. Acute inhalation LC_{50} values of 6350 to 6700 ppm (4-hour exposure) were reported in rats for mixed xylenes [4]. LC_{50} values for the separate isomers are comparable to the mixture. Cause of death was usually respiratory failure and/or sudden ventricular fibrillation. In humans, inhalation of approximately 10,000 ppm xylenes has been fatal [4]. Exposure of humans to 90 ppm xylene has produced impairment of reaction time, manual coordination and body balance [5]. Brief exposure to concentrations of 200 ppm has caused irritation of the eyes, nose and throat. and exposure to concentrations above 200 ppm has resulted in nausea, vomiting, abdominal pain and loss of appetite [5]. Long-term high-level occupational exposure to xylenes ($>$ 200 ppm) has resulted in central nervous system effects, incoordination, nausea, vomiting, and abdominal pain [5]. Studies in laboratory animals suggest that xylenes have a relatively low chronic toxicity. Some data in animals suggest possible kidney and liver impairment with high level inhalation exposures ($>$1000 ppm) [5]. Information regarding the effects of xylenes on human reproduction and development are not available, but teratogenicity, fetotoxicity, and maternal toxicity have been observed in animals [4,5]. Xylenes have been found to cross the human placenta, therefore, there is sufficient reason for concern for pregnant women who are exposed to

xylenes [4,5]. It is not known whether inhaled xylenes cause cancer in humans or animals, therefore, an inhalation unit risk is not available [6].

Dermal Exposure. Acute dermal LD_{50} values in rabbits of 14.1 ml/kg and greater than 5.0 ml/kg are reported for m-xylene and mixed xylenes, respectively [5]. Xylene is a skin irritant and causes redness, defatting and dryness. Vesicles may form following prolonged skin contact [4,5].

ECOLOGICAL TOXICITY

General. Xylenes are not a priority pollutant because they have low acute and chronic toxicity. Xylenes move through the soil/groundwater system when present at low concentrations, dissolved in water and adsorbed on soil, or as a separate organic phase resulting from a spill of significant quantities. Xylenes readily volatilize from water, are moderately adsorbed on soil, and have a moderate potential for bioccumulation [8]. No information on biomagnification of xylenes was available in the technical literature.

Vegetation. Nearly all xylenes (98.8 percent) are expected to be sorbed into the soil. For the portion of xylenes in the gaseous phase of soil (0.5 percent), diffusion through the soil/air pores up to the ground surface and removal by wind will be a significant loss pathway [8]. Review of the technical literature did not produce information regarding the phytotoxic effects of xylenes.

Aquatic Life. The half-life of xylenes in surface water has been calculated as 2.6 to 11.2 days [9]. Under normal environmental conditions, xylenes are not expected to undergo hydrolysis because they contain no hydrolyzable functional groups [8]. The LC_{50} value for freshwater fish was approximately 30 mg/L [9]. The 96-hour LC_{50} values for fathead minnows were 26.7 mg/L in soft water and 28.8 mg/L in hard water [10]. The 96-hour LC_{50} for bluegills was 20.9 mg/L in soft water [10]. There are no federal water quality standards established to protect aquatic life [11].

Wildlife. Xylenes are considered to be of low acute and chronic toxicity to birds and mammals [12]. No changes were found in rats, guinea pigs, dogs, and monkeys continuously exposed to 80 ppm for 127 days, nor in rats exposed to 700 ppm for 130 days [8]. Japanese quail showed no signs of toxicity at oral concentrations of 5,000 to 20,000 ppm (approximately 600 to 2,400 mg/kg body weight) [9]. Mallard eggs were immersed in xylene (10%) for 30 seconds and no significant effects on embryonic weight and length were observed when compared to controls [13]. Arthur D. Little, Inc. [8] reported an oral LD_{50} for rats at 4,300 mg/kg.

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SEMI-VOLATILE ORGANIC COMPOUNDS
TOXICITY PROFILES

BENZOIC ACID

CAS NUMBER

65-85-0

COMMON SYNONYMS

Benzenecarboxylic Acid

ANALYTICAL CLASSIFICATION

Volatile organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 2700 mg/L at 18°C [1]
Vapor Pressure: 4.5 x 10^{-3} mm Hg at 20°C [1]
Henry's Law Constant: 7.0 x 10^{-8} atm-m^3/mole [1]
Specific Gravity: 1.27 [2]
Organic Carbon Partition Coefficient: ND

FATE DATA: HALF-LIVES

Soil: ND
Air: ND
Surface Water: ND
Groundwater: ND

NATURAL SOURCES

Beaver scent glands, black cherry tree bark, cranberries, berries, prunes, ripe cloves, oil of anise seed, and tolu balsam. [1]

ARTIFICIAL SOURCES

May commonly be found in wastewater or emissions during its production/use in the manufacture of phenol, plasticizers (benzoate), and benzol chloride. Used as a food preservative, and in medicines, and cosmetics. Formed in combustion processes, and found in gasoline/diesel fuel exhaust, refuse combustion, and tobacco smoke. [1]

FATE AND TRANSPORT

Benzoic acid can leach into soil and biodegrade with a half-life less than one week. In water, it will also rapidly biodegrade (half-life of 0.2 - 3.6 days). Volatilization and sediment adsorption should not be significant. Benzoic acid does not tend to bioconcentrate

in aquatic organisms. In the air, benzoic acid is most often associated with aerosols, and will be washed out with rain. [1]

HUMAN TOXICITY

General. Benzoic acid and sodium benzoate are used as food preservatives, with a daily intake of 4 mg/kg/day benzoic acid. This intake is considered safe by the FDA [3]. Benzoic acid is an irritant in humans and animals. There is no evidence that benzoic acid is mutagenic or carcinogenic in humans or animals following any route of exposure [3]. USEPA has placed benzoic acid in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [3].

Oral Exposure. A chronic oral RfD of 4 mg/kg/day is based on a NOAEL of 4.4 mg/kg/day for no adverse effects in humans [3]. Benzoic acid is absorbed following oral exposure but the extent of absorption is not known. Acute oral LD_{50} values of 1700 to 2530 mg/kg in rats, 2370 mg/kg in mice and 2000 mg/kg in dogs, cats and rabbits have been reported [2,4]. The lowest reported lethal dose in humans is 500 mg/kg [4]. Ingestion of higher doses of benzoic acid is associated with gastrointestinal irritation. In animals, long-term ingestion of benzoic acid resulted in decreased food intake and body weight [3]. There is no information regarding the effects of ingested benzoic acid on reproduction or development in humans or animals. An oral Slope Factor for cancer is not available for benzoic acid [3].

Inhalation Exposure. Information regarding the toxicity of inhaled benzoic acid in humans and animals were not located. Consequently, a chronic inhalation RfC and an inhalation Unit Risk for cancer are not available for benzoic acid [3].

Dermal Exposure. Benzoic acid is a mild irritant to skin, eyes and mucous membranes [4]. Further information regarding the effects of dermal exposure to benzoic acid were not located.

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BIS(2-ETHYLHEXYL)PHTHALATE

CAS NUMBER

117-81-7

COMMON SYNONYMS

1,2-Benzenedicarboxylic acid bis(2-ethylhexyl)ester; di(2-ethylhexyl) phthalate; dioctylphthalate.

ANALYTICAL CLASSIFICATION

Semi-volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.3 mg/L at 25°C [1]
Vapor Pressure: 6.45 x 10^{-6} mm Hg at 25°C [1]
Henry's Law Constant: 1.1 x 10^{-5} atm-m^3/mole [1]
Specific Gravity: 0.99 at 20/20°C [2]
Organic Carbon Partition Coefficient: 10,000 - 100,000 [1]

FATE DATA: HALF-LIVES

Soil: 5 - 23 days [3]
Air: 2.9 - 29 hours [3]
Surface Water: 5 - 23 days [3]
Groundwater: 10 - 389 days [3]

NATURAL SOURCES

Possible product of animal and/or plant life.

ARTIFICIAL SOURCES

Plasticizer for polyvinylchloride and other polymers; disposal/incineration of plastic(s)/polymer(s) [1].

FATE AND TRANSPORT

Bis(2-ethylhexyl)phthalate (hereafter, BEHP) has a strong tendency to adsorb to soils and sediments, suggesting low likelihood of leaching to groundwaters. Given the very low vapor pressure and Henry's Law constant of BEHP, volatilization from soils and waters is very unlikely. This compound does show a tendency to bioconcentrate in aquatic organisms. Hydrolysis (from aquatic systems), photolysis (in the water and atmosphere), and photo-oxidation (in atmospheric systems) are not predicted to be important removal

processes. In aquatic environments, aerobic biodegradation occurs rapidly following acclimation; no anaerobic biodegradation occurs. Some slight biodegradation in soils is expected. In the atmosphere, the primary removal mechanism is via rainfall washout [1].

HUMAN TOXICITY

General. There is currently no evidence that BEHP causes adverse effects in humans, but animal studies indicate that the liver, kidneys and testes are targets of oral exposure [4]. Information regarding the genotoxicity of BEHP are equivocal but indicate that BEHP may act as a co-carcinogen in rodents [4]. The USEPA has placed BEHP in weight-of-evidence cancer Group B2, indicating that it is a probable human carcinogen [5].

Oral Exposure. A chronic oral RfD of 0.02 mg/kg/day is based on a LOAEL of 19 mg/kg/day for increased relative liver weight in a chronic oral study in guinea pigs [5]. BEHP is readily absorbed following oral exposure. Acute oral LD_{50} values of 30,600 mg/kg and 33,900 mg/kg have been defined for rats and rabbits, respectively [4]. BEHP has not been found to be fatal to humans at doses up to 143 mg/kg; mild abdominal pain and diarrhea were the only effects reported at this dose [4]. Oral studies in animals reported effects on the liver (morphological changes, nodules, tumors), kidneys (effects on kidney cells), thyroid and pancreas (changes in the acinar cells of both organs), and testes (atrophy and degeneration). Animal studies indicated that monkeys are less susceptible to the toxic effects of BEHP than are mice and rats [4]. The relative susceptibility of humans is not known. Effects on fetal development (reduced survival, malformations) were reported in rodents following oral exposure [4]. There is no evidence that BEHP causes cancer in humans, but studies in animals suggest that oral exposure results in liver cancer [4]. An oral slope factor of 0.014 $(mg/kg/day)^{-1}$ is based on the incidence of liver tumors in mice [5].

Inhalation Exposure. An inhalation RfC is not available for BEHP [5]. Information regarding the toxicity of inhaled BEHP in humans are not available and data in animals are limited to one developmental study [4]. In the developmental study, no adverse effects were reported in rats following exposure to up to 300 mg/m^3 during gestation [4]. There is no evidence that inhaled BEHP causes cancer in humans or animals, therefore, an inhalation unit risk for cancer is not available for BEHP [5].

Dermal Exposure. An acute dermal LD_{50} value of 24,750 mg/kg was reported for rabbits [4]. Dermal exposure of both humans and animals indicate that BEHP is neither an irritant nor a sensitizer [4].

ECOLOGICAL TOXICITY

General. Bis(2-ethylhexyl)phthalate (BEHP) is the most well studied of the phthalate esters. Most information reported in the technical literature dealt with phthalate esters as a

group. Autian [6] suggests there is evidence phthalate esters are degraded by microbiota and metabolized by fish and animals. As a result, phthalate esters are not likeley to biomagnify. According to Arthur D. Little, Inc. [7], phthalate esters readily complex with natural organic substances (e.g., fulvic acid) to form complexes which are very soluble in water. BEHP is nonvolatile, strongly adsorbed, and has a high potential for bioaccumulation.

Vegetation. Review of the technical literature did not produce information regarding the phototoxic effects of BEHP.

Aquatic Life. Bioconcentration factors (BCFs) for fish and aquatic invertebrates range from 54 to 2,680. Fathead minnows accumulated levels of BEHP 1,380 times the water concentration of 2.5 μg/L after 28 days. Residue half-life was 7 days. Invertebrates accumulated BEHP up to 13,400 times when exposed to water concentrations ranging from 0.08 to 0.3 μg/L. Over 90 percent of the residues were lost within 10 days [8]. The 96-hour LC_{50} of bluegill is more than 770,000 μg/L [9]. The LC_{50} of *Daphnia magna* exposed to BEHP was 11,000 μg/L. There are no USEPA acute or chronic aquatic life criteria for BEHP [10,11].

Wildlife. The only information available on wildlife toxicity to BEHP concerns laboratory animals. The oral LD_{50} values for rats is 31,000 mg/kg, 30,000 mg/kg, for mice, and 34,000 mg/kg for rabbit [12].

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BUTYLBENZYLPHTHALATE

CAS NUMBER

85-68-7

COMMON SYNONYMS

Benzyl butyl phthalate

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 2.69 mg/L at 25°C [1]
Vapor Pressure: 8.60 x 10^{-6} mm Hg at 20°C [1]
Henry's Law Constant: 1.3 x 10^{-6} atm-m^3/mole [1]
Specific Gravity: 1.1 at 25/25°C [2]
Organic Carbon Partition Coefficient: 17,000 [1]

FATE DATA: HALF-LIVES

Soil: 1 - 7 days [3]
Air: 6 hours - 2.5 days [3]
Surface Water: 1 - 7 days [3]
Groundwater: 2 days - 6 months [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Almost always used as a plasticizer. Half of its production is used in PVC flooring products; and the other fifty-percent is used in adhesives in the packaging industry. [4]

FATE AND TRANSPORT

BBP may be released into the environment from its production, distribution, and polyvinyl chloride blending operations. BBP is most commonly found in the soil and water, and not often in the atmosphere. BBP has a high K_{oc} value, and will tend to adsorb to soil, and therefore, is not likely to leach into the groundwater. In water, BBP will adsorb to sediments and biota, and will not volatilize to any great extent, except under windy weather conditions or in shallow water bodies. Biodegradation is primarily the loss mechanism, and occurs under anaerobic conditions [1].

HUMAN TOXICITY

General. The major targets of BBP toxicity are the liver, kidneys and testes [4]. BBP is considered to be nonmutagenic. BBP has been placed in weight-of-evidence cancer Group C, indicating that it is a possible human carcinogen [5].

Oral Exposure. A chronic oral RfD of 0.2 mg/kg/day is based on a NOAEL of 159 mg/kg/day for increased liver-to-body weight and liver-to-brain weight ratios in a subchronic study in rats [5]. BBP is absorbed following oral exposure but the extent of absorption is not known. Acute oral LD_{50} values of 2330 and 4170 mg/kg were reported for rats and mice, respectively [4]. An LD_{50} of 20,400 mg/kg in rats was found for undiluted material [4]. Ingested BBP has not been reported to be fatal to humans and information is not available regarding the effects of oral exposure of humans to BBP. In animals, short-term administration of high levels of BBP (25,000 mg/kg/day) resulted in effects on the testes (degeneration) and long-term administration to lower levels (2,000 mg/kg) resulted in effects on the liver (increased liver weight, focal necrosis) and kidneys (increased kidney weight) [4]. It is not known whether ingested BBP will effect human development. No evidence of fetotoxicity or teratogenicity was reported in rabbits [4]. There is no evidence that ingested BBP causes cancer in humans, but studies in animals suggest that BBP may cause leukemia in female rats [4]. An oral Slope Factor for cancer is not available for BBP [5].

Inhalation Exposure. A chronic inhalation RfC is not available for BBP [5]. BBP is absorbed following inhalation exposure, but the extent of absorption is not known. An acute inhalation LC_{50} value of 13,100 mg/m^3 was reported for mammals (exact species not specified) [6]. Inhaled BBP has not been reported to be fatal to humans and information is not available regarding the effects of inhalation exposure of humans to BBP. In animals, short-term exposure to 1936 mg/m^3 resulted in decreased body weight and atrophy of the spleen and testes, while long-term exposure to 200 mg/m^3 resulted in decreased kidney weight (decrease liver weight was noted at a higher concentration) [4]. There is no evidence that inhaled BBP causes effects on development or cancer in humans or animals. An inhalation Unit Risk for cancer is not available for BBP [5].

Dermal Exposure. An acute dermal LD_{50} value of greater than 10,000 mg/kg is reported for rabbits [4]. In humans, a repeat insult patch test indicated that BBP is not a primary or cumulative skin irritant or sensitizing agent [4].

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CARBAZOLE

CAS NUMBER

86-74-8

COMMON SYNONYMS

Dibenzopyrole

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: insignificant at 25°C [2]
Henry's Law Constant: ND
Specific Gravity: 1.10 at 18/4°C [2]
Organic Carbon Partition Coefficient: 12,882 [3]

FATE DATA: HALF-LIVES

Soil: ND
Air: ND
Surface Water: ND
Groundwater: ND

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Important as a dye intermediate. Used in the formulation of photographic plates sensitive to ultraviolet light. Lignin, carbohydrate, and formaldehyde reagent. [1]

FATE AND TRANSPORT

Given its high K_{oc} value and insolubility in water, carbazole will be tightly bound to soil and is unlikely to migrate to groundwater. Carbazole is not likely to volatilize from soil or water. Information regarding biodegradation of carbazole in the environment and bioconcentration of carbazole in aquatic organisms was not located.

HUMAN TOXICITY

Very little information is known regarding the toxicity of carbazole to humans and animals. An acute oral LD_{50} value of > 5000 mg/kg is reported for rats [1]. The lowest lethal reported dose in rats is 500 mg/kg [4]. Chronic oral RfD and inhalation RfC values are not available [4]. An oral slope factor and inhalation unit risk for cancer are also not available [4].

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DI-n-BUTYLPHTHALATE

CAS NUMBER

84-74-2

COMMON SYNONYMS

Butyl phthalate

ANALYTICAL CLASSIFICATION

Semivolatile-Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 8.7 to 13 mg/L at 20°C [1]
Vapor Pressure: 1.0×10^{-5} to 1.4×10^{-5} mm Hg at 25°C [1]
Henry's Law Constant: 2.8×10^{-7} 4.6×10^{-7} atm-m^3/mole [1]
Specific Gravity: 1.047 at 20/4°C [1]
Organic Carbon Partition Coefficient: 169,824 [1]

FATE DATA: HALF-LIVES

Soil: 2 to 23 days [2]
Air: 7.4 hours to 3.1 days [2]
Surface Water: 1 to 14 days [2]
Groundwater: 2 to 23 days [2]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Di-n-butylphthalate (DBP) is most commonly used as a plasticizer for epoxy resins and polyvinyl chloride (PVC). It is also used in carpet-back coatings, as a concrete additive, as an insect repellent, and can be found in cosmetics [3].

FATE AND TRANSPORT

DBP can be released into the environment through emissions and in wastewater during the manufacture, use, and burning of materials containing it. In water, it will adsorb moderately to particulates and sediment. Pollution in water affects biodegradation, with DBP disappearing more rapidly in moderately polluted water bodies. Biodegradation in soils is slow, and once spilled, it will moderately adsorb. When introduced to groundwater,

it will degrade under anaerobic conditions. Vapor phase DBP is subject to degradation through the reaction with photochemically produced hydroxyl radicals. [4]

HUMAN TOXICITY

General. There is no reliable information that DBP has caused adverse health effects in humans. The most serious health effects of this compound, as revealed by animal studies, are associated with its ability to interfere with normal reproduction [1]. The USEPA has placed DBP in weight-of-evidence Group D, indicating that it is not classifiable as to carcinogenicity [5].

Oral Exposure. A chronic RfD of 0.1 mg/kg/day is based on a NOAEL of 125 mg/kg/day and a LOAEL of 600 mg/kg/day for increased mortality in a rat subchronic to chronic oral bioassay [5]. Animal studies indicate that DBP is rapidly and extensively absorbed by the oral route. Absorption of up to 100% of an orally-administered dose was reported for rats. DBP is of low acute toxicity. The acute oral LD_{50} is reportedly in excess of 20,000 mg/kg. Developmental effects, as well as minor liver and kidney effects have been noted in animals following oral administration. Rats receiving 600 mg/kg/day or more while pregnant had an increased number of fetal resorptions. Pregnant rats receiving 1,000 mg/kg/day during gestation experienced complete reproductive failure. Oral exposure of male rats for 7 days at a dose of 1,000 mg/kg resulted in decreased testicular weight and decreased sperm count [1].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for DBP [5,6]. No reliable information was located regarding the absorption of DBP following inhalation exposure in either humans or animals. The health effects reportedly caused in animals following inhalation exposure were minor [1].

Dermal Exposure. DBP appears to be reasonably well absorbed at a slow, steady rate across the skin. The 90-day dermal LD_{50} for rabbits was reported to be greater than 4,200 mg/kg/day. Slight kidney damage was also noted at this dose rate. A NOAEL of 2,100 mg/kg/day was identified. In rabbits, a single dermal application of 520 mg/kg/day was reported to be slightly irritating to skin and "quite irritating" to mucous membranes [1].

ECOLOGICAL TOXICITY

General. Di-n-butylphthalate (DBP) is a member of the phthalate ester group. Most information found in the technical literature dealt with phthalate esters as a group. Autian [7] suggests there is evidence that phthalate esters are degraded by microbiota and metabolized by fish and animals. As a result, phthalate esters are not likely to biomagnify. DBP has a very low volatility, is strongly absorbed to soil, and has a high potential for bioaccumulation [8].

Vegetation. Arthur D. Little, Inc. [8] estimates that all (99.97 percent) DBP would be sorbed on soil. Corn plants showed decreased growth at 2,000 μg/g soil concentration, but no effects were reported at 200 μg/g [9]. Review of the technical literature did not produce any other information regarding the phytotoxic effects of DBP.

Aquatic Life. DBP is rapidly metabolize in fish reducing its capability to bioconcentrate. Invertebrates accumulated DBP up to 6,700 times when exposed to water concentrations ranging from 0.08 to 0.3 μg/L [10]. The USEPA [9] cited the 96-hour LC_{50} for aquatic organisms at 100-1,000 ppm. The 96-hour LC_{50} values are 1.3 ppm for fathead minnow, 0.73 ppm for bluegill, and greater than 10 ppm for crayfish [11]. Fathead minnow embryos did not survive exposure to 1.8 mg/L DBP. Hatching and larval survival were affected by exposure to 1.0 mg/L DBP, but not to 0.56 mg/L [11]. There are no USEPA chronic or acute aquatic life water quality criteria [12].

Wildlife. Tests show there is a low order of acute toxicity in experimental animals. Rats maintained for three generations on diets containing 300 to 500 mg/kg/day or for five generations on diets containing 100 mg/kg/day experienced no adverse effects [8]. The oral LD_{50} values are 1200 to 12,000 mg/kg body weight for rats, 5282 mg/kg for mice, and 1000 mg/kg for rabbits [13]. Mallard ducks fed a diet containing 10 mg/kg of DBP showed no significant accumulation after 5 months of continuous dietary exposure [11].

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DI-n-OCTYLPHTHALATE

CAS NUMBER

117-84-0

COMMON SYNONYMS

Dioctyl phthalate; Octyl phthalate

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.285 mg/L at 24°C [1]
Vapor Pressure: 1.2 mm Hg at 200°C [1]
Henry's Law Constant: 2.2 x 10^{-4} atm-m^3/mole [2]
Specific Gravity: 0.99 at 20/20°C [1]
Organic Carbon Partition Coefficient: 19,000 [2]

FATE DATA: HALF-LIVES

Soil: 7 days - 4 weeks [3]
Air: 4.5 hours - 1.9 days [3]
Surface Water: 7 days - 4 weeks [3]
Groundwater: 14 days - 1 year [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Emissions from the manufacture, recycling and processing of plastics; leaches from plastic tubing, containers, etc.; used as organic pump fluid [1].

FATE AND TRANSPORT

Given its high K_{oc} value, di-n-octylphthalate will strongly adsorb to soils and sediment and is unlikely to leach to groundwater. Di-n-octylphthalate will slowly biodegrade with acclimation. Some volatilization from environmental media will occur and aerobic biodegradation may be extensive. Di-n-octylphthalate will bioconcentrate in aquatic organisms, especially in species where little or no metabolism occurs. If released to air, di-n-octylphthalate will be primarily in aerosol form and will be subject to gravitational settling and photodegradation by hydroxy radicals [1,2].

HUMAN TOXICITY

General. Very little information is available regarding the toxicity of di-n-octylphthalate in humans or animals. There is no evidence that di-n-octylphthalate is mutagenic or carcinogenic in humans or animals. Di-n-octylphthalate has not been placed in a weight-of-evidence group by the USEPA [4].

Oral Exposure. A chronic oral RfD of 0.02 mg/kg/day is based on a LOAEL of 175 mg/kg/day for increased liver and kidney weight and increased SGOT and SGPT activity in a subchronic study in rats [5]. Di-n-octylphthalate is absorbed following oral exposure, but the extent of absorption is not known. An acute oral LD_{50} value of 6513 mg/kg was reported for mice [6]. It is not known if ingested di-n-octylphthalate is fatal to humans. There is no evidence that ingested di-n-octylphthalate causes reproductive or developmental effects in humans or animals, but teratogenic effects have been reported following intraperitoneal injection in animals [7]. An oral Slope Factor for cancer is not available for di-n-octylphthalate [4].

Inhalation Exposure. Information regarding effects resulting from the inhalation of di-n-octylphthalate have not been reported in humans or animals. Consequently, a chronic inhalation RfC and an inhalation Unit Risk for cancer are not available [4].

Dermal Exposure. Di-n-octylphthalate is a skin and eye irritant in animals [6].. Further information regarding toxic effects of di-n-octylphthalate following dermal exposure are not available.

ECOLOGICAL TOXICITY

General. Di-n-octylphthalate is one of the least studied phthalate esters. Most information found in the technical literature dealt with phthalate esters as a group. Autian [8] suggests there is evidence that phthalate esters are degraded by microbiota and metabolized by fish and animals. As a result, phthalate esters are not likely to bioconcentrate or biomagnify.

Vegetation. Review of the technical literature did not produce information regarding the phytotoxic effects of di-n-octylphthalate.

Aquatic Life. McCarthy and Whitmore [9] reported that exposure of embryos and larvae of fathead minnows to di-n-octylphthalate at concentrations as high as 10 mg/L did not affect survival of either life stage. Hatching, however, was significantly decreased at 10 mg/L but not at 3.2 mg/L. There are no USEPA aquatic life water quality criteria established for di-n-octylphthalate [10].

Wildlife. Review of the technical literature produced little information regarding toxicity of wildlife to di-n-octylphthalate. Sax [11] reported an oral LD_{50} for mice as 6,513 mg/kg.

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DIBENZOFURAN

CAS NUMBER

132-64-9

COMMON SYNONYMS

Diphenylene Oxide

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 10 mg/L at 25°C [1]
Vapor Pressure: 0.0044 mm Hg at 25°C [1]
Henry's Law Constant: 9.73 x 10^{-5} atm-m^3/mole [1]
Specific Gravity: 1.0886 at 99/4°C [1]
Organic Carbon Partition Coefficient: 4,600 - 6,350 [1]

FATE DATA: HALF-LIVES

Soil: 7 days to 4 weeks [2]
Air: 1.9 to 19 hours [2]
Surface Water: 7 days to 4 weeks [2]
Groundwater: 8.5 to 35 days [2]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Atmospheric emissions result from the combustion of coal, biomass, refuse and diesel fuel. Wastewater emissions from coal tar, coal gasification and shale oil operations [1].

FATE AND TRANSPORT

Dibenzofuran will have very low mobility in soil, and significant leaching is not expected. Dibenzofuran is biodegraded readily by microbes in the presence of sufficient oxygen. In low-oxygen environments, biodegradation may occur very slowly. If released to water, dibenzofuran may partition to sediments and suspended material. Volatilization from water may also be an important process. In the air, dibenzofuran will exist primarily in the gas phase where it will rapidly degrade by reaction with hydroxyl radicals. A small percentage of dibenzofuran in air will be in the particle phase. Removal from air may occur via both

dry and wet deposition. Significant bioconcentration of dibenzofuran in aquatic organisms is expected to occur [1]

HUMAN TOXICITY

No useful information was located regarding the toxicity of dibenzofuran in humans or animals following any route of exposure. The HEAST indicates that data for dibenzofuran are inadequate for quantitative risk assessment [3], but IRIS states that a chronic inhalation RfC for dibenzofuran is currently under review [4].

Dibenzofuran has been placed in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [3].

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DIETHYL PHTHALATE

CAS NUMBER

84-66-2

COMMON SYNONYMS

Diethyl phthalate; Ethyl phthalate

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 1,080 mg/L at 25°C [1]
Vapor Pressure: 1.65 x 10^{-3} mm Hg at 25°C [1]
Henry's Law Constant: 4.8 x 10^{-7} atm-m^3/mole [1]
Specific Gravity: 1.120 at 25/25°C [2]
Organic Carbon Partition Coefficient: 94 - 526 [1]

FATE DATA: HALF-LIVES

Soil: 3 days - 8 weeks [3]
Air: 21 hours - 8.8 days [3]
Surface Water: 3 days - 8 weeks [3]
Groundwater: 6 days - 16 weeks [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

It is primarily used as a plasticizer for cellulosic plastics. It has also been used as a fixative for perfumes, as a solvent to cellulose acetate in varnishes, and as an alcohol denaturant [4].

FATE AND TRANSPORT

DEP most often enters the environment through plastic materials containing DEP. Air, water, and soil are potential targets, with volatilization and leaching the primary routes of transport. When released to both soil and water, DEP biodegrades under aerobic conditions. Oxidation, chemical hydrolysis and volatilization are not expected to be important processes from wet soil. DEP may volatilize from dry soil. The Henry's Law Constant suggests volatilization may occur in shallow water bodies as opposed to deeper

water bodies. Bioaccumulation is not expected to be significant. When released to the atmosphere, the vapor form of DEP is emitted and adsorbs to airborne particles. Removal via particulate settling and precipitation is expected to occur [1].

HUMAN TOXICITY

General. Both the acute and chronic toxicity of DEP appear to be very low [4]. DEP is considered to be nonmutagenic and information regarding the carcinogenicity of DEP are not available [4]. DEP has been placed in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [5].

Oral Exposure. A chronic oral RfD of 0.8 mg/kg/day is based on a NOAEL of 750 mg/kg/day for decreased growth rate and food consumption, and altered organ weights in a subchronic study in rats [5]. DEP is absorbed following oral exposure, but the extent of absorption is not known. Acute oral LD_{50} values of 8600 mg/kg for rats and 6172 mg/kg for mice were reported [4]. Information regarding the short- or long-term effects of ingested DEP in humans is not available. Animal studies indicate that ingested DEP has low toxicity, with effects on growth and organ weights reported only at high doses [4,5]. There is no information regarding effects of ingested DEP on reproduction or development in humans or animals. Teratogenic effects were reported in animals, however, following intraperitoneal administration of DEP. An oral Slope Factor for cancer is not available for DEP [5].

Inhalation Exposure. A chronic inhalation RfC for DEP is not available [5]. It is not known if DEP is absorbed following inhalation exposure because the only reported effects observed following inhalation exposure are portal-of-entry effects (respiratory system effects) [4,6]. An acute inhalation LC_{50} value of 7510 mg/m^3 was reported for rats [4]. Inhaled DEP has not been reported to be fatal to humans. Exposure to heated vapors of DEP may result in transient irritation of the nose and throat [6]. Other reported symptoms of toxicity include conjunctivitis, corneal necrosis, respiratory tract irritation, dizziness, nausea and eczema [6]. There is no information regarding effects of inhaled DEP on reproduction or development in humans or animals. Teratogenic effects were reported, however, in animals following intraperitoneal administration of DEP. An inhalation Unit Risk for cancer is not available for DEP [5].

Dermal Exposure. An acute dermal LD_{50} value of 3000 mg/kg was reported for guinea pigs [4]. No other useful information was located regarding effects in humans or animals following dermal exposure to DEP.

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2,4-DIMETHYLPHENOL

CAS NUMBER

105-67-9

COMMON SYNONYMS

m-Xylenol

ANALYTICAL CLASSIFICATION

Semi-volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 6200 mg/L at 25°C [1]
Vapor Pressure: 0.098 mm Hg at 25°C [1]
Henry's Law Constant: 6.3 x 10^{-7} atm-m^3/mole at 8°C [1]
Specific Gravity: 1.036 at 20/4°C [2]
Organic Carbon Partition Coefficient: 425 [1]

FATE DATA: HALF-LIVES

Soil: 1 - 7 days [3]
Air: 1.19 - 11.9 hours [3]
Surface Water: 1 - 7 days [3]
Groundwater: 2 - 14 days [3]

NATURAL SOURCES

Coal; tea; tobacco; marijuana; and Siberian pines [1]

ARTIFICIAL SOURCES

Coal processing/refining; manufacture of plastics, resins, pharmaceuticals, insecticides, fungicides, disinfectants, solvents, etc; asphalt and roadway runoff; domestic sewage; gasoline and diesel exhausts; and tobacco smoke [1]

FATE AND TRANSPORT

When released in water, 2,4-dimethylphenol will degrade principally due to biological action (with a half-life of hours to days). Photolysis may occur in clear surface waters, while oxidation by alkyl peroxy radicals may be important in humic waters. Because of the low Henry's Law constant, volatilization from water would not be a significant transport process. A low log bioconcentration factor (1.18) indicates a low potential for bioconcentration in aquatic organisms. 2,4-Dimethylphenol will adsorb moderately to

soils, and will biodegrade in several days. Releases to the atmosphere involve the reaction of vapor-phase 2,4-dimethylphenol with photochemically-produced hydroxyl radicals (daylight) or nitrate radicals (nighttime); atmospheric washout, via rainfall, is also an effective removal process [1].

HUMAN TOXICITY

General. Information regarding the toxicity of 2,4-dimethylphenol is limited to two short-term oral studies in mice [4] and an oral LD_{50} study in rats [5]. There is no information regarding the potential effects of 2,4-dimethylphenol on reproduction, development or cancer following any route of exposure. 2,4-Dimethylphenol has not been placed in a weight-of-evidence cancer group by the USEPA [4].

Oral Exposure. A chronic oral RfD of 0.02 mg/kg/day is based on a NOAEL of 50 mg/kg/day for clinical signs (lethargy, prostration, ataxia) and hematological changes in a subchronic study in mice [4]. 2,4-Dimethylphenol is absorbed following oral exposure, but the extent of absorption is not known. An acute oral LD_{50} of 3200 mg/kg is reported for rats [5]. Ingested 2,4-dimethylphenol has not been reported to be fatal to humans. Two short-term (14 day and 90 day) studies in rats reported clinical effects (described above) at 250 mg/kg/day [4]. In the 90-day study, hematological effects (lower mean red blood cell volume and hemoglobin) were also reported at 250 mg/kg/day [4]. An oral Slope Factor for cancer is not available for 2,4-dimethylphenol [4].

Inhalation Exposure. No useful information was located regarding inhalation exposure to 2,4-dimethylphenol in humans or animals.

Dermal Exposure. 2,4-Dimethylphenol appears to be a cocarcinogen following dermal exposure [6]. Its role as a primary carcinogen is not clear.

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NAPHTHALENE
2-METHYLNAPHTHALENE

GENERAL

There is relatively little information available on 2-methylnaphthalene as compared to naphthalene. Therefore, all information below refers to naphthalene unless explicitly stated otherwise.

CAS NUMBERS

Naphthalene	91-20-3
2-Methylnaphthalene	91-57-6

COMMON SYNONYMS

Naphthalene: Naphthene, Tar Camphor.
2-Methylnaphthalene: Beta-methylnaphthalene

ANALYTICAL CLASSIFICATION

Semi-Volatile Organic.

PHYSICAL AND CHEMICAL DATA

	Naphthalene	2-Methylnaphthalene
Water Solubility (mg/L at 20°C) [1]	31.7	ND
Vapor Pressure (mm Hg at 25°C) [1]	0.087	ND
Henry's Law Constant (atm-m^3/mole) [1]	4.6×10^{-4}	ND
Specific Gravity (20/4°C) [1]	1.145	1.0058
Organic Carbon Partition Coefficient [1]	933	ND

FATE DATA: HALF-LIVES (HRS)

Soil: 16.6 to 48 days [2]
Air: 2.96 to 29.6 hours [2]
Surface Water: 12 hours to 20 days [2]
Groundwater: 1 to 288 days [2]

NATURAL SOURCES

Crude oil; natural, uncontrolled combustion (i.e., forest fires) [3,4].

ARTIFICIAL SOURCES

Naphthalene: Petroleum refining, mothball use and manufacture, coal tar distillation, pitch fumes, chemical intermediate (i.e., phthalic anhydride manufacture), vehicle emissions, combustion processes (i.e., refuse combustion), tobacco smoke, and oil spillage [3,4].

2-Methylnaphthalene: Synthesis of organic compounds such as insecticides, and release from gasoline due to its use as an additive [1,5].

FATE AND TRANSPORT

Naphthalene's sorption to soil ranges from low to moderate, depending upon the organic carbon content of the soil, and will leach rapidly through sandy soils. Volatilization from the uppermost soil layer will be important, but will lessen in importance with soil depth. In addition, volatilization from moisture-saturated soil is not expected to be important. Biodegradation is expected to be rapid in soils previously contacted with other polycyclic aromatic hydrocarbons (PAHs), but slow in "virgin" soils [3].

Volatilization, photolysis, sorption (to suspended solids, sediments, etc.), and biodegradation are the primary removal mechanisms for naphthalene in waters. The actual predominant mechanisms change with variations in several factors (i.e., water flow rate, level of sediments/suspended soils, water clarity, etc.) In addition, biodegradation rates of naphthalene in water vary with changes in concentration of naphthalene (higher concentrations yield higher rates), "virgin" versus oil-polluted water (quicker in oil-polluted waters), actual pollution site (more rapid biodegradation in sediments than waters), aerobic versus anaerobic conditions (no biodegradation in anaerobic conditions), and so on. Bioconcentration in aquatic organisms is expected to be moderate, except for accelerated bioconcentration in organisms lacking an aryl hydroxylase enzyme system (i.e. phytoplankton, snails, mussels). Naphthalene in the atmosphere reacts during daylight hours with hydroxyl radicals, and during nighttime hours with nitrate radicals. Photolysis is also expected in the atmosphere [3].

HUMAN TOXICITY

General. The breakdown of red blood cells is the primary health concern for humans exposed to naphthalene. Human deaths following ingestion have occurred [1]. The USEPA has placed naphthalene in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [6]. The USEPA does not currently provide any toxicity values for 2-methylnaphthalene [7,8].

Oral Exposure. Both the chronic and subchronic RfDs for naphthalene of 0.04 mg/kg/day are based on a NOEL of 50 mg/kg/day for decreased body weight observed in a subchronic oral (gavage) study in rats [7]. Clinical evidence indicates that naphthalene is absorbed by

humans in significant quantities via the oral route. The oral LD_{50} reported for naphthalene in rats ranges from 2,200 to 2,400 mg/kg in rats [1]. The oral LD_{50} reported for 2-methylnaphthalene in rats is 1,630 mg/kg [5]. Lethal doses of naphthalene in humans have ranged from as low as 74 mg/kg to as high as 574 mg/kg [1,8]. Ocular damage has been documented in humans and animals following oral exposure [1]. Symptoms of intoxication include: nausea, vomiting, headache, diaphoresis, hematuria, hemolytic anemia, fever, central nervous system depression, hepatic necrosis, jaundice, convulsions, and coma [1,2,9]. Administration of 300 mg/kg/day to pregnant mice resulted in a decrease in the number of live pups per litter [1].

Inhalation Exposure. An inhalation RfC was not reported for naphthalene [6,7]. Clinical reports suggest that inhaled naphthalene may be absorbed in sufficient quantity to produce adverse health effects in humans; however, no quantitative absorption data were located for humans or animals. One study, on rats, reported a NOAEL of 78 ppm for a 4-hour exposure. Symptoms and effects of inhalation exposure in humans include: headache, nausea, vomiting, abdominal pain, malaise, confusion, anemia, jaundice, and renal disease. No information was found regarding developmental and reproductive effects [1].

Dermal Exposure. Limited evidence in human infants indicated that hemolytic anemia may have resulted from dermal exposure to an unknown quantity of naphthalene. A NOAEL of 2,500 mg/kg was reported for rats. Naphthalene is a mild dermal and ocular irritant [1].

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2-METHYLPHENOL

CAS NUMBER

95-48-7

COMMON SYNONYMS

o-Cresol, 2-Cresol

ANALYTICAL CLASSIFICATION

Semi-volatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 30,800 mg/L at 40°C [1]
Vapor Pressure: 0.31 mm Hg at 25°C [1]
Henry's Law Constant: 1.6 x 10^{-6} atm-m^3/mol [1]
Specific Gravity: 1.047 at 20/4°C [2]
Organic Carbon Partition Coefficient: 18 - 22 [1]

FATE DATA: HALF-LIVES

Soil: 1 - 7 days [3]
Air: 1.6 - 16 hours [3]
Surface Water: 1 - 7 days [3]
Groundwater: 2 - 14 days [3]

NATURAL SOURCES

Petroleum; soil; wood; and volcanic activities/surroundings [1,2]

ARTIFICIAL SOURCES

Disinfectant; solvent; coal tar/petroleum refining; organic chemicals, plastics, and resins manufacture; ore floatation and textile scouring agent; wood pulping emissions; tobacco smoke; auto/diesel exhaust; sewage; and toluene photo-oxidation [1,2].

FATE AND TRANSPORT

2-Methylphenol should be relatively mobile in most soils, given its low K_{oc} value. An exception to this predicted pattern appears to occur where soils have high values for iron oxide concentration and pH. Adsorptivity increases in these soils due to increased hydrogen-bonding and oxidation reactions. 2-Methylphenol will readily biodegrade in soils (acclimation is frequently necessary) [1].

Biodegredation of 2-methylphenol will proceed rapidly in surface waters and groundwaters. In surface layers of oligotrophic waters, photolysis may be an important fate process. With a low vapor pressure value and a low Henry's Law constant, volatilization from soils and waters is considered unimportant. Bioconcentration is expected to be insignificant. Atmospheric 2-methylphenol undergoes ring addition reactions with hydroxyl radicals during daylight, and nighttime reactions with nitrate radicals. Hydrolysis reactions are expected to be insignificant, but photolytic reactions occur in the atmosphere. In addition, oxidation reactions may occur in urban rainwater and fog [1].

HUMAN TOXICITY

General. 2-Methylphenol is one of three methylphenol isomers (2-methylphenol, 3-methylphenol, and 4-methylphenol) that are often found as a mixture. The major effects of 2-methylphenol exposure are irritation of the skin, eyes, mouth and throat, and gastrointestinal distress (abdominal pain, vomiting) [4]. Information regarding the genotoxicity of 2-methylphenol are equivocal. 2-Methylphenol has been placed in weight-of-evidence cancer Group C, indicating that it is a possible human carcinogen [5].

Oral Exposure. A chronic oral RfD of 0.05 mg/kg/day is based on a NOAEL of 50 mg/kg/day for decreased body weight and neurotoxicity in a subchronic study in rats [5]. 2-Methylphenol is readily absorbed following oral exposure. An acute oral LD_{50} value of 1350 mg/kg was reported for rats [4]. In humans, ingestion of a mixture of methylphenol isomers (in the form of Lysol) has been fatal with an estimated lethal dose of approximately 2000 mg/kg [4]. Symptoms of acute poisoning include throat and mouth burns, abdominal pain, vomiting, hematological effects (methemoglobin formation, intravascular hemolysis), renal toxicity and coma [4]. There is no information regarding effects in humans following long-term oral exposure to 2-methylphenol. Repeated oral exposure of animals has resulted in decreased body weight gain and neurological effects (coma, tremors, convulsions) [4]. Information regarding the potential effects of ingested 2-methylphenol on human reproduction and development were not located, and animal studies suggested that 2-methylphenol is mildly fetotoxic, but only at doses that produce maternal toxicity [4]. There is no evidence that 2-methylphenol is carcinogenic in humans or animals following oral exposure, therefore, an oral Slope Factor is not available [5].

Inhalation Exposure. Due to insufficient data, a chronic inhalation RfC for 2-methylphenol is considered non-verifiable by the USEPA [5]. 2-Methylphenol is absorbed following inhalation exposure, but the extent of absorption is not known. Inhaled 2-methylphenol has not been reported to be fatal to humans and acute inhalation LC_{50} values in animals are not available. Inhaled 2-methylphenol is a respiratory irritant in humans, with dryness, nasal constriction and throat irritation reported following brief exposure to 6 mg/m^3 [4]. The minimal exposure concentration associated with irritation is not known. In animals,

inhalation exposure resulted in respiratory irritation and effects on the nervous system (mild nervous excitation, muscle twitching, general fatigue, convulsions) [4]. There is no information regarding effects on reproduction, development or cancer in humans or animals following inhalation exposure to 2-methylphenol. An inhalation Unit Risk for cancer is not available [5].

Dermal Exposure. An acute dermal LD_{50} value of 890 mg/kg is reported for rabbits [4]. Dermal exposure of humans to methylphenols has been reported to be fatal. In one of the fatal cases, the lethal dose was estimated at 820 mg/kg [4]. Methylphenols are strong skin irritants in both humans and animals with corrosive, irreversible damage being reported. Neurological effects, including coma, swelling of the brain and facial paralysis, have been reported following dermal exposure of humans to methylphenols. The exposure dose resulting in the effects is not known. 2-Methylphenol has not been evaluated for its ability to produce cancer following dermal exposure, but a cancer-promotion study indicates that all three methylphenol isomers may be tumor promoters [4].

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4-METHYLPHENOL

CAS NUMBER

106-44-5

COMMON SYNONYMS

p-Cresol; 4-Cresol; 4-Hydroxytoluene; p-Methylphenol

ANALYTICAL CLASSIFICATION

Semi-Volatile

PHYSICAL AND CHEMICAL DATA

Water Solubility: 22.6 g/L at 40°C [1]
Vapor Pressure: 0.13 mm Hg at 25°C [1]
Henry's Law Constant: 9.6×10^{-7} atm-m^3/mole [1]
Specific Gravity: 1.0347 at 20/4°C [2]
Organic Carbon Partition Coefficient: 49 to 3420 [1]

FATE DATA: HALF-LIVES

Soil: 1 to 16 hours [3]
Air: 1.5 to 15 hours [3]
Surface Water: 1 to 16 hours [3]
Groundwater: 2 to 672 hours [3]

NATURAL SOURCES

Plant volatile. Methylphenols also occur in petroleum [1].

ARTIFICIAL SOURCES

When released into the environment, 4-methylphenol is most commonly associated with wastewater and emissions from its production in coal tar refining and its use as a disinfectant, as well as metal refining and chemical manufacturing. Emissions from autos and diesel engines, wood pulping, brewing, glass fibre manufacture, and tobacco smoke are sources of 4-methylphenol. The photooxidation of toluene will also produce 4-methylphenol [1].

FATE AND TRANSPORT

When released to water, biodegradation is expected to be the dominant loss mechanism. Volatilization of this chemical from water will be low. In soils, it is relatively mobile, and therefore can be expected to leach into groundwater. Biodegradation is rapid in soils,

sewage, activated sludge, and freshwater inocula. In the atmosphere, it will react with hydroxyl radical during daylight hours and with nitrate radicals at night. Being a highly soluble chemical in water, it will be scavenged from the atmosphere by rain [1].

HUMAN TOXICITY

General. 4-Methylphenol is one of three methylphenol isomers (2-methylphenol, 3-methylphenol, 4-methylphenol) that are often found as a mixture. The major effects of 4-methylphenol are irritation of the skin, eyes, mouth and throat, and gastrointestinal distress (abdominal pain, vomiting) [4]. Information regarding the genotoxicity of 4-methylphenol are equivocal. 4-Methylphenol has been placed in weight-of-evidence Group C, indicating that it is a possible human carcinogen [5].

Oral Exposure. A chronic oral RfD of 0.05 mg/kg/day is based on a NOAEL of 50 mg/kg/day for decreased body weight and neurotoxicity in a subchronic study in rats [6]. 4-Methylphenol is readily absorbed following oral exposure. An acute oral LD_{50} value of 1800 mg/kg was reported for rats [4]. In humans, ingestion of a mixture of methylphenol isomers (in the form of Lysol cleaner) has been fatal with an estimated lethal dose of approximately 2000 mg/kg [4]. Symptoms of acute poisoning include throat and mouth burns, abdominal pain, vomiting, hematological effects (methemoglobin formation, intravascular hemolysis), renal toxicity and coma [4]. There is no information regarding effects in humans following long-term oral exposure to 4-methylphenol. Repeated oral exposure of animals to 4-methylphenol has resulted in decreased body weight gain and neurological effects (coma, tremors, convulsions) [4]. Information regarding the potential effects of ingested 4-methylphenol on human reproduction and development were not located, and animal studies suggest that 4-methylphenol is mildly fetotoxic, but only at doses that produce maternal toxicity [4]. There is no evidence that 4-methylphenol is carcinogenic in humans following oral exposure, but one animal study suggests 4-methylphenol may act as a promoter of forestomach carcinogenesis in hamsters [4]. An oral Slope Factor for cancer is not available for 4-methylphenol [5].

Inhalation Exposure. A chronic inhalation RfC for 4-methylphenol is considered non-verifiable by the USEPA [5]. 4-Methylphenol is absorbed following inhalation exposure, but the extent of absorption is not known. Inhaled 4-methylphenol has not been reported to be fatal to humans and acute inhalation LC_{50} values in animals are not available. Information regarding toxic effects of inhaled 4-methylphenol in humans are not available, but the isomer 2-methylphenol is a respiratory irritant in humans [4]. There is no information regarding effects on reproduction, development or cancer in humans or animals following inhalation exposure to 4-methylphenol. Consequently, an inhalation Unit Risk for cancer is not available for 4-methylphenol [5].

Dermal Exposure. An acute dermal LD_{50} value of 300 mg/kg is reported for rabbits [4]. Dermal exposure of humans to methylphenols has been reported to be fatal. In one of the fatal cases, the lethal dose was estimated at 820 mg/kg [4]. Methylphenols are strong skin irritants in both humans and animals with corrosive, irreversible damage being reported. Neurological effects, including coma, swelling of the brain and facial paralysis, have been reported following dermal exposure of humans to methylphenols. The exposure dose resulting in the effects is not known. 4-Methylphenol has not been evaluated for its ability to produce cancer following dermal exposure, but a cancer-promotion study indicates that all three methylphenol isomers may be tumor promoters [4].

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NAPHTHALENE
2-METHYLNAPHTHALENE

GENERAL

There is relatively little information available on 2-methylnaphthalene as compared to naphthalene. Therefore, all information below refers to naphthalene unless explicitly stated otherwise.

CAS NUMBERS

Naphthalene	91-20-3
2-Methylnaphthalene	91-57-6

COMMON SYNONYMS

Naphthalene: Naphthene, Tar Camphor.
2-Methylnaphthalene: Beta-methylnaphthalene

ANALYTICAL CLASSIFICATION

Semi-Volatile Organic.

PHYSICAL AND CHEMICAL DATA

	Naphthalene	2-Methylnaphthalene
Water Solubility (mg/L at 20°C) [1]	31.7	ND
Vapor Pressure (mm Hg at 25°C) [1]	0.087	ND
Henry's Law Constant (atm-m^3/mole) [1]	4.6×10^{-4}	ND
Specific Gravity (20/4°C) [1]	1.145	1.0058
Organic Carbon Partition Coefficient [1]	933	ND

FATE DATA: HALF-LIVES (HRS)

Soil: 16.6 to 48 days [2]
Air: 2.96 to 29.6 hours [2]
Surface Water: 12 hours to 20 days [2]
Groundwater: 1 to 288 days [2]

NATURAL SOURCES

Crude oil; natural, uncontrolled combustion (i.e., forest fires) [3,4].

ARTIFICIAL SOURCES

Naphthalene: Petroleum refining, mothball use and manufacture, coal tar distillation, pitch fumes, chemical intermediate (i.e., phthalic anhydride manufacture), vehicle emissions, combustion processes (i.e., refuse combustion), tobacco smoke, and oil spillage [3,4].

2-Methylnaphthalene: Synthesis of organic compounds such as insecticides, and release from gasoline due to its use as an additive [1,5].

FATE AND TRANSPORT

Naphthalene's sorption to soil ranges from low to moderate, depending upon the organic carbon content of the soil, and will leach rapidly through sandy soils. Volatilization from the uppermost soil layer will be important, but will lessen in importance with soil depth. In addition, volatilization from moisture-saturated soil is not expected to be important. Biodegradation is expected to be rapid in soils previously contacted with other polycyclic aromatic hydrocarbons (PAHs), but slow in "virgin" soils [3].

Volatilization, photolysis, sorption (to suspended solids, sediments, etc.), and biodegradation are the primary removal mechanisms for naphthalene in waters. The actual predominant mechanisms change with variations in several factors (i.e., water flow rate, level of sediments/suspended soils, water clarity, etc.) In addition, biodegradation rates of naphthalene in water vary with changes in concentration of naphthalene (higher concentrations yield higher rates), "virgin" versus oil-polluted water (quicker in oil-polluted waters), actual pollution site (more rapid biodegradation in sediments than waters), aerobic versus anaerobic conditions (no biodegradation in anaerobic conditions), and so on. Bioconcentration in aquatic organisms is expected to be moderate, except for accelerated bioconcentration in organisms lacking an aryl hydroxylase enzyme system (i.e. phytoplankton, snails, mussels). Naphthalene in the atmosphere reacts during daylight hours with hydroxyl radicals, and during nighttime hours with nitrate radicals. Photolysis is also expected in the atmosphere [3].

HUMAN TOXICITY

General. The breakdown of red blood cells is the primary health concern for humans exposed to naphthalene. Human deaths following ingestion have occurred [1]. The USEPA has placed naphthalene in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [6]. The USEPA does not currently provide any toxicity values for 2-methylnaphthalene [7,8].

Oral Exposure. Both the chronic and subchronic RfDs for naphthalene of 0.04 mg/kg/day are based on a NOEL of 50 mg/kg/day for decreased body weight observed in a subchronic oral (gavage) study in rats [7]. Clinical evidence indicates that naphthalene is absorbed by

humans in significant quantities via the oral route. The oral LD_{50} reported for naphthalene in rats ranges from 2,200 to 2,400 mg/kg in rats [1]. The oral LD_{50} reported for 2-methylnaphthalene in rats is 1,630 mg/kg [5]. Lethal doses of naphthalene in humans have ranged from as low as 74 mg/kg to as high as 574 mg/kg [1,8]. Ocular damage has been documented in humans and animals following oral exposure [1]. Symptoms of intoxication include: nausea, vomiting, headache, diaphoresis, hematuria, hemolytic anemia, fever, central nervous system depression, hepatic necrosis, jaundice, convulsions, and coma [1,2,9]. Administration of 300 mg/kg/day to pregnant mice resulted in a decrease in the number of live pups per litter [1].

Inhalation Exposure. An inhalation RfC was not reported for naphthalene [6,7]. Clinical reports suggest that inhaled naphthalene may be absorbed in sufficient quantity to produce adverse health effects in humans; however, no quantitative absorption data were located for humans or animals. One study, on rats, reported a NOAEL of 78 ppm for a 4-hour exposure. Symptoms and effects of inhalation exposure in humans include: headache, nausea, vomiting, abdominal pain, malaise, confusion, anemia, jaundice, and renal disease. No information was found regarding developmental and reproductive effects [1].

Dermal Exposure. Limited evidence in human infants indicated that hemolytic anemia may have resulted from dermal exposure to an unknown quantity of naphthalene. A NOAEL of 2,500 mg/kg was reported for rats. Naphthalene is a mild dermal and ocular irritant [1].

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N-NITROSODIPHENYLAMINE

CAS NUMBER

86-30-6

COMMON SYNONYMS

Diphenyl-N-nitrosoamine, Diphenylnitrosamine, NDPA

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 113 mg/L at 25°C [1]
Vapor Pressure: 6.30 x 10^{-4} mm Hg at 25°C [1]
Henry's Law Constant: 1.40 x 10^{-6} atm-m^3/mole [1]
Specific Gravity: ND
Organic Carbon Partition Coefficient: 650 [2]

FATE DATA: HALF-LIVES

Soil: 10 to 34 days [3]
Air: 0.70 to 7.0 hours [3]
Surface Water: 10 to 34 days [3]
Groundwater: 20 to 68 days [3]

NATURAL SOURCES

Found in a wide variety of foods such as cured meats, beer, some cheeses, nonfat dry milk, and sometimes in fish. [1]

ARTIFICIAL SOURCES

It is primarily used as an intermediate in the manufacture of para-nitrosodiphenylamine, and as a rubber-processing chemical. It can also be utilized in pesticide manufacturing. [1]

FATE AND TRANSPORT

In soils, the mobility of NDPA is dependent on the extent of sorption on soil particles. Given the K_{oc} of 650, the potential for sorption to soils is significant. Volatilization from near-surface soils may also be important. Groundwater underlying NDPA-contaminated soils with a low organic content has the potential to become contaminated. Given the low Henry's Law constant, volatilization of NDPA from water is not likely to be significant. NDPA released to the air will undergo photochemical oxidation or direct photolysis [1]

HUMAN TOXICITY

General. Information regarding the toxicity of NDPA are limited, but suggest that the major target of toxicity is the urinary bladder [2]. Data regarding the mutagenicity of NDPA are equivocal [2,3]. The USEPA has placed NDPA in weight-of-evidence cancer Group B2, indicating that it is a probable human carcinogen [4].

Oral Exposure. A chronic oral RfD is not available for NDPA [4]. NDPA is absorbed following oral exposure, but the extent of absorption is not known. Acute oral LD_{50} values of 1650 to 3850 mg/kg and 3850 mg/kg have been reported for rats and mice, respectively [2,3]. NDPA has not been reported to be fatal to humans and information regarding effects in humans following oral exposure is not available. Studies in animals reported effects on the urinary bladder (inflammation, hyperplasia of the epithelium, cancer) and decreased body weight [2]. There is no information regarding the effects of ingested NDPA on reproduction or development. An oral Slope Factor 0.0049 $(mg/kg/day)^{-1}$ is based on the increased incidence of bladder tumors in rats [4].

Inhalation Exposure. No useful information was located regarding inhalation exposure to NDPA in humans or animals. Consequently, neither an inhalation RfC nor an inhalation Unit Risk for cancer are available [4].

Dermal Exposure. No useful information was located regarding dermal exposure to NDPA in humans or animals.

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PENTACHLOROPHENOL

CAS NUMBER

87-86-5

COMMON SYNONYMS

PCP; Penchlorol

ANALYTICAL CLASSIFICATION

Pesticide (organic).

PHYSICAL AND CHEMICAL DATA

Water Solubility: 14 mg/L at 20°C [1]
Vapor Pressure: 1.10×10^{-4} mm Hg at 25°C [1]
Henry's Law Constant: 2.75×10^{-6} atm-m^3/mole [1]
Specific Gravity: 1.978 at 22/4°C [2]
Organic Carbon Partition Coefficient: 1000 - 4000 [1]

FATE DATA: HALF-LIVES

Soil: 23 - 178 days [3]
Air: 5.8 - 58 days [3]
Surface Water: 1 hour - 4.6 days [3]
Groundwater: 46 days - 4.2 years [3]

NATURAL SOURCES

Fungus metabolism [1].

ARTIFICIAL SOURCES

Wood preservative; fungicide; bactericide; algicide; herbicide [1].

FATE AND TRANSPORT

Given its high K_{oc} value, pentachlorophenol will adsorb to soils, with stronger adsorption occurring under acid conditions. In soils, slow biodegradation and leaching into groundwater will occur. Biodegredation of pentachlorophenol appears to become significant after a period of acclimation. In soils, biodegredation appears more thorough under anaerobic conditions, yielding byproducts such as pentachloroamisole and tri-/tetrachlorophenols (as well as 2,3,7,8-tetrachlorophenol and carbon dioxide, in estuarine sediment). Photolysis does not readily occur in soils, but will occur with dissociated pentachlorophenol (which occurs at ambient pH levels) to a significant degree. Given the

tendency of pentachlorophenol to dissociate in acidic soils, leaching to unprotected groundwater is possible. Hydrolysis and oxidation do not appear to be significant loss mechanisms in either soils or waters. Volatilization from soils and water may occur, but is not predicted to be significant. Bioconcentration of this material in aquatic organisms is expected, but is dependant upon pH levels of the aquatic environment (since pentachlorophenol will be dissociated at higher pH levels) [1].

Atmospheric pentachlorophenol may be found in the vapor phase or adsorbed to particulate matter. Vapor-phase pentachlorophenol undergoes photolysis and, to a lesser extent, hydroxyl-radical reaction. Particulate adsorbed complexes are subject to gravitational deposition [1].

HUMAN TOXICITY

General. The major targets of pentachlorophenol toxicity are the liver and kidneys [4]. Information regarding the genotoxicity of pentachlorophenol are equivocal [4]. The USEPA has placed pentachlorophenol in weight-of-evidence cancer Group B2, indicating that it is a probable human carcinogen [5].

Oral Exposure. The chronic oral RfD of 0.03 mg/kg/day is based on a NOAEL of 3 mg/kg/day for liver and kidney effects in a chronic study in rats [5]. Pentachlorophenol is readily absorbed following oral exposure. Acute oral LD_{50} values in animals ranged from 27 to 230 mg/kg in rats and 117 to 134 mg/kg in mice [4]. The lowest lethal dose of pentachlorophenol in humans is estimated at 1 gram (14 mg/kg) [4]. Limited data in humans indicate that pentachlorophenol is a neurotoxin. Neurological effects result from the ability of pentachlorophenol to disrupt biochemical pathways, and not from direct effects on the nervous system [4]. Studies in animals indicate that oral exposure results in effects on the liver, kidneys and blood at doses greater than 2.5 mg/kg/day [4]. Data in animals suggest that pentachlorophenol is not teratogenic (causing birth defects), but may be toxic to both the fetus and the mother [4]. There is no evidence that pentachlorophenol causes cancer in humans, but studies in animals suggest that oral exposure results in cancer of the liver and blood vessels [4]. An oral slope factor of 0.12 $(mg/kg/day)^{-1}$ is based on the incidence of cancer of the liver and blood vessels in rodents [5].

Inhalation Exposure. A chronic inhalation RfC for pentachlorophenol is currently under review by the USEPA [5]. Inhalation LC_{50} values in rats ranged from 1.2 ppm (45 minutes) to 31 ppm (exposure time not specified) [4]. Based on animal studies, NIOSH determined that a concentration of 14 ppm is immediately dangerous to human life and health [4]. Inhalation of 0.09 ppm has resulted in irritation to the eyes and nose [4]. Inhaled pentachlorophenol has not been shown to cause effects on reproduction or

development or to cause cancer in humans or animals [4]. An inhalation unit risk for cancer is not available for pentachlorophenol [5].

Dermal Exposure. Exposure in the workplace or misuse of pentachlorophenol-containing products in the home are the most likely methods of exposure. The primary route of exposure in these cases is dermal, although inhalation probably also occurs. Effects on the respiratory tract (congestion, edema), blood (anemia), liver (enlarged liver, degeneration), kidneys (dysfunction), and skin (skin eruptions) have been reported following occupational exposure, but the exposure concentration is not known [4]. Neurological effects have also been observed, but these effects probably result from the ability of pentachlorophenol to disrupt biochemical pathways, and not from direct effects on the nervous system [4].

ECOLOGICAL TOXICITY

General. Pentachlorophenol and its sodium salt (sodium pentachlorophenate) are among the mostly widely used pesticides and wood preservative in the United States. Both compounds have the same toxic effects, but different solubilities [6]. Pentachlorophenol will bioconcentrate because of its low water solubility, but the BCF will be dependent upon the pH [7]. With water pH of 7.3, the photodegradation of ionized pentachlorophenol was completed in 20 hours [6]. No information on biomagnification was available in the technical literature.

Vegetation. Pentachlorophenol is strongly phytotoxic [6]. It has a tendency to adsorb to soil and sediment. Adsorption to soil and sediment appears to be pH dependent, and is stronger under acid conditions [8]. According to Eisler [9], terrestrial plants were adversely affected by pentachlorophenol at 0.3 mg/L. Micromedex, Inc. [8] gives its toxicity to aquatic plants at 0.001 ppm.

Aquatic Life. Increasing pH of the water column decreases the hazard of pentachlorophenol to aquatic biota. Pentachlorophenol is rapidly accumulated and rapidly excreted, and has little tendency to persist in living organisms. It also is readily degraded in the environment by chemical, microbiological, and photochemical processes [9]. Adverse effects on growth, survival, and reproduction of sensitive species of aquatic organisms occurred at concentrations of 8 to 80 μg/L for algae and macrophytes, 3 to 100 μg/L for invertebrates, and <1 to 68 μg/L for fish [9]. The accumulation of pentachlorophenol in fish is rapid and primarily by direct uptake from water rather than through the food chain or diet. Fish can bioconcentrate pentachlorophenol from water up to 10,000 times [9], but the half-life in fish tissues is less than 24 hours. The mean acute LC_{50}s values are 63.1 μg/L for fathead minnow and 65.5 μg/L for goldfish. The mean value is derived because the toxicity of pentachlorophenol varies with pH [10]. Micromedex, Inc. [8] reported a 96-hour LC_{50} for bluegill at 32 μg/L. Eisler [9]

proposed pentachlorophenol criteria for protection of aquatic biota. For freshwater life, the acute criterion was 48 to <55 μg/L, and the chronic criterion was <3.2 μg/L. For warmwater fish, the criterion was 10 to <15 μg/L. The USEPA acute and chronic aquatic life water quality criteria for pentachlorophenol are 20 μg/L and 13 μg/L, respectively, based on a pH of 7.8 [11].

Wildlife. Eisler [9] reported pentachlorophenol killed various species of birds at single oral doses of 380 to 504 mg/kg body weight, at dietary concentrations of 3,850 mg/kg ration fed over a 5-day period, and when nesting materials contained >285 mg/kg. The acute oral LD_{50} for mallards is 380 mg/kg body weight, for rabbits 100 to 130 mg/kg body weight, and for mice is 65 to 252 mg/kg body weight [9]. Sax [12] gives the oral LD_{50} for rats at 50 mg/kg and hamsters at 168 mg/kg. Eisler [9] proposed pentachlorophenol criteria for the protection of wildlife. For bird diets, the recommended criteria were <1.0 mg/kg to avoid adverse effects and $>3,850$ mg/kg for fatal effects. In a study on rats, 3 to 10 mg/kg body weight produced no adverse effects [9].

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PHENOL

CAS NUMBER

108-95-2

COMMON SYNONYMS

Hydroxybenzene

ANALYTICAL CLASSIFICATION

Semivolatile Organic

PHYSICAL AND CHEMICAL DATA

Water Solubility: 87,000 mg/L at 25°C [1]
Vapor Pressure: 0.524 mm Hg at 25°C [1]
Henry's Law Constant: 3.97 x 10^{-7} atm-m^3/mole [1]
Specific Gravity: 1.07 at 20/20°C [2]
Organic Carbon Partition Coefficient: 148 [1]

FATE DATA: HALF-LIVES

Soil: 1 to 10 days [3]
Air: 2.28 to 22.8 hours [3]
Surface Water: 0.22 to 2.4 days [3]
Groundwater: 0.5 to 7 days [3]

NATURAL SOURCES

Animal wastes, decomposition of organic wastes. [1]

ARTIFICIAL SOURCES

Wastewater; resins, plastics, fibers, adhesives, iron and steel; aluminum, leather, and rubber industries; spills connected with its transport and use. Phenol is also found in cigarette smoke, and automobile exhaust, as well as disinfectants and medicinal products. [1]

FATE AND TRANSPORT

Phenol will rapidly degrade in sewage, soil, freshwater, and seawater. When it is released to soil, biodegradation will occur in under five days. Groundwater can be expected to be free of this chemical due to the rapidity of degradation. In freshwater systems, it can be expected to biodegrade on the order of hours to days, and in estuarine waters up to a few weeks. It will exist in the vapor phase in the atmosphere. Evaporation is not a primary loss

mechanism. Generally, biodegradation will be quicker under aerobic conditions for both soils and water. Bioconcentration is not significant [1].

HUMAN TOXICITY

General. Phenol is considered to be very toxic. Human deaths due to phenol exposure have been reported [2,4]. Based on animal studies, exposure to high levels of phenol vapor for several weeks results in paralysis and severe injury to the heart, kidneys, liver, and lungs [2]. The USEPA has placed phenol in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [4].

Oral Exposure. A chronic RfD of 0.6 mg/kg/day is based on a NOAEL of 60 mg/kg/day and a LOAEL of 120 mg/kg/day determined for reduced fetal body weight in a rat oral developmental study [4]. Phenol is readily absorbed via the gastrointestinal tract in humans and animals. Up to 98% of an orally-administered dose was absorbed by humans, while up to 95% was absorbed by rats. The oral LD_{50} for rats varies depending on the concentration of dosing solution used, but ranges from 340 to 530 mg/kg. Acute oral poisoning in rats and rabbits is characterized by muscular tremors in the head region, followed by effects in the lower extremities [2]. The probable lethal oral dose in humans is 50 to 500 mg/kg, and ingestion of 1 gram has been lethal. Symptoms of exposure in humans include sonorous breathing, frothing at the mouth and nose [4], mouth sores, and diarrhea [2].

Inhalation Exposure. An inhalation RfC for phenol is considered non-verifiable by the USEPA [4]. Phenol is readily absorbed following inhalation exposure. Up to 99% absorption was determined for humans. A concentration of 26 to 52 ppm phenol was lethal to guinea pigs over the course of a 28-day exposure. The effects on the lungs in these guinea pigs included inflammation, cellular infiltration, pneumonia, and bronchitis. Phenol exposure in animals has also been shown to cause severe damage to the heart, liver, and kidney. A concentration of 26 ppm was reported as the LOAEL for serious neurological effects in guinea pigs exposed for 41 days. No useful information was found regarding adverse effects of phenol inhalation in humans [2].

Dermal Exposure. Phenol is readily absorbed from skin. Substantial dermal absorption of phenol vapor occurs. The dermal LD_{50} for molten phenol liquid in the rat was reported to be about 669 mg/kg, while application of a 66% aqueous solution (330 mg phenol/kg) was 100% lethal to rats. Application of concentrated phenol to skin results in severe edema, erythema, and necrosis. Muscle tremors and convulsions are a characteristic response of laboratory animals to acute dermal phenol toxicity [2]. Skin exposure in humans may cause pain followed by numbness [4]. Arrhythmias have been associated with dermal exposure of humans. Human deaths have occurred following dermal exposure to phenol.

Phenol applied to the skin is reportedly a tumor promoter and possibly a complete carcinogen in mice [2].

ECOLOGICAL TOXICITY

General. Most of the information found in the technical literature dealt with aquatic life because phenol is very toxic to fish. Phenol should not be bioaccumulated to any extent in aquatic environments [5].

Vegetation. The chronic toxicity value of phenol to vegetation is 20 ppm [6]. The toxicity of phenol to aquatic plants is 0.2 ppm [6].

Aquatic life. Phenol is harmful to aquatic life in very low concentrations. Phenol can affect freshwater biota by direct toxicity and by lowering the amount of available oxygen because of the high oxygen demands of the compound [7]. The toxicity of phenol toward fish increases as the dissolved oxygen concentration is diminished, as the temperature is raised, and as the hardness is lessened [8]. The effect of combinations of different phenolic compounds is additive [8]. Phenols appear to be less toxic toward fish-food organisms and other lower aquatic life than towards fish [8]. The acute and chronic toxicity to freshwater aquatic life occurs at concentrations as low as 10,200 μg/L and 2,560 μg/L, respectively [9]. Acute LC_{50} values for fathead minnow and bluegill range from 24,000 to 67,500 μg/L and 11,500 to 28,116 μg/L, respectively [10]. Tests for the acute toxicity of phenol found rainbow trout to be the most sensitive species with an LC_{50} value of 5,020 μg/L [10]. The acute LC_{50} value for mosquitofish is 26 mg/L [6]. The acute lowest observed effect level for *Daphnia magna* is 5,000 μg/L [11]. The chronic aquatic toxicity limit is 0.001 ppm [6]. Bioconcentration factors for *Daphnia* and goldfish are 277 and 1.9, respectively [6]. The federal acute and chronic lowest observed effect levels for freshwater aquatic life are 10,200 μg/L and 2,560 μg/L [12].

Wildlife. The oral LD_{50} values for rats and mice are 317 mg/kg and 270 mg/kg, respectively [6]. The oral LD_{50} values for rabbits and dogs are 600 mg/kg and 500 mg/kg body weight, respectively [6]. The livestock toxicity value is 1,000 ppm [6]. The chronic waterfowl toxicity limits is 0.025 ppm [6].

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POLYCYCLIC AROMATIC HYDROCARBONS

GENERAL

Polycyclic aromatic hydrocarbons (PAHs) are a large group of chemicals formed during the incomplete combustion of organic materials. There are over one hundred PAHs, and they are found throughout the environment in air, water, and soil. Seven of the 15 PAHs addressed in this profile are classified as probable human carcinogens [1,2].

CAS NUMBERS

Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Phenanthrene	85-01-8
Benzo(g,h,i)perylene	191-24-2	Pyrene	129-00-00
Benzo(k)fluoranthene	207-08-9		

COMMON SYNONYMS

Polynuclear aromatic hydrocarbons, PNAs, PAHs.

ANALYTICAL CLASSIFICATION

Semivolatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble to 3.93 mg/L [1]
Vapor Pressure: negligible to very low at 25°C [1]
Henry's Law Constant: 6.95×10^{-8} to 1.45×10^{-3} atm-m^3/mole [1]
Specific Gravity: approximately 0.9 to 1.4 at 0 to 27°C [1]
Organic Carbon Partition Coefficient (K_{oc}): 2.5×10^3 to 5.5×10^6 [1]

FATE DATA: HALF-LIVES

Soil: 12.3 days to 5.86 years [3]
Air: 0.191 hours to 2.8 days [3]
Surface Water: 0.37 hours to 1.78 years [3]
Groundwater: 24.6 days to 10.4 years [3]

NATURAL SOURCES

Volcanoes, forest fires, crude oil, and oil shale [1].

ARTIFICIAL SOURCES

Motor vehicles and other petroleum fuel engines, wood-burning stoves and fireplaces, furnaces, cigarette smoke, industrial smoke or soot, and charcoal-broiled foods [1].

FATE AND TRANSPORT

Because the physical and chemical properties of PAHs vary substantially depending on the specific compounds in question, the fate and transport characteristics vary. Thus, the following discussion is presented in very general terms. Some fate characteristics are roughly correlated with molecular weight; so the compounds are grouped as follows [1]:

- Low molecular weight: acenaphthene, acenaphthylene, anthracene, fluorene, and phenanthrene;
- Medium molecular weight: fluoranthene and pyrene; and
- High molecular weight: benzo(a)anthracene, benzo(b)fluoranthene, benzo-(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo-(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

PAHs are present in the atmosphere in the gaseous phase and sorbed to particulates. They may be transported great distances, and are subject to photodegradation as well as wet or dry deposition [1].

PAHs in surface water are removed by volatilization, binding to particulates and sediments, bioaccumulation, and sorption onto aquatic biota. The low molecular weight PAHs have Henry's Law constants in the range of 10^{-3} to 10^{-5} atm-m^3/mole, and would therefore be expected to undergo significant volatilization; medium molecular weight PAHs have constants in the 10^{-6} range; and high molecular weight PAHs have constants in the range of 10^{-5} to 10^{-8}. Half-lives for volatilization of benzo(a)anthracene and benzo(a)pyrene from water have been estimated to be greater than 100 hours. It has been reported that lower molecular weight PAHs could be substantially removed by volatilization under conditions of high temperature, shallow depth, and high wind. For example, anthracene was found to have a half-life for volatilization of 18 hours in a stream with moderate current and wind. In an estuary, volatilization and adsorption are the primary removal mechanisms for medium and high molecular weight PAHs, whereas volatilization and biodegradation are the major mechanisms for low molecular weight compounds. PAHs can bioaccumulate in plants and animals, but are subject to extensive metabolism by high-trophic-level consumers, indicating that biomagnification is not significant [1].

Potential mobility in soil is related to the organic carbon partition coefficient (K_{oc}). The low molecular weight PAHs have K_{oc} values in the range of 10^3 to 10^4, which indicates a

moderate potential to be adsorbed to organic material. Medium molecular weight compounds have values on the order of 10^4, while high molecular weight compounds have values in the 10^5 to 10^6 range. The latter compounds, then, have a much greater tendency to adsorb and resist movement through soil. Volatilization of the lower molecular weight compounds from soil may be substantial. However, some portion of PAHs in soil may be transported to groundwater, and then move laterally in the aquifer, depending on soil/water conditions [1].

HUMAN TOXICITY

General. Ingestion of, inhalation of, or dermal contact with PAHs by laboratory animals has been shown to produce tumors. Reports in humans show that individuals exposed by inhalation or dermal contact for long periods of time to mixtures of PAHs and other compounds can also develop cancer. However, the relationship of exposure to any individual PAH with the onset of cancer in humans is not clear [1]. The available slope factors are presented below. No other toxicity values were available [2,4].

Oral Exposure. Indirect evidence suggests that benzo(a)pyrene may not be readily absorbed following oral exposure in humans. On the other hand, absorption in rats appears to be rapid and efficient. Whether or not there is actually a significant difference between humans and rats in the capacity to absorb benzo(a)pyrene is questionable. It should be noted that the degree of uptake is highly dependent on the vehicle of administration. A NOAEL of 150 mg/kg/day was determined for gastrointestinal, hepatic, and renal effects in rats following acute oral exposure to benzo(a)pyrene or benzo(a)anthracene. LOAELs in the range of 40 to 160 mg/kg/day were determined for developmental and reproductive effects in mice following acute oral exposure to benzo(a)pyrene [1]. An oral slope factor of 7.3 $(mg/kg/day)^{-1}$ for benzo(a)pyrene is based on tumors detected in the forestomachs of rats and mice in various diet studies [2].

Inhalation Exposure. The USEPA does not currently provide inhalation RfCs for any of the PAHs [2,4]. Pure PAH aerosols appear to be well absorbed from the lungs of animals. However, PAHs adsorbed to various particles appear to be poorly absorbed, if at all. The latter are most likely to be removed from the lungs by mucociliary clearance and subsequent ingestion. Lung cancer in humans has been strongly associated with long-term inhalation of coke-oven emissions, roofing-tar emissions, and cigarette smoke, all of which contain mixtures of carcinogenic PAHs. It has been estimated that the 8-hour time-weighted average exposure to PAHs in older coke plants was approximately 22 to 33 mg/m^3 [1]. An inhalation slope factor of 6.1 $(mg/kg/day)^{-1}$ for benzo(a)pyrene is based on tumors detected in the respiratory tracts of hamsters in a chronic intermittent inhalation study [4].

Dermal Exposure. Limited *in vivo* evidence exists that PAHs are at least partially absorbed by human skin. An *in vitro* study with human skin indicated that 3% of an applied dose of benzo(a)pyrene was absorbed after 24 hours. Studies in mice indicated that at least 40% of an applied dose of benzo(a)pyrene was absorbed after 24 hours. The carcinogenic PAHs as a group cause various noncancerous skin disorders in humans and animals. Substances containing mixtures of PAHs have been linked to skin cancers in humans. Studies in laboratory animals have demonstrated the ability of benz(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene to induce skin tumors [1].

ECOLOGICAL TOXICITY

General. The molecular weight of the individual PAHs affects their mobility and solubility in the environment, with lower weight compounds generally being more volatile and soluble than higher weight compounds, which have strong sorption properties. In aquatic environments, PAH partitioning in sediments occurs in an equilibrium process, with a potential for localized occurrences of high levels of dissolved PAHs [5,6]. PAHs can bioaccumulate in plants and animals, but do not biomagnify in food chains. Inter- and intraspecies responses to carcinogenic PAHs are variable, and some PAHs tend to inhibit the carcinogenicity of other compounds in mammals [7]. A variety of adverse effects on aquatic and terrestrial animals has been observed.

Vegetation. Plants absorb PAHs from soils through their root systems, and can translocate them to above ground parts. Lower weight PAHs are absorbed more readily than other PAHs [7]. Airborne deposition of particulate PAHs, and the subsequent adsorption to the skins of fruits and vegetables, accounts for reported higher PAH concentrations in aboveground versus underground plant parts. Soil concentrations of benzo(a)pyrene typically may reach 1,000 mg/kg; concentrations for total PAHs typically exceed benzo(a)pyrene concentrations by at least one order of magnitude. PAH concentrations in vegetation typically range from 20 to 1,000 μg/kg [6]. Some plants biocentrate PAHs in their oily parts (e.g., seeds) above levels in surrounding soils, but this does not appear to be typical [6]. In limited studies on PAHs in plants, phytotoxic effects were rare; photosynthetic inhibition in algae has been documented [6,7]. Some vascular plants catabolize benzo(a)pyrene [6], and PAHs synthesized by plants may act as growth hormones [7,8]. Plants may serve as a pathway for exposure of higher-order consumers to toxic levels of PAHs.

Aquatic Life. Most PAHs in aquatic environments tend to sorb to sediments, and sediment-associated PAHs have accounted for up to 77 percent of the steady-state body burden in benthic amphipods [7]. Absorption and assimilation of PAHs vary widely among species and according to the specific compound. Crustaceans and fish appear better

able to assimilate, metabolize, and eliminate PAHs than do molluscs and polychaetes [7,8]. Fish appeared to detoxify benzo(a)pyrene as quickly as it was absorbed in water-only exposures [9]. Little potential for biomagnification through aquatic food chains exists, and bioconcentration factors range widely. A 2- to 3-day exposure BCF of 485 was reported for anthracene in fathead minnows, and a 24-hour BCF of 12 was reported for benzo(a)pyrene in bluegill [7].

Toxic effects of PAHs in fish include liver, thyroid, gonad, and skin tumors. Phenanthene has an LC_{50} of 370 μg/L in grass shrimp, and benz(a)anthracene has an LC_{87} of 1,000 μg/L in bluegill [7]. In the Black River, Ohio, where sediment PAH levels were 10,000 times those in a control location, brown bullheads showed elevated concentrations of lower molecular weight PAHs in their livers and a higher incidence of liver tumors [5,7,8]. Dissolved fluorene introduced into pond waters resulted in reduced growth in bluegill at 0.12 mg/L, and in increased vulnerability to predation at 1.0 mg/L [7].

There are no promulgated federal aquatic life water quality criteria for any of the PAHs, though the USEPA has proposed a chronic criterion of 6.3 μg/L and an acute criterion of 30 μg/L for phenanthrene in fresh waters [10].

Wildlife. PAH toxicity studies in animals are mostly confined to laboratory experiments. Many PAHs can produce tumors in skin and epithelia tissues in all animal species tested, with malignancies induced by microgram acute exposures. Some carcinogenic PAHs can pass across skin, lungs, intestines, and placenta in mammals. Target organs are diverse, and the tissue affected is dependent on the compound and method of exposure. For example, dietary benzo(a)pyrene caused leukemia, lung adenoma, and stomach tumors in mice. Ancillary tissue damage may accompany carcinomas [7]. Selective effects based on age and gender of the receptor have also been observed [8,9,11,12]. Mammals do not tend to accumulate PAHs, which is likely due to the rapid metabolism of these compounds. For example, the biological half-life of benzo(a)pyrene in rat blood and liver was 5 to 10 minutes [7].

There is a scarcity of data on PAHs that are not carcinogenic [13]. Many chemicals, including other PAHs, modify the carcinogenic actions of PAHs in laboratory animals. Inhibitors of PAH-induced tumors include selenium, vitamins A and E, flavones, and ascorbic acid [7]. LD_{50} values also range widely: acute oral LD_{50} values for rodents range from 50 mg/kg body weight for benzo(a)pyrene to 700 mg/kg for phenanthrene, to 2,000 mg/kg for fluoranthene. Chronic oral carcinogenicity values for rodents include 40 mg/kg for benzo(b)fluoranthene, 72 mg/kg for benzo(k)fluoranthene, and 99 mg/kg for chrysene [7].

In a study on mallards, no mortality or visible toxic effects were observed over 7 months during which birds were fed diets containing 4,000 mg/kg PAHs, though heptatic changes

were observed. Sax [9] reports that single oral doses of 250 ppm benzo(a)pyrene were not acutely toxic to ducks or chickens.

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PESTICIDES/PCB'S
TOXICITY PROFILES

ALDRIN/DIELDRIN

GENERAL

Aldrin and dieldrin are structurally similar man-made insecticides. Additionally, dieldrin is a breakdown product of aldrin, resulting from biodegradation. Aldrin is rapidly converted to dieldrin in the environment. Humans and animals exposed to aldrin metabolize it into dieldrin [1].

CAS NUMBERS

Aldrin	309-00-2
Dieldrin	60-57-1

COMMON SYNONYMS

Aldrin	HHDN
Dieldrin	HEOD

ANALYTICAL CLASSIFICATION

Pesticide (organic)

PHYSICAL AND CHEMICAL DATA

	Aldrin	Dieldrin
Water Solubility (mg/L at 20°C) [2]:	0.02	0.17
Vapor Pressure (mm Hg at 20°C) [2]:	3.75×10^{-5}	3.75×10^{-6}
Henry's Law Constant (atm-m³/mole) [2]:	4.69×10^{-4}	5.8×10^{-5}
Specific Gravity [1]:	1.70 (at 20°C)	1.75 (at 25°C)
Organic Carbon Partition Coefficient [1]:	48,978	7,413

FATE DATA: HALF-LIVES

	Aldrin	Dieldrin
Soil: [3]	3 wk to 1.6 yr	175 da to 3 yr
Air: [3]	55 min to 9.1 hr	4 hr to 1.7 da
Surface Water: [3]	3 wk to 1.6 yr	175 da to 3 yr
Groundwater: [3]	1 da to 3.2 yr	1 da to 6 yr

NATURAL SOURCES

None noted [2].

ARTIFICIAL SOURCES

Insecticides; dieldrin is also an environmental degradation product of aldrin [2].

FATE AND TRANSPORT

Aldrin is no longer produced or used in the United States. Since it is readly converted to dieldrin in the environment, there should be relatively little left. Aldrin is considered to be moderately persistent. Biodegradation of aldrin should be slow and it should not leach to groundwaters. Photooxidation in water is significant. Reaction with hydroxyl radicals in air should be rapid.

Dieldrin is an extremely persistent compound. Releases of dieldrin to soils may persist for periods exceeding 7 years. The low water solubility and high K_{oc} values make leaching into groundwaters unlikely even over long periods of time at elevated temperatures. Soil runoff may carry particle-adsorbed dieldrin to the water system. Dieldrin in water systems will not undergo hydrolysis or appreciable biodegradation; photoarrangement to photodieldrin is a possibility. Adsorption to sediments/suspended solids in waters, and moderate to significant bioconcentration in aquatic organisms are predicted to be important transport/fate mechanisms. At low water flow conditions, the main "sink" for dieldrin in water systems will be the sediment (via desorption and pore water diffusion through sediments). Evaporation from waters may be an important process. Volatilization from soils, slight in any case, will increase as the moisture content of the soils increases. Dieldrin in the atmosphere is probably associated with particulate matter, given the low vapor pressure and high K_{oc} values of dieldrin, and may be transported over long distances. Vapor-phase dieldrin in the atmosphere may undergo photodegradation to photodieldrin although it is not expected to be an important process [2].

HUMAN TOXICITY

General. Aldrin and dieldrin are absorbed by oral, inhalation, and dermal routes of exposure. Exposure to very high levels of aldrin and/or dieldrin for a short time causes convulsions and/or kidney damage. Exposure to lower levels for a longer time may also cause convulsions. Human deaths following exposure have been documented [1]. The USEPA has placed both aldrin and dieldrin in weight-of-evidence Group B2, indicating that they are probable human carcinogens [4].

Oral Exposure. A chronic RfD for aldrin of 0.00003 mg/kg/day is based on a LOAEL of 0.025 mg/kg/day for liver toxicity in a chronic feeding study in rats. A chronic RfD of 0.00005 mg/kg/day for dieldrin is based on a NOAEL of 0.005 mg/kg/day for liver lesions in a chronic feeding study in rats [4]. Aldrin and dieldrin are absorbed from the gastrointestinal tract, but the rate and extent of absorption have not been fully characterized. Oral LD_{50} values in rats reportedly range from 39 to 60 mg/kg/day for aldrin, and 37 to 46 mg/kg/day for dieldrin, indicating a fairly high level of toxicity. Decreased survival in dogs exposed for 25 months was observed at a level of 1 mg/kg/day for aldrin, and a level of 0.5 mg/kg/day for dieldrin. Adverse central nervous system

effects have been observed in humans and animals following oral exposure to aldrin and/or dieldrin. Several cases of aldrin and dieldrin poisoning in humans, including deaths, have been reported [1]. An oral slope factor of 17 $(mg/kg/day)^{-1}$ for aldrin is based on liver carcinomas observed in mice maintained on a treated diet. An oral slope factor of 16 $(mg/kg/day)^{-1}$ for dieldrin is based on liver carcinomas observed in mice maintained on a treated diet [4].

Inhalation Exposure. The USEPA does not currently provide inhalation RfCs for aldrin or dieldrin [4,5]. Although quantitative data are lacking, it appears that aldrin is readily absorbed in the mammalian lung. Central nervous system symptoms reported by workers involved in the manufacture and application of aldrin and/or dieldrin included headaches, dizziness, hyperirritability, general malaise, nausea and vomiting, anorexia, muscle twitching, and myoclonic jerking [1]. An inhalation unit risk of 0.0049 $(mg/m^3)^{-1}$ for aldrin was calculated based on the oral study. An inhalation unit risk of 0.0046 $(mg/m^3)^{-1}$ for dieldrin was calculated based on the oral study [4].

Dermal Exposure. Dermal absorption of aldrin and dieldrin in skin is rapid for rats, and appears to be rapid in humans as well. Central nervous system symptoms reported by workers involved in the manufacture and application of aldrin and/or dieldrin included headaches, dizziness, hyperirritability, general malaise, nausea and vomiting, anorexia, muscle twitching, and myoclonic jerking [1].

ECOLOGICAL TOXICITY

General. Both aldrin and dieldrin were developed and widely used as insecticides. As would be expected from this class of compounds, both chemicals have a high environmental toxicity for invertebrates and are also quite toxic to fish, birds, and mammals. They also shows strong tendencies for bioaccumulation, with bioconcentration factors on the order of 10^5 in fish tissue, ostracods, and snails; 10^3 in algae, freshwater vascular plants (*Elodea*), and clams; and 10^2 for crabs [6]. As a result, the use and manufacture of these chemicals has been prohibited in the United States since the 1970's.

Vegetation. In soils, aldrin is volatilized or slowly transformed to dieldrin. In studies reviewed by Micromedex, Inc. [7], the half-life of aldrin in soils was reported in one source to be from 20 to 100 days, while another source reported a 2- to 3-month half-life for the first half year, and 9 months to 13 months for the following 3 years. Although aldrin has some affinity for soil particles, it is not strongly adsorbed like many other organochlorines. It therefore is more bioavailable to plants than are many other members of this chemical group.

Sax [8] states that aldrin has no phytotoxicity to irrigable plants when it is used in the proper formulation. This appears to be demonstrated by studies that involved the

application of a 5-percent solution of aldrin to *Viburnum lantana* (a woody shrub) with resulting injury to only 15 percent of the test species [9]. Corn seed soaked in aldrin at a rate of 2 ounces per bushel had a 40 percent decrease in germination [10].

Data summarized by Micromedex, Inc. [7] indicate that dieldrin in the environment is very persistent, having a half-life in soils of 7 years. Biodegradation and hydrolysis are unimportant processes, and losses occur only through slow photodegradation at the soil surface or the volatilization of small amounts from soil.

No data on the phytotoxicity of dieldrin were found. However, its widespread application to corn and other crops for many years without reports of decreased crop germination, growth, or yields indicates a low level of phytotoxicity. Dieldrin is strongly adsorbed to soils, and is immobile even with high temperatures and prolonged leaching [7]. As a result, this compound is not readily bioavailable for plant uptake.

Aquatic Life. The federal aquatic life criterion for dieldrin for the chronic protection of freshwater aquatic life is 0.0019 μg/L.

Aldrin and dieldrin are highly toxic to aquatic invertebrates and fish. For example, studies cited in the USEPA "Red Book" [6] show 96-hour LC_{50}s (acute toxicities) of dieldrin for invertebrates of 0.2 μg/L to 0.3 μg/L. Micromedex, Inc. [7] shows 96-hour LC_{50}s of dieldrin for invertebrates ranging from 0.9 to 6,700 μg/L and most 96-hour LC_{50}s of aldrin for invertebrates between 1.3 μg/L and 50 μg/L. Dieldrin is acutely toxic to frog and toad tadpoles at 100 to 150 μg/L [7]. Acute toxicities to common freshwater fish species such as bluegill, trout, largemouth bass, and catfish typically range from 1 to 20 μg/l [6,7]. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [6].

A major concern for aquatic life is the bioconcentration of dieldrin. (Aldrin has a negligible bioconcentrating effect because it is rapidly converted to dieldrin by aquatic organisms [6]. Studies cited in the Red Book showed bioconcentration factors on the order of 10^5 in fish tissue, ostracods, and snails; 10^3 in algae, freshwater vascular plants (*Elodea*), and clams; and 10^2 for crabs [6].

Wildlife. Toxicity of aldrin and dieldrin to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents and dogs. The lethal dose of dieldrin by ingestion for mule deer was 75 mg/kg to 100 mg/kg [7]. Adverse effects on deer occurred with long-term feeding at 2 ppm dieldrin [6]. In the mammalian body, dieldrin accumulates chiefly in the adipose tissue where some bioconcentration occurs [8]. For example, in cattle and swine, the adipose tissue concentrations of dieldrin after 28 days were approximately twice the concentrations in the animals' feed [8].

Birds are also susceptible to aldrin and dieldrin poisoning. Studies summarized in Micromedex, Inc. [7] showed that ring-necked pheasant, bobwhite quail, Japanese quail, grey partridge, and house sparrows had 5-day LC_{50}s for ingestion of dieldrin ranging from 10 to 80 mg/kg. Waterfowl appeared to be more tolerant of this compound, with 5-day LC_{50}s of 100 to 380 mg/kg. Aldrin was toxic to bird species at concentrations ranging from 6 to 520 mg/kg. In long-term feeding studies, 1 ppm of dieldrin affected reproduction in Hungarian partridge, and slight eggshell thinning was noted in mallards fed 3 ppm dieldrin.

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CHLORDANE

CAS NUMBER

57-74-9 for nonstereospecific chlordane; 5103-71-9 for cis- or alpha-chlordane; 5103-74-2 for trans- or gamma-chlordane

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Pesticide (organic).

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.056 - 0.1 mg/L at 25°C [1]
Vapor Pressure: 3.0×10^{-6} to 4.6×10^{-4} mm Hg at 25°C [1]
Henry's Law Constant: 4.85×10^{-5} to 1.3×10^{-3} atm-m^3/mole [1]
Specific Gravity: 1.59 - 1.63 at 25°C [2]
Organic Carbon Partition Coefficient: 15,500 - 24,600 [1]

FATE DATA: HALF-LIVES

Soil: 283 days - 3.8 years [3]
Air: 5.2 hours - 2.2 days [3]
Surface Water: 283 days - 3.8 years [3]
Groundwater: 1.6 - 7.6 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Chlordane was used in the past as an insecticide [1].

FATE AND TRANSPORT

Chlordane may persist for long periods of time if released to soil. Given the high K_{oc} value, chlordane is expected to be generally immobile or only slightly mobile in soil; however, movement into groundwater may occur. Chlordane may volatilize from surface soils on which it has been sprayed, particularly if the soil is moist. Incorporation into shallow soils, however, will greatly reduce volatilization. If released to water, chlordane is not expected to undergo significant hydrolysis, oxidation or photolysis. Adsorption to sediment will inhibit volatilization. Chlordane is biotransformed very slowly and has a

high potential to bioconcentrate (BCF for fish: 8,320-11,500). In the air, chlordane will be predominantly in the vapor phase. Long range transport of chlordane through the atmosphere is known to occur [1].

HUMAN TOXICITY

General. The major target of chlordane toxicity is the central nervous system [4,5]. Chlordane is generally considered nonmutagenic. The USEPA has placed chlordane in weight-of-evidence cancer Group B2, indicating that it is a probable human carcinogen [6].

Oral Exposure. A chronic oral RfD of 0.00006 mg/kg/day is based on a NOEL of 0.055 mg/kg/day for regional liver hypertrophy in a chronic study in rats [6]. Chlordane is readily absorbed following oral exposure. Acute oral LD_{50} values of 200 to 335 mg/kg in rats and 1720 mg/kg in hamsters have been reported [4,5]. The fatal oral dose for adults is estimated to be between 86 and 860 mg/kg, with the onset of symptoms within 45 minutes to several hours after ingestion [4,5]. Acute symptoms include vomiting, diarrhea, seizures, coma and respiratory failure [5]. Convulsive symptoms have occurred at doses of 32 mg/kg [5]. Chronic animal studies suggest chlordane causes liver and kidney damage, but these findings have not been observed with long-term human exposure [4,5]. Information regarding the effects of ingested chlordane on human reproduction and development are not available, but animal studies indicate that exposure to high doses for several generations results in decreased fertility and viability of the offspring [5]. There is no evidence that ingestion of chlordane causes cancer in humans, but studies in animals suggest that oral exposure to chlordane may result in liver cancer [4]. An oral slope factor of 1.3 $(mg/kg/day)^{-1}$ is based on the increase in the incidence of liver cancer in mice [6].

Inhalation Exposure. An inhalation RfC for chlordane is currently under review by the USEPA [6]. Chlordane is readily absorbed following inhalation exposure. An acute inhalation LC_{50} value of 100 mg/m^3 is reported for a 4-hour exposure in cats [5]. Inhaled chlordane has not been reported to be fatal to humans. Symptoms associated with accidental inhalation exposure to chlordane include headache, dizziness, vision problems, incoordination, excitability, weakness, muscle twitching, convulsions, gastrointestinal effects, and jaundice [4,5]. The exposure concentration necessary to elicit these effects is not known. Several epidemiologic studies involving occupational exposure to chlordane do not provide any evidence of increased cancer mortality, although anecdotal reports suggest a relationship between exposure to chlordane and a noncancer blood disease, acute leukemia, and development of malignant tumors in children. An inhalation unit risk of 0.00037 $(\mu g/m^3)^{-1}$ was extrapolated from the oral slope factor [6].

Dermal Exposure. Acute dermal LD_{50} values of 690 to 840 mg/kg in rats and 780 to 1150 mg/kg in rabbits have been reported [4]. Dermal exposure to chlordane has been reported

to be fatal to humans, but the fatal dose is not known. Chlordane is rapidly absorbed through the skin [5]. Effects on the central nervous system similar to those reported following other routes of exposure have been reported following dermal exposure to chlordane [4,5].

ECOLOGICAL TOXICITY

General. Chlordane was widely used as an insecticide until 1975, when the USEPA severely limited its use in the United States [7]. As would be expected from this class of compounds, it has a high environmental toxicity to invertebrates and is also quite toxic to fish, birds, and mammals. It also shows strong tendencies for bioaccumulation, with bioconcentration factors on the order of 10^3 to 10^5 for both plants and animals. Its persistence in the environment, its ability to bioconcentrate in almost all classes of biota, and its ability to biomagnify through the food chain make chlordane a greater ecological risk than most other organochlorines.

Vegetation. Sax [8] summarized several articles that studied the effects of chlordane on plants. According to this source, Probst and Everly [9] found no effect to mature soybeans or to harvest yield from the application of chlordane at a rate of 2.1 pounds per acre (which translates to a concentration in near-surface soils of approximately 1 ppm). Juska [10] found decreased germination of *Poa annua* (annual bluegrass) seeds in soils treated with chlordane at a rate of 260 pounds per acre (about 130 ppm in near-surface soils) and in *Poa pratensis* (Kentucky bluegrass) seeds in soils with chlordane applications of 87 pounds per acre (about 40 ppm in near-surface soils). Sources reviewed by Eisler [11] found that low (0.1 to 100 μg/L) concentrations of chlordane stimulated the growth of simple freshwater plants like blue-green and green algae, but that growth was inhibited by higher concentrations [12,13]. These data indicate that chlordane has relatively low toxicities to plants compared to its effects on animals.

Chlordane has been shown to bioconcentrate in both terrestrial and aquatic plants. Studies summarized in Eisler [11] showed dry-weight concentrations in corn stalks and kernels of 1,260 μg/kg and 480 μg/kg, respectively. Dry-weight concentrations in sorghum were 420 μg/kg. Bioconcentration factors of 10^4 were reported in green algae [14]. Although in-tissue concentrations of chlordane may not be toxic to the plants, they could be important as sources of chlordane in higher trophic levels.

Aquatic Life. The federal aquatic life criterion for chlordane for the chronic protection of freshwater aquatic life is 0.0043 μg/L [15].

These standards derive from the high toxicity of chlordane to aquatic invertebrates and fish. For example, studies show that 96-hour LC_{50}s (acute toxicities) for invertebrates are usually between 4 μg/L and 40 μg/L [7,14,17]. Most 96-hour LC_{50}s for fish are in a

similar range, falling between 10 μg/L and 60 μg/L [7,14,17]. Eisler [11] reports that water concentrations between 0.2 μg/L and 3 μg/L were harmful (chronic toxicity) to various species of fish and aquatic invertebrates. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [7].

A major concern to aquatic life is the bioconcentration of chlordane. Studies show bioconcentration factors for invertebrates and fish generally ranging from 10^3 to 10^5 [7,8,14,18]. The USEPA [17] cites data showing half lives for the elimination of chlordane in invertebrates and fish in the range of 2 to 3 days. However, most other sources indicate biological half lives in aquatic life of 4.4 weeks to 20 weeks [11,14,16]. One study reported in Eisler [11] estimated that 99 percent of alpha-chlordane remained in goldfish tissues after 25 days. Generally, alpha-chlordane persisted longer in tissue than did gamma-chlordane [11]. Bioaccumulation of chlordane is important both because the chemical can build up to toxic concentrations in the animal's tissues and because it serves as a source of toxic levels of chlordane to higher trophic levels.

Although the use of chlordane has been highly restricted since 1975, substantial concentrations of chlordane were detected in fish samples collected a decade later. Data presented in Eisler [11] show that numerous samples of whole fish, fish muscle, or fish eggs collected in the United States in the mid-1980's had chlordane concentrations in excess of 1,000 μg/kg wet weight, and some values were greater than 5,000 μg/kg wet weight. These values exceeded both the guideline for protection of predatory fish of 0.1 mg/kg fresh weight and the Food and Drug Administration's action level of 0.3 mg chlordane per kg of fresh weight for protection of human health [11].

Wildlife. Toxicity of chlordane to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents and rabbits. In warm-blooded animals, chlordane is transformed to oxychlordane and/or heptachlor epoxide, both of which are more toxic and persistent than chlordane [11]. (See the discussion on heptachlor epoxide in the heptachlor profile). Chlordane and its metabolites accumulate chiefly in the adipose tissue but are also found in the liver, kidney, brain, and muscle [11,14]. The half-life of chlordane in the mammalian body is reported as ranging from 1 day to 88 days [11,14]. The half-life for oxychlordane in mammals is about 92 days [11].

Birds are also susceptible to chlordane poisoning. Studies summarized in Micromedex Inc. [14] showed that mallards, ring-necked pheasants, bobwhite quail, and Japanese quail had 5-day LD_{50}'s for ingestion of chlordane ranging from 330 ppm to 850 ppm. However, Eisler [11] reports that sensitive bird species had reduced survival on diets containing chlordane at 1.5 mg/kg.

Some chlordane isomers persist in avian tissues for lengthy periods. For example, the biological half-lives of alpha-chlordane, cis-nonachlor (a chlordane metabolite) and oxychlordane in northern gannets were estimated to be 11.2, 19.4, and 35.4 years, respectively [11]. As recently as 1986, maximum brain tissue concentrations of these compounds in many species of debilitated birds collected in New York were above 2,000 μg/kg fresh weight, with some values above 8,000 μg/kg. Affected species included hawks, herons, jays, owls, robins, grackles, bluebirds, and starlings [11]. Lethal exposures of birds to chlordane in the environment occurred at least a decade after the use of this chemical was restricted, with chlordane implicated as the principal toxicant in 30 pesticide poisonings of hawks, owls, herons, and other birds in New York between 1982 and 1986 [11]. Secondary poisonings of raptors after consumption of prey that had accumulated large quantities of chlordane also have been documented [11].

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4,4'-DDE

CAS NUMBER

72-55-9

COMMON SYNONYMS

p,p' - DDE; 4,4-Dichlorodiphenylchloroethane; 1,1-Dichloro-2,2-bis(p-ethylphenyl) ethane; 1,1'-(2,2-Dichloroethylidene)bis[4-ethylbenzene] [1]

ANALYTICAL CLASSIFICATION

Pesticide (organic).

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.12 mg/L at 25°C [2]
Vapor Pressure: 6.50 x $10E^{-6}$ mm Hg at 20°C [2]
Henry's Law Constant: 6.8 x 10^{-5} atm-m^3/mole [2]
Specific Gravity: ND [2]
Organic Carbon Partition Coefficient: 4,400,000 [2]

FATE DATA: HALF-LIVES

Soil: 2 - 15.6 years [3]
Air: 17.7 hours - 7.4 days [3]
Surface Water: 15 hours - 6.1 days [3]
Groundwater: 16 days - 31.3 years [3]

NATURAL SOURCES

None noted [1].

ARTIFICIAL SOURCES

Insecticide [1].

FATE AND TRANSPORT

Like 4,4-DDD and 4,4-DDT, 4,4-DDE is a highly stable compound. Generally, it is resistant to photodegradation and/or oxidation [1]. Given the high K_{oc} value, 4,4-DDE is expected to adsorb tightly to soils and sediments/suspended solids in waters. In addition to the high K_{oc} value, the low level of solubility suggests little probability of groundwater infiltration via leaching through soils. The low vapor pressure and Henry's Law constant values suggest little tendency to volatilize from soils and/or waters. 4,4-DDE has a high

bioconcentration factor (51,000), indicating that it is expected to readily bioconcentrate in aquatic organisms [4]. Biodegradation, aerobic or anaerobic, is expected to be slow.

HUMAN TOXICITY

General. Typically, individuals are exposed to a mixture of 4,4-DDT, 4,4-DDE and 4,4-DDD, and not to the compounds individually. Both 4,4-DDE and 4,4-DDD are contaminants, as well as degradation and metabolic products, of 4,4-DDT [2]. Most of the available toxicity data deal with 4,4-DDT. The major targets of the three compounds are the central nervous system (CNS) and the liver [2]. Data regarding the genotoxicity of the compounds are equivocal, but chromosomal damage has been observed in exposed individuals [2]. The USEPA placed 4,4-DDT, 4,4-DDE and 4,4-DDD in weight-of-evidence Group B2, indicating that they are probable human carcinogens [6].

Oral Exposure. A chronic oral RfD is currently not available for 4,4-DDE [6]. 4,4-DDE is readily absorbed following oral exposure [2]. Acute oral LD_{50} values of 880 to 1240 mg/kg were reported for male and female rats, respectively, and a range of 700 to 1000 mg/kg was reported in mice [5]. Symptoms of acute exposure were not reported, but toxic effects on the liver (necrosis) and CNS (tremors, ataxia, loss of equilibrium) have resulted in animals following long-term oral exposure [5]. In one study in humans, no adverse effects were noted in an individual given 5 mg (0.07 mg/kg/day) 4,4-DDE orally for 92 days [5]. Limited animal studies indicate that 4,4-DDE is not likely to affect reproduction or development. There is no evidence that 4,4-DDE causes cancer in humans, but studies in animals suggest that oral exposure may result in liver cancer [5]. The USEPA derived an oral slope factor of 0.34 $(mg/kg/day)^{-1}$ based on the incidence of liver tumors in animals [6].

Inhalation Exposure. A chronic inhalation RfC is not available for 4,4-DDE [6]. Inhalation of 4,4-DDE is considered to be a minor route of entry because 4,4-DDE is a large particle and, when inhaled, is trapped in the upper regions of the respiratory tract and eventually swallowed [2]. Data are not available regarding the toxicity of inhaled 4,4-DDE in humans or animals [2].

Dermal Exposure. No useful information was located regarding dermal exposure to 4,4-DDE.

ECOLOGICAL TOXICITY

General. 4,4-DDE is an impurity in 4,4-DDT and also is formed as a degradation product of 4,4-DDT [7]. It is not manufactured as a commercial product [8]. As would be expected from this class of compounds, 4,4-DDE has a high environmental toxicity to invertebrates and is also quite toxic to fish, birds, and mammals. However, the primary concerns related to 4,4-DDE are its persistence in the environment, its ability to

bioconcentrate in almost all classes of biota, and its capacity to biomagnify through the food chain. These problems are particularly serious because, unlike 4,4-DDT and 4,4-DDD, 4,4-DDE in biota appears to be a stable end product incapable of being further degraded by biotransformation [8]. This characteristic results in 4,4-DDE being detected in 90 to 100 percent of fish and bird samples collected throughout the United States at least 11 years after the use of 4,4-DDT was banned [7].

Vegetation. Although no data were found on the phytotoxicity of DDE, the risk of this compound to plants is probably low. According to Micromedex, Inc. [7], enough 4,4-DDT was produced to cover all of the arable land in the world with this compound and its metabolites, 4,4-DDD and 4,4-DDE, at a rate of 1.5 pounds per acre. Despite the abundance of these chemicals, the scientific literature is virtually devoid of information on phytotoxicity. This implies that 4,4-DDE has low toxicity to plants.

Like 4,4-DDT, 4,4-DDE bioconcentrates in aquatic plants. Studies summarized by the USEPA [8] and Micromedex, Inc. [7] show bioconcentration factors in algae of 10^3 to 10^4. Tissue concentrations in aquatic vascular plants of 2 μg/kg dry weight were found in Finnish lakes. Although in-tissue concentrations of 4,4-DDE may not be toxic to the plants, they are important as sources of 4,4-DDE in higher trophic levels. Concerning the structurally similar compound 4,4-DDT, Johnson and Finley [9] state that "Food seems to be more important than water as a source of body residues," while a study on DDE summarized by the USEPA [8] found concentration factors of 10^4 in mosquito larvae and fish exposed in a food-chain microcosm, but only 10^2 through aquatic exposure where a food chain did not exist.

Aquatic Life. The USEPA has not established a criterion for 4,4-DDE for the chronic protection of freshwater aquatic life. However, because of the chemical similarities between 4,4-DDE and 4,4-DDT, it is assumed that the 4,4-DDT criteria would provide adequate protection if applied to 4,4-DDE. The federal aquatic life criterion for 4,4-DDT for the chronic protection of freshwater aquatic life is 0.001 μg/L [10].

4,4-DDE appears to be slightly less toxic to fish than 4,4-DDT. Acute toxicities (96-hour LC_{50}s) from 4,4-DDE for freshwater fish summarized by Micromedex, Inc. [7] ranged from 32 μg/L to 240 μg/L. Acute toxicities for 4,4-DDT for fish seldom exceeded 10 μg/L. No data were found concerning acute toxicities of 4,4-DDE to aquatic invertebrates.

A major concern to aquatic life is the bioconcentration of 4,4-DDE. Studies reported by the USEPA [8] and Micromedex, Inc. [7] show bioconcentration factors for invertebrates and fish generally ranging from 10^3 to 10^5. Bioaccumulation of 4,4-DDE is important both because the chemical can build up to toxic concentrations in the animal's tissues and because it serves as a source of toxic levels of 4,4-DDE to higher trophic levels. In fish

collected from Great Lakes watersheds in the early 1980's, 94 percent were positive, with 4,4-DDE concentrations ranging from 15 to 5,800 ppb [7]. More than 30 percent of snapping turtles from waters in New York had 4,4-DDE concentrations of greater than 5 ppm [7].

Wildlife. Toxicity of 4,4-DDE to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents. In the body, 4,4-DDE accumulates chiefly in the adipose tissue, but is also found in significant concentrations in liver, brain, and muscle tissues [11].

Birds are also susceptible to 4,4-DDE poisoning. Studies summarized by Micromedex, Inc. [7] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LD_{50}'s for ingestion of 4,4-DDE ranging from 825 to 3,572 ppm. Bioaccumulation also occurs in birds. In other studies summarized by Micromedex, Inc. [7], 100 percent of 293 dead or moribund bald eagles collected in the United States from 1978 through 1981 tested positive for 4,4-DDE and had median carcass concentrations of 4,4-DDE each year of 2.4 to 3.3 ppm. Mean 4,4-DDE concentrations in Pacific black ducks were 331 ppm in fat, 42 ppm in wings, 10 ppm in liver, and 2.1 ppm in brain [7]. However, the greatest environmental threat to birds from 4,4-DDE is associated with eggshell thinning and related reproduction failure. Studies cited by Micromedex, Inc. [7] showed 100 percent of black-crowned night heron eggs collected from Colorado and Wyoming in 1979 contained concentration of 4,4-DDE ranging from 0.33 to 44 ppm (wet weight) as did 98 percent of colonial waterbirds eggs collected from Green Bay and Lake Michigan between 1975 and 1980 (0.30 to 44 ppm wet weight). Steep declines in populations of birds such as eagles, peregrine falcons, ospreys, and brown pelicans that occupy upper trophic levels prompted the United States and many other developed countries to ban the use of 4,4-DDT in the early 1970's.

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4,4'-DDD

CAS NUMBER

72-54-8

COMMON SYNONYMS

p,p' - DDD; 4,4-Dichlorodiphenyldichloroethane; 1,1-Dichloro-2,2-bis(p-chlorophenyl) ethane; 1,1'-(2,2-Dichloroethylidene)bis[4-chlorobenzene]

ANALYTICAL CLASSIFICATION

Pesticide (organic)

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble (maximum 0.16 mg/L at 25°C) [1]
Vapor Pressure: 10.2 x 10^{-7} mm Hg at 30°C [1]
Henry's Law Constant: 7.96E-6 atm-m^3/mole [2]
Specific Gravity: 1.385 gm/m^3 [1]
Organic Carbon Partition Coefficient: 770,000 [1]

FATE DATA: HALF-LIVES

Soil: 2 - 15.6 years [3]
Air: 17.7 hours - 7.4 days [3]
Surface Water: 2 - 15.6 years [3]
Groundwater: 70 days - 31.3 years [3]

NATURAL SOURCES

None noted [4].

ARTIFICIAL SOURCES

Contact insecticide; pediculicide [4].

FATE AND TRANSPORT

Like 4,4-DDE and 4,4-DDT, 4,4-DDD is a highly stable compound difficult to remove from soils and waters. It is resistant to photodegradation and/or oxidation [4]. Given the high K_{oc} value, 4,4-DDD would be expected to adsorb very tightly to soils and sediments/suspended solids in waters. In addition to the high K_{oc}, the low level of solubility suggests little probability of groundwater infiltration via leaching. The low values associated with this compound for vapor pressure and Henry's Law constant suggest little tendency to volatilize from soils or waters. The bioconcentration of similar

compounds (namely, 4,4-DDE and 4,4-DDT) suggests that this compound is likely to bioconcentrate. Biodegration, aerobic or anaerobic, is expected to be slow [1].

HUMAN TOXICITY

General. Typically, individuals are exposed to a mixture of 4,4-DDT, 4,4-DDE and 4,4-DDD, and not to the compounds individually. Both 4,4-DDE and 4,4-DDD are contaminants, as well as degradation and metabolic products, of 4,4-DDT [1]. Most of the available toxicity data deal with 4,4-DDT. The major targets of the three compounds are the central nervous system (CNS) and the liver [1]. Data regarding the genotoxicity of the compounds are equivocal [1,5]. The USEPA placed 4,4-DDT, 4,4-DDE and 4,4-DDD in weight-of-evidence cancer Group B2, indicating that they are probable human carcinogens [6].

Oral Exposure. A chronic oral RfD is currently not available for 4,4-DDD [6]. 4,4-DDD is readily absorbed following oral exposure [1]. An oral LD_{50} value of 113 mg/kg is reported for rats [5]. It is not known whether oral exposure to 4,4-DDD will result in effects on human reproduction or development. There is no evidence that 4,4-DDD causes cancer in humans, but studies in animals suggest that oral exposure results in liver cancer [5]. The USEPA derived an oral slope factor of 0.24 $(mg/kg/day)^{-1}$ based on the incidence of liver tumors in mice [6].

Inhalation Exposure. A chronic inhalation RfC is not available for 4,4-DDD [6]. Inhalation of 4,4-DDD is considered to be a minor route of entry because 4,4-DDD is a large particle and, when inhaled, is trapped in the upper regions of the respiratory tract and eventually swallowed [1]. Data are not available regarding the toxicity of inhaled 4,4-DDD in humans or animals [1].

Dermal Exposure. Dermal LD_{50} values in rabbits range from 1200 to 5000 mg/kg [1,5]. Further information regarding the toxicity of dermal exposure to 4,4-DDD were not located.

ECOLOGICAL TOXICITY

General. 4,4-DDD was widely used as an insecticide until 1972, when its use in the United States was banned. However, it is still manufactured and used elsewhere in the world. It is also produced from the anaerobic decomposition of 4,4-DDT in the environment [7].

As would be expected from this class of compounds, 4,4-DDD has a high environmental toxicity to invertebrates and is also quite toxic to fish, birds, and mammals. However, the primary concerns related to 4,4-DDD are its persistence in the environment, its ability to

bioconcentrate in almost all classes of biota, and its capacity to biomagnify through the food chain.

Vegetation. Although no data was found on the phytotoxicity of 4,4-DDD, the risk of this compound to plants is probably low. According to Micromedex, Inc. [8], enough 4,4-DDT was produced to cover all of the arable land in the world with this compound and its metabolites 4,4-DDD and 4,4-DDE at a rate of 1.5 pound per once. Despite the abundance of these chemicals, the scientific literature is virtually devoid of information on phytotoxicity. This implies that 4,4-DDD has low toxicity to plants.

Like 4,4-DDT, 4,4-DDD bioconcentrates in aquatic plants. Studies summarized by Micromedex, Inc. [8] show a bioconcentration factor in algae of more than 6,200. Tissue concentrations in aquatic vasuclar plants of 0.5 μg/kg dry weight were found in Finnish lakes. Although in-tissue concentrations of DDT may not be toxic to the plants, they are important as sources of 4,4-DDD in higher trophic levels. Concerning the structurally similar compound 4,4-DDT, Johnson and Finley [9] state that "Food seems to be more important than water as a source of body residues," while a study on DDE (another metabolite of DDT with a similar chemical structure) summarized by the USEPA [7] found concentration factors of 10^4 in mosquito larvae and fish exposed in a food-chain microcosm, but only 10^2 through aquatic exposure where a food chain did not exist.

Aquatic Life. The USEPA has not established a criterion on 4,4-DDD for the chronic protection of freshwater aquatic life. However, because of the chemical simularities between 4,4-DDD and 4,4-DDT, it is assumed that the 4,4-DDT criteria would provide adequate protection if applied to 4,4-DDD. The federal aquatic life criterion for 4,4-DDT for the chronic protection of freshwater aquatic life is 0.001 μg/L [10].

4,4-DDD appears to be slightly less toxic to aquatic fauna than 4,4-DDT. Acute toxicities (96-hour LC_{50}s) for 4,4-DDD for freshwater aquatic invertebrates summarized by Johnson and Finley [9] and Micromedex, Inc. [8] ranged from 0.6 μg/L to 380 μg/L, with approximately half of the values above 10 μg/L. Acute toxicities for fish ranged between 18 μg/L and 70 μg/L 4,4-DDD for sensitive species such as walleye, bass, and trout, and to more than 1,500 μg/L for species such as the catfish and fathead minnow [8]. Acute toxicities for 4,4-DDT for batch invertebrates and fish seldom exceed 10 μg/L.

A major concern to aquatic life is the bioconcentration of 4,4-DDD. Studies reported by the USEPA [7] and Micromedex, Inc. [8] show bioconcentration factors for invertebrates and fish generally ranging from 10^3 to 10^5. Bioaccumulation of 4,4-DDD is important both because the chemical can build up to toxic concentrations in the animal's tissues and because it serves as a source of toxic levels of 4,4-DDD to higher trophic levels. The classic example, as reported by the USEPA [7], occurred at Clear Lake, California. This lake was treated three times from 1949 to 1957 with 4,4-DDD at concentrations of 14 and

20 ppb to control gnats. The deaths of numerous grebes (aquatic birds), found to contain up to 1,600 ppm 4,4-DDD in their fatty tissue, prompted examination of 4,4-DDD levels in fish. Analysis of nine fish species from the lake showed concentrations of DDD in edible fish ranging from 5 ppm to 221 ppm, with DDD levels in visceral fat exceeding 2,000 ppm in some samples.

Wildlife. Toxicity of 4,4-DDD to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents and rabbits. In the body, 4,4-DDD accumulates chiefly in the adipose tissue, but is also found in significant concentrations in the liver, brain, and muscle tissues [11]. Tissue concentrations of 4,4-DDD in both wild rabbits and white-tailed deer collected at 4,4-DDT-treated system fields ranged up to approximately 1.5 ppm and averaged 0.32 ppm for rabbits and 0.62 ppm for deer [8].

Birds are also susceptible to 4,4-DDD poisoning. Studies summarized in Micromedex Inc. [8] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LD_{50}s for ingestion of 4,4-DDD ranging from 445 ppm to 4,800 ppm. Bioaccumulation also occurs in birds, as evidenced by the Clear Lake incident cited earlier. In other studies summarized by Micromedex, Inc. [8], dead or moribund bald eagles collected from 32 states had median carcass concentrations of 4,4-DDD of 10.7 ppm, while ospreys collected from six eastern states had maximum wet weight 4,4-DDD concentrations of 18 ppm in both brain and carcass. However, the greatest environmental threat to birds from 4,4-DDD is associated with eggshell thinning and related reproductive failure. Studies cited by Micromedex, Inc. [8] showed 89 percent of bald eagle eggs collected from 1969 to 1979 contained measurable concentrations of 4,4-DDD, as did 16 percent of black-crowned night heron eggs collected in 1979. Steep decline in populations of birds such as eagles, peregrine falcons, as preys, and brown pelicans that occupy upper trophic levels prompted the United States and many other developed countries to ban the use of 4,4-DDD and 4,4-DDT in the early 1970's.

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4,4'-DDT

CAS NUMBER

50-29-3

COMMON SYNONYMS

p,p' - DDT; 4,4-Dichlorodiphenyltrichloroethane, 1,1-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]

ANALYTICAL CLASSIFICATION

Pesticide (organic).

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble (maximum 0.0034 mg/L at 25°C) [1]
Vapor Pressure: 5.5 x 10^{-6} mm Hg at 20°C [1]
Henry's Law Constant: 5.13 x 10^{-4} atm-m^3/mole [1]
Specific Gravity: 0.98 - 0.99 gm/ml at 20°C [2]
Organic Carbon Partition Coefficient: 243,000 [1]

FATE DATA: HALF-LIVES

Soil: 2 - 15.6 years [3]
Air: 17.7 hours - 7.4 days [3]
Surface Water: 7 - 350 days [3]
Groundwater: 16 days - 31.3 years [3]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Contact insecticide, pesticide [2].

FATE AND TRANSPORT

Like 4,4-DDD and 4,4-DDE, 4,4-DDT is a highly stable compound and is considered a persistent pollutant in soils and waters. It is generally resistant to photodegradation and/or oxidative processes [4]. Given the high K_{oc} value, 4,4-DDT is expected to adsorb very tightly to soils, sediments and suspended solids in waters. In addition to the high K_{oc} value, the low level of solubility suggests little probability of groundwater infiltration via leaching. The low values associated with this compound for vapor pressure and Henry's Law constant suggest little tendency to volatilize from soils or waters. The

bioconcentration factor (54,000) associated with this compound suggests a readiness to bioconcentrate in aquatic organisms [5]. Biodegradation, aerobic or anaerobic, is expected to be slow [1].

HUMAN TOXICITY

General. Typically, individuals are exposed to a mixture of 4,4-DDT, 4,4-DDE and 4,4-DDD, and not to the compounds individually. Both 4,4-DDE and 4,4-DDD are contaminants, as well as degradation and metabolic products, of 4,4-DDT [1]. Most of the available toxicity data deal with 4,4-DDT. The major targets of the three compounds are the central nervous system and the liver [1]. Data regarding the genotoxicity of the compounds are equivocal [1,2]. The USEPA placed 4,4-DDT, 4,4-DDE and 4,4-DDD in weight-of-evidence Group B2, indicating that they are probable human carcinogens [6].

Oral Exposure. A chronic oral RfD of 0.0005 mg/kg/day is based on a NOEL of 0.05 mg/kg/day for liver lesions in a subchronic oral study in rats [6]. 4,4-DDT is readily absorbed following oral exposure [1]. Oral LD_{50} values in animals ranged from 87 mg/kg in rats to 400 mg/kg in guinea pigs [1,2]. The human oral LD_{50} value has been estimated at 250 mg/kg [2]. The initial symptoms of oral poisoning include a burning or prickling sensation of the mouth and face, tremor of the extremities, confusion, malaise, headache, fatigue and delayed vomiting [2]. These symptoms can occur as soon as 30 minutes after the ingestion of a large dose or as long as 6 hours after the ingestion of a small dose. Recovery is usually complete within 24 hours after poisoning. Several longer-term studies have been conducted in humans [2]; no adverse effects were observed following treatment with up to 35 mg daily (0.5 mg/kg/day) for 21.5 months. Pathological lesions of the liver and kidneys were reported in chronic studies in animals [2]. There is no evidence that 4,4-DDT affects reproduction or development in humans [1]. There is no evidence that 4,4-DDT causes cancer in humans, but studies in animals suggest that oral exposure results in liver cancer [1]. The USEPA derived an oral slope factor of 0.34 $(mg/kg/day)^{-1}$ based on the incidence of liver tumors in mice [6].

Inhalation Exposure. A chronic inhalation RfC is not available for 4,4-DDT [6]. Inhalation of 4,4-DDT is considered to be a minor route of entry because 4,4-DDT is a large particle and, when inhaled, is trapped in the upper regions of the respiratory tract and eventually swallowed [1]. In occupationally exposed workers, no overt symptoms of exposure were reported, although an increase in neurological effects was suggested [2]. Daily intake in workers was estimated to be approximately 18 mg/man (0.25 mg/kg/day) [2]. Limited, short-term inhalation studies in animals indicate that the central nervous system is the target of 4,4-DDT toxicity [2]. An inhalation unit risk of 9.7×10^{-5} was calculated from the oral slope factor [6].

Dermal Exposure. Dermal LD_{50} values ranged from 300 mg/kg in rabbits to 3000 mg/kg in rats [1,2]. Dermal contact with 4,4-DDT does not appear to cause irritation or systemic effects [2].

ECOLOGICAL TOXICITY

General. 4,4-DDT was widely used as an insecticide until 1972, when its use in the United States was banned. However, it is still manufactured and used elsewhere in the world. As would be expected from this class of compounds, 4,4-DDT has a high environmental toxicity to invertebrates and is also quite toxic to fish, birds, and mammals. However, the primary concerns related to 4,4-DDT are its persistence in the environment, its ability to bioconcentrate in almost all classes of biota, and its capacity to biomagnify through the food chain.

Vegetation. Although no data were found on the phytotoxicity of 4,4-DDT, the toxicity of this compound to plants is probably low. Since the 1940's, more than 3.5 billion pounds of 4,4-DDT have been produced, which is an amount sufficient to cover all of the arable land in the world at the rate of 1.5 pounds per acre [7]. Because of the environmental persistence of DDT and its metabolities, this application rate would have resulted in a concentration of 4,4-DDT, 4,4-DDD, and/or 4,4-DDE of approximately 750 μg/kg in arable surface soils worldwide. Despite the abundance of these chemicals, the scientific literature is virtually devoid of information on phytotoxicity. This implies that 4,4-DDT, 4,4-DDD, and 4,4-DDE have low toxcicities to plants.

4,4-DDT bioconcentrates in many species of aquatic plants. Studies summarized by Micromedex, Inc. [7] show a bioconcentration factor in *Cladophora* (a green algae) of more than 21,000. Bioconcentration factors in aquatic vasuclar plants range from approximately 500 to 14,000. Although in-tissue concentrations of 4,4-DDT may not be toxic to the plants, they are important as sources of 4,4-DDT in higher trophic levels. Johnson and Finley [8] state that "Food seems to be more important than water as a source of body residues," while a study on DDE (a metabolite of 4,4-DDT with a similar chemical structure) summarized by the USEPA [9] found concentration factors of 10^4 in mosquito larvae and fish exposed in a food-chain microcosm, but only 10^2 through aquatic exposure where a food chain did not exist.

Aquatic Life. The federal aquatic life criterion for 4,4-DDT for the chronic protection of freshwater aquatic life is 0.001 μg/L [10].

These standards derive from the high toxicity of 4,4-DDT to aquatic invertebrates and fish. For example, studies cited in Johnson and Finley [8] and Micromedex, Inc. [7] show most 96-hour LC_{50}s (acute toxicities) for both invertebrates and fish between 1 and 10 μg/L.

Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [11].

A major concern to aquatic life is the bioconcentration of 4,4-DDT. Numerous studies reported by the USEPA [9] and Micromedex, Inc. [7] show bioconcentration factors for invertebrates and fish generally ranging from 10^3 to 10^5. Residue accumulations in fish of up to 2 million have been reported [11]. Bioaccmulation of 4,4-DDT is important both because the chemical can build up to toxic concentrations in the animal's tissues and because it serves as a source of toxic levels of 4,4-DDT to higher trophic levels.

Wildlife. Toxicity of 4,4-DDT to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents and rabbits. In the body, 4,4-DDT and its metabolites accumulate chiefly in the adipose tissue, but are also found in significant concentrations in the liver, brain, and muscle tissues [12]. Cattle and swine fed 25 ppm in the diet for 28 days had 4,4-DDT levels in fat of 22 ppm and 10 ppm, respectively [12].

Birds are also susceptible to 4,4-DDT poisoning. Studies summarized by Micromedex, Inc. [7] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LD_{50}s for ingestion of 4,4-DDT ranging from 300 ppm to 4800 ppm. Bioaccumulation also occurs in birds, with mean wet weight concentrations in muscle tissue from gamebirds (goose, quail, and woodcock) in several Tennessee counties ranging from 2.9 mg/kg to 9.9 mg/kg [13]. Bald eagle carcasses showed 4,4-DDT concentrations as high as 25 ppm (lipid basis), while ospreys accumulated 4,4-DDT up to 5.7 ppm (wet weight) [7]. However, the greatest environmental threat to birds from 4,4-DDT and its metabolities is associated with eggshell thinning and associated reproductive failure. Studies cited by the USEPA [11] showed that dietary intake of 4,4-DDT at more than 3 mg/kg wet weight in natural food adversely affected reproduction in captive waterfowl. By the late 1960's, populations of birds occupying upper trophic levels, such as eagles, peregrine falcons, ospreys, and brown pelicans, had declined sharply because of eggshell thinning caused by 4,4-DDT and its metabolities in the natural diet. Concerned about these declining populations lead the United States and many other developed countries to ban to use of 4,4-DDT in the early 1970's.

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ENDOSULFAN

GENERAL

Endosulfan is a widely-used insecticide. It is a mixture of two isomers, known as endosulfan I (a-endosulfan) and endosulfan II (b-endosulfan) [1]. The information presented below pertains to the mixed isomers unless otherwise specified.

CAS NUMBERS

Endosulfan	115-29-7
Endosulfan I	959-98-8
Endosulfan II	33213-65-9

COMMON SYNONYMS

Endosulfan: Thiodan, [1].

Endosulfan I: a-Endosulfan, a-Thiodan, [1].

Endosulfan II: Endosulfan, b-endosulfan, b-Thiodan, [1].

ANALYTICAL CLASSIFICATION

Pesticide.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.45 to 0.51 mg/L at 20°C [2]
Vapor Pressure: 1.0×10^{-5} mm Hg at 25°C [2]
Henry's Law Constant: 1.0×10^{-5} atm-m^3/mole at 25°C [1]
Specific Gravity: 1.75 [3]
Organic Carbon Partition Coefficient: 3,162 [1]

FATE DATA: HALF-LIVES

For the technical-grade mixture of endosulfan (approximately 64-76% endosulfan I and 29-32% endosulfan II).

Soil: 4.5 hours to 9.1 days [4]
Air: 2.5 to 24.8 hours [4]
Surface Water: 4.5 hours to 9.1 days [4]
Groundwater: 4.5 hours to 9.1 days [4]

NATURAL SOURCES

None [1].

ARTIFICIAL SOURCES

Non-systemic, contact insecticide. [3,5]

FATE AND TRANSPORT

Endosulfan is a colorless-to-brown crystalline solid with a sulfur dioxide odor. Technical endosulfan is composed of a-endosulfan (64 to 76%) and b-endosulfan (29 to 32%). For releases of endosulfan to soil, the primary removal/transport mechanisms will be hydrolysis and biodegradation, especially under alkaline conditions. In addition, endosulfan deposited upon the soil surface may photolyze. Given the low level of water solubility and the low sorptive capability of endosulfan, volatilization and leaching to groundwaters are not expected to be significant. For releases to surface waters, hydrolysis under alkaline conditions is expected to proceed readily; neutral and acidic waters slow the rate of hydrolysis. Biodegradation and volatilization from surface waters should also be significant removal/transport mechanisms. Products of biodegradation and/or abiotic degradation include endosulfan sulfate (the primary metabolite) under aerobic conditions, and endosulfan diol and endosulfan-a-hydroxy ether under anaerobic (methanogic) conditions. Finally, oxidation of endosulfan in waters may also be expected, to a lesser degree. Given the high K_{oc} (values from 2,344 to 6,761) and BCF (values from 2,754 to 28,840) for endosulfan, its isomers, and the primary metabolite (endosulfan sulfate), bioconcentration in aquatic organisms is expected to be significant. Atmospheric concentrations of endosulfan are predicted to undergo reaction with photochemically-produced hydroxyl radicals. Adsorption of endosulfan onto particulate matter may increase the atmospheric residence time. In addition, photolysis may also prove to be a removal mechanism for atmospheric endosulfan.

Of the two isomers endosulfan I exhibits a greater potential for bioconcentration, sorption to organic matter, and, therefore, a more limited mobility from soils to groundwater or surface water (via leaching and runoff). The main product of degradation, endosulfan sulfate, exhibits this trait of immobility and bioconcentratibility as well [2].

HUMAN TOXICITY

General. Endosulfan has caused nervous system damage and death in humans and animals. Adverse effects to the liver, kidney, blood, immune system, and reproductive organs have also been observed in laboratory animals [1]. The USEPA has not evaluated endosulfan for evidence of human carcinogenicity [6,7].

Oral Exposure. A chronic RfD of 5×10^{-5} mg/kg/day is based on an LEL of 0.15 mg/kg/day determined for kidney toxicity following oral administration in a two-generation rat reproduction study [6]. There is indirect evidence that endosulfan is absorbed following ingestion by humans. Studies in mice indicated that absorption could

be as high as 78% and 85% for a- and b-endosulfan, respectively. The acute oral LD_{50} in rats ranges from 76 mg/kg for a-endosulfan to 240 mg/kg for b-endosulfan. In laboratory animals ingestion has resulted in damage to the nervous system, lungs, blood, liver, kidney, immune system, and reproductive organs in both males and females. Adverse developmental effects have also been noted. A number of human deaths have been attributed to ingestion of endosulfan, but the amounts have not been quantified. The symptoms of exposure included gagging, vomiting, diarrhea, agitation, writhing, unconsciousness, cyanosis, dyspnea, foaming of the mouth, and noisy breathing. In one case of attempted suicide, approximately 60 mg (roughly 0.86 mg/kg) was ingested by a 20-year-old man. Tachycardia, hypertension, and cardiogenic shock followed. Respiratory distress lasted about 2 weeks. [1].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for endosulfan [6,7]. Indirect evidence indicates that endosulfan is absorbed following inhalation in both humans and animals. A 4-hour LC_{50} value of 350 mg/m^3 was reported for male rats. Details on this study are lacking. Adverse neurological effects have been observed in humans following inhalation of endosulfan. However, confounding factors in these studies (e.g., chronic alcohol consumption) limit their usefulness [1].

Dermal Exposure. Animal studies provide indirect evidence that endosulfan is absorbed following dermal exposure. The dermal LD_{50} in rabbits has been reported to range from 167 to 182 mg/kg. The most prominent signs of acute overexposure to endosulfan following dermal contact are neurological; that is, muscle tremors, hyperactivity, and convulsions. Adverse effects on the liver, kidney, and blood have also been noted following dermal exposure in experimental animals [1].

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ENDRIN
ENDRIN KETONE

GENERAL

Endrin is a pesticide that has been used to control insects and rodents. It is not currently produced or sold for general use in the United States. Endrin ketone is a breakdown product of endrin [1]. Little information pertaining to endrin ketone was located; therefore, all information in this profile applies specifically to endrin unless explicitly stated otherwise.

CAS NUMBERS

Endrin	72-20-8
Endrin ketone	53494-70-5

COMMON SYNONYMS

Endrex, hexadrin, mendrin, nendrin [2,3,4]

ANALYTICAL CLASSIFICATION

Pesticide

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.25 mg/L at 25°C [1]
Vapor Pressure: 7.0×10^{-7} mm Hg [2]
Henry's Law Constant: 5.0×10^{-7} atm-m^3/mole [2]
Specific Gravity: 1.7 at 20/4°C [1]
Organic Carbon Partition Coefficient: 8,318 [2]

FATE DATA: HALF-LIVES

Soil: 4 to 14 years [2]
Air: 0.06 hours [2]
Surface Water: 4 to 14 years [2]
Groundwater: ND

NATURAL SOURCES

None noted.

ARTIFICIAL SOURCES

Insecticide; avicide; rodenticide [3,4].

FATE AND TRANSPORT

Endrin is a white, odorless, crystalline solid when pure, or a light-tan solid with a faint chemical odor when at technical- grade purity. It is soluble in acetone, benzene, carbon tetrachloride, hexane, xylene, aromatic hydrocarbons, esters, and ketones, but only marginally soluble in water. Releases of endrin to soils are highly resistant to degradation of any form. Endrin sorbs strongly to organic matter in soils and, therefore, can be expected to be highly immobile in soils. Endrin has, however, been detected in groundwater samples; this suggests that leaching may be possible under certain conditions. In addition, small amounts of endrin may volatilize to the atmosphere. The most prominent mechanism for transport to surface waters, other than direct discharge, is via sorption to particulate matter and subsequent soil erosion after rainfall or irrigation incidents. The primary removal/degradation mechanism in surface waters is photoisomerization of endrin to endrin ketone. Endrin will adsorb strongly to suspended solids/sediments in waters; this strong sorption will reduce the rate of volatilization from surface waters. Endrin resists biodegradation in soils and aerated waters; biodegradation may occur in flooded soils and anoxic waters (anaerobic conditions) at a somewhat enhanced rate. Products of microbial degradation include aldehydes and ketones, of which endrin ketone was the only metabolite identified. Typically, though, endrin will prove highly persistent in soils and waters. Given the high BCF of 15,136 for endrin, bioconcentration in aquatic organisms should be expected to be significant. Endrin found in the atmosphere is expected to exist primarily associated with particulate matter (via sorption), with small amounts found in the vapor phase. The primary removal/degradation mechanism for endrin in the atmosphere is predicted to be photoisomerization to endrin ketone. Additionally, reactions with hydroxyl radicals may be expected [2,4].

HUMAN TOXICITY

General. Endrin is a central nervous system depressant and hepatotoxin in humans. There is evidence that endrin may cause chromosomal damage [5]. The USEPA does not currently provide any toxicity values for endrin ketone [5,6]. The USEPA has placed endrin in weight-of-evidence Group D, indicating that it is not classifiable as to carcinogenicity in humans [5].

Oral Exposure. A chronic RfD of 3×10^{-4} mg/kg/day is based on a NOEL of 0.025 mg/kg/day and a LOAEL of 0.05 mg/kg/day determined for histological lesions in the liver and occasional convulsions following dietary administration to dogs [5]. Human case studies have reported that endrin is absorbed following oral exposure. No quantitative data were available regarding absorption by humans or animals. The oral LD_{50} in male rats reportedly ranges from 28.8 to 43.4 mg/kg, while that for female rats ranges from 7.3 to 16.8 mg/kg. A number of human deaths have been linked to ingestion of endrin. In one

case, flour containing 2,153 to 3,367 ppm was used to make bread, which was then consumed by up to 1,600 people. Twenty-six deaths occurred within 12 hours of the onset of symptoms [1]. A dose of 1 mg/kg may cause symptoms in humans [5]. Symptoms of oral exposure in humans and/or other mammals include central nervous system effects such as muscle contractions, hyperexcitability, and convulsions; degeneration of liver, kidney, and brain; and pulmonary edema. A single 1.5 mg/kg dose of endrin administered to pregnant hamsters had serious adverse effects on fetal development of the brain and spinal cord [1].

Inhalation Exposure. The USEPA does not currently provide an RfC for endrin [5,6]. Case reports of occupational exposure, as well as animal studies indicate that absorption takes place following inhalation exposure. However, no information was located on the rate and extent of such absorption. Six species of mammals were exposed to a concentration of 15 mg/m^3 for 7 hr/day, 5 days/week, for 130 exposures; 20% of the animals died. The dead animals were characterized by degenerative changes to the kidney, liver, and brain. Deaths in humans exposed occupationally have not been reported, although tonic-clonic contractions and seizures have been noted. Human and animal data suggest that death by inhalation is unlikely at typical concentrations encountered. Symptoms of exposure in humans are related to central nervous system effects, and include twitching and jerking of muscles, dizziness, mental confusion, and seizures [1].

Dermal Exposure. Endrin is rapidly absorbed through human skin. Symptoms appear between 20 minutes and 12 hours after exposure [5]. Rabbits exposed dermally experienced toxicity and death, indicating absorption. No quantitative data were available regarding absorption by humans or animals. A minimum lethal dose of 94 mg/kg and a NOAEL of 60 mg/kg was determined for rabbits by dermal exposure. Symptoms of intoxication following dermal application in rabbits include convulsions, tremors, twitching, salivation, lacrimation, shallow breathing, brain degeneration, fatty degeneration of the liver, and degenerative changes in the kidney [1].

ECOLOGICAL TOXICITY

General. Endrin was developed and widely used as an insecticide. As would be expected from this class of compounds, it has a high environmental toxicity for invertebrates and is also quite toxic to fish, birds, and mammals. It shows strong tendencies for bioaccumulation, with bioconcentration factors in aquatic systems on the order of 10^4 in invertebrates and fish, and 10^3 for algae [7,8,9].

Vegetation. Endrin is a very stable, chlorinated hydrocarbon insecticide with a soil half-life of 14 years or more [9]. It has a low water solubility and strongly adsorbs to the soil [9]. Therefore, endrin in soils would have a low bioavailability to plants.

Prager [8] included phytotoxicity information for terrestrial plants in a review article on endrin. Studies included in this review showed that endrin in the soil at concentrations of 1 to 30 ppm produced physiological effects in several crop species. At 100 ppm in soil, endrin significantly decreased the fresh weight of corn and bean plants. The growth rate of onion seedlings in soils containing approximately 1 ppm endrin was not affected. The use of 0.5 percent endrin as a coating for Douglas fir seeds had no significant effect on either germination or seedling growth. The use of 0.1 percent endrin to coat barley seeds had no effect on germination, but resulted in significantly reduced seedling height at 7 days and significantly higher pollen sterility in mature plants.

Toxicities of endrin to aquatic plants vary. Studies summarized by Prager [8] show inhibition of growth in freshwater algae at concentrations ranging from 0.475 mg/L to 20 mg/L. Endrin has been shown to bioaccumulate in freshwater algae, with bioconcentration factors ranging from 100 to 4,600 [8,9]. No data were found on the toxicity of endrin to freshwater vascular plants or its bioaccumulation in these life forms..

Aquatic Life. The federal criterion for endrin for the chronic protection of freshwater aquatic life is 0.0023 μg/L [10]. This standard derives from the high toxicity of endrin to aquatic invertebrates and fish. For example, studies cited in several review articles [7,8,9] show 96-hour LC_{50}s (acute toxicities) for invertebrates range from 0.08 to 64 μg/L, with most values between 1 and 10 μg/L. Acute (96-hour) LC_{50}s for fish were between 0.1 μg/L and 4 μg/L, with most values less than 1 μg/L. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [7].

A major concern for aquatic life is the bioconcentration of endrin. Studies have shown concentration factors ranging from 8,600 to 49,000 in snails, and from 7,000 to 15,000 in several species of freshwater fish [7,8,9]. However, endrin has been found to be eliminated quickly in aquatic vertebrates after termination of exposure. In studies cited by the USEPA [7], endrin levels in channel catfish and flagfish declined by 95 percent in 13 and 5 days, respectively, while tissue residues of 78 ppb in marine spot were reduced below detection levels in 13 days.

Wildlife. Toxicity of endrin to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents, dogs, and rabbits. Like other organochlorines, endrin tends to accumulate most heavily in adipose tissue [8]. However, as in aquatic vertebrates, nonlethal doses of endrin are rapidly excreted [8]. As a result, endrin does not bioconcentrate in the tissues of mammals as it does in lower animals. For example, dogs, cattle, and swine that were fed nonlethal doses of endrin from 4 weeks to 18 weeks had adipose tissue concentrations of endrin ranging from 0.25 to 8 times those in their diets [8]. However, these levels would be expected to decline

rapidly. The biological tissue half-life of endrin in rats is 3 to 4 days, and in rabbits, more than 96 percent of radioactively labeled endrin was excreted in 49 days [8].

Birds are also susceptible to endrin poisoning. Studies summarize by Micromedex, Inc. [9] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LC_{50}s for ingestion of endrin ranging from 14 ppm to 22 ppm. However, as with mammals, bioaccumulation in bird tissues is limited by the ability of this biological class to excrete endrin. For example, after endrin was eliminated from their diets, mallard drakes with endrin tissue concentrations of 4.25 ppm eliminated 50 percent of the endrin in their tissues within 3 days, lost 50 percent of the remaining tissue endrin in the next 9 days, and had eliminated 90 percent of the original tissue burden of endrin in 33 days.

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HEPTACHLOR
HEPTACHLOR EPOXIDE

GENERAL

Heptachlor is a man-made insecticide. It is a component of the pesticide chlordane. Heptachlor epoxide is a breakdown product of heptachlor.

CAS NUMBERS

Heptachlor	76-44-8
Heptachlor Epoxide	1024-57-3

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Pesticide (organic).

PHYSICAL AND CHEMICAL DATA

Characteristic	Heptachlor	Heptachlor Epoxide
Water Solubility at 25°C (mg/L) [1]:	0.18	0.200
Vapor Pressure at 25°C (mm Hg) [1]:	4×10^{-4}	1.95×10^{-5}
Henry's Law Constant at 25°C (atm-m^3/mole) [1]:	1.48×10^{-3}	3.2×10^{-5}
Specific Gravity at 9/4°C [2]:	1.57	ND
Organic Carbon Partition Coefficient [2]:	21,878	2,188 to 23,442

FATE DATA: HALF-LIVES

Medium	Heptachlor	Heptachlor Epoxide
Soil [3]:	23.1 hr to 5.4 da	33 da to 1.5 yr
Air [3]:	59 min to 9.8 hr	6 hr to 2.5 da
Surface Water [3]:	23.1 hr to 5.4 da	33 da to 1.5 yr
Groundwater [3]:	23.1 hr to 5.4 da	1 da to 3.0 yr

NATURAL SOURCES

None [2].

ARTIFICIAL SOURCES

Heptachlor was manufactured in the past for use as an insecticide. Since 1983 its use has been restricted to termite control. Chemical and biological transformation of heptachlor in

the environment produces heptachlor epoxide. Heptachlor epoxide is not produced commercially, nor is it normally present in commercial heptachlor [1,2,4].

FATE AND TRANSPORT

Heptachlor strongly adsorbs to soils and should not leach extensively to groundwater. In soil, heptachlor will degrade to 1-hydroxychlordene and heptachlor epoxide, among other species. Volatilization from soil surfaces will be significant. Significant biodegradation occurs under both aerobic and anaerobic conditions. The volatilization half-life of heptachlor in aquatic media is estimated to range from 2 to 10 days. Heptachlor is expected to exist almost entirely in the vapor phase in ambient air. Reactions with photochemically-produced hydroxyl radicals and ozone in the atmosphere may be important fate processes. The physical removal of heptachlor from air by rainfall is of limited importance [1].

Heptachlor epoxide adsorbs strongly to soils and sediments/suspended solids in waters. On the soil surface, heptachlor epoxide may slowly photodegrade or volatilize, although it is expected to persist for many years. This compound is not expected to leach significantly to lower soil layers or to groundwaters. Little or no biodegradation, under aerobic or anaerobic conditions, is expected to occur in either soils or waters. In surface waters, photolysis may occur significantly in the presence of photosensitizers. Slow volatilization may occur as well, but is not considered a primary loss mechanism. Heptachlor epoxide, given its vapor pressure value, is expected to be found in the vapor phase, as well as adsorbing to particulate matter, in ambient air. Atmospheric loss mechanisms include vapor-phase reactions with hydroxyl radicals (considered an important process), gravitational setting of particulate matter, and atmospheric washout of heptachlor epoxide via rainfall. Wet deposition of heptachlor epoxide is considered to be the primary contamination mechanism of lakes. Atmospheric photolysis of heptachlor epoxide is expected to occur, as well as photolytic reactions occurring on plant surfaces (degradation products are ketones). This photolytic rate is affected by the form of solid material and the intensity of illumination. Finally, bioconcentration of this material in aquatic organisms is expected to occur readily [1].

HUMAN TOXICITY

General. Humans and animals may take in heptachlor epoxide directly, or they may produce it themselves following exposure to the insecticide heptachlor. Tremors and convulsions have been observed in humans and animals exposed to heptachlor. No reports of human fatalities were located [2]. The USEPA has placed both heptachlor and heptachlor epoxide in weight-of-evidence Group B2, indicating that they are probable human carcinogens [5].

Oral Exposure. A chronic RfD for heptachlor of 5 x 10^{-4} mg/kg/day is based on a NOEL of 0.15 mg/kg/day and an LEL of 0.25 mg/kg/day determined for increased liver weight in a chronic rat feeding study. A chronic RfD for heptachlor epoxide of 1.3 x 10^{-5} mg/kg/day is based on an LEL of 0.0125 mg/kg/day determined for increased liver-to-body weight ratio following subchronic administration to dogs [5]. Both heptachlor and heptachlor epoxide are absorbed after oral administration to rats. The acute oral LD_{50} values for heptachlor in rodents range from 40 to 162 mg/kg. The acute oral LD_{50} values for heptachlor epoxide in rats, mice, and rabbits range from 39 to 144 mg/kg. No information was available on human fatalities resulting from the ingestion of heptachlor or heptachlor epoxide. Cataracts and decreased postnatal survival were reported in the progeny of rats fed diets containing heptachlor [2]. An oral slope factor of 4.5 $(mg/kg/day)^{-1}$ is based on hepatocellular carcinomas observed in mice following dietary exposure to heptachlor. An oral slope factor of 9.1 $(mg/kg/day)^{-1}$ is based on hepatocellular carcinomas observed in mice following dietary exposure to heptachlor epoxide [5].

Inhalation Exposure. The USEPA does not currently provide RfC values for heptachlor or heptachlor epoxide [5,6]. Heptachlor epoxide is absorbed following inhalation. Heptachlor and heptachlor epoxide inhalation may cause blood dyscrasias [2,4]. An inhalation unit risk of 0.0013 $(mg/m^3)^{-1}$ for heptachlor is based on hepatocellular carcinomas observed in mice following dietary exposure. An inhalation unit risk of 0.0026 $(mg/m^3)^{-1}$ for heptachlor epoxide is also based on hepatocellular carcinomas observed in mice following dietary exposure [5].

Dermal Exposure. Heptachlor is readily absorbed through the skin. The dermal LD_{50} for heptachlor is 195 to 250 mg/kg/day in rats. No information specifically on heptachlor epoxide was located [2].

ECOLOGICAL TOXICITY

General. Heptachlor was developed and widely used as an insecticide for more than 20 years. Heptachlor expoxide is a degradation product of heptachlor. As would be expected, these compounds have a high environmental toxicity to invertebrates and are also quite toxic to fish, birds, and mammals. Heptachlor epoxide also shows strong tendencies for bioaccumulation, with bioconcentration factors on the order of 10^4 in algae, snails, and mosquito larvae and 10^3 for mosquito fish and spot [7].

Vegetation. Heptachlor that enters the soil system is strongly adsorbed to soil particles and resists both further volatilization and leaching into surface or ground waters. This characteristic limits the bioavailability of heptachlor in the soils to plants. In moist soils, heptachlor is decomposed primarily by hydrolysis, although biodegradation may also be

significant. The half-life of heptachlor in soils is calculated to range from 04. to 0.8 years. This was based on data collected in Mississippi, New Jersey and Beltsville, MD [8].

Heptachlor has been shown to inhibit the growth of simple plants like algae at concentrations of 26 to 2,260 μg/L [8]. No information was found concerning phytotoxic effects on higher plants. However, despite the widespread application of this compound for agricultural purposes, including seed treatment, there are few reported adverse effects on crop germination, growth, or yields. Therefore, it is assumed that heptachlor has low toxicity to vegetation.

As discussed previously, heptachlor epoxide is a decomposition product resulting from the hydrolysis of heptachlor. According to Micromedex, Inc. [8], heptachlor epoxide adsorbs strongly to soil and is extremely resistant to biodegradation, persisting for many years in the soil. Its strong bonds to soil also make it unavailable for plant uptake.

Heptachlor epoxide has a relatively low toxicity to plants, Lichtenstein et al. [9] grew corn, oats, peas, and cucumbers in quartz sand (which has minimal sorptivity) that had been treated with 30 ppm (30,000 μg/kg equivalent) of heptachlor epoxide. After 21 days, they found no significant differences in root or stem growth between the test plants and controls. Only oats had a significant decrease in respiration.

Aquatic Life. The federal aquatic life criteria for both heptachlor and heptachlor epoxide for the chronic protection of freshwater aquatic life are 0.0038 μg/L [10].

These standards derive from the high toxicity of heptachlor and heptachlor epoxide to aquatic invertebrates and fish. For example, studies cited in the USEPA "Red Book" [12] show 96-hour LC_{50}s (acute toxicities) for invertebrates of less than 1 μg/L and 96-hour LC_{50}s for fish usually between 1 μg/L and 10 μg/L. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [11].

A major concern for aquatic life is the bioconcentration of heptachlor or its derivatives. Studies cited in the Red Book showed concentration factors ranging from 1,840 in bluegills to 21,300 in estuarine fish [12].

Wildlife. Toxicity of heptachlor and heptachlor epoxide to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents and rabbits. In the body, heptachlor is rapidly transformed into heptachlor epoxide, which accumulates chiefly in the adipose tissue, but which is also found in significant concentrations in the liver, brain, and muscle tissues [8].

The bioaccumulation and bioconcentration of heptachlor epoxide in the body is the primary concern. For example, two horses poisoned by heptachlor had bone marrow concentrations of heptachlor epoxide of 530 mg/kg of fat and 370 mg/kg of fat. Other

tissue concentrations of heptachlor epoxide in these animals were as follows: renal fat - 550 mg/kg; brain - 49 mg/kg [8].

Birds are also susceptible to heptachlor poisoning. Studies summarized by Micromedex, Inc. [8] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LC_{50}s for ingestion of heptachlor ranging from 92 to 480 ppm. The Red Book cites data showing 100 percent mortality of woodcock with a dietary dosage of 0.72 ppm [11]. Bioaccumulation also occurs in birds, with a study cited by Micromedex, Inc. [8] showing that concentrations in the fat of broiler chickens plateaued at levels approximately five times those in their feed.

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BHC
(LINDANE)

GENERAL

BHC is a man-made chemical which exists in eight different isomers. Three of these isomers, alpha-, delta-, and gamma-BHC are addressed in this profile. Technical-grade BHC is a mixture consisting of (by weight) 18-22% alpha-, 40-45% gamma-, and 20-22% delta-BHC.

CHEMICAL IDENTITY

Isomer	CAS No.	Common Synonyms
alpha-Hexachlorocyclohexane	319-84-6	alpha-HCH, alpha-lindane, alpha-benzenehexachloride, alpha-BHC.
delta-Hexachlorocyclohexane	319-86-8	delta-HCH, delta-lindane, delta-benzenehexachloride, delta-BHC.
gamma-Hexachlorocyclohexane	58-89-9	gamma-HCH, lindane, gamma-benzenehexachloride, gamma-BHC.
technical Hexachlorocyclohexane	608-73-1	technical HCH, technical BHC

ANALYTICAL CLASSIFICATION

Pesticide (organic)

PHYSICAL AND CHEMICAL DATA

Water Solubility: 2.00 to 7.3 mg/L [1]
Vapor Pressure: 4.5×10^{-5} to 5.57×10^{-5} mm Hg at 25°C [1]
Henry's Law Constant: 1.06×10^{-5} to 2.92×10^{-6} atm-m^3/mole at 25°C [1]
Specific Gravity: approximately 1.9 at 19/4°C [2]
Organic Carbon Partition Coefficient: 1,000 to 6,463 [1,2]

FATE DATA: HALF-LIVES

Soil: 13.8 to 240 days [3]
Air: 9.24 hours to 3.85 days [3]
Surface Water: 13.8 to 240 days [3]
Groundwater: 5.9 to 270 days [3]

NATURAL SOURCES

None [2].

ARTIFICIAL SOURCES

Insecticide, pediculicide, scabicide, ectoparasiticide [1].

FATE AND TRANSPORT

Lindane (gamma-BHC) in soil is not expected to bind tightly to organic matter. Given a moderate K_{oc} value and a slight solubility in water, lindane is expected to leach slowly to unprotected groundwaters. Lindane can be expected to volatilize from moistened soils. This compound has been shown to support the growth of microorganisms, so biodegradation does occur. Anaerobic biodegradation is expected to proceed much more rapidly than aerobic biodegradation. Metabolites of lindane biodegradation include: chloride ion, 1,2,4-trichlorobenzene, 1,2,3,5- and/or 1,2,4,5-tetrachlorobenzene, 1,2,3,4-tetrachlorobenzene, gamma-2,3,4,5,6-pentachloro-1-cyclohexene, alpha-, beta-, and/or gamma-3,4,5,6-tetrachloro-1-cyclohexane, and pentachlorobenzene. These compounds may undergo further metabolism with the ultimate release of chlorine-free (or nearly chlorine-free) compounds and chloride ion.

Lindane released to water may partition from the water by adsorbing to sediments and suspended solids. Lindane may be expected to bioconcentrate in aquatic organisms in degrees ranging from slight (BCF approximately 63) to significant (BCF approximately 1,622). Lindane will volatilize from waters, but the degree of volatilization is greatly dependent upon the depth of the water (i.e., much slower volatilization at greater depths). Biodegradation, hydrolysis, and photolysis are all loss mechanisms for lindane in aqueous environments. In addition, since products of lindane hydrolysis are more susceptible to photolysis, it is expected that lindane in the aqueous environment will undergo a series of reactions.

Lindane released to the atmosphere is expected to exist almost exclusively in the vapor phase, given lindane's vapor pressure. Lindane in the vapor phase will undergo reactions with hydroxyl radicals. This compound can also be expected to undergo gravitational settling and/or atmospheric washout via rainfall [1].

HUMAN TOXICITY

General. The major effects of exposure to lindane and/or its various isomers in humans include lung irritation, heart disorders, blood disorders, headache, convulsions, and changes in the levels of sex hormones. High level exposure has caused death in both humans and animals. Several forms of BHC have been associated with liver cancer in rodents.

Oral Exposure. Information on RfDs is presented in Table 1. BHC appears to be readily absorbed from the gastrointestinal tract of both humans and animals. The acute oral LD_{50} in male rats is reportedly 88 mg/kg, while that for females is 91 mg/kg [2]. The probable human oral lethal dose is 50 to 500 mg/kg [4]. Symptoms of oral exposure include decreased appetite, vomiting, nausea, diarrhea, seizures, and convulsions. In rats,

exposure to 65 mg/kg/day of gamma-BHC in the feed for 24 weeks resulted in liver injury, while slight kidney damage was noted at 5 mg/kg/day for 39.7 weeks. Adverse effects on fetuses were noted when pregnant rats were exposed to 5 mg/kg/day gamma-BHC for 10 days. Adverse reproductive effects were noted when male rats were fed 75 mg/kg/day gamma-BHC for 90 days [2]. The oral slope factor for alpha-BHC of 6.3 $(mg/kg/day)^{-1}$ is based on liver nodules and hepatocellular carcinomas observed in male mice exposed via diet [4]. The oral slope factor for technical BHC of 1.8 $(mg/kg/day)^{-1}$ is also based on liver nodules and hepatocellular carcinomas observed in male mice exposed via diet [4].

Inhalation Exposure. The USEPA does not currently provide noncarcinogenic inhalation toxicity values for any form of BHC [4,5]. BHC appears to be readily absorbed via inhalation in humans. Death following inhalation exposure appears to have occurred in humans, although details are lacking. Other effects in humans following inhalation exposure have included lung irritation, heart disorders, blood disorders, headache, numbness, vertigo, and changes in the levels of sex hormones [2]. The inhalation unit risk for alpha-BHC of 1.8×10^{-3} $(mg/m^3)^{-1}$ is based on liver nodules and hepatocellular carcinomas observed in male mice exposed via diet [4]. The inhalation unit risk for technical BHC of 5.1×10^{-4} $(mg/m^3)^{-1}$ is also based on liver nodules and hepatocellular carcinomas observed in male mice exposed via diet [4].

Dermal Exposure. At least some of a dermally- applied dose of BHC is readily absorbed by humans and animals. One study found that at least 9% of such a dose is rapidly absorbed. The dermal LD_{50} for gamma-BHC in male rats is reportedly 1,000 mg/kg, while for females it is reported to be 900 mg/kg. At least one human death due to dermal exposure was recorded. Dermal exposure of humans to BHC has resulted in adverse effects on the lungs, heart, blood, liver, skin, and central nervous system [2]. Contact with eyes or skin may produce irritation [4].

ECOLOGICAL TOXICITY

General. Delta-BHC is the only isomer of BHC that is of environmental concern at the landfill sites. However, because it constitutes approximately 20 percent of Technical grade BHC, which is the common name of the commercial product composed largeley of the gamma isomer of BHC, this discussion includes information on lindane as well as delta-BHC.

BHC has been widely used as an insecticide for many years. Although it is a member of the organochlorine class of compounds, it has a somewhat lower environmental toxicity to invertebrates, fish, birds, and mammals than many other compounds in this class. It also shows lower tendencies for bioaccumulation, with biocencentration factors on the order of 10^2 to 10^3 in aquatic invertebrates and fish.

Vegetation. Lindane is used as an insecticide on seeds, vegetables and fruit, woody or ornamentals, and hardwood forests [6]. No data were found indicating adverse effects of lindane or other BHC isomers or plants. Factors indicating that BHC isomers have low phytotoxicity include the low toxicities of most other organochlorines to plants and the use of BHC as a seed treatment, which exposes highly susceptible sprouts and seedlings to high concentrations of this chemical without reported adverse affects.

Aquatic Life. There is no federal criterion for BHC for the chronic protection of freshwater aquatic life. The USEPA has identified a lowest observed effect level (LOEL) of 100 μg/L, but states that there is insufficient data to develop criteria [7].

The "Red Book" [8] recommends a criterion of 0.01 μg/L for freshwater aquatic life. Other studies show 96-hour LC_{50}s (acute toxicities) for invertebrates of 3 μg/L to more than 100 μg/L and 96-hour LC_{50}s for fish usually between 25 μg/L and 90 μg/L [6,9]. The USEPA [8] reports that increased resistance to lindane toxicity has been docuemnted among fish and invertebrates experiencing previous exposure to the chemical. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [8].

Bioconcentration is of lower concern for BHC than for most other organochlorines. Bioconcentration factors in aquatic invertebrates and fish are in the range of 10^2 to 10^3 [6,8,10]. Storage in body fat is directly proportional to concentration in feed [11]. However, lindane is eliminated in less than 2 days when fish are transferred to clean water [10].

Wildlife. Toxicity of BHC to non-human mammals is indicated by the human toxicity information presented earlier, which was based on studies of rodents. The USEPA (1976) [8] identified the dog as the most sensitivie mammal tested and reported that the highest concentration of lindane to have no long-term effects on this species was 15 mg/kg in the diet. In the body, lindane accumulates chiefly in the adipose tissue, reaching equilibrium in 1 to 3 weeks, depending on dietary levels [11]. However, BHC is metabolized in the body and residues disappear within three weeks afeter dosing ceases [11].

Birds are also susceptible to BHC poisoning. Studies summarized in Micromedex, Inc. [6] showed that mallards, ring-necked pheasant, bobwhite quail, and Japanese quail had 5-day LD_{50}s for ingestion of lindane ranging from 425 ppm to more than 2,000 ppm. Bioaccumulation also occurs in birds, with a study cited in Extoxnet [11] showing birds of pray contained up to 89 ppm in adipose tissue. Hoever, based on the ability of animal groups to excrete lindane, it is anticipated that birds also would be able to eliminate body burdens of this chemical after intake was eliminated.

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POLYCHLORINATED BIPHENYLS (PCBS)

GENERAL

Polychlorinated biphenyls (PCBs) represent a class of chlorinated aromatic compounds which, until they were banned in 1979, had widespread industrial application because of their stability, inertness, excellent dielectric properties, and excellent solvent characteristics [1]. There are 209 possible PCB congeners when biphenyl is chlorinated. Monsanto Corporation marketed mixtures of PCBs under the trade name Aroclor. The Aroclors are identified by a four-digit numbering code in which the first two digits indicate biphenyl (12 carbon atoms), and the last two digits indicate the average chlorine content by weight percent. For example, Aroclor 1260 has an average chlorine content of 60%. An exception to this system is Aroclor 1016, with an average chlorine content of 41% [2]. Given their extensive past usage history, PCBs may be expected to be found throughout the environment. This profile addresses four Aroclors and PCBs collectively, as listed below.

CAS NUMBERS

Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
PCBs	1336-36-3

COMMON SYNONYMS

PCBs, Aroclors

ANALYTICAL CLASSIFICATION

Semivolatile organic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 6.00×10^{-3} to 2.40×10^{-1} mg/L at 24 to 25°C [3]
Vapor Pressure: 7.71×10^{-5} to 4.06×10^{-4} mm Hg at 25°C [3]
Henry's Law Constant: 5.60×10^{-4} to 2.70×10^{-3} atm-m^3/mole [3]
Specific Gravity: 1.38 to 1.62 at 25°C [2]
Organic Carbon Partition Coefficient: 5.13×10^3 to 2.63×10^6 [3]

FATE DATA: HALF-LIVES

Soil: 6 to > 365 days [1]
Air: 2 days to 4.7 years [1]
Surface Water: 9.5 hours to > 365 days [1]
Groundwater: persistent

NATURAL SOURCES

None noted.

ARTIFICIAL SOURCES

Electrical transformers; dielectric fluids; solvents.

FATE AND TRANSPORT

As a class of compounds, polychlorinated biphenyls exhibit a tendency to sorb strongly to soils and suspended solids/sediments in waters. PCB releases to the environment, then, will be expected to show very limited mobility and present only a slight danger of leaching to unprotected groundwaters. There is a wide distribution of a variety of microorganisms capable of degrading PCBs, mainly through dechlorination actions. The degradation rate/action of these microorganisms is lowered, however, as the number of chlorine ion substitutions on the biphenyl parent compound increases. In addition, biodegradation rates are slowed by the tight sorptive ability of PCBs, low ambient temperatures, low moisture content, extremes in pH, and available oxygen content (with no biodegradation evidenced under anaerobic conditions). The number of chlorine ion substitutions also affects volatilization and photoionization rates; as chlorine ion substitutions increase, so do these rates. PCBs volatilized to the atmosphere undergo two major modes of degradation: reaction with hydroxyl radicals and/or reaction with ozone. Reaction with hydroxyl radicals (resulting in substitution of OH^- for Cl^- on the biphenyl parent compounds) is the more important of these two processes. Hydrolysis and/or oxidative reactions are not considered to be important fate processes for PCBs. Generally, PCBs having a higher chlorine content exhibit greater persistency in the environment than do PCBs with lower chlorine content. Bioconcentration of PCBs in aquatic organisms is expected to be an important process for all PCBs, and shows an increase as the chlorine content increases [1].

HUMAN TOXICITY

General. PCBs are known to cause skin irritations, such as acne and rashes, in humans. Young children of women who ate foods containing high levels of PCBs, such as fish, before and during their pregnancies may experience learning difficulties. Consumption of contaminated food is presumed to be the major route of exposure for the general population

[2]. The USEPA has placed PCBs in weight-of-evidence Group B2, indicating that they are probable human carcinogens [4].

Oral Exposure. The USEPA does not currently provide an oral RfD for PCBs [4,5]. PCBs are readily absorbed by humans via the oral route. Absorption in rats reportedly ranges from 75% to 90% of the administered dose. Single-dose LD_{50} values determined for rats ranged from 1,010 mg/kg for Aroclor 1254 to 4,250 mg/kg for Aroclor 1242 [2].

Numerous studies have been done on human children born to mothers who consumed large quantities of PCB-contaminated fish while pregnant. In one such study, the concentrations in the fish consumed ranged from 168 ppb to 3,012 ppb. Overall consumption of fish and levels of total PCBs in cord serum were positively correlated with lower birth weight, smaller head circumference, and shorter gestational age. By 7 months of age the infants with the highest levels of PCBs in cord serum scored significantly lower on neurobehavioral tests. By 4 years of age the children with the highest levels of PCBs in cord serum exhibited poorer performance on tests involving short-term memory [2].

Occupational studies have indicated possible PCB-related cancers of the liver, gastrointestinal tract, hematopoietic system, and skin [2]. An oral slope factor of 7.7 $(mg/kg/day)^{-1}$ is based on hepatocellular carcinomas observed in rodents [4].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for PCBs [4,5]. Qualitative evidence exists that PCBs are absorbed via inhalation in humans and rats. NOAELs in rats, rabbits, guinea pigs, and mice exposed for up to 121 days ranged from 5.4 to 8.6 mg/m^3. A LOAEL of 1.5 mg/m^3 for liver and kidney degeneration was determined for rats exposed for 213 days. Upper respiratory tract and eye irritation, cough, and tightness of the chest were symptoms noted in humans exposed to 0.007 to 11 mg/m^3. Low birth weight and shortened gestational age has been correlated with occupational exposure of pregnant women to PCBs; however, confounding factors make these studies suspect [2]. The USEPA does not currently provide an inhalation slope factor or unit risk for PCBs [4,5].

Dermal Exposure. Hard data on dermal absorption of PCBs by humans and animals are lacking. Absorption efficiency in rhesus monkeys and guinea pigs ranged from about 15% to 34%. Median lethal doses for single dermal applications of PCBs to rabbits were as follows (mg/kg): <1,269 for Aroclors 1242 and 1248, <3,169 for Aroclors 1221 and 1262, and <2,000 for Aroclors 1232 and 1260. Liver and kidney damage were noted in rabbits treated dermally 5 days/week for up to 38 days with up to 44 mg/kg/day Aroclor 1260 [2].

ECOLOGICAL TOXICITY

General. Aroclor 1254 and Aroclor 1260 are the only two PCB cogeners of ecological concern at the OB Grounds. Therefore, this discussion is limited to these two compounds.

Environmental persistence of PCBs is determined by the degree of chlorination. Higher chlorobiphenyls, i.e., those with five or more chlorine atoms, are more persistent in the environment than those with three or fewer chlorine atoms. Aroclor 1254 has five chlorine atoms per moleclue, and Aroclor 1260 has six or more, making them among the most stable compounds in this chemical class [6].

Since 1979, the manufacture, processing, distribution, and use of PCB's has been banned in the United States [6]. However, because these chemicals are so stable, the major source of Aroclor 1254 and Aroclor 1260 release to the environment is an enviromental cycling process of these compounds previously introduced into the environment. The cycle involves volatilization from water and soil into the atmosphere with subsequent removal from the atmosphere via wet or dry deposition, followed by revolatilization [7]. Although biodegradation of Aroclor 1254 and Arolclor 1260 may occur very slowly in the environment, no other degradation mechanisms have been shown to be important in natural systems. Therefore, biodegradation may be the ultimate fate process [7].

PCBs have a significant environmental toxicity to invertebrates, fish, birds, and mammals. PCB toxicity is further enhanced by their ability to bioaccumulate and biomagnify in the food chain [6]. Their persistence in the environment, their ability to bioconcentrate in almost all classes of biota, and their ability to bioconcentrate and biomagnify through the food chain make PCBs a potentially significant hazard to fish, wildlife, and invertebrate resources [6].

Vegetation. CH2M Hill [8] summarized data that show that PCBs are not very toxic to terrestrial plants. Beets grown in soils with PCBs at a concentration of 100 mg/kg (dry weight) had no significant reduction in growth, while a significant reduction in growth of corn was noted at this concentration. Ostrich ferns growing on sediments with PCB residues of 26 mg/kg (mostly Aroclor 1254) showed five-fold increases in somatic mutations (genetic damage), but other plants in the contaminated area were not genetically damaged. While one source states that PCBs in the soil at concentrations of 100 mg/kg (dry weight) had no significant effect on growth of soybeans, another source identifies a 27 percent reduction in growth of soybean plants at this soil concentration and states that the NOEL is 2 to 3 mg/kg. Regardless, all of these values show low phytotoxicities for this class of compounds.

PCBs have been shown to bioconcentrate in both terrestrial and aquatic plants. Studies summarized in Eisler [6] showed dry-weight concentrations in foliage, grasses, aspen

leaves, and goldenrod leaves of up to 0.29 ppm, 0.14 ppm, 0.12 ppm, and 0.32 ppm dry weight, respectively. Some of these values exceed the FDA limit of 0.2 ppm for PCBs in feeds for livestock [6]. Crop leaves (soybeans, string beans, and corn) grown on a contaminated site had PCB levels of 30 ppb to 50 ppb [7] BCFs of 10^4 to 10^5 were reported in various species of algae [6]. Although in-tissue concentrations of PCBs may not be toxic to the plants, they could be important as sources of PCBs in higher trophic levels.

Aquatic Life. The federal aquatic life criterion for PCBs for the chronic protection of freshwater aquatic life is 0.014 μg/L [9].

The chronic aquatic life standards derive in part from the toxicity of PCBs to aquatic invertebrates and fish. Studies show 96-hour LC_{50}s (acute toxicities) for freshwater invertebrates are usually between 50 μg/L and 800 μg/L. Most 96-hour LC_{50}s for warm water fish are between 100 μg/L and 600 μg/L [6,7,10,11]. Generally, an application factor of 0.01 is used to convert acute toxicities to criteria that provide for the chronic protection of aquatic life [10]. However, because of the extent to which PCBs bioaccumulate, more stringent criteria are appropriate [10].

A major concern to aquatic life is the bioconcentration of PCBs. Studies cited in virtually every summary article on PCBs showed concentration factors ranging from 10^3 to 10^5 in freshwater invertebrates and fish [6,7,10,11,12]. PCBs with the highest chlorination (which would include Aroclor 1254 and Aroclor 1260) were accumulated most readily [6]. This ability to bioaccumulate further enhances the toxicity of these compounds [6]. Diet contributes most of the total PCB body burdens of upper-level aquatic carnivores, with diet accounting for 90 percent of the total PCB body burden in brown trout and 51 to 83 percent in striped bass [6]. Elimination of accumulated PCBs is slow, with no elimination by codfish larvae after 12 days and 97.8 percent retention by chironomid (an invertebrate) larvae after 7 days [6].

Wildlife. Because of their ability to bioaccumulate, PCBs have been studied more extensively in wildlife than have most other chemicals. Studies summarized by Eisler [6] show that effects vary among PCB compounds. For example, tissues from cattle that had been dosed with Aroclor 1254 and fed to mink at levels as low as 0.64 ppm fresh weight of diet caused severe reproductive effects. However, Aroclors 1016 and 1221 at dietary concentrations of 2 ppm produced no adverse reproductive effects in mink over a 9-month period, nor did Aroclor 1242 at 5 ppm during a similar period.

Aroclor 1260 has relatively low oral toxicity, at least to rats. Micromedex, Inc. [7] cites several studies in which laboratory rats were fed Aroclor 1260 at concentrations of 100 ppm to 1,250 ppm in the diet for periods ranging from 2 months to 21 months. Although

sublethal effects such as reduced reproductive success, liver tumors, and retarded growth were noted, these concentrations did not cause large-scale mortality.

Aroclor 1254 has been tested in a number of species of wildlife. LD_{50} data for dietary intake of Aroclor 1254 that were summarized in Eisler [6] and Micromedex, Inc. [7] are presented below.

Raccoon	>50 mg/kg, 8 days
Cottontail rabbit	>10 mg/kg, 12 weeks
Mink	4 mg/kg, no time given
Mink	6.7 mg/kg, 9 months
White-footed mouse	>100 mg/kg, 3 weeks
Norway rat	>75 mg/kg, 6 days
Mouse, PCB-resistant	>250 mg/kg, 18 weeks

Aroclor 1254 apparently is more toxic to rats than is Aroclor 1260. Rats fed Aroclor 1254 at the rate of 1,000 mg/kg in the diet all died in 53 days; mortality started at day 28 [6]. These and other feeding studies suggest that a total intake of about 500 to 2,000 mg of Aroclor 1254 per kg body weight is the lethal level in rats for dietary exposures of 1 to 7 weeks [6].

In the body, PCBs are accumulated primarily in the adipose tissue, skin, and liver [6,12]. More highly chlorinated congeners have longer half-lives, with a half-life of Aroclor 1260 in humans of 33 to 34 months [7].

Birds are generally more resistant to acutely toxic effects of PCBs than mammals [6]. Studies summarized in Eisler [6] and Micromedex Inc. [7] showed that mallards, ring-necked pheasants, bobwhite quail, and Japanese quail had 5-day LD_{50}s for ingestion of Aroclor 1254 and Aroclor 1260 ranging from 600 ppm to more than 2,000 ppm in the diet. Acute LD_{50}s for European starlings, red-winged blackbirds, and brown-headed cowbirds were all 1,500 mg/kg in the diet [6]. However, sublethal effects can occur at much lower concentrations. For example, 20 ppm in the diet of chickens caused a significant decrease both in the hatchability of eggs and in the viability of the surviving chicks [10]. Delayed reproduction and decreased numbers of eggs occurred in mourning doves fed 10 ppm Aroclor 1254 for 28 days [8].

Bioaccumulation also occurs in birds. Diet is an important route of PCB accumulation, with highest liver concentrations of PCBs in birds that fed on fish, followed by species that feed on small birds and mammals; and on worms and insects. Concentrations were lowest in herbivorous bird species [6]. In general, PCB accumulation is rapid and elimination is

slow. For example, in common grackles, the biological half-life of Aroclor 1254 was calculated to be 89 days [6].

The Red Book [10] states, "Evidence is accumulating that PCBs do not contribute to shell thinning of bird eggs." However, this statement was contradicted by Prager [12] and Micromedex, Inc. [7], who indicate that PCBs cause eggshell thinning and reduced reproductive ability. Although Eisler [6] cited several PCB-related instances of eggshell thinning and associated reproductive failure in cormorants, peregrine falcons, bald eagles, and black-crowned night herons, he states, "At present, the evidence implicating PCBs as a major source of eggshell thinning is inconclusive."

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EXPLOSIVES
TOXICITY PROFILES

HMX

GENERAL

HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine) is a colorless crystalline solid used in military formulations[2]. It occurs in four polymorphic forms, the beta form being the least sensitive and stable.

CAS NUMBER

2691-41-0

COMMON SYNONYMS

Cyclotetramethylenetetranitramine; Octagen; RRI; Octahydro-1,3,5,7-tetranitroazocine; octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazoncine; 1,3,5-tetranitro-1,3,5,7-tetraazocyclooctane.

ANALYTICAL CLASSIFICATION

Explosive.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 50 mg/L [1]
Vapor Pressure: 3 x 10^{-9} mm Hg at 25°C [1]
Henry's Law Constant: atm-m3/mole [1]
Specific Gravity: 1.9 at 25/25°C [1]
Organic Carbon Partition Coefficient: 508 [1]
Molecular Weight: 296.16 [2]

FATE DATA: HALF-LIVES

Soil: No Data
Air: No Data
Surface Water: 4 to 5 days [2]
Groundwater: No Data

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

HMX or "High Melting Explosive" which is the origin of the abbreviated form name, is an explosive polynitramine [3]. It is manufactured in the United States at the Holston Army Ammunition Plant. [2]

FATE AND TRANSPORT

Photolysis has been identified as the dominant fate process for HMX in aquatic systems [2]. Major photolytic transformation products were nitrate, nitrite, and formaldehyde.[2] Aerobic biotransformation was also found to be an important fate process [2]. Anaerobic biotransformation is also a viable mechanism, but is much slower than aerobic biotransformation [2]. In general, HMX was found to only be slightly mobile in soils. Concentrations were found to drop off quickly with depth. This was attributed to the low solubility of HMX [2]. Effective decomposition of HMX wastewater can be achieved through photolysis with ultraviolet (UV) light or UV radiation in combination with 0.01% hydrogen peroxide [3].

HUMAN TOXICITY

General. HMX is absorbed by oral and inhalation routes and has been implicated in dermal studies as a skin irritant. The USEPA has placed HMX in weight-of-evidence Group D indicating that it is not classifiable as to human carcinogenicity [3].

Oral Exposure. A chronic RfD for HMX of 0.05 mg/kg/day is based on a NOAEL of 50 mg/kg/day for hepatic lesions in a subchronic feeding study in rats [3]. An oral slope factor has not been established because of the lack of cancer bioassays available.

Inhalation Exposure. A study was conducted on 93 workers at an Army munitions plant. No increases in the incidence of hematologic, hepatic, or renal system abnormalities or autoimmune disease were reported [2]. There is no RfC value currently available for HMX.

Dermal Exposure. A study was conducted using a patch test with solid HMX on human volunteers. Some skin irritation was reported, but no further information was available [2].

ECOLOGICAL TOXICITY

General. No information is available on the ecological toxicity of HMX.

Vegetation.

Aquatic Life.

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.

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RDX

GENERAL

RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine), is a white crystalline solid that has been extensively used in military munitions formulations [2]. The abbreviation RDX originates from the British code name "Research Department Explosive" or "Royal Demolition Explosive."

CAS NUMBER

121-82-4

COMMON SYNONYMS

Cyclonite; cyclotrimethyleneitramine; cyclotrimethylenetrinitramine; Hexogen; TA; Sym-Trimethylenetrinitramine; 1,3,5-trinitrohexahydro-s-triazine.

ANALYTICAL CLASSIFICATION

Explosive.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 50 mg/L [1]
Vapor Pressure: 4.1 x 10^{-9} mm Hg at 25°C [1]
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: 1.82 at 25/25°C [1]
Organic Carbon Partition Coefficient: 538 [1]
Molecular Weight: 222.26 [2]

FATE DATA: HALF-LIVES

Soil:
Air: No data
Surface Water: No data
Groundwater: No data

NATURAL SOURCES

None. RDX is manufactured at the Holston Army Ammunition Plant [2].

ARTIFICIAL SOURCES

Explosives.

FATE AND TRANSPORT

A variety of fate mechanisms have been documented for RDX [2]. Photolysis will rapidly degrade RDX [2]. RDX and its reaction products may be completely destroyed using ultraviolet light and hydrogen peroxide. Bacterial degradation of RDX yields di- and tri-nitroso derivatives as end products [2].

In soils, volatilization and leaching are not expected to be significant fate mechanisms [2]. RDX has a low Henry's Law constant, and is highly adsorbed in soils.

HUMAN TOXICITY

General. RDX has been found to be completely absorbed via the oral and inhalation routes. The USEPA has placed RDX in weight-of-evidence Group C indicating that it is a possible human carcinogen.

Oral Exposure. A chronic RfD for RDX of 0.003 mg/kg/day is based on a NOAEL of 0.3 mg/kg/day for the inflammation of the prostate gland in a chronic feeding study with rats [3]. In humans, toxic effects of RDX have been on the central nervous system. In a case report, four military personnel who ingested from 25 to 180 g of C-4 plastic explosive (91% RDX).

Symptoms included muscular twitching, hyperactive reflexis, headaches, nausea, and vomiting along with a low-grade fever [2]. An oral slope factor of 0.11 $(mg/kg/day)^{-1}$ has been established based on hepatocellular adenomas and carcinomas in female B6C3F1 mice [3].

Inhalation Exposure. The USEPA does not currently provide an inhalation Rfc for RDX. Chronic exposure via inhalation have been characterized in munitions workers by epileptiform (tonic/clonic) seizures (convulsions) and unconsciousness [2].

Dermal Exposure. Skin contact to RDX was reported at a World War II munitions plant. Primary irritation and sensitization dermatitis of the face and eyelids occurred in workers exposed to production related fumes [2]. However, subsequent patch testing with solid RDX failed to produce local skin reactions [2].

ECOLOGICAL TOXICITY

General. No information is available on ecological toxicity of RDX.

Vegetation.

Aquatic Life.

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
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1,3,5-TRINITROBENZENE

GENERAL

Trinitrobenzene (TNB) a powerful high explosive which has more shattering power than TNT [3]. It is used as an explosive and as a vulcanizing agent for natural rubber [4]. TNB is a yellow crystalline solid with a netting point of 122°C.

CAS NUMBER

99-35-4

COMMON SYNONYMS

TNB; Trinitrobenzene; Benzite; 1,3,5-TNB, RCRA waste number U234

ANALYTICAL CLASSIFICATION

High Explosive (HE) DOT Class A Explosive.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 35 mg/L [1]
Vapor Pressure: 2.2 x 10^{-4} mm Hg at 25°C [1]
Henry's Law Constant: atm-m3/mole [1]
Specific Gravity: 1.76 at 25/25°C [1]
Organic Carbon Partition Coefficient: 520 [1]
Molecular Weight: 213.12 [3]

FATE DATA: HALF-LIVES

Soil: days [4]
Air: days [4]
Surface Water: days [4]
Groundwater: days [4]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Man-made.

FATE AND TRANSPORT

HUMAN TOXICITY

General. Toxic effects of trinitrobenzene suggest that it is poisonous by intravenous route and moderately toxic by ingestion. Inhalation difficulties have been reported by is limited. The USEPA has not placed a weight-of-evidence for TNB, thus evidence of carcinogenicity is unknown.

Oral Exposure. A chronic RfD for 1,3,5-TNT of 0.00005 mg/kg/day is based on a NOAEL of 3 ppm for m-dinitrobenzene in drinking water which was converted to 0.51 mg/kg/day for TNB[2]. Because of the extrapolations of the oral RfD, the uncertainty factor for this compound is 10,000. The oral LD_{50} for rats is 450 mg/kg [3]. There is no oral slope factor currently available for TNB.

Inhalation Exposure. The USEPA does not currently have an inhalation RfC for 1,3,5-TNB. Case reports have shown breathing difficulty among exposed workers. Central nervous system damage has also been implicated with TNB exposure [4].

Dermal Exposure. No information is available.

ECOLOGICAL TOXICITY

General.

Vegetation.

Aquatic Life.

Wildlife.

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1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
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4. Sittig, Marshall, 1991. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*. Third Edition. Noyes Publications. Park Ridge, New Jersey.

TETRYL

GENERAL

Tetryl is a yellow solid which is a highly explosive compound as evident by the DOT classification of Class A explosive. Tetryl is a powerful oxidant. A dangerous fire and disaster hazard and highly sensitive to shock, friction or heat [2]. Primarily used in explosives as an intermediary detonating agent and as a booster charge [3].

CAS NUMBER

479-45-8

COMMON SYNONYMS

Picrylmethylnitramine; picrylnitromethylamine; tetralite; 2,4,6-tetryl.

ANALYTICAL CLASSIFICATION

High Explosive (HE).

PHYSICAL AND CHEMICAL DATA

Water Solubility: [1]
Vapor Pressure: mm Hg at 25°C [1]
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: at 25/25°C [2]
Organic Carbon Partition Coefficient: [3]
Molecular Weight: 287.17

FATE DATA: HALF-LIVES

Soil: days [4]
Air: days [4]
Surface Water: days [4]
Groundwater: days [4]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Man-made explosive intermediate.

FATE AND TRANSPORT

Decomposes by detonation.

HUMAN TOXICITY

General. Tetryl is an irritant, sensitizer, and allergen. The chief effect from exposure is dermatitis [2]. The dermatitis first appears on exposed skin areas, but can spread to other parts of the body [3]. Currently, tetryl is not listed in the Integrated Risk Information System (IRIS).

Oral Exposure. The systemic toxicity of tetryl exposure may cause irritability, malaise, headaches, insomnia, and vomiting. RfD is currently available. Exposure to tetryl has produced liver and kidney damage in animals [3].

Inhalation Exposure. Tetryl attacks the respiratory system and effects the central nervous system (CNS). Tetryl is acutely irritating to the mucous membranes of the body causing coughing, sweezing, epistaxis, and palpebral and periorbital edema [3]. No inhalation RfC is currently available in (IRIS).

Dermal Exposure. Dermal exposure to tetryl is perhaps the worst condition. The severest forms of skin exposure show massive generalized edema with partial obstruction of the trachea due to swelling of the tongue [3]. Contact may stain skin and hair yellow or orange. Eye contact causes conjunctivitis which is followed by iridocyclitis, and keratitis can occur [2].

ECOLOGICAL TOXICITY

General. No information is available for ecological toxicity of tetryl.

Vegetation.

Aquatic Life.

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
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2,4,6-TRINITROTOLUENE

GENERAL

Trinitrotoluene (TNT) or, more specifically, alpha-TNT is the common designation for 2,4,6-trinitrotoluene, the most widely used military high explosive [2]. TNT exists as a colorless to pale yellow odorless solid which melts at 81°C [5]. The 2,4,6 isomer of TNT is one of five isomers, which is the most commonly used species and is a relatively stable high explosive [5].

CAS NUMBER

118-96-7

COMMON SYNONYMS

TNT; 2-methyl-1,3,5-trinitrobenzene; trotyl; NCI-C56155; Tolite; X-TNT.

ANALYTICAL CLASSIFICATION

High Explosive (HE).

PHYSICAL AND CHEMICAL DATA

Water Solubility: 130 mg/L at 20°C [1]
Vapor Pressure: 1 x 10^{-4} mm Hg at 25°C [1]
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: 1.65 at 25/25°C [1]
Organic Carbon Partition Coefficient: 190 [1]
Molecular Weight: 227.13 [2]

FATE DATA: HALF-LIVES

Soil: No data
Air: No data
Surface Water: 8 to 25 days [2]
Groundwater: No data

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Explosives, munitions. Produced and synthesized at Army Ammunition Plants such as Radford Ammunition Plant (RAAP).

FATE AND TRANSPORT

The major fate mechanisms for 2,4,6-TNT in the environment are photolysis and biotransformation [2]. Hydrolysis is not expected to be an important mechanism [2]. Adsorption in soil may play an important role in the fate of 2,4,6-TNT, with cation exchange capacity and organic carbon content being important parameters [2]. Volatilization is expected to be insignificant [2]. Sorption of 2,4,6-TNT to sediment is directly related to pH and temperature [2].

HUMAN TOXICITY

General. Exposure to TNT has been found to be via inhalation of dusts, fumes, or vapor; ingestion of dust, percutaneous adsorption from dust, eye and skin contact. The USEPA has placed TNT in weight-of-evidence Group C indicating that it is a possible human carcinogen.

Oral Exposure. A chronic RfD for TNT of 0.0005 mg/kg/day is based on a LOAEL of 0.5 mg/kg/day for liver effects during a 26-week dog feeding study [3]. An oral LD_{50} for rats was found to be 795 mg/kg [4]. Ingestion of TNT has produced gastrointestinal disorders including nauseau, anorexia, and constipation [2]. Tightening of the chest and epigastric pain not associated with food intake are first signs of possible intoxication [2]. An oral slope factor of 0.03 $(mg/kg/day)^{-1}$ has been established based on bladder papilloma and carcinoma observed in female Fischer 344 rats [3].

Inhalation Exposure. A chronic RfC has not been established for 2,4,6-TNT. TNT is absorbed through the lungs which can produce methemoglobin formation resulting in signs of cyanosis. Liver damage leads to toxic jaundice and aplastic anemia. Laboratory findings include an amber to deep red coloration of the urine [2]. Cardiovascular manifestations such as bradycardia, decreased amplitude of QRS complex, and a flattened T-Wave [2].

Dermal Exposure Contact with TNT may include yellow discoloration of the skin, nails, and hair. More significant would be a bluish discoloration of the mucosa indicative of developing cyanosis [2]. Skin adsorption might include dermatitis with or without rash [2]

ECOLOGICAL TOXICITY

General. No information concerning 2,4,6-TNT's ecological toxicity is available.

Vegetation.

Aquatic Life.

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
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4. Sax, N.I. (ed.) 1988. *Sym-trinitrotoluene. Dangerous Properties of Industrial Materials Report.* Van Nostrand Reinhold, New York. Volume (3): 3405.
5. Sitting, Marshall, 1991. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*. Third Edition. Noyes Publications. Park Ridge, New Jersey.

2,4-DINITROTOLUENE/2,6-DINITROTOLUENE

GENERAL

There are six isomers of dinitrotoluene, the most important being 2,4-DNT [4]. It is yellow-orange solid which has a melting point of 71°C. DNT is used in the preparation of polyurethane foams and manufacture of toluene disocyanate for the production of polyurethane plastics, in the production of military and commercial explosives, to plasticize cellulose nitrate in explosives, to moderate the burning rate of propellants and explosives, and as an intermediate in TNT production [4].

CAS NUMBER

2,4-Dinitrotoluene	121-14-2
2,6-Dinitrotoluene	606-20-2

COMMON SYNONYMS

2,4-Dinitrotoluene

1-methyl-2,4-dinitrobenzene; dinitrotoluol; 2,4-DNT; DNT; RCRA Waste Number U105, NCI-C01865.

2,6-Dinitrotoluene

2,6-DNT; 2-methyl-1,3-Dinitrotoluene; RCRA Waste Number U106.

ANALYTICAL CLASSIFICATION

Explosives.

PHYSICAL AND CHEMICAL DATA

2,4-DNT

Water Solubility: 270 mg/L [1]
Vapor Pressure: 5.1 x 10^{-3} mm Hg at 25°C [1]
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: 1.52 at 25/25°C [1]
Organic Carbon Partition Coefficient: 201 [1]
Molecular Weight: 182.15 [3]

2,6-DNT

Water Solubility: 0.5 mg/l [1]
Vapor Pressure: 0.018 mm Hg
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: 1.28 at 25/25°C [1]
Organic Carbon Partition Coefficient: 249 [1]
Molecular Weight: 182.15 [3]

FATE DATA: HALF-LIVES

Common

Soil: days [4]
Air: days [4]
Surface Water: days [4]
Groundwater: days [4]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Man-made.

FATE AND TRANSPORT

Mixture with Sodium Carbonate can decompose with significant pressure increase at 210°C [3]. Decomposes when heated to 250°C. Emits a toxic fume upon decomposition.

HUMAN TOXICITY

General. 2,4-DNT and 2,6-DNT can be toxic by ingestion, inhalation, or adsorption through the skin or eyes. The USEPA has placed 2,4-DNT in weight-of-evidence B2 indicating that it is a animal carcinogen [2]. There is no data on 2,6-DNT at this time.

Oral Exposure. A chronic oral RfD for 2,4-DNT is of 0.002 mg/kg/day is based on a NOAEL of 0.2 mg/kg/day for neurotoxicity, Heinz bodies and biliary tract hyperplasia in a feeding study [2]. Ingestion of 2,4-DNT have been associated with decreased oxygen carrying capacity and moderate to severe headache, nausea, vomiting, irregular heart beat and drop in blood pressure [4]. The Oral LD_{50} in the rat for 2,4-DNT is 268 mg/kg and 177 mg/kg for 2,6-DNT [3]. Currently, no oral slope factor has been assigned to this explosive.

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for 2,4-DNT or 2,6-DNT. Inhalation of 2,4-DNT and 2,6-DNT may affect the central nervous

system and the blood. Nervous system effects may include confusion, disorientation, dizziness, weakness, drowsiness and coma [4].

Dermal Exposure. 2,4-DNT and 2,6-DNT is readily absorbed through the skin. Exposure may be small amounts on clothing or shoes [4]. Eye contact to hot fumes can cause severe burning of the eyelids and cornea [4].

ECOLOGICAL TOXICITY

General. No information is available involving the toxicity of 2,4-DNT relating to vegetation or wildlife.

Vegetation.

Aquatic Life. To protect fresh water aquatic life 330 ug/L on an acute toxicity basis and 230 ug/L on a chronic toxicity basis [4].

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
2. USEPA, 1993. *Integrated Risk Information System (IRIS)*. On-Line Database. September 16, 1993.
3. Sax, N.I.(ed.) 1988. 2,4-Dinitrotoluene. *Dangerous Properties of Industrial Materials Report*. Van Nostrand Reinhold, New York. Volume (2): 1461.
4. Sittig, Marshall, 1991. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*. Third Edition. Noyes Publications. Park Ridge, New Jersey.

1,3-DINITROBENZENE

GENERAL

1,3-Dinitrobenzene (DNB) is a by-product in the manufacture of trinitrotoluene explosives and nitrobenzene. It is used primarily in the production of m-phenylenediamine, a dye intermediate [2].

CAS NUMBER

99-65-0

COMMON SYNONYMS

DNB; 1,3-DNB; m-Dinitrobenzene; m-DNB.

ANALYTICAL CLASSIFICATION

High Explosive (HE) DOT Classification: Poison B.

PHYSICAL AND CHEMICAL DATA

Water Solubility: [1]
Vapor Pressure: mm Hg at 25°C [1]
Henry's Law Constant: atm-m^3/mole [1]
Specific Gravity: at 25/25°C [2]
Organic Carbon Partition Coefficient: [3]
Molecular Weight: 168.11

FATE DATA: HALF-LIVES

Soil: days [4]
Air: days [4]
Surface Water: days [4]
Groundwater: days [4]

NATURAL SOURCES

None.

ARTIFICIAL SOURCES

Man-made. Production in the United States takes place mainly at commercial plant in New Jersey [2].

FATE AND TRANSPORT

The environmental fate of DNB is not known, but in general aromatic nitro compounds are resistant to hydrolysis and probably do not oxidine in water. Phtotlytic degradation may be on important fate [2].

HUMAN TOXICITY

General. Inhalation and dermal absorption has been inferred from occupational exposure. The USEPA place 1,3-DNB in weight-of-evidence D indicating that it is not classifiable as a human carcinogen.

Oral Exposure. A Chronic Oral RfD of 0.0001 mg/kg/day for 1,3-DNB. Oral toxicity studies have indicated that 1,3-DNB is a potent testicular toxicant. Symptoms in the rat population showed reduced spermatogenesis, atrophy of seminiferous tubules and reduced litter size [2]. The oral LD_{50} in the rat is 83 mg/kg [3]. 1,3-DNB is a human poison by oral ingestion. Currently there is no oral slope factor.

Inhalation Exposure. The USEPA currently does not have an RfC for 1,3-DNB. Six workers exposed to DNB dust developed cyanosis, anemia, dizziness, and fatigue [2]. DNB is distributed mainly to liver, fat, kidney, and nerve tissues and excreted primarily in urine [2].

Dermal Exposure. Demeral absorption of 1,3-DNB has been inferred from occupational exposure but no studies of potential dermal sensitization are available [2]. Human systemic effects by skin contact: cyanosis and motor activity changes [3].

ECOLOGICAL TOXICITY

General. No data is available.

Vegetation.

Aquatic Life.

Wildlife.

REFERENCES

1. USATHAMA, 1985. *Evaluation of Critical Parameters Affecting Contaminant Migration Through Soils*. Report No. AMXTH-TE-CR-85030.
2. USEPA, 1991. *Drinking Water Health Advisory. Office of Science and Technology.*
3. Sax, N.I. (ed.) 1988. *Dangerous Properties of Industrial Materials.* Van Nostrand Reinhold, New York. Volume (2): 1447.

METALS
TOXICITY PROFILES

ALUMINUM

CAS NUMBER

7429-90-5

COMMON SYNONYMS

Alumina fibre, Metana [1]

ANALYTICAL CLASSIFICATION

Inorganic

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: 1 mm Hg at 1284°C [2]
Henry's Law Constant: NA
Specific Gravity: 2.70 [3]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Aluminum comprises approximately 8% of the earth's crust, making it the third most abundant element. Aluminum does not occur naturally in the metallic, elemental state, but is widely distributed in the earth's crust in combination with oxygen, fluorene, silicon, and the others. Its concentration in soils varies widely, ranging from about 700 mg/kg to over 100,000 mg/kg. The concentrations of dissolved aluminum in water vary with pH levels and the humic-derived acid content of the water. Since aluminum concentrations occur in surface water bodies only when the pH is less than 5, the aluminum concentration in most natural waters is negligible. In general, aluminum concentrations in surface waters at pH levels above 5.5 will be less than 0.1 mg/L. The background level of aluminum in the atmosphere of U.S. cities and industrial areas generally range from about 0.4 to 8 ug/m^3.[1]

FATE AND TRANSPORT

Aluminum is highly reactive and is not found as a free metal in nature. The transport of aluminum in the environment is determined by the chemical properties of the element and the characteristics of the environmental matrix that affect solubility. At a pH greater than 5.5, naturally occurring aluminum compounds exist predominantly in an undissolved form. Decreasing pH may result in an increase in mobility for certain forms of aluminum. In addition to the effect of pH on mobility, the type of acid entering environmental systems

may also be important. In alpine soils, nitric acid was found to leach aluminum from soil columns. In soil, the adsorption of aluminum onto clay surfaces may be a significant factor in controlling aluminum mobility in the environment. In surface water, the presence of high levels of suspended solids resulted in higher concentrations of adsorbed aluminum than in the absence of suspended solids. [1]

Because aluminum is an element, it does not degrade in the environment, and only one trivalent oxidation state of aluminum is possible. Aluminum is found in plants, terrestrial food chairs, and aquatic food chains at low concentrations. Biomagnification of aluminum, however, does not appear to be significant in them. [1]

HUMAN TOXICITY

General Population is exposed to aluminum on daily basis, primarily through ingestion of food. Although aluminum is widely used in cooking utensils, antacids, and antiperspirants, it is not thought to be toxic to humans in these forms. However, exposure to aluminum is not beneficial and excess exposure may be harmful to certain segments of population. Sensitive subpopulations to aluminum may include pregnant mothers and Alzheimer's patients. The potential health risks associated with exposure to aluminum include respiratory problems from breathing the dust, and possibly neurological, teratogenic, and skeletal problems from drinking water or ingesting food containing high levels of aluminum. Aluminum is not known to cause cancer. [1]

Oral Exposure Despite the widespread occurrence of aluminum in foods and drinking water, there is little indication that it is toxic by oral route. Aluminum has not been known to cause death in humans. In laboratory animals, aluminum is fatal only at very high doses. The LD_{50} for aluminum (nitrate form) is 261 mg/kg for rats. Aluminum has been associated with neurodegenerative diseases such as Alzheimer's disease. It is, however, not known whether aluminum is a causal agent in these diseases. The only human data on developmental effects of aluminum come from infants with renal failure. Osteomalacia and increased bone and serum levels of aluminum were reported in three infants with kidney failure who had been treated orally with aluminum hydroxide from the 1st month of life. Their responses, however, are probably not indicative of responses expected in normal infants. The effects of aluminum on the development of laboratory animals are controversial. Some studies show decreases in pup growth and neurological development, while others do not. [1]

Inhalation Exposure No case of death in humans following inhalation exposure to aluminum alone has been reported. Increases in the respiratory problems (cough, fibrosis) and excess deaths from certain cancers have been observed among workers who have been

exposed to high levels of aluminum dusts. These workers, were also exposed to a number of other toxicants that could have caused similar conditions. [1]

Dermal Exposure. Little information is available concerning adverse dermal effects of aluminum. The cases of skin sensitization on areas previously injected with aluminum-containing vaccines have been reported among sensitive population. [1]

ECOLOGICAL TOXICITY

General. Aluminum is found as a ubiquitous constituent of all soils and plant, and animal tissues. It occurs naturally, primarily in combination with silica and as an oxide. Aluminum is generally considered nontoxic, except under certain water and soil pH conditions that increase its solubility. Elemental aluminum is highly unstable in the normal pH range of soils and readily oxidizes to a trivalent form which readily bonds with any of several radicals.[3]

Vegetation. There is no evidence that aluminum is essential to plants. It bioaccumulates readily in some plant species but it does not biomagnify in terrestrial or aquatic food chains. Information regarding the phytotoxic effects of aluminum on terrestrial and aquatic vascular plants indicates that phytotoxic effects are due to the soluble form of aluminum, and not to total aluminum. Most information is derived from crops and other agriculturally important plants tested under laboratory conditions. Such testing has shown that plants are sensitive to concentrations of soluble aluminum at ranges exceeding 2 to 14 mg/kg.[4] There are some accumulator plants that can tolerate large amounts of aluminum. Accumulator plants that transport aluminum to above-ground parts include club moss, sweetleaf (*Symplocos trinctoria*), Australian silk oak, and hickory (*Juncus* sp.). Aluminum concentrations of 3.0 to 30 ppm have been reported for ash (*Fraxinus* sp.) and hickory tissues.[5] Soluble aluminum only occurs when soil pH conditions reach 4.5 or lower. Soil conditions above pH 4.7 result in formation of insoluble aluminum that is not bioavailable for plant uptake and phytotoxic reactions.[4] Aluminum poisoning is localized in roots and usually kills the plant's root system before aluminum can be transported to the leaves. Thus, except for accumulator species, plants will die before storing lethal concentrations of aluminum in leaves or stems. Aluminum in plant tissues does not biomagnify through the food chain.[4]

Aquatic Life. The toxicity of aluminum is due to soluble inorganic forms. Toxicity varies with pH and turbidity and increases greatly as pH drops below 5.0.[6] Aluminum has been reported to bioaccumulate in some algae and in both aquatic flora and fauna. Snyder and Snyder reported no evidence of aquatic ecosystem biomagnification.[7] Toxicity studies on fish indicated LD_{50} values ranged from 0.07 to 240 mg/L.[7] Chronic toxicity has been

tested with *Daphnia magna*, which was found to have a chronic value of 1,388 μg/L after 28 days.[8] The federal chronic aquatic life water quality criterion is 87 μg/L.[9]

Wildlife. Aluminum poses relatively little hazard to animals. Results from several laboratory studies on rats and mice indicate that aluminum probably constitutes a very low environmental hazard to small mammals.[4] Cattle and sheep can tolerate dietary levels of 1000 ppm, and poultry can tolerate levels of 200 ppm.[5] Aluminum toxicity in birds and mammals is generally expressed as a phosphorus deficiency. This is the result of the binding of aluminum with phosphorus in the intestine and thus making the phosphorus unavailable for absorption.[3] Ingestion by animals of about 1,400 ppm of aluminum lowered the level of inorganic phosphorus in their blood and bones, and chickens developed severe rickets.[8] Aluminum ingested by mammals does not bioaccumulate or biomagnify because it is readily eliminated by the kidneys.[4]

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2. TOMES (R) Medical Management. September, 1992.
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7. Snyder, Bruce D. and Janet L. Snyder. 1984. Feasibility of Using Oil Shale Wastewater for Waterfowl Wetlands. U.S. Fish and Wildlife Service. FWS/OBS-84/01.
8. Micromedex, Inc. 1992. Tomes Plus System. Toxicology, Occupational Medicine and Environmental Series. Volume 14. Denver, Colorado.
9. U.S. Environmental Protection Agency (USEPA). 1991. Water Quality Criteria Summary. Office of Sciences and Technology. Washington, D.C.

ANTIMONY

CAS NUMBER

7440-36-0

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble (elemental) [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: Density: 6.68 at 20/4°C [1]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATION

Pure antimony is a silver-white, lustrous, hard brittle metal. Antimony was detected (in measurable quantities) in 66 of 354 soils samples from across the conterminous United States [2]. The concentration of antimony in minimally disturbed soils shows limited variations, with a range from <1 ppm up to a maximum of 8.8 ppm, and an overall geometric mean of 0.48. Of the samples collected, 81 percent showed antimony concentrations to be less than 1 ppm [2].

FATE AND TRANSPORT

Elemental antimony is relatively short-lived in the natural environment undergoing oxidation reactions to form antimony oxides and trihalides. Although not demonstrated, antimony may undergo biological methylation (forming organometals) as do those compounds surrounding it in the periodic table. Antimony oxides and trihalides are expected to volatilize readily, with $SbCl_3$ releasing HCl gas to the atmosphere when in the presence of moisture [1]. Antimony oxides are also expected to undergo photoreduction in aqueous environments. Organic antimony compounds are relatively mobile in all environments, while inorganic antimony compounds tend to be only slightly soluble or decompose in water [1]. Antimony, is not expected to bioconcentrate appreciably in fish or aquatic organisms [1].

HUMAN TOXICITY

General. The major targets of antimony toxicity are the respiratory system, the heart, the gastrointestinal system and the skin [1]. Antimony exposure, however, has beneficial as well as adverse effects. Antimony is currently used to treat two parasitic diseases, schistosomiasis and leishmaniasis. Side effects following treatment include altered EKG, anemia, vomiting, diarrhea, joint and/or muscle pain and even death [1]. Information regarding the genotoxicity of antimony is equivocal. Metallic antimony has not been placed in a weight-of-evidence cancer group by the USEPA [3].

Oral Exposure. A chronic oral RfD of 0.0004 mg Sb/kg/day is based on a LOAEL of 0.35 mg Sb/kg/day for longevity, decreased blood glucose levels and altered cholesterol levels in a chronic oral study in rats [3]. Antimony is poorly absorbed following oral exposure (< 10%) [1]. Ingested antimony has not been reported to be fatal to humans, and acute oral LD_{50} values in animals are not available [1]. In humans, gastrointestinal effects have been reported following exposure to oral doses of 0.53 mg Sb/kg/day [1]. In animals, long-term oral exposure to > 0.07 mg Sb/kg/day resulted in effects similar to those reported in humans [1]. There is no evidence that ingested antimony results in developmental or reproductive effects or cancer in humans or animals [1]. An oral Slope Factor for cancer is not available for antimony [3].

Inhalation Exposure. An inhalation RfC for antimony is not available [3]. Antimony is absorbed following inhalation exposure, but the extent of absorption in humans is not known [1]. Inhaled antimony has not been reported to be fatal to humans, and acute inhalation LC_{50} values in animals are not available [1]. The effects of antimony in occupationally exposed workers include pneumoconiosis, altered EKG readings, increased blood pressure, abdominal distress, ulcers, dermatosis, and eye irritation [1]. These effects were generally observed following the inhalation of > 2 mg Sb/m^3 [3]. In animals, long-term inhalation exposure to concentrations > 0.05 mg Sb/m^3 resulted in effects similar to those reported in humans [1]. There is no conclusive evidence that inhaled antimony effects human reproduction or development, but problems with fertility were observed in animals exposed to high levels (209 mg Sb/m^3) of antimony for 9 weeks [1]. Information regarding the carcinogenicity of inhaled antimony in humans is not available, but studies in animals indicate that inhaled antimony may cause lung cancer [1]. An inhalation Unit Risk for cancer is not available for antimony [3].

Dermal Exposure. Dermal exposure to antimony has not been reported to be fatal to humans, and acute dermal LD_{50} values in animals are not available [1]. Antimony is not a skin sensitizer in humans, but animal studies have shown that antimony is a skin and eye irritant [1].

REFERENCES

1. ATSDR, 1990. Toxicological Profile for Antimony (Draft). Agency for Toxic Substances and Disease Registry. USPHS/USEPA. October 1990.
2. USGS, 1984. Elemental Concentrations in Soils and Other Surficial Material of the Conterminous United States. United States Geological Survey Professional Paper 1270, U.S. Department of the Interior. United States Government Printing Office, Washington, D.C. 105 pp.
3. USEPA, 1992. Integrated Risk Information System (IRIS). Data base. Online. August 3, 1992.

ARSENIC

CAS NUMBER

7440-38-2

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 5.727 at 25/5°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Arsenic is a naturally-occurring element. The concentration of arsenic in minimally disturbed soils varies tremendously. A collection of 1,257 soil samples from across the conterminous U.S. determined that 90 percent were less than or equal to 10 ppm, with a geometric mean of 5.2 ppm, but with a maximum value as high as 100 ppm [3].

FATE AND TRANSPORT

Elemental arsenic is extremely persistent in both water and soil. Environmental fate processes may transform one arsenic compound to another; however, arsenic itself is not degraded. Soluble forms of arsenic tend to be quite mobile in water, while less soluble species adsorb to clay or soil particles. Microorganisms in soils, sediments, and water can reduce and methylate arsenic to yield methyl arsines, which volatilize and enter the atmosphere. These forms then undergo oxidation to become methyl arsonic acids and are ultimately transformed back to inorganic arsenic [1].

Bioconcentration of arsenic occurs in aquatic organisms, primarily in algae and lower invertebrates. Biomagnification in aquatic food chains does not appear to be significant, although some fish and invertebrates contain high levels of arsenic compounds which are relatively inert toxicologically. Plants may accumulate arsenic, subject to various factors including soil arsenic concentration, plant type, and soil characteristics [1].

HUMAN TOXICITY

General. Arsenic is a long-recognized human poison capable of producing a lethal reaction and cancer. The major targets of arsenic toxicity are the respiratory system, gastrointestinal system, nervous system, hematological system and skin [1]. Studies in animals suggest that low levels of arsenic may be necessary to maintain good health, but this has not been shown in humans [1]. Arsenic is considered a weak mutagen and has been placed in weight-of-evidence cancer Group A, indicating that it is a human carcinogen [4].

Oral Exposure. A chronic oral RfD of 0.0003 mg As/kg/day is based on a NOAEL of 0.0008 mg As/kg/day for hyperpigmentation, keratosis and possible vascular complications in a chronic oral study in humans [4]. Arsenic is readily absorbed following oral exposure. Acute oral LD_{50} values of 26 mg/kg for mice and 15 to 110 mg/kg for rats are reported [1]. The fatal dose in humans is estimated to be 2 mg/kg [1]. Low-level oral exposure (> 0.01 mg As/kg/day) may cause irritation of the digestive tract, pain, nausea, vomiting, diarrhea, skin abnormalities, decreased production of blood cells, abnormal heart function, blood-vessel damage, liver damage, kidney damage, and impaired nerve function ("pins and needles" sensation). In animal studies, high doses of arsenic (> 14 mg As/kg/day) have resulted in effects on the developing fetus. These effects have not been observed in humans [1]. In humans, chronic, oral exposure to low doses of arsenic (> 0.01 mg As/kg/day) has been shown to cause cancer of the skin, liver, bladder, and lung. The most characteristic effect of long-term oral exposure to arsenic is a darkening of the torso and the appearance of small "corns" or "warts" on the palms, soles and torso. These "corns" or "warts" may develop into skin cancer [1]. An oral Unit Risk of 0.00005 (ug As/L)$^{-1}$ [1.75 (mg/kg/day)$^{-1}$] has recently been adopted by the USEPA [4]. The Unit Risk is based on the increased incidence of skin cancer in humans exposed to arsenic in the drinking water.

Inhalation Exposure. An inhalation RfC is not available for inorganic arsenic [4]. Approximately 40% of an inhaled concentration of arsenic is absorbed [1]. Inhalation of arsenic has not been reported to be fatal in humans, and acute inhalation LC_{50} values are not available [1]. Inhalation of arsenic at concentrations greater than 0.1 mg As/m^3 may result in irritation of the nose and throat, leading to laryngitis, bronchitis or rhinitis [1]. Effects on the skin, nervous system, and gastrointestinal system similar to those found following oral exposure have been observed in humans following inhalation exposure. Of much greater concern, however, is that inhaled arsenic has been found to increase the risk of lung cancer in humans [1]. An inhalation Unit Risk of 0.0043 (ug As/m^3)$^{-1}$ was derived by USEPA [4] based on the increased incidence of lung cancer in occupationally exposed workers. Several epidemiology studies have suggested an association between arsenic inhalation and an increased risk of developmental effects (congenital malformations, low

birth weight, spontaneous abortion) [1]. Studies in animals support the view that arsenic is a developmental toxicant, but only at high doses (20 mg/m3) [1].

Dermal Exposure. Arsenic has not been reported to be fatal following dermal contact [1]. Dermal contact with arsenic may result in mild to severe irritation of the skin and mucous membranes and could lead to dermal sensitization [1].

ECOLOGICAL TOXICITY

General. Arsenic is a relatively common element that is present in air, water, soil, plants, and all living tissues. At comparatively low doses, arsenic stimulates growth and development in various species of plants and animals [5]. Arsenic exists in the trivalent (III) and pentavalent (V) states, and its compounds may be either organic or inorganic [6]. Inorganic arsenic compounds are more toxic than organic compounds [5]. Background concentrations of arsenic in unpolluted river waters and soils in the United States are usually < 5 μg/L and < 15 mg/kg dry weight, respectively [5]. Arsenic is bioconcentrated by organisms, but does not biomagnify in the food chain.

Vegetation. There is no evidence that arsenic is essential for plant growth [7]. Elemental arsenic is considered to be relatively nontoxic to plants [8]. In plants, arsenic concentrations vary between 0.01 and 1.0 ppm. Plants grown in soils contaminated with arsenic do not show higher concentrations of this element than plants grown on uncontaminated soil [7]. In cases of arsenic toxicity, the roots are usually severely affected and plant growth is limited before large amounts of arsenic are absorbed and translocated [8]. Arsenic in soils is most toxic to plants at the seedling stage where it limits germination and reduces viability [7]. The concentration of arsenic that is toxic to plants was determined to be > 10 ppm by the National Academy of Sciences [9].

Aquatic Life. Arsenic is toxic to aquatic organisms within the range of 1.0 to 45.0 mg/L arsenite, which is considered more toxic than arsenate [8]. Arsenic is extremely mobile in the aquatic environment, and its fate depends largely on prevailing pH and Eh conditions [10]. Normal arsenic concentrations in fish are 0.52 ppm for bluegill and 0.14 to 1.95 ppm for minnows [9].

Arsenic can bioaccumulate in aquatic vertebrates and invertebrates from water and food, but concentration factors are relatively low [5,11]. The BCF of inorganic arsenic in most invertebrates and fish exposed for 21 to 30 days did not exceed 17 [5]. The biological half-lives of arsenic in green sunfish and bluegills are 7 days and 1 day, respectively [11]. The lethal threshold of arsenic for minnows has been reported to be 234 mg/L [6]. Micromedex, Inc. [12] reported the 36-hour toxic value for minnows was 11.6 ppm and the 16-hour toxic value was 60 ppm.

The USEPA acute freshwater criterion for arsenic (V) is 850 μg/L and because there is insufficient data to develop the criteria, the value presented is the LOEL. The acute freshwater criterion for arsenic (III) is 360 μg/L, and the chronic freshwater criterion for the trivalent form is 190 μg/L [13].

Wildlife. Chronic poisoning is infrequently seen in most animals because detoxication and excretion are rapid [5]. Normal arsenic concentrations in mice are 1.0 ppm, while hawks typically have body burdens of 0.4 ppm [9]. Adverse effects were noted in mammals at single oral doses of 2.5 to 33 mg/kg body weight and at chronic oral doses of 1 to 10 mg/kg body weight [5]. Acute waterfowl toxicity is reported at 0.05 ppm [12]. Median lethal concentrations in the diets of mallards were reported at 5,000 ppm [14]. The oral LD_{50} values are 15 mg/kg body weight for rats, 25 to 47 mg/kg body weight for mice, 4 to 19 mg/kg body weight for rabbits, and 6.5 mg/kg body weight for fowl [12]. Arsenic does not accumulate in mammals [10].

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BARIUM

CAS NUMBER

7440-39-3

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: decomposes [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 3.51 at 20/20°C [1]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Barium is a naturally-occurring element. The concentration of barium in minimally disturbed soils varies tremendously. A collection of 1,319 soil samples from across the conterminous U.S. determined that 86 percent were less than or equal to 700 ppm, with a geometric mean of 440 ppm, but with a maximum value as high as 3,000 ppm [2].

FATE AND TRANSPORT

Barium is a highly reactive metal that occurs naturally only in the combined state. Most barium released to the environment from industrial sources is in forms that do not become widely dispersed. In the atmosphere, barium is likely to be present in the particulate form. Environmental fate processes may transform one barium compound to another; however, barium itself is not degraded. It is removed from the atmosphere primarily by wet or dry deposition [1].

In aquatic media, barium is likely to precipitate out of solution as an insoluble salt, or adsorb to suspended particulate matter. Sedimentation of suspended solids removes a large portion of the barium from surface waters. Barium in sediments is found largely in the form of barium sulfate. Bioconcentration in freshwater aquatic organisms is minimal [1].

Barium in soil may either be taken up to a small extent by vegetation, or transported through soil with precipitation. Barium is not very mobile in most soil systems. The

higher the level of organic matter, the greater the adsorption. The presence of calcium carbonate will also limit mobility. Mobility is increased in the presence of high chloride concentrations. Barium complexes with fatty acids, for example, in acidic landfill leachate, will be much more mobile [1].

HUMAN TOXICITY

General. The primary target of barium toxicity is the cardiovascular system [1]. Information regarding the genotoxicity of barium are equivocal. Barium has not been placed in a weight-of-evidence cancer group by the USEPA [3].

Oral Exposure. A chronic oral RfD of 0.07 mg Ba/kg/day is based on a NOAEL of 0.21 mg Ba/kg/day for increased blood pressure in a long-term drinking water study in humans [3]. Barium is poorly absorbed following oral exposure (about 5%) [1]. In rats, acute oral LD_{50} values range from 132 to 277 mg/kg [1]. In humans, ingestion of very large amounts of barium (doses not reported) over a short period may cause paralysis or death. Ingestion of lower doses of barium over a short period may result in difficulties in breathing, increased blood pressure, changes in heart rhythm, stomach irritation, minor changes in blood, muscle weakness, changes in nerve reflexes, swelling of the brain, and damage to the liver, kidney, heart, and spleen [1]. Studies in animals report effects similar to those found in humans. Barium sulfate is sometimes given orally or rectally for the purpose of making X rays. This has not been shown to be harmful [1]. There is no evidence that oral exposure to barium affects human reproduction or development and developmental and reproduction studies in animals are inconclusive [1]. Barium has not been shown to cause cancer in humans or animals following oral exposure, therefore, an oral slope factor is not available [1,3].

Inhalation Exposure. The chronic inhalation RfC for barium of 5×10^{-4} mg/m^3 is based on a NOEL of 0.8 mg/m^3 for fetal toxicity in rats [4]. Approximately 65% of an inhaled concentration of barium is absorbed following inhalation exposure [1]. Barium has not been reported to be fatal to humans or animals following inhalation exposure [1]. Studies examining the toxicity of inhaled barium in humans and animals are extremely limited but suggest that exposure results in effects on the respiratory, cardiovascular, and gastrointestinal systems [1]. There is no evidence that inhaled barium affects human reproduction or development, but studies in animals suggest that barium may have adverse effects on these processes [1]. Barium is not known to cause cancer in humans or animals following inhalation exposure, therefore, an inhalation unit risk is not available [1,3].

Dermal Exposure. Dermal exposure to barium has not been reported to be fatal in humans or animals. Limited animal studies indicate that barium is a dermal and ocular irritant, but the results of this study are inconclusive [1].

ECOLOGICAL TOXICITY

General. Barium compounds are generally insoluble making them relatively unavailable for biological uptake [5]. All water- or acid-soluble barium compounds are poisonous. Barium is considered a nonessential element for plants and animals.

Vegetation. There are very few reports of barium toxicity to plants, except under conditions of acidic soils or with highly concentrated soil solutions where the bioavailable fractions are excessive (e.g., 2 mg/L soluble barium). Some authors report that concentrations of barium need to be extreme before toxicity occurs. Barium accumulation in plants is unusual except when the barium concentration exceeds calcium and magnesium concentrations in the soil, a condition which may occur when sulfate is depleted [6].

Aquatic Life. Barium ions in general are rapidly precipitated or removed from solution by chemical bonding, adsorption, and sedimentation. In most natural water, there is sufficient sulfate or carbonate to precipitate soluble barium present in the water, converting it to an insoluble nontoxic compound [6]. Experimental data indicate that soluble barium concentrations would have to exceed 50,000 μg/L before toxic effects to aquatic life might be observed [5]. Other data show the concentrations of barium lethal to half the test population of fish range from 150 to 10,000 mg/L [7]. Because barium represents little hazard under natural conditions, there are no federal aquatic life water quality standards [8].

Wildlife. Soluble barium compounds such as barium chloride, barium carbonate, barium sulfide, and barium oxide are highly toxic to animals when injested [9], although it is unlikely that suitable conditions would exist under natural conditions to accommodate exposure to these compounds. No reports of barium toxicity to wildlife under natural conditions were identified.

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BERYLLIUM

CAS NUMBER

7440-41-7

COMMON SYNONYMS

Glucinium.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 1.848 20/4°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATION

Beryllium is a naturally-occurring element. The concentration of beryllium in minimally disturbed soils varies tremendously. A collection of 1303 soil samples from across the counterminous U.S. determined that 86 percent were less than 2 ppm, with a geometric mean of 0.63 ppm and a maximum value of 15 ppm [3].

FATE AND TRANSPORT

Pure beryllium is a gray metal, resistant to attack by acids (due to formation of a thin oxide film). In nature, beryllium is present in much greater concentrations in soils and sediments than in water. Beryllium is tightly adsorbed to most types of soils because it displaces divalent cations that share common sorption sites. Consequently, beryllium has limited mobility in soil and is not likely to leach to groundwater. Beryllium will not volatilize from water or soil. In water, beryllium compounds may hydrolyze to form other beryllium compounds. In air, beryllium will probably be in the form of beryllium oxide. It is not known if beryllium will be transformed to more soluble compounds, which will be removed via precipitation. Bioconcentration of beryllium in aquatic organisms will not be significant [1].

HUMAN TOXICITY

General. The major target of beryllium toxicity is the respiratory system [1]. Information regarding the mutagenicity of beryllium are mixed. Beryllium has been placed in weight-of-evidence Group B2, indicating that it is a probable human carcinogen [4].

Oral Exposure. A chronic oral RfD of 0.005 mg Be/kg/day is based on a NOAEL of 0.54 mg Be/kg/day for no adverse effects in a chronic oral study in rats [4]. Beryllium is poorly absorbed following oral exposure. Information regarding the effects of oral exposure in humans are not available and animal studies are limited. Acute oral LD_{50} values in rodents ranged from 18 to 200 mg Be/kg/day [1]. Rats fed a diet containing high levels of beryllium (> 10 mg Be/kg/day) developed rickets. When the diet is deficient in calcium, beryllium will substitute for calcium in the bone, resulting in rickets; it is not known if this effect will occur in humans [1]. Information regarding the potential effects of ingested beryllium on reproduction and development in humans and animals are not available. There is no evidence that ingested beryllium causes cancer in humans, but animal studies suggest that beryllium may be carcinogenic following oral exposure [1]. An oral Slope Factor of 4.3 $(mg/kg/day)^{-1}$ has been derived based on an increase in the incidence of gross tumors at various sites in rats [4].

Inhalation Exposure. An inhalation RfC for beryllium is not available [4]. Beryllium is absorbed following inhalation exposure, but the extent of absorption is not known. Acute, 4-hour inhalation LC_{50} values in animals were 0.15 to 0.86 mg/m^3 in rats and 4.02 mg/m^3 in guinea pigs [1]. Occupational exposure of humans to beryllium dusts, including both inhalation and dermal exposure, is the primary route of beryllium exposure. The respiratory system is the target of beryllium toxicity following both acute and chronic exposure. Short-term exposure results a condition called chemical pneumonitis, which is characterized by cough, a burning in the chest, shortness of breath, anorexia and increasing fatigue. These effects are associated with concentrations > 0.1 mg Be/m^3 [1]. Chronic exposure to beryllium results in a condition known as berylliosis, or chronic beryllium disease, which is characterized by the presence of granulomas, fibrosis and emphysema in the lungs. Berylliosis has been found to occur at concentrations > 0.001 mg/m^3 [1]. The chemical pneumonitis occurs primarily with exposure to soluble beryllium compounds, while the berylliosis results primarily from exposure to insoluble beryllium compounds. Both conditions may be fatal. Effects on the heart, liver and kidney may also occur, but are probably secondary to the respiratory effects. There is no evidence that inhaled beryllium will cause developmental effects in humans, but studies in animals indicate that intratracheal exposure to beryllium may result in developmental effects [1]. Lung cancer has also been found in occupationally exposed workers [1]. An inhalation Unit Risk of 0.0024 $(ug/m^3)^{-1}$ has been derived based on an increase in the incidence of lung tumors in humans [4].

Dermal Exposure. Dermal exposure to beryllium has not been reported to be fatal to humans or animals. Dermal exposure to beryllium may result in allergic reactions in both humans and animals [1]. Skin granulomas (non-cancerous growths) may form on the skin of sensitized individuals [1].

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CADMIUM

CAS NUMBER

7440-43-9

COMMON SYNONYMS

None noted.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Neglibible [2]
Henry's Law Constant: ND
Specific Gravity: 8.65 at 25/4°C [1]
Organic Carbon Partition Coefficient: ND

BACKGROUND CONCENTRATIONS

Pure cadmium is a silver-white, blue-tinged, lustrous metal with a distorted hexagonal close-packed structure; cadmium is easily cut with a knife. Cadmium can be found in zinc ores, as greenockite (CdS), and as otavite ($CdCO_3$). The estimated occurrence of cadmium in the earth's crust is from 0.1 to 0.2 ppm [1]. No data on cadmium was gathered as part of the 1984 Department of the Interior survey of conterminous United States soils [3].

FATE AND TRANSPORT

Elemental cadmium is insoluble in water [1], while cadmium compounds show varying degrees of solubility depending on the nature of the compounds and the aquatic environment [2]. Cadmium in the environment may be found as cadmium salts, hydrated cations, or organic/inorganic cadmium complexes. As hydrated cations or complexes, cadmium may be considered fairly mobile in water (relative to other heavy metals). Cadmium in soils may leach into water, especially under acidic conditions. It does not volatilize from either waters or soils, but does exhibit a tendency to adsorb strongly to clays, muds, and humic/organic materials in soils and waters. Complexation and sorbing with organic materials are the most important factors in aquatic fate and transport. The evidence indicates that cadmium bioconcentrates in all levels of the food chain. Cadmium accumulation has been reported in many animal and plant species. Reported BCFs range

from 113 to 18,000 for invertebrates, and from 3 to 2,213 for fish. The pH and humus content of the water affect bioconcentration [2].

HUMAN TOXICITY

General. Breathing air with very high levels of cadmium severely damages the lungs and can cause death. High cadmium levels in the diet severely irritate the digestive tract, while lower levels consumed over a long period of time may cause kidney damage [2]. The USEPA has placed cadmium in weight-of-evidence Group B1, indicating that it is a probable human carcinogen [4].

Oral Exposure. A chronic oral RfD of 0.0005 mg/kg/day for water is based on a NOAEL of 0.005 mg/kg/day for proteinuria following chronic exposures in humans. A chronic oral RfD of 0.001 mg/kg/day for food is based on a NOAEL of 0.01 mg/kg/day for proteinuria following chronic exposures in humans [4]. It is estimated that humans absorb about 5 percent of ingested cadmium [2]. In rats and mice the acute oral LD_{50} values range from about 100 to 300 mg/kg. Two human deaths due to intentional ingestion of cadmium resulted from doses of 25 and 1,500 mg/kg [4]. Symptoms of acute toxic reaction to ingestion may include gastroenteritis, vomiting, diarrhea, abdominal pain, increased salivation, choking, anemia, hypotension, respiratory arrest, pulmonary edema, renal dysfunction, and death. Chronic oral overexposure symptoms may include renal dysfunction and/or failure, as well as anemia [1,2,5]. Cadmium has been implicated as a fetotoxin by the oral route in animal studies [2].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for cadmium [4,6]. It is estimated that humans rapidly absorb about 25 percent of inhaled cadmium. The 15-minute LC_{50} for rats exposed to cadmium oxide fumes is approximately 33 mg/m^3. It has been estimated that exposure to 1 mg/m^3 for 8 hours might be sufficient to cause death in humans [2]. Symptoms associated with acute cadmium poisoning via inhalation may include fever, headache, dyspnea, pleuritic chest pain, conjuctivitis, rhinitis, sore throat, cough, pulmonary edema, extreme restlessness, respiratory failure, and death. Chronic inhalation overexposure symptoms may include renal dysfunction and/or failure, dyspnea, emphysema, bronchitis, and anemia [1,2,5]. Cadmium has been implicated as a developmental toxin by the inhalation route in animal studies [2]. An inhalation unit risk of 0.0018 mg/m^3 is based on excess lung cancers observed in humans [4].

Dermal Exposure. Cadmium is poorly absorbed through the skin [2]. No other useful information regarding dermal exposure to cadmium was located.

ECOLOGICAL TOXICITY

General. Cadmium is considered nonessential for plants and animals. It is relatively mobile in the environment compared to most other heavy metals. Cadmium occurs naturally in close association with zinc, usually in concentrations directly related to zinc levels [7]. Its cumulative nature in organisms and its high toxicity makes it an extremely dangerous poison for most animals. Cadmium is accumulated through the food chain in sufficient quantities to be harmful to higher trophic levels. However, no evidence was found of biomagnification of this element through trophic levels [8].

Vegetation. The soil chemistry of bioavailable cadmium is controlled by pH. Brooks [9] reported that the general toxicity of cadmium to plants was moderate. Cadmium is usually more available in acidic, sandy soils than in neutral or alkaline soils with large amounts of clay and organic matter [7]. Absorption is strongly pH-dependent, increasing as conditions become more alkaline. It has been suggested that there is a 100-fold increase in cadmium absorption for each unit increase in pH [10]. Plants tissues normally contain <0.5 ppm cadmium, but many species may accumulate much higher concentrations (up to several hundred ppm) when they grow in soil with elevated cadmium concentrations. Cadmium levels in plant tissues may subsequently affect the balance of essential elements in the plant [7]. It has been noted that 3 mg/kg of cadmium in the tissues of plants depressed growth [11]. Tall fescue (*Festuca arundinacea*) had a reduced yield of 50 percent with a soil concentration of 320 mg/kg [10].

Aquatic Life. In aquatic systems, water hardness affects the biological toxicity of cadmium. The uptake of cadmium is faster in hard water than in soft water, but the total concentration of cadmium is greater in soft water [12]. Cadmium uptakes also increase with increasing water temperature and decreasing salinity [8]. The environmental mobility of cadmium is influenced by the pH levels in the water. Cadmium is less mobile in alkaline waters than in acid waters because it becomes chemically bound in alkaline waters [13]. Cadmium can be quite toxic to aquatic organisms, even in concentrations of less than 1 ppm [10]. Fish are quite susceptible to acute toxicity, with reported 4-day LC_{50} values ranging from 0.002 to 2.9 mg/L [8]. Cadmium has been reported to accumulate in the tissues of aquatic organisms at concentrations hundreds to thousands of times higher than in the water [12]. The federal chronic freshwater quality criterion for cadmium is 3.37 μg/L based on water hardness of 400 mg/L $CaCo_3$ [14].

Wildlife. Cadmium has been shown to have a toxic effect on a variety of mammals and birds. Mammals have no effective mechanism for the elimination of ingested cadmium; therefore, the cadmium tends to accumulate in the liver and kidneys. Its relative toxicity to mammals has been rated from moderate to high [15]. Toxic effects include decreased growth rates, anemia, infertility, fetus abnormalities, abortion, kidney disease, intestinal

disease, and hypertension [11]. The known effects for mallards are all sublethal, primarily affecting the kidneys, testes, and egg production [8]. In mallards chronically dosed with cadmium contaminated food, significant effects on energy metabolism were found at 450 mg/kg, but not at 150 mg/kg [11]. In general, cadmium levels in excess of 20 ppm may reduce reproductive output of nesting waterfowl. More direct effects on individual mallards may occur as cadmium levels approach 200 ppm [8].

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CHROMIUM

CAS NUMBER

7440-47-3

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 7.2 at 28°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Chromium is a naturally-occurring element which is dispersed throughout the environment primarily as a result of anthropogenic activities [1]. The concentration of chromium in minimally disturbed soils varies tremendously. A collection of 1,319 soil samples from across the conterminous U.S. determined that 87 percent were less than or equal to 70 ppm, with a geometric mean of 37 ppm, but with a maximum value as high as 700 ppm [3].

FATE AND TRANSPORT

Two of the major forms of chromium are trivalent or chromium (III), and hexavalent or chromium (VI). Chromium is released into the atmosphere mainly by the combustion of coal and oil. The most toxic form is hexavalent chromium, which is due mainly to chemical manufacture, primary metal production, chrome plating, and cooling towers. Chromium is removed from the atmosphere by fallout and precipitation, but may be transported long distances before removal. The residence time of atmospheric chromium is expected to be less than 10 days. There are no known chromium compounds that can volatilize from water. Most of the trivalent form is expected to precipitate in sediments. Hexavalent chromium will be present predominantly in the soluble form. Hexavalent chromium will eventually be reduced to the trivalent form by the organic materials present

in surface water. The residence time of chromium in lake water is estimated to be in the range of 4.6 to 18 years. Bioconcentration should be minimal [1].

Chromium in soil may become airborne due to fugitive dust emissions, while runoff and leaching may transport it to surface water and groundwater. Flooding of soils and the subsequent anaerobic decomposition of plant material may increase the mobilization of chromium from soils. The half-life of chromium in soils may be several years [1].

HUMAN TOXICITY

General. There are two forms of chromium that are of concern; trivalent chromium (chromium III) and hexavalent chromium (chromium VI). In general, chromium (VI) compounds are more toxic than chromium (III) compounds [1]. Trivalent chromium (chromium III) is considered an essential nutrient which helps to maintain normal glucose, cholesterol, and fat metabolism. A daily ingestion of 0.05 to 0.20 mg/day (0.0007 to 0.003 mg/kg/day) is estimated to be safe and adequate [1]. The major targets of chromium toxicity are the respiratory system and the gastrointestinal system. Chromium is considered to be genotoxic. The USEPA [4] has placed chromium (VI) in weight-of-evidence cancer Group A, indicating that it is a human carcinogen. Chromium (III) has not been placed in a cancer class by the USEPA [4].

Oral Exposure. A chronic oral RfD value of 1 mg Cr/kg/day for chromium (III) is based on a NOEL of 1468 mg Cr/kg/day for adverse effects in a chronic feeding study in rats [4]. An oral RfD of 0.005 mg Cr/kg/day for chromium (VI) is based on a NOAEL of 2.4 mg Cr/kg/day for adverse effects in a 1-year drinking study in rats [4]. Chromium is poorly absorbed following oral exposure. Acute oral LD_{50} values in rats ranged from 13 to 2365 mg Cr/kg, depending on the chromium compound [1]. Short-term oral exposure of humans to high doses of chromium (> 4.1 mg Cr (VI)/kg/day) has resulted in stomach upsets and ulcers, convulsions, liver and kidney damage and even death [1]. Information regarding potential effects of chromium on human reproduction and development are not available. Exposure of animals to chromium (VI) (57 mg Cr (IV)/kg/day) during pregnancy has been found to result in developmental effects on the fetus [1]. Treatment of male mice with chromium (III) and (VI) (> 3.5 mg Cr/kg/day) has caused effects on spermatogenesis [1]. There is no evidence that oral exposure to chromium (III) or (VI) causes cancer in humans or animals, therefore, an oral Slope Factor is not available [4].

Inhalation Exposure. Inhalation RfC values for both chromium (III) and chromium (VI) are currently under review by the USEPA [4]. Following inhalation exposure, approximately 53-85% of chromium (VI) compounds and 5-30% of chromium (III) compounds are absorbed into the blood [1]. Acute (4-hour) inhalation LC_{50} values in rats ranged from 29 to 137 mg/kg, depending on chromium compound [1]. In humans, acute

inhalation of chromium has not been reported to be fatal. The respiratory system is the major target of toxicity for both forms of chromium following inhalation exposure. Respiratory effects include perforations and ulcerations of the nasal septum, bronchitis, pneumonoconiosis (inflammation of the lung leading to fibrosis), decreased pulmonary function, pneumonia, rhinorrhea (runny nose), nasal itching and soreness and epistaxis (nose bleed) [1]. These effects have occured at concentrations > 0.002 mg Cr (VI)/m^3. In some chromium-sensitive people, chromium exposure may trigger an allergic response manifested by asthma or a skin rash. There is no conclusive evidence that inhaled chromium causes reproductive or developmental effects in humans or animals [1]. Long-term inhalation exposure of workers to low levels of chromium compounds (> 0.04 mg Cr/m^3) has been associated with lung cancer. The form of chromium responsible for this effect has not been established, but only hexavalent chromium has been found to cause cancer in animal studies. An inhalation Unit Risk of 0.012 $(ug/m^3)^{-1}$ for chromium (VI) is based on an increase in the incidence of lung cancer in occupationally exposed workers [4]. An inhalation Unit Risk is not available for chromium (III) [4].

Dermal Exposure. Acute dermal LD_{50} values in rabbits ranged from 30 to 553 mg Cr/kg depending on chromium compound [1]. Dermal exposure to chromium has been found to be fatal in humans, but the exact exposure dose is not known [1]. Dermal exposure of humans to chromium can cause allergic reactions as well as skin burns, blisters and ulcers [1]. Exposure of animals to chromium results in effects similar to those found in humans.

ECOLOGICAL TOXICITY

General. Chromium is essential for mammals, but can be toxic at higher levels. It is beneficial but not essential to the growth in higher plants. Plants do not accumulate chromium, and animals apparently absorb little chromium from plant material in their digestive tract [5]. No biomagnification of chromium has been observed in food chains, and concentrations are usually highest at the lowest trophic levels [6]. The bioconcentration factors for freshwater fish, invertebrates, and plants are 200, 2,000 and 4,000, respectively [6].

Vegetation. The chromium content of plants is controlled mainly by the amount of soluble chromium in the soils. Chromium (VI) is the most soluble and available to plants, but it is also the most unstable form under normal soil conditions [7]. Chromium usually exists in soils as insoluble oxides, which are largely unavailable at pH's greater than 4.0 [7]. There is some indication that chromium is accumulated in plant roots. Some plants experience decreased yields at soil concentrations as low as 0.5 ppm. These data indicate that the phytotoxic concentration is greater than 10 ppm [8]. Translocation of chromium from roots to plant tops apparently is not a serious problem. Typical symptoms of chromium phytotoxicity are wilting of plant tops, root injury, chlorosis in young leaves, brownish-red

leaves, and chlorotic bands on cereals [7]. The 96-hour LC_{50} for aquatic freshwater plants ranges from 2,500 μg/L to 25,000 μg/L for chromium (VI) [6].

Aquatic Life. The toxicity of chromium (III) and (VI) to aquatic species appears to increase as pH and/or water hardness decreases [9]. For chromium (VI), the 96-hour LC_{50} values for sensitive freshwater and marine species were between 445 and 2,000 ppb [6]. For chromium (III) the 96-hour LC_{50} concentrations were 2,000 to 3,200 ppb for sensitive freshwater organisms and 3,300 to 7,500 ppb for marine biota [6]. Sensitive freshwater organisms showed reduced growth, inhibited reproduction, and increased bioaccumulation at 10 μg/L of chromium (VI), and other adverse effects at 30 μg/L of chromium (III) [6]. The 96-hour LC_{50} values for bluegill and fathead minnow are 71,900 μg/L and 64,700 μg/L, respectively for chromium (III) [5]. The 96-hour LC_{50} value for bluegill range from 133,000 μg/L to 213,000 μg/L for chromium (VI) [6]. Fish rapidly eliminate chromium upon return to freshwater following exposure. Thus, fish exposed intermittently to high chromium levels would not experience cumulative chromium uptake [10]. The federal acute and chronic water quality criteria for aquatic life in freshwater are 16 μg/L and 11 μg/L, respectively for chromium (VI) and 1,700 μg/L and 210 μg/L, respectively for chromium (III) at 100 mg/L $CaCO_3$ [11].

Wildlife. In mammals, chromium (III) is less toxic than chromium (VI), probably because the former permeates biological membranes less readily [5]. Although chromium is highly toxic to invertebrates, it is only moderately toxic to higher animals, and most mammals can tolerate up to 1,000 ppm chromium in their diets [8]. Eisler found the toxic threshold in rats to be 1,000 ppm chromium (VI) in their diet and 100 percent survival when exposed to 134 ppm in their drinking water for three months [6]. It appears the primary source of uptake of chromium by small mammals is through ingestion of contaminated soil while grooming [6]. Dietary levels of 10 mg/kg of chromium (III) adversely affected young black ducks (*Anas rubripes*) [6].

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COBALT

CAS NUMBER

7440-48-4

COMMON SYNONYMS

Cobalt-59; ^{59}Co; CI77320. [1]

ANALYTICAL CLASSIFICATION

Metal.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 8.9 at 20°C [1]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Cobalt is a naturally-occurring element found widely distributed throughout the earth's crust and organisms. The abundance of cobalt in the earth's crust has been estimated at 0.001 - 0.002% [2]. The concentration of cobalt in minimally disturbed soils varies tremendously [3]. A collection of 1,311 samples from across the conterminous U.S. determined that 78% were less than or equal to 10 ppm, with a geometric mean of 6.7 ppm, but with a maximum value as high as 70 ppm. Of fifteen samples collected around Ohio, 60 percent were found to contain cobalt at levels ranging from 10 to 70 ppm [3].

FATE AND TRANSPORT

Cobalt is a gray, hard (although somewhat malleable), magnetic, ductile metal which appears essential to life (playing an important role in animal nutrition), and which exists in two allotropic forms: hexagonal and cubic. The hexagonal form is the more stable, although both can exist, at normal ambient temperatures. In addition, both are stable in air and towards water at normal ambient temperatures. Cobalt is readily soluble in dilute nitric acid, and is slowly attacked by hydrochloric acid or cold sulfuric acid.

Compounds and/or complexes of cobalt are not usually volatile. Therefore, the transport of cobalt probably results from particulate matter interactions. Dry and wet deposition accounts for the majority of transport to soils and surface waters. As with most metals, soils and sediments are the final repository for cobalt. Transport of cobalt in soils depends

upon adsorption/desorption reactions. Cobalt is also retained in soils/sediments by oxides (e.g., iron/manganese oxides) and crystalline materials (e.g., aluminosilicate, geothite). Available data, however, suggest little adsorption of cobalt to organic matter (e.g., humic and/or fulvic matter) in waters. Mobility/transport of cobalt in soils is accelerated with decreasing soil pH. Leaching to groundwaters occurs only minimally, and is postulated to be the result of the formation of pseudo-colloidal suspensions and their subsequent migration/leaching to groundwaters. Generally, cobalt exhibits greater mobility in soils than does lead, chromium (+2 state), zinc, and nickel, but lesser mobility than cadmium. Bioaccumulation of this material in aquatic organisms may be great (log bioaccumulation factor = 3.60), but biomagnification through the trophic levels does not appear to be significant. [1]

HUMAN TOXICITY

General. Cobalt is part of vitamin B_{12}, which is essential to maintain good health. Toxic effects occur, however, when too much cobalt is taken into the body. The major targets of cobalt toxicity are the blood, the heart, and the gastrointestinal system following oral exposure, and the lungs following inhalation exposure [1]. Cobalt is considered to be genotoxic. Cobalt has not been placed in a weight-of-evidence cancer group by the USEPA [4].

Oral Exposure. A chronic oral RfD for cobalt is currently under review by the USEPA [4]. Absorption of cobalt through the gastrointestinal tract is dependent on the type and dose of cobalt given and on the nutritional status of the person [1]. More cobalt will be absorbed by an iron-deficient person than by a normal person. Acute oral LD_{50} values in rats ranged from 91 to 190 mg/kg [1]. In humans, deaths were reported following long-term ingestion of large quantities of cobalt-contaminated beer (0.04 to 0.14 mg/kg/day). Cobalt was added to the beer to stabilize the foam, but this practice has since been discontinued. The victims died from cardiomyopathy. Cobalt stimulates the production of red blood cells and, therefore, has been given as a treatment for anemia (0.16-1.0 mg/kg/day) [1]. Gastrointestinal effects were noted both in the beer-drinkers and in the anemic patients. In animals, effects on the testes (degeneration) were found in addition to the cardiovascular and hematological effects found in humans [1]. Cobalt has not been found to cause birth defects in people, but exposure of animals to high doses has resulted in effects on the fetus [1]. Cobalt is not known to cause cancer following oral exposure, therefore, an oral slope factor has not been derived by the USEPA [4].

Inhalation Exposure. A chronic inhalation RfC is not available for cobalt [4]. The amount of inhaled cobalt that is absorbed depends on the size if the dust particles; the smaller the particle, the more likely it is to be absorbed through the lungs [1]. An acute LC_{50} value of 165 mg/m^3 (30-minutes) was reported for rats [1]. There is no conclusive evidence that

inhaled cobalt causes death in humans. The respiratory system is the target of inhaled cobalt. Short-term (6 hours) exposure of people to 0.038 mg/m3 resulted in difficulty in breathing. More serious effects on the lungs (asthma, pneumonia, wheezing) have been found in workers exposed to 0.003 mg/m3, while workers exposed to 0.007 mg/m3 have also had allergic asthma and skin rashes [1]. The respiratory system is also the target of cobalt toxicity in animals. There is no information regarding potential effects of inhaled cobalt on reproduction, development, or cancer. An inhalation unit risk is not available for cobalt [4].

Dermal Exposure. There is no information regarding lethal dermal doses of cobalt in humans or animals. Dermal exposure to cobalt results in dermatitis that is the result of an allergic reaction to cobalt. Exposure levels associated with the dermatitis are not known [1].

ECOLOGICAL TOXICITY

General. Cobalt is an essential trace nutrient for animals and for some algae. Although growth and yield increases have been reported, it is considered non-essential to most higher plants [5]. Cobalt does not biomagnify in terrestrial or aquatic food chains.

Vegetation. The bioavailability of cobalt to plants is primarily regulated by soil pH with soil leaching and plant uptake enhanced by lower pH [6]. Phytotoxicity from soil containing 50 to 100 ppm occurs in plants and foliar symptoms resembling iron deficiency are apparent at these levels [6]. Plants exhibit a wide range of species-specific tolerances to cobalt. Symptoms of cobalt phototoxicity are white, dead margins and tips of leaves, chlorosis of new leaves, and stunted growth [7]. Cobalt at concentrations of 10 to 400 μg/L inhibited seed germination and concentrations at 100 to 400 μg/L reduced plant growth and leaf chlorophyll contents [8]. These results were noted for laboratory or culture experiments. Naturally occurring excess of cobalt in soils is improbable because of soil bonding characteristics.

Aquatic Life. Cobalt is water soluble when in the form of chloride, nitrate, and sulfate salts. At a pH of 7, cobalt is 50 to 80 percent soluble when it is associated with ammonium, magnesium, calcium, sodium and potassium [6].

Among invertebrates, *Daphnia* were immobilized by 3.1 to 21.0 mg/L of cobalt, while concentrations of 16.0 to 32.0 mg/L were lethal to aquatic insect larvae in four to eight days [9]. The 10-day lethal concentration for fish is about 10.0 mg/L [9]. There are no USEPA aquatic life water quality standards [10].

Wildlife. Cobalt is required by animals because it is the central atom in vitamin B12 [6]. Cobalt is relatively nontoxic to animals. No reports of cobalt toxicity attributed to consumption of natural forage were identified. Animal health can be affected by

consumption of plants containing 100 ppm of cobalt [6]. Sheep can tolerate doses of 3 mg/kg body weight without adverse effects, and 200 mg/kg of cobalt in rats has been reported as toxic [11].

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COPPER

CAS NUMBER

7440-50-8

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 8.94 [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Copper is a naturally-occurring element. The concentration of copper in minimally disturbed soils varies tremendously. A collection of 1,311 soil samples from across the conterminous U.S. determined that 85 percent were less than or equal to 30 ppm, with a geometric mean of 17 ppm, but with a maximum value as high as 700 ppm [3].

FATE AND TRANSPORT

Copper is dispersed throughout the atmosphere primarily as a result of anthropogenic activities. Environmental fate processes may transform one copper compound to another; however, copper itself is not degraded. Most of the copper in the atmosphere occurs in the aerosol form, and long-distance transport may occur. Wet or dry deposition is expected to be the primary fate process in air.

Several processes determine the fate of copper in aquatic environments: formation of complexes, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. Organic complexes of copper are more easily adsorbed on clay and other surfaces than the free form. The aquatic fate of copper is highly dependent on factors such as pH, oxidation-reduction potential, concentration of organic matter, and the presence of other metals. In regard to the latter, it has been demonstrated that coprecipitation of copper with hydrous oxides of iron effectively

scavenges copper from solution, although in most surface waters organic materials prevail over inorganic ions in complexing copper [4].

Generally, copper is considered to be among the more mobile of the heavy metals in surface environments. Seasonal fluctuations have been observed in surface water copper concentrations, with higher levels in fall and winter, and lower levels in the spring and summer. It is not expected to volatilize from water. Since copper is an essential nutrient, it is strongly accumulated by all plants and animals, but is probably not biomagnified [4].

The degree of persistence of copper in soil depends on the soil characteristics and the forms of copper present. For example, in soils of low organic content, soluble copper compounds may move into groundwater at a significant rate. On the other hand, the presence of organic complexing agents may restrict movement in soil, and copper may be immobilized in the form of various inorganic complexes. It is not expected to volatilize from soil.

HUMAN TOXICITY

General. Copper is an essential trace element; therefore, toxic effects can result if too much or too little is taken into the body. The Recommended Dietary Allowance (RDA) for copper is 2 to 3 mg/day (0.03 to 0.04 mg/kg/day) [5]. The major targets of copper toxicity are the gastrointestinal tract following oral exposure and the lungs following inhalation exposure [5]. Information regarding the genotoxicity of copper are equivocal. USEPA has placed copper in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [6].

Oral Exposure. A chronic oral RfD of 1.3 mg/L (0.04 mg/kg/day) is based on a LOAEL of 5.3 mg/L for gastrointestinal irritation in humans [7]. Approximately 60% of an oral dose of copper is absorbed through the gastrointestinal tract [5]. Case studies of human suicides indicate that doses of 6 to 637 mg/kg have been fatal [5]. LD_{50} values are not available for animals. In humans, doses greater than 0.07 mg/kg have resulted in gastrointestinal effects including vomiting, diarrhea, nausea, abdominal pain and a metallic taste in the mouth [5]. Adverse effects were also noted in the liver (necrosis) and the kidneys (necrosis, tubular damage) of humans following oral exposure [5]. Chronic toxic effects due to copper are rarely seen except for individuals with Wilson's Disease. Wilson's Disease is a genetically determined condition in which the body absorbs and retains abnormally high copper concentrations [5]. It is not known whether exposure to copper will result in effects on reproduction or development in humans, but animal studies indicate that copper exposure may increase fetal mortality [5]. There is no evidence that copper causes cancer in humans or animals, therefore, an oral slope factor for cancer is not available [6].

Inhalation Exposure. A chronic inhalation RfC is not available for copper [6]. The extent of copper absorption following inhalation exposure is not known. Information regarding the fatal dose of copper following inhalation exposure was not located for humans or animals. In humans, copper is a respiratory irritant. Short-term inhalation exposure to copper dust or fumes (0.075-0.12 mg/m^3) results in a condition known as "metal fume fever". This condition is a 24-48 hour illness characterized by chills, fever, aching muscles, dryness in the mouth and throat and headache [5]. Respiratory effects have also been noted in animals [5]. Information is not available regarding potential effects on reproduction and development in humans or animals following inhalation exposure. There is no evidence that copper exposure causes cancer in human or animals, therefore, an inhalation unit risk for cancer is not available [6].

Dermal Exposure. Dermal exposure to copper may result in allergic contact dermatitis [5]. Other information regarding the toxic effects of dermal exposure to copper are not available [5].

ECOLOGICAL TOXICITY

General. Copper is an essential trace element or micronutrient for plants and animals. However, excessive amounts of the element are toxic [8]. Copper is accumulated by all plants and animals, but it has very little if any potential for biomagnification through the food chain [9].

Vegetation. Copper retention in soils and bioavailability to plants are dependent on pH. Sorption of copper increases with increasing pH [10]. Copper is held most securely at a pH range of 7.0 to 8.0 [11]. Several researchers have reported a decrease in plant copper when large amounts of organic matter are present. Copper is strongly chelated in plant roots. Phytotoxic concentration of copper ranges from about 70 to 640 ppm in the soil for most plants [12]. In vascular plants, toxic levels of copper can cause reduced growth, chlorosis, and stunted root development. Toxic copper concentrations also interfere with the uptake of iron and other heavy metals [8]. Copper salts have been used effectively to control aquatic vegetation, algae, and terrestrial plants invading sewer lines for many years.

Aquatic. The toxicity of copper to aquatic life varies with hardness (increases with decreased hardness), pH (increases with decreased pH), and temperature (increase with higher temperatures) [13]. Many studies have been published on the toxicity of copper to fish and other aquatic life forms. Relatively high concentrations of copper may be tolerated by adult fish for short periods of time. The critical effect appears to be its greater toxicity to young or juvenile fish [10]. Reproduction of fish is impaired at concentrations of 0.018 to 0.033 mg/L, growth is reduced at concentrations of 0.0025 to

0.0184 mg/L, and survival is reduced at 0.018 to 0.04 mg/L [8]. The maximum acceptable toxicant concentration for fathead minnows is 0.011 to 0.018 mg/L, as it affects embryo, larval, and early juvenile stages [13]. The 96-hour LC_{50} acute toxicity of copper sulfate in fathead minnows and bluegills was reported to be 1.4 mg/L and 10.2 mg/L, respectively, at a water hardness of 400 mg/L $CaCO_3$ and a pH of 8.2 [10]. The 96-hour LC_{50} acute toxicity of copper in fathead minnows and creek chub was 0.44 mg/L and 0.31 mg/L, respectively, with a water hardness of 200 mg/L $CaCO_3$ [10].

Concentrations of 0.015 mg/L produced sublethal effects in crayfish and a 4-day LC_{50} of 3.0 ppm [8]. The federal chronic freshwater quality criterion for copper is 38.7 μg/L based on a water hardness of 400 mg/L $CaCO_3$ [14].

Wildlife. Copper is an essential trace element for animals, with some species, such as sheep, being extremely sensitive to excessive concentrations of copper or to certain ratios of copper to molybdenum in their forage. Sheep have died after consuming plants and soils containing 15 ppm copper (dry weight) [15]. The maximum tolerable dietary level for turkey and chickens is 300 ppm [16]. However, copper toxicity in mammals and birds is of little significance because they possess barriers to copper absorption [17]. Mammals and birds are 100 to 1,000 times more resistance to toxic effects than aquatic biota.

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CYANIDE

CAS NUMBER

57-12-5

COMMON SYNONYMS

None noted.

ANALYTICAL CLASSIFICATION

Inorganic (wet chemistry).

PHYSICAL AND CHEMICAL DATA

Note: Data is for hydrogen cyanide (HCN).

Water Solubility: miscible [1]
Vapor Pressure: 264.3 mm Hg at)°C [1]
Henry's Law Constant: 5.1 x 10^{-2} atm-m^3/mole [1]
Specific Gravity: 0.6884 at 20°C (liquid) [1]
Organic Carbon Partition Coefficient: ND

FATE DATA: HALF-LIVES

Soil: ND
Air: ND
Surface Water: ND
Groundwater: ND

NATURAL SOURCES

Fruits, roots, and leaves of numerous plants [1].

ARTIFICIAL SOURCES

Vermicidal fumigants; insecticides; rodenticides; metal polishes; electroplating solutions; metallurgical processes [1,2].

FATE AND TRANSPORT

Cyanides may be found in the environment bound with organic and/or inorganic cations. The fate and transport of cyanide, therefore, is dependent upon the properties of the cyanide-bound material. Any discussion attempting to encompass all properties of cyanide-bound materials is beyond the scope of this assessment.

Cyanides may occur in soils as hydrogen cyanide, alkali metal salts, or immobile metallocyanide complexes. The fate of cyanides in soil will be largely dependent upon pH conditions of that soil. Volatilization of hydrogen cyanide from surface soils is expected to be a primary removal mechanism for soils having a pH of 9.2 or less. Though cyanide typically does not sorb strongly to soils (or organic matter therein), leaching to unprotected groundwaters is not expected to be significant due to the probability of cyanide fixation by trace metals found in soils, or transformation of cyanide via microbial action. However, if the initial cyanide loading proves toxic to soil-based microorganisms, leaching to groundwater may be expected. In water, cyanide occurs most commonly in the form of hydrogen cyanide. Hydrogen cyanide is removed from water primarily by volatilization. The rate of volatilization is also pH-dependent, with more rapid volatilization occurring at lower pH values [1].

Although simple metal cyanides and hydrogen cyanide are not expected to bioconcentrate in aquatic organisms, concentrations of simple metal cyanides have been detected in the tissues of fish exposed to waters containing silver and copper metal complexes. There is, as well, no evidence of biomagnification through trophic levels. Adsorption to suspended solids and sediments in waters will occur, but is expected to be a minor pathway in comparison to volatilization and biodegradation. [1]

Atmospheric concentrations of cyanide will exist almost exclusively as hydrogen cyanide, though small amounts of metal cyanides may exist associated with particulate matter. Given the relatively slow degradation rate of hydrogen cyanide in the atmosphere, this material has the potential to be transported for long distances. The most important removal mechanism for hydrogen cyanide in the atmosphere is via reaction with photochemically-produced hydroxyl radicals. Removal of hydrogen cyanide via either dry or wet deposition is expected to be a negligible mechanism. Metal cyanides (as particulates) will, however, be subject to deposition via gravitational settling and/or rainfall washout. [1]

HUMAN TOXICITY

General. Cyanide is highly toxic to humans following all routes of exposure. Cyanide acts by inhibiting enzymes that are needed to use oxygen efficiently, resulting in respiratory arrest. The major targets of cyanide toxicity are the central nervous system, the lungs and the heart [1]. Cyanide is not mutagenic and has been placed in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [3].

Oral Exposure. A chronic oral RfD of 0.02 mg/kg/day is based on the NOAEL of 10.8 mg/kg/day for weight loss, thyroid effects and nervous system effects in a chronic study in rats [3]. Cyanide is readily absorbed following oral exposure. Acute oral LD_{50} values ranged from 2.7 to 11 mg/kg in rats, 2.34 to 2.70 mg/kg in rabbits and 4.3 mg/kg in mice

[1,2]. In humans, an average fatal dose of 1.52 mg/kg has been calculated based on case reports of intentional or accidental poisonings. The lowest reported fatal dose in humans was 0.56 mg/kg [1]. Acute oral poisoning results in effects on the gastrointestinal system (vomiting), the heart (atrial fibrillation, shallow pulse, inaudible heart sounds), kidneys (increased protein output) and nervous system (tremors, stupor, coma). These effects have occurred at doses above 15 mg/kg [1]. Similar effects have been found in animals. Information regarding potential effects of cyanide on reproduction and development in humans are not available, but studies in animals indicate that effects on development may result following oral exposure [1]. Cyanide is not known to cause cancer in humans or animals following any route of exposure, therefore, an oral slope factor is not available [3].

Inhalation Exposure. A chronic inhalation RfC is not available for cyanide [3]. Cyanide is readily absorbed following inhalation exposure. Acute inhalation LC_{50} values vary according to duration of exposure: in rats, values ranged from 3,417 ppm (10 seconds) to 142 ppm (60 minutes), and in rabbits, values ranged from 2,200 ppm (45 seconds) to 208 ppm (35 minutes) [1]. In humans, an average fatal concentration is estimated to be 546 ppm for a 10-minute exposure. Exposure to 110 to 135 ppm for greater than an hour can be life-threatening, while exposure to 18-36 ppm for the same time period may not cause any effects [1]. Acute exposures to approximately 6 ppm and above may result in effects on the respiratory system (dyspnea, nasal irritation), cardiovascular system (chest pain, heart palpitations), gastrointestinal system (abdominal pain, nausea, vomiting), and nervous system (lightheadedness, breathlessness, numbness, headaches, and, at higher concentrations, coma). Chronic inhalation exposure of workers to comparable concentrations results in effects similar to those reported following acute exposure. Information regarding the potential effects of cyanide on reproduction and development are not available in humans or animals [1]. Cyanide is not known to cause cancer in humans or animals following any route of exposure, therefore, an inhalation unit risk is not available [3].

Dermal Exposure. The average fatal dose of cyanide in humans following dermal exposure was estimated to be 100 mg/kg [1]. Acute dermal LD_{50} values in rabbits ranged from 1.0 to 8.93 mg/kg [1]. Toxic effects observed following dermal exposure are similar to those following other routes of exposure [1].

ECOLOGICAL TOXICITY

General. Cyanide is a highly lethal, but short-lived noncumulative poison. No evidence was found of either cyanide bioaccumulation or biomagnification [4]. Hydrogen cyanide is the most common and the most toxic of the cyanides. The environmental chemistry of

cyanide is complex, with cyanide gas (HCN) and ionic cyanide (CN^-) representing the toxic chemical forms.

Vegetation. Cyanide seldom remains biologically available in soils because it is either complexed by trace metals, metabolized by various microorganisms, or lost through volatilization. In plants, elevated cyanide concentrations inhibit respiration [5]. Some plant species, such as arrowgrass (*Triglochin* sp.) wind wild cherry (*Prunus*), are natural producers of cyanocompounds and will have inherent high concentrations of these compounds in their tissues.

Aquatic. Cyanide in aquatic systems exists as simple hydrocyanic acid; as water-soluble alkali metal salts, such as potassium cyanide and sodium cyanide; and as metallocyanide complexes of variable stability [4]. Cyanide toxicity increases with decreasing pH and dissolved oxygen. Cyanide concentrations in the range from 50 to 100 μg/L have proven to eventually fatal to many sensitive fishes and levels above 200 μg/L probably are rapidly fatal to most fish species [6].

The 96-hour LC_{50} of cyanide for bluegill was 56.0 to 227.0 μg/L and the maximum toxicant concentration was 9.3 to 19.8 μg/L [5]. The 96-hour LC_{50} of cyanide for juvenile and adult fathead minnows was 117.0 to 157.0 μg/L and 121.0 to 129.0 μg/L, respectively [7]. During chronic exposure, cyanide inhibited spawning in bluegill at 5.0 μg/L and reduced growth rate in fathead minnows at 35.0 μg/L [5]. The federal chronic freshwater quality criterion for cyanide is 5.2 μg/L [8].

Wildlife. Cyanide is acutely toxic to birds and mammals in very small concentrations. Cyanide biomagnification in the food chain has not been reported, possibly due to rapid detoxification of sublethal doses by most species, and death at higher doses [5]. In mallards, a single oral dose of cyanide of 0.53 mg/kg body weight produced no deaths, but an LC_{50} result was produced at 1.43 mg/kg body weight [5]. In rabbits, a single oral dose of 10.0 to 15.0 mg/kg body wight produced a 100 percent kill in 14 to 30 minutes [5].

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LEAD

CAS NUMBER

7439-92-1

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not applicable [1]
Specific Gravity: 11.34 at 20/4°C [2]
Organic Carbon Partition Coefficient: ND [1]

FATE DATA: HALF-LIVES

Note: Data for tetraethyl lead; CAS No. 78-00-2

Soil: 1 to 4 weeks [3]
Air: 2.3 to 9.0 hours [3]
Surface Water: 2.3 to 9.0 hours [3]
Groundwater: 2 to 8 weeks [3]

BACKGROUND CONCENTRATIONS

Lead is a naturally-occurring element which is dispersed throughout the environment primarily as a result of anthropogenic activities [1]. The concentration of lead in minimally disturbed soils varies tremendously. A collection of 1,300 soil samples from across the conterminous U.S. determined that 80 percent were less than or equal to 30 ppm, with a geometric mean of 16 ppm, but with a maximum value as high as 700 ppm [4]. Concentrations along roadways and adjacent to houses with exterior lead-based paints may be as high as 10,000 ppm [1].

FATE AND TRANSPORT

Lead is extremely persistent in both water and soil. Environmental fate processes may transform one lead compound to another; however, lead itself is not degraded. It is largely associated with suspended solids and sediments in aquatic systems, and it occurs in

relatively immobile forms in soil. Lead which has been released to soils may become airborne as a result of fugitive dust generation. Tetraethyl lead may occur in the vapor phase [1].

HUMAN TOXICITY

General. The general human population is exposed to lead primarily via the oral route of exposure, with some contribution from the inhalation route. However, in some subpopulations, the predominant route of exposure is via inhalation. The effects of lead are the same regardless of whether it enters the body through breathing or ingestion. The major health threat from lead arises from the damage it causes to the brain, especially in fetuses, infants, and young children. Young and developing humans are highly sensitive to its effects. Also, young children are prone to ingest more lead as a result of normal mouthing behavior. Decreased IQ and reduced growth may result from childhood exposure. Fetal exposure may result in preterm birth, reduced birth weight, and decreased IQ [1]. The Federal Centers for Disease Control recently lowered the threshold at which children are considered to have lead poisoning from 25 to 10 micrograms of lead per deciliter of blood [5]. Some of the health effects of lead, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood levels so low as to be essentially without a threshold [6].

Lead exposure may increase blood pressure in middle-aged men. High-level exposure can severely damage the brain and kidneys in adults or children. In addition, high doses of lead will cause abortion and damage the male reproductive system [1]. The USEPA currently does not provide any toxicity values for lead [6,7]. The USEPA has placed lead in weight-of-evidence Group B2, indicating that it is a probable human carcinogen [6].

Oral Exposure. Oral absorption of lead appears to be low in humans. The absorption of lead into the body is highly dependent on its state of complexation. In general, soluble lead compounds tend to be more readily absorbed into the body than insoluble compounds, and are therefore more toxic. Certain organic lead compounds are also readily absorbed. Gastrointestinal absorption is highly dependent on the form of lead and the amount of food present. For example, in one experiment 3 percent of lead chloride was absorbed when provided with a meal, but 60 percent was absorbed when animals were fasted. Lead absorption is higher in children than in adults. Oral LD_{50} values were not available. LD_{LO} values for various inorganic lead compounds reportedly ranged from 191 mg lead/kg in the dog to 20,500 mg lead/kg in the guinea pig. An LD_{LO} is the lowest dose causing death. The reported adverse effects of lead in laboratory animals following oral exposure include severe central nervous system damage, elevated blood pressure, impaired heme synthesis, liver damage, kidney damage, fetotoxicity, and damage to the reproductive organs in both

males and females. Renal tumors have been observed in laboratory animals following oral administration of lead acetate [1].

Inhalation Exposure. Once deposited in the lower respiratory tract, lead is almost completely absorbed, and all chemical forms of lead also appear to be absorbed. Limited experimental evidence suggests that inhaled tetraethyl lead is rapidly absorbed by rats [1]. No other useful information was located regarding specific adverse health effects resulting from inhalation exposure to lead.

Dermal Exposure. Compounds such as lead acetate are poorly absorbed through skin, while tetraethyl lead appears to be rapidly absorbed [1]. No other useful information was located regarding specific adverse health effects resulting from dermal exposure to lead.

ECOLOGICAL TOXICITY

General. Lead is generally considered a highly toxic contaminant because it is not an essential nutrient to either plants or animals. Lead can be bioaccummulated, but it does not biomagnify in aquatic or terrestrial food chains. The tendency for lead to form complexes with naturally occurring organic material (e.g., humic and fulvic acids) increases its adsorption affinity for clays and other mineral surfaces, and decreases its bioavailability, except under acidic soil or water conditions. Benthic microbes can methylate lead to form tetramethyl lead, which is volatile and more toxic than inorganic lead [8].

Vegetation. Lead toxicity in plants under natural condition is uncommon even though field and laboratory studies have demonstrated lead's toxicity. Most of the lead in soils is insoluble and largely unavailable for plant uptake. Symptoms of lead toxicity are found only in plants grown on acid soils [9]. The amount of bioavailable lead taken up by plants decreases as soil pH, cation exchange capacity, and available phosphorus increase. Lead inhibits plant growth and reduces photosynthesis, mitosis, and water absorption. When taken up by plants, lead is rarely translocated because it becomes chelated in the roots [9]. Lead levels of approximately 500 mg/kg in soil reduced pollen germination by greater than 90 percent in two weed species. Normal germination rates were observed at soil levels of 46 mg/kg, but other adverse effects were observed at lead levels of 12 to 312 mg/kg [8].

Aquatic Life. The toxicity of lead in water is dependent on pH, organic materials, water hardness, and the presence of other metals [10]. Organolead compounds are more toxic than inorganic lead compounds to aquatic organisms [11]. Lead toxicity decreases with increasing water hardness [8]. Lead is more mobile in acidic waters than in higher pH waters. In alkaline and circumneutral waters, removal of lead by sorption and precipitation may occur relatively quickly [10]. The solubility of lead ranges from 500 μg/L in soft water to 3 μg/L in hard water [11]. In aquatic systems, most lead is found in bottom

sediments. The toxicity of lead to fish varies from 0.1 to 542 mg/L. Generally, the medium tolerance limit for fathead minnows in hard water (360 mg/L $CaCO_3$) is 482 mg/L [12]. The federal chronic freshwater quality criterion for lead is 18.6 μg/L based on a water hardness of 400 mg/L $CaCO_3$ [13].

Wildlife. Lead bioaccumulates in animal tissues, but does not biomagnify in the food chain [10]. Evidence of lead poisoning in mammals and other wildlife have been reported from sites heavily contaminated by lead smelter emissions and other types of atmospheric fallout. Neurological effects in mallard ducks were observed within 24 hours of dosing them with lead shot for a total intake of 423.8 mg/kg body weight. Assuming a mallard weighs approximately 1.2 kg and consumes food equivalent to 10 percent of its body weight each day, dosage of 423.8 mg/kg body weight is equivalent to an approximate lead concentration in the food of 4,600 mg/kg [8]. It was found that 1,000 ppm dietary lead reduced egg production and caused soft-shelled eggs and 500 ppm inhibited growth and produced anemia [8].

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MANGANESE

CAS NUMBER

7439-96-5

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: decomposes [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable [1]
Specific Gravity: 7.20 at 20/4°C [1]
Organic Carbon Partition Coefficient: Not Applicable [1]

BACKGROUND CONCENTRATIONS

Manganese is a naturally-occurring element. The concentration of manganese in minimally disturbed soils varies tremendously. A collection of 1,317 soil samples from across the conterminous U.S. determined that 89 percent were less than or equal to 700 ppm, with a geometric mean of 330 ppm, but with a maximum value as high as 7,000 ppm [2].

FATE AND TRANSPORT

Environmental fate processes may transform one manganese compound to another; however, manganese itself is not degraded. Elemental manganese and inorganic manganese compounds may exist in air as suspended particulate matter. Such particles are removed from the atmosphere primarily by dry deposition, and, to a lesser extent, by washout. In water, the metal may exist in any of four oxidation states (2+, 3+, 4+, or 7+). Mn(+2) predominates in most waters, and usually combines with carbonate to form a compound of low solubility. In extremely reduced water, poorly soluble sulfides are formed. Manganese is often transported in rivers as suspended sediments. Manganese in water may be significantly bioconcentrated at lower trophic levels. Bioconcentration may not be significant in predatory fish; thus biomagnification may not be significant [1].

Adsorption of manganese to soils may be highly variable, increasing with higher organic content and anion-exchange capacity. At low concentrations, manganese may be "fixed" by clays, and will not be readily released into solution. At higher concentrations, it may

be desorbed by ion exchange. For example, the discharge of waste water into estuarine environments resulted in the mobilization of manganese from the bottom sediments. Also, microorganisms may increase the mobility of manganese under some circumstances [1].

HUMAN TOXICITY

General. The only adverse health effect identified following exposure to high levels of manganese is a condition known as "manganism," which results in psychomotor disturbances. Manganese in small amounts is believed to be an essential nutrient for humans [1]. The USEPA has placed manganese in weight-of-evidence Group D; that is, it is not classifiable as to human carcinogenicity [3].

Oral Exposure. A chronic RfD of 0.1 mg/kg/day is based on a NOAEL of 0.14 mg/kg/day for central nervous system effects determined from human chronic ingestion data [3]. The amount of manganese absorbed from the gastrointestinal tract typically averages 3 to 5%. Most animal studies indicate that manganese compounds have low acute oral toxicity. A NOAEL of 2,300 mg/kg/day in food for 6 months was determined for mice. On the other hand, single doses of highly concentrated solutions of various manganese compounds delivered to rats by gavage produced LD_{50} values ranging from 410 to 820 mg manganese/kg/day. Thus it was concluded that high doses delivered by gavage did not yield a model relevant for normal environmental exposure. Evidence for the onset of manganism in humans following oral exposure is inconclusive. In animals, changes in the brain have been observed following very high oral exposure [1].

Inhalation Exposure. An RfC of 0.4 mg/m^3 is based on a LOAEL of 0.97 mg/m^3 for increased prevalence of psychomotor disturbances observed in occupational exposure of humans [3]. The rate and extent of absorption of manganese following inhalation is unknown. A significant fraction of inhaled manganese-containing particles are carried via mucociliary transport to the gastrointestinal tract. Exposure of humans to high levels of manganese dust in air for a prolonged period of time (1 month to several years) may cause mental and emotional disturbances, and the impairment of locomotion and dexterity, a condition known as manganism. However, this condition has only been documented for workers in mines and foundries. Manganism occurs because excessive manganese injures a part of the brain that helps control body movements. Some of the symptoms of manganism can be reduced by medical treatment, but the brain injury is permanent [1].

Dermal Exposure. No information was located on the dermal absorption of manganese or adverse health effects resulting therefrom. It is reasonable to assume that intake via this pathway under normal circumstances is minimal.

ECOLOGICAL TOXICITY

General. Manganese is an essential trace element or micronutrient for plants and animals. Manganese does not occur naturally as a metal, but is found in various salts and minerals, frequently in association with iron compounds [4]. Manganese readily bioaccumulates in plants and animals, but does not biomagnify in food chains.

Vegetation. At pH values of 5.0 or less, manganese is rendered very soluble and excessive accumulation in plants can result. At pH values of 8.0 or above, precipitation results in the removal of bioavailable manganese from the soil [5].

Wetland plants, such as cattails, tend to maintain higher tissue concentrations of manganese than upland plants, probably because of greater availability of soluble manganese in wet soils or sediments [6]. Cattails can take up 779 mg/kg dry weight without injury [4]. Plants having more than 400 to 3,000 mg/kg of manganese (dry weight) in their tissues may exhibit toxic symptoms depending on the plant species [6]. Manganese toxicity in young plants is indicated by brown spotting on leaves [5]. Vegetation phytotoxic concentrations in soils and sediments are species specific and range widely.

Aquatic Life. Manganese ions are rarely found at concentrations above 1 mg/L, so manganese is not considered to be a problem in freshwater [7]. Manganese is toxic to fish in concentrations ranging from 1.5 to 1000 mg/L. Most toxic thresholds for fish are probably less than 50 mg/L [4]. Toxicity of manganese increases with decreasing pH [8]. Manganese has been shown to bioaccumulate in freshwater invertebrates [4]. There is no USEPA aquatic life water quality standard [9].

Wildlife. The divalent form of manganese has a low order of toxicity to biota, especially to vertebrate animals. The hexavalent form is highly toxic, but does not occur in nature. Toxic concentrations of divalent manganese is reported in the diets of the following species: birds, 4,800 ppm; rats greater than 2,000 ppm; and rabbits 1,250 to 6,000 ppm. Toxic levels of manganese in mammals can cause decreased feed intake, decrease growth, reduced hemoglobin, and even death [10]. Growing rats have had dietary intake as high as 1,000 to 2,000 mg/kg with no apparent ill effects [6]. Maximum tolerable levels of manganese recommended by the National Academy of Sciences was 15 mg/kg body weight for sheep and cattle, 16 mg/kg body weight for swine, and 250 mg/kg body weight for poultry [10].

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MERCURY

CAS NUMBER

7439-97-6

COMMON SYNONYMS

Hydragyrum; quicksilver

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: 0.56 mg/L [1]
Vapor Pressure: 2 x 10^{-3} mm Hg at 25°C [2]
Henry's Law Constant: ND
Specific Gravity: 13.534 at 25/4°C [2]
Organic Carbon Partition Coefficient: ND

BACKGROUND CONCENTRATIONS

Mercury is a naturally-occurring element. Elemental mercury is a silver-white, heavy, mobile, liquid metal exhibiting slight volatility at room temperature [2]. Concentrations of mercury at sampling points across the contiguous United States exhibit a limited, but varied range. A total of 1,267 soils samples were gathered by the United States Geological Survey for mercury concentration analysis. Of this total, 1,263 samples exhibited some concentration of mercury across a range of <0.01 ppm to a maximum of 4.6 ppm. Fourteen percent of the total samples gathered showed a mercury concentration of from less than 0.01 ppm up to 0.002 ppm; 16 percent showed concentrations between 0.002 ppm and 0.032 ppm, 33 percent between 0.032 and 0.051, 24 percent between 0.051 and 0.13, and 13 percent showed concentrations of mercury to be from 0.13 ppm up to a maximum value of 4.6 ppm; geometric mean concentration of mercury was 0.058 ppm [3].

FATE AND TRANSPORT

Mercury may exist as one of three forms: elemental mercury, inorganic mercury, and organic mercury. Elemental mercury will combine with sulfur at ordinary temperatures, and react with nitric acid and/or ammonia solutions in air (to form Hg_2NOH); it does not react with hydrochloric acid, sulfuric acid (when cold), or alkalies. Mercurous salt will be slowly degraded by sunlight [2]. Inorganic mercury compounds generally dissociate into the mercuric form (Hg^{2+}) rather than the mercurous form (Hg^{+}). Organic mercury

compounds are generally divided into two broad classes: alkyl mercury (e.g., monomethyl mercury) and phenyl mercury (e.g., phenylmercury acetate). Organic mercury compounds are more easily absorbed than elemental and/or inorganic forms, but will readily undergo biodegradation with the ultimate release of inorganic mercury. Organomercury compounds, especially alkyl mercury compounds, are viewed as posing the greatest toxicological danger [4]. Given their high specific gravity/density values, elemental and inorganic mercury compounds are generally susceptible to gravitational deposition in sediments of aqueous environments. Given the relative values of water solubility and vapor pressure, mercury should be expected to be a fairly mobile material. Mercury entering surface waters can be microbially converted to methylmercuric ion given favorable conditions. Methylmercury accumulates in carnivorous fish to levels 10,000 times those concentrations found in the ambient water [1].

HUMAN TOXICITY

General. Long-term exposure to either organic or inorganic mercury can permanently damage the brain, kidneys, and developing fetuses. Short-term exposure can also have adverse health effects, but full recovery is more likely. Methylmercury is a potent neurotoxin [1]. The USEPA has placed inorganic mercury in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity [5].

Oral Exposure. The chronic RfD of 0.0003 mg/kg/day is based on kidney effects observed following oral administration in the rat [6]. Oral absorption of metallic mercury by humans has been estimated to be approximately 0.10%. Organic forms of mercury are readily absorbed by humans and animals via the oral route. For example, in one study approximately 95% of methylmercuric nitrate was absorbed. The oral LD_{50} for $HgCl_2$ ranged from 35 to 105 mg/kg in rats. The lethal dose of $HgCl_2$ in adult humans has been estimated to range from 10 to 42 mg/kg. Signs of acute mercury toxicity in humans and animals include gastrointestinal lesions and renal involvement. Death is usually caused by shock, cardiovascular collapse, acute renal failure, and severe gastrointestinal damage. A number of human deaths have resulted from organic mercury ingestion; the lethal dose is estimated to range between 10 and 60 mg/kg. A neurological syndrome in humans following the consumption of methylmercury-contaminated fish has been characterized by many symptoms including tingling in the extremities, impaired vision, hearing, taste, and smell, incoordination, weakness, slurred speech, irritability, memory loss, depression, and insomnia. Pregnant women who have ingested organic mercury have given birth to infants with severe brain damage. The evidence that the brain damage was caused by organic mercury is very strong [1].

Inhalation Exposure. The RfC of 0.0003 mg/m^3 is based on a NOAEL of 0.009 mg/m^3 determined for humans exposed by inhalation [6]. Metallic mercury diffuses rapidly across

lung membranes into the blood. Studies have shown that about 74 to 80% of inhaled elemental mercury vapor is retained in human tissues. Exposure to a metallic mercury vapor concentration of 28.8 mg/m^3 for 1 to 30 hours reportedly caused death in rabbits. In humans, death reportedly occurred following exposure to about 1.1 mg/m^3 diethylmercury vapor for 4 to 5 months. Symptoms of exposure to metallic mercury vapor in humans include chest pains, dyspnea, cough, hemoptysis, impairment of pulmonary function, tremors, insomnia, decreased motor function, headaches, decreased libido, and irritability. Some kidney damage in humans may occur at vapor concentrations of elemental mercury of 0.1 mg/m^3. Inorganic mercury vapor has been reported to cause menstrual disturbances and spontaneous abortions in women, and congenital malformations and resorptions in the offspring of exposed female rats [1].

Dermal Exposure. Both inorganic and organic forms of mercury are absorbed by the skin, although the extent of absorption was not reported. Children exposed to inorganic mercury salts dermally, exhibited the following symptoms: tremor of face or extremities, sudden jerky movements, a lack of muscle tone, impaired reflexes, seizures, light sensitivity, deafness, insomnia, and irritability. Symptoms in an adult human exposed dermally to metallic mercury were reported to include headache, tinnitus, and vertigo [1].

ECOLOGICAL TOXICITY

General. Biologically, mercury is considered nonessential and nonbeneficial for plants and animals. It is a highly toxic element that can both bioaccumulate in biota and readily biomagnify through biological food chains, increasing by a factor of three to five at each higher trophic level [7]. Organic forms of mercury such as methylmercury and dimethylmercury are readily bioavailable; are produced by anaerobic bacteria in aquatic sediments; and are more toxic than inorganic mercury. Substantial environmental research has been conducted for this metal.

Vegetation. Mercury is not readily taken up by plants. Most higher vascular plants are resistant to mercury poisoning, although they may accumulate it to a limited degree [8]. Symptoms of toxicity include stunting of seedling growth and root development, and an inhibition of photosynthesis causing yield reduction [9]. Mercury concentrations in plant leaves range from 0.001 to 0.01 ppm [10]. The phytotoxic concentration of mercury in the soil was reported to be greater than 10 ppm (USEPA, 1983). Phytotoxic levels reported from four studies range from 0.3 to 5 mg/kg (soil dry weight) [9].

Aquatic Life. The most serious mercury contamination in the aquatic food chain occurs with methyl mercury. Methylmercury is very soluble in water, which means it is readily accumulated by aquatic organisms. Freshwater plants appear to be less sensitive than freshwater fish or invertebrates to methyl mercury. Bioaccumulation of mercury was

markedly enhanced at elevated water temperatures, reduced water salinity or hardness, reduced water pH, increased age of the organism, and reduced organic matter content of the medium; in the presence of zinc, cadmium, or selenium in the solution; and after increased duration of exposure [11]. Mercury toxicity varies among species, with concentrations in water of 0.1 to 2.0 μg/L fatal to sensitive aquatic species and concentrations of 0.03 to 0.1 μg/L associated with significant sublethal effects [11]. Spawning in fathead minnows was inhibited by 0.00012 mg/L mercury, and the entire test population was killed by 0.0008 mg/L in 3 months [7]. Other studies with the same species, however, found only detrimental effects at 0.12 mg/L and no toxic effects at 0.07 mg/L [7]. Fish toxicity from mercury ranges from 30 μg/L (guppy) to 1,000 μg/L (*Mozambique tilapia*) [9]. In fish, the biological half-life of mercury is between 1 and 3 years [7]. Bioconcentration factors range from 5,000 for mercury to 4,000 to 85,000 for methylmercury [9]. For aquatic life protection, mercury water levels should not exceed 0.012 μg/L (4-day average) or 2.4 μg/L on an hourly average [11]. The federal chronic freshwater quality criterion for mercury is 0.012 μg/L [12].

Wildlife. Mercury in birds and mammals can adversely affect reproduction, growth and development, behavior, blood chemistry, coordination, vision, hearing, and metabolism [9]. Environmental concentrations of 0.1 ppm or greater would have significant detrimental effects on waterfowl population dynamics [7]. Intensive studies have been conducted on mallards. Studies of over three generations of mallards have shown that methylmercury fed in concentrations as low as 0.5 ppm resulted in reduced reproductive output and altered behavior in young ducklings. This concentration is calculated to be equivalent to 0.1 ppm in a wild diet [7]. Acute oral LD_{50} based on tests with five other bird species ranged from 2.2 to 37.8 mg/kg for methylmercury and 11.5 to 75.5 mg/kg for ethylmercury. The LD_{50} in mule deer for organomercury is 17.88 mg/kg [9]. Bowen [14] reported that a dietary intake of 800 ppm mercury (as HG^{+2}) was lethal to rats (study duration not provided). The biological half-life for mercury is 20 to 70 days in most species. The biological half-life of methylmercury in mammals is 70 to 80 days [7].

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NICKEL

CAS NUMBER

7440-02-0

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: insoluble [1]
Vapor Pressure: insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 8.90 [2]
Organic Carbon Partition Coefficient: NA [1]

BACKGROUND CONCENTRATIONS

Nickel is a naturally-occurring element. The concentration of nickel in minimally disturbed soils varies tremendously. A collection of 1,318 soil samples from across the conterminous U.S. determined that 81 percent were less than or equal to 20 ppm, with a geometric mean of 13 ppm, but with a maximum value as high as 700 ppm [3]. Levels as high as 24,000 ppm have been found in soils near metal refineries [1].

FATE AND TRANSPORT

Nickel is dispersed throughout the atmosphere primarily as a result of anthropogenic activities. The primary source of nickel in the atmosphere is from the burning of fuel oil. Most of the nickel in the atmosphere occurs in the aerosol form, and is believed to be nickel sulfate. The average residence time for nickel in the atmosphere is 7 days, during which time long-distance transport may occur. Wet or dry deposition is expected to be the primary fate process in air [1].

Nickel is extremely persistent in water. Any nickel found in surface water or groundwater at moderate to high concentrations is probably of anthropogenic origin. In pristine environments, nickel tends to precipitate or be sorbed, leading to decreases in mobility and bioavailability. In polluted waters containing more organic matter, organic materials will keep nickel solubilized by complexation. In water under anaerobic conditions, and in the presence of sulfides, nickel will precipitate out as nickel sulfide. Nickel is not believed to

volatilize from water, or undergo biotransformation by microorganisms in water. Nickel is bioaccumulated by some aquatic plants, but not fish [1].

The average residence time of nickel in soil is estimated to be 2,400 to 3,500 years. Although it is extremely persistent in soil, it can leach to groundwater. Organic complexing agents appear to restrict movement in soil. Nickel may be immobilized in soil as various inorganic complexes. It is not expected to volatilize from soil. It is reasonably mobile in low pH and cation exchange capacity mineral soils, but less mobile in basic mineral soils and soils with high organic content. Acid rain can facilitate leaching. Some terrestrial plants accumulate nickel [1].

HUMAN TOXICITY

General. The primary targets of nickel toxicity are the respiratory, gastrointestinal and immunological systems [1]. Studies in animals suggest that low levels of nickel may be necessary to maintain good health, but this has not been shown in humans [1]. Nickel is considered to be genotoxic. Metallic nickel has not been placed in a weight-of-evidence cancer group by the USEPA, but both nickel refinery dust and nickel subsulfide have been placed in Group A, indicating that they are human carcinogens [1].

Oral Exposure. A chronic oral RfD of 0.02 mg Ni/kg/day is based on a NOAEL of 5 mg Ni/kg/day for decreased body and organ weights in a chronic oral study in rats [4]. Nickel is poorly absorbed following oral exposure [1]. Acute oral LD_{50} values in rodents ranged from 66 to 136 mg Ni/kg [1]. A fatal oral dose in humans of approximately 570 mg Ni/kg has been reported [1]. Information regarding the effects of nickel in humans following oral exposure are limited. Gastrointestinal distress and effects on the blood were noted in workers who drank nickel-contaminated water from a drinking fountain (approximately 7 mg Ni/kg) [1]. Animal studies indicate that oral exposure to nickel ($>$ 0.7 mg Ni/kg/day) can result in adverse effects on the blood, lungs, kidneys and sperm and decreases in body and organ weights [1]. There is no evidence that oral exposure to nickel causes developmental effects in humans, but animal studies suggest that nickel may be fetotoxic [1]. Oral exposure to metallic nickel has not been reported to cause cancer in humans or animals, therefore, an oral Slope Factor is not available [4].

Inhalation Exposure. An inhalation RfC for nickel is currently under review by the USEPA [4]. Approximately 35% of inhaled nickel is absorbed into the blood [1]. Acute inhalation exposure to nickel has not been reported to be fatal in humans, and acute LC_{50} values in animals are not available [1]. The respiratory system is the target of nickel toxicity in people employed in nickel refineries or in nickel processing plants. Respiratory effects reported in occupationally exposed workers include chronic bronchitis, emphysema and reduced lung capacity. Of greater concern, however, is the production of cancer of the lung and nasal cavity. Recent studies indicate that cancer usually occurred when the

workers were exposed to > 1 mg Ni/m3 of soluble nickel compounds (such as nickel sulfate or nickel chloride) or to > 10 mg Ni/m3 of insoluble nickel compounds (such as nickel oxide) [1]. An inhalation Unit Risk for cancer is not available for the soluble salts of nickel, but are available for nickel subsulfide and nickel refinery dust [4]. Inhaled nickel has not been associated with developmental or reproductive effects in humans, but testicular effects have been found in animal studies [1].

Dermal Exposure. Dermal exposure to nickel has not been reported to be fatal in humans or animals [1]. The most prevalent effect of nickel to the general population is the production of skin allergies that result in dermatitis [1]. These allergies can be elicited in sensitive individuals following exposure to nickel via any route [1].

ECOLOGICAL TOXICITY

General. Nickel is suspected to be an essential trace element for both plants and animals [5]. Nickel produces toxic effects in many species of plants, and mammals have shown a low to moderate toxicity. Nickel can be accumulated by aquatic vascular plants and has been found in elevated concentrations in fish [5]. Bioconcentration factors for nickel for freshwater fish, invertebrates, and plants are 40,100, and 100, respectively [6]. There is no evidence that nickel biomagnifies through the food chain.

Vegetation. Nickel uptake and phytotoxicity has been found to be much greater in acidic soil [8]. Normally the nickel content of plant material is about 0.1 ppm to 1.0 ppm of dry matter. Toxic limits of nickel are considered to be 50 ppm in plant tissues [7]. Nickel in water is generally toxic to plant life at concentrations above 0.5 mg/L [8]. Vascular aquatic plants have apparently developed a high nickel tolerance. Sedge can absorb 2.46 mg/kg dry weight, while bulrush, cattail, and reed absorb 1.71 mg/kg, 1.83 mg/kg, and 1.53 mg/kg dry weight, respectively [5]. The early stages of nickel toxicity are expressed by stunting in the affected plant [7]. Nickel interferes with the uptake of iron, and sufficient levels of iron appear to reduce the toxicity of nickel to plants [9].

Aquatic Life. Nickel toxicity to aquatic life varies widely, and is influenced by pH, hardness, species tested, and chemical form [8]. Nickel combines readily with cyanide to form a nickel-cyanide complex that is relatively stable. It can be present in water concentrations greater than 100 mg/L as cyanide without harm to fish life if the water is moderately alkaline [10]. Toxicity of nickel to freshwater organisms decreases with increasing water hardness [13]. In fish, the 4-day LC_{50} values are 4.58 mg/L to 9.82 mg/L in soft water and 39.2 mg/L to 42.4 mg/L in hard water [8]. The acute no effect level for fathead minnow is 0.38 ppm in hard water and the lethal limit is 10 ppm [12]. The LC_{50} value for *Daphnia* ranges from 0.13 mg/L to 0.51 mg/L [8]. The federal acute

and chronic criteria for freshwater aquatic life are 1,400 μg/L and 160 μg/L, respectively for water hardness of 100 mg/L $CaCO_3$ [13].

Wildlife. Nickel is not highly toxic to mammals when injested. The oral LD_{50} value for nickel is 136 mg/kg in mice and 116 mg/kg in rats [14]. No adverse effects were reported in cattle fed 50 ppm nickel for up to 6 weeks and this is the maximum tolerable level for cattle recommended by NAS [14]. At higher levels (100 ppm) decreased food intake was observed in young cattle, and decreased growth rate occurred at 1,000 ppm [14].

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SELENIUM

CAS NUMBER

7782-49-2

COMMON SYNONYMS

Vandex; CI77805; selenium base; selenium dust; colloidal selenium; selenium homopolymer [1].

ANALYTICAL CLASSIFICATION

Metal.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 4.81 at 20°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Selenium is a naturally-occurring element. The concentration of selenium in minimally disturbed soils varies tremendously. A collection of 1,267 soil samples from across the conterminous U.S. determined that 80 percent were less than or equal to 0.5 ppm, with a geometric mean of 0.26 ppm, but with a maximum of 5 ppm [3].

FATE AND TRANSPORT

The behavior of selenium in the environment is dependent upon its oxidation state, and the behavior of the chemical compounds formed as a result of the differing oxidation states. In addition, the oxidation state of selenium in the environment is dependent upon a number of environmental factors, including pH, Eh, and biological activity, etc. For releases of selenium to soils, pH and Eh will be the primary determining factors for its fate and transport. Elemental and/or inorganic selenium may undergo microbial methylation (to dimethyl selenide and dimethyl deselenide), ultimately being volatilized to the atmosphere. Temperature, however, will moderate the methylation of selenium; reductions in temperature from 20°C to 4°C resulted in a methylation rate reduction of 90%. Acidic soil conditions favor the predominance of selenides. Selenides are insoluble and are expected to be immobile in the soils. Neutral to alkaline soil conditions favor the predominance of selenates. Selenates are expected to be very mobile in soils, given their

high solubility and low sorption potential, and represent a potential for leaching to unprotected groundwaters. For water-soluble selenium compounds (i.e., selenates), terrestrial plant uptake represents a removal/transport mechanism of concern, but will be influenced by a variety of environmental factors (e.g., pH, soil type, reduction oxidation (redox) potentials, etc.) [1].

Selenium released to surface waters is expected to be found in the form of salts of selenic and selenious acids. Salts of selenic acid (such as sodium selenate) are generally found in aerobic, alkaline waters, and are expected to be highly mobile in the aquatic environment. Salts of selenious acid (selenite salts) are found in neutral to acidic waters, and show less environmental mobility than do selenate salts. Under acidic conditions, however, selenite is readily reduced to elemental selenium; selenate, as well, is converted to elemental selenium, but more slowly. Elemental selenium will be stable over a wide range of pH and redox conditions. Aquatic organisms, however, will convert selenium to selenoamino acids and, subsequently, methylated selenium compounds. Neither metabolic product is expected to exist long in the aquatic environment, with the methylated forms volatilizing rapidly to the atmosphere. Selenium in the aquatic environment has been demonstrated to bioaccumulate ($\log_{BAF} = 3.60$), bioconcentrate ($\log_{BCF} = 3.27$), and, potentially, biomagnify in aquatic organisms [1].

Atmospheric concentrations of selenium are generally found as inorganic compounds such as selenium dioxide and hydrogen selenide, and organic compounds such as dimethyl selenide and dimethyl diselenide. Dry and/or wet deposition of selenium compounds is expected to account for some removal of these materials from the atmosphere [1].

HUMAN TOXICITY

General. Selenium is considered an essential element. Toxic effects may occur, however, when too much selenium is taken into the body. The major target of selenium toxicity is the lungs, with the heart, liver and kidneys also being affected. Selenium is considered to be genotoxic [1]. The USEPA placed selenium in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [4].

Oral Exposure. A chronic oral RfD of 0.005 mg/kg/day is based on a NOAEL of 0.015 mg/kg/day for clinical selenosis in a human epidemiology study [4]. Selenium is readily absorbed following oral exposure. Acute oral LD_{50} values of 4.8 - 7 mg/kg in rats, 3.2 - 3.5 mg/kg in mice, 2.3 mg/kg in guinea pigs and 1.0 mg/kg in rabbits have been reported for selenium [1]. In humans, selenium exposure has resulted in death, but the fatal dose is not known. Following accidental ingestion of selenium, effects on the lungs (pulmonary edema, breathing difficulties), upset stomachs and muscular weakness have been noted. The dose resulting in these effects is not known. Symptoms reported in people who

ingested selenium over a long period of time include loss of hair, loss of and poorly formed nails, problems with walking, reduced reflexes and some paralysis. These effects occurred at doses greater than or equal to 0.053 mg/kg/day [1]. Selenium has not been found to cause developmental effects in humans or mammals, but birth defects have been found in birds [1]. Most epidemiological studies indicate that selenium is not carcinogenic to humans. In fact, some animal studies suggest that oral selenium may inhibit cancer. An oral Slope Factor for cancer is not available for selenium [4].

Inhalation Exposure. A chronic inhalation RfC is not available for selenium [4]. Selenium is readily absorbed following inhalation exposure. Acute inhalation LC_{50} values in guinea pigs ranged from 1-12.7 mg/m^3 for 2 to 8 hours [1]. Inhaled selenium has not been reported to be fatal in humans. In both humans and animals, the respiratory system is the primary target of inhaled selenium because selenium is an irritant when it comes in contact with water. Short-term exposure to high concentrations of selenium (exact levels not known) results in pulmonary edema, bronchial spasms, symptoms of asphyxiation, and persistent bronchitis [1]. Neurological effects (headaches, dizziness, malaise) have also been noted following short-term inhalation of selenium. Occupational exposure to low concentrations (0.007-0.05 mg/m^3) has resulted in slight tracheobronchitis [1]. Information regarding the potential effects of inhaled selenium on reproduction and development are not available. Inhaled selenium has not been reported to cause cancer in humans or animals, therefore, an inhalation Unit Risk is not available [4].

Dermal Exposure. Contact dermatitis and skin rashes have been reported following both acute and chronic exposure to selenium [1]. This is due to the irritative properties of selenium. Other information regarding the toxicity of selenium following dermal exposure are not available.

ECOLOGICAL TOXICITY

General. Selenium is considered a non-essential trace element for most plants and a required trace element or micronutrient for most animals. Selenium has a comparatively short biological life in various species of organisms for which data are available: 10 days in pheasant; 13 days in voles; 15 days in ants; 28 days in leeches; and 64 days in earthworms [5]. Recent studies suggest that selenium biomagnifies in aquatic and terrestrial food chains. It usually magnifies from two to six times in aquatic food chains [6].

Vegetation. Selenium is readily absorbed in high quantities in some plants, apparently without injury. Selenium bioaccumulation is typically associated with arid and semi-arid soil regions of the western United States where selenium-containing geologic deposits are abundant and alkaline soils are common. Because soil parent materials are low in selenium

most forage and grain crops would typically contain <0.05 ppm selenium in their tissues [7]. A suggested maximum concentration value of selenium in plants is given at 3 to 10 ppm to avoid animal health problems [8]. Selenium in soil is more soluble under alkaline conditions. Selenium accumulators can tolerate extremely high selenium concentrations without injury. The primary indication of selenium injury in nontolerant plants is growth inhibition. A symptom of selenium toxicity in grains is white chlorosis of some or all of the leaves [7].

Aquatic Life. Impacts of selenium in surface waters on aquatic animal species have been noted at concentrations of 0.8 mg/L [8]. The lowest concentration of selenium that results in the impairment of mature fish is 0.25 mg/L and selenium at 0.003 mg/L has harmful effects on fish fry [9]. Field and laboratory data suggest that selenium at concentrations greater than 0.002 to 0.005 mg/L can be bioconcentrated in food chains and cause toxicity and reproductive failure in fish [6]. Two- to 4-day LC_{50}s for fish range from 2.0 to 80.0 mg/L [10]. Selenium toxicity of fathead minnows has LC_{50} values of 0.37 to 1.0 mg/L and at 20 mg/L 100 percent mortality occurred [8]. The 48-day LC_{50} for bluegill larvae was 0.4 mg/L at a water hardness of 330 mg/L [6], whereas 100 percent mortality of juvenile bluegills was achieved with a dietary exposure equivalent to 45 ppm selenium (hardness was 18 mg/L). The 96-hour LC_{50} for fathead minnow fry was 2.9 mg/L, and for bluegill juveniles was 40.0 mg/L [7]. Selenium accumulation is affected by water temperature, age of organism, organ or tissue specificity, mode of administration, and other factors [5]. It is noteworthy that selenium in the diet is known to exert a protective influence against mercury poisoning [11]. The federal aquatic life chronic freshwater quality criterion are 5.0 μg/L for warmwater and modified warmwater habitats [12].

Wildlife. Selenium protects mammals and some birds against the toxic affects of mercury, cadmium, arsenic, thallium, and the herbicide paraquat [5]. There is a danger of selenium toxicity in the diets of terrestrial animals at concentrations in excess of 5 ppm [8]. In terrestrial systems, Byers [13] suggested 4 ppm (dry weight) of selenium in plants as a tolerance limit for animals that consume them and reported 5 ppm to be potentially dangerous. Lemly and Smith [6] suggested that environmental exposures to waterfowl from water, diet, and sediments should not exceed 0.005 ppm in water and 3 ppm (dry weight) in food and sediments to protect waterfowl from reproductive failures and/or mortality through food chain biomagnification effects. Studies with adult mallards indicated that 100 ppm dietary selenium (as sodium selenite) was fatal within 1 month, but that survival was high at 25 ppm after 3 months. Poor egg hatchability was recorded at 25 ppm, but not at 10 ppm [5].

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SILVER

CAS NUMBER

7440-22-4

COMMON SYNONYMS

Argentum; Argentum crede; CI77820; shell silver; silver atom; silver colloidal; silflake; silber. [1]

ANALYTICAL CLASSIFICATION

Metal.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 10.49 at 15/4°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Silver is a naturally-occurring element whose average abundance is 0.1 ppm in the earth's crust and 0.3 ppm in soil [1].

FATE AND TRANSPORT

Silver is a white metal with a face-centered cubic structure. With the exception of gold, no other metal is more malleable or ductile. Silver is not appreciably attacked by water, atmospheric oxygen, or most acids (with the exception of dilute nitric acid and hot concentrated sulfuric acid). It is insoluble in water, but solubilizes in fused alkali hydroxides (in the presence of air), in alkali cyanides (in the presence of air), and in fused alkali peroxides. Additionally, most salts of silver are photosensitive [2].

Silver released to soils under oxidizing conditions will be found primarily in compounds with bromide, chloride, and/or iodide; silver released to soils under reducing conditions will be primarily in the form of free silver metal and/or silver sulfide. The fate and transport, then, of silver released to soils is a function of the form of silver-containing material/compound released (i.e., elemental silver versus silver nitrate). In addition, the mobility of silver through soils is influenced by: the drainage rate of the soil (silver is readily removed from well-draining soils); the reduction-oxidation (redox) potential and pH of the soil, which affects the ability of manganese and iron (among others) to

immobilize silver; and organic matter, which tends to form complexes with silver. Plants account for another mechanism of silver removal from soils since plants will take silver from soils into the root system. Biodegradation and/or biotransformation of silver is expected to be very restricted since silver proves toxic to most microorganisms [1].

Silver released to waters will be found primarily as sulfates, bicarbonates, sulfate salts, chlorides, and particulate-associated matter. Sorption appears to be the primary process affecting partitioning of silver through sediment layers in waters, with silver being sorbed readily by compounds such as manganese dioxide. The redox potential and pH of waters will affect the ability of silver to sorb to organic matter therein. Bioconcentration of silver in aquatic organisms represents another fate/transport process of significant concern, given the bioconcentration factor ($\log_{BCF} = 4.82$) for silver. In addition, silver is slowly bioaccumulated by aquatic organisms ($\log_{BAF} = 1.41$). Biomagnification through the trophic levels is expected to be minimal, however. As with silver released to soils, silver released to waters is not expected to undergo significant biodegradation/biotransformation given its inherent toxicity [1].

Atmospheric concentrations of silver will primarily be found as particulate-associated matter and/or fine particles of metallic silver. The major forms of atmospheric silver include: metallic silver, silver sulfide, silver sulfate, silver carbonate, and silver halides. Silver found in any of these forms may be subject to long-range transport, and will eventually be removed from the atmosphere via dry or wet deposition; up to 50% of silver released to the atmosphere from industrial operations has been demonstrated to travel up to 100 km prior to deposition [1].

HUMAN TOXICITY

General. The major targets of silver toxicity are the respiratory system following inhalation exposure and the skin following inhalation, oral and dermal exposure [1]. Data suggest that silver is a mutagen. The USEPA has placed silver in weight-of-evidence cancer Group D, indicating that it is not classifiable as to human carcinogenicity [3].

Oral Exposure. A chronic oral RfD of 0.005 mg/kg/day is based on a LOAEL of 0.014 mg/kg/day for argyria in a long-term study in humans [3]. Approximately 20% of an oral dose of silver is absorbed through the gastrointestinal tract [1]. Ingested silver has not been reported to be fatal to humans, and LD_{50} values are not available for animals. Short- and long-term ingestion of silver results in argyria (grey or blue-grey discoloration of the skin) in humans. The dose associated with argyria is not known. Argyria is considered to be more of a cosmetic problem rather than a health problem. Information is not available regarding the potential effects of silver on reproduction or development in humans. There

is no evidence that silver causes cancer in humans or animals and, therefore, an oral Slope Factor is not available [3].

Inhalation Exposure. A chronic inhalation RfC is not available for silver [3]. Silver is absorbed through the respiratory tract, but the extent of absorption is not known. Inhaled silver has not been reported to be fatal to humans, and LC_{50} values are not available for animals. Occupational exposure to 0.039 to 0.378 mg/m^3 has resulted in effects on the respiratory system (sneezing, stuffiness, runny nose, sore throat, cough, wheezing, chest tightness) and on the gastrointestinal system (abdominal pain) [1]. Occupational exposure also results in argyria. Information is not available regarding the potential effects of silver on reproduction or development in humans. There is no evidence that silver causes cancer in humans or animals, and therefore, an inhalation Unit Risk is not available [3].

Dermal Exposure. Silver has not been reported to be fatal in humans or animals following dermal exposure. Argyria and mild allergic responses are the only known effects of dermal exposure to silver [1]. The doses that elicit these effects are not known.

ECOLOGICAL TOXICITY

General. Silver is not an essential element for plants or animals. Silver toxicity ranks second only to mercury among the heavy metals [4]. Many of its salts, such as silver chloride, sulfide and arsenate, are insoluble [5].

Vegetation. No reports of silver toxicity in plants growing under natural conditions were found. Under man-induced conditions, silver toxicity to corn was reported at 0.0098 μg/ml and 0.0049 μg/ml was fatal to lupines [6]. Silver tends to be retained in surface soil at a pH greater than 4, especially in soils with a high concentration of organic matter. In plants, silver has a tendency to accumulate in the root [7]. The ratio of silver content in plants to soil has been given as 1:1.5. Such a ratio must be used with caution because the silver content of plants has a very wide range [7].

Aquatic Life. Silver nitrate and sulfate are relatively soluble compounds of silver and are considered toxic to aquatic life. Silver is not present in aquatic animals at very high concentrations because most of its compounds are virtually insoluble in water and because silver has a very short biological half-life [5]. Extremely low concentrations of silver, as low as 0.0000001 mg/L, have been found to be harmful to sensitive fish species. LC_{50} values for fish range from 0.003 mg/L for silver nitrate to 250 mg/L for silver thiosulfate. However, most reported LC_{50}s were between 0.003 and 0.1 mg/L [5]. Fish are capable of accumulating silver from water, however, the food chain is not an important route of silver accumulation for animals at higher trophic levels [4]. The federal chronic freshwater quality criterion for silver is 0.12 μg/L based on water hardness of 400 mg/L $CaCO_3$ [8].

Wildlife. No references have been found which discuss or report toxic effects of silver on wildlife under natural conditions. Silver is a general microconstituent of many animals. Although the presence of silver in most animals suggests that it might serve some purpose, its role in animal metabolism is still unknown [7]. Longterm experiments with rats and rabbits concluded that ingestion of silver in drinking water at a dose of 0.0025 mg/kg body weight did not produce any detrimental effects. Doses of 0.025 mg/kg body weight affected the rats' reflexes and rabbits' immunological activity [7]. Field studies exposing sheep ewes to as much as 10 mg/kg/day failed to produce clinical signs of toxicity [9].

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THALLIUM

CAS NUMBER

7440-28-0

COMMON SYNONYMS

None.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Negligible at 25°C [2]
Henry's Law Constant: ND
Specific Gravity: 11.85 [1]
Organic Carbon Partition Coefficient: ND

BACKGROUND CONCENTRATIONS

Thallium is a naturally-occurring element. It can be found as crookesite in Sweden, as lorandite in Greece, and as hutchinsonite in Switzerland. The estimated occurrence of thallium within the Earth's crust is 0.7 ppm [1]. No data on thallium were gathered as part of the 1984 Department of the Interior survey of conterminous United States soils [3].

FATE AND TRANSPORT

Elemental thallium is a bluish-white, very soft, inelastic, easily fusible, heavy metal. It will oxidize superficially in air forming a coat of thallium oxide. It will react with nitric and/or sulfuric acids, but only slightly so with hydrochloric acid [1]. Thallium exists in either monovalent (thallous) or trivalent (thallic) forms; thallous being much more common. Thallic salts are readily reduced to thallous salts; virtually all are chemically reactive with air and moisture. Volatilization of thallium and its salts is not expected to occur at ambient temperatures and pressures. Elemental thallium is insoluble in water; thallium salts show a moderate to high degree of solubility (i.e.: thallium sulfide exhibiting solubility to 200 mg/L; and thallium fluoride exhibiting solubility to 780 g/L) [2]. Therefore, thallium is expected to be relatively mobile in aquatic environments and/or moist-to-wet soils. Thallium shows some tendency to bioconcentrate in aquatic organisms [4].

HUMAN TOXICITY

General. In humans, ingestion of large amounts of thallium can affect the nervous system, lung, heart, liver, and kidney [4]. The USEPA currently provides no toxicity values for thallium [5,6].

Oral Exposure. Animal studies indicate that thallium is completely absorbed when ingested. Evidence also suggests that thallium is well absorbed in humans. Estimates of the oral LD_{50} for rats vary from 32 to 39 mg/kg. A NOAEL (for death) of 0.2 mg/kg/day for 90 days was determined in rats. Male rats receiving 0.7 mg/kg/day (the LOAEL) for 60 days experienced adverse reproductive effects. The most likely route of human exposure is via direct ingestion. Indirect ingestion of dust may occur following inhalation [4].

Numerous human deaths have occurred following oral exposure to thallium. Damage to several systems have been reported, including the nervous system, cardiovascular system, liver, kidney, and muscles [4]. At physiological pH, thallium is soluble. The exact mechanism of toxicity is unclear; inhibition of enzymatic reactions and/or oxidative phosphorylation are the most likely toxic actions. Thallium poisoning in humans is insidious with four generalized stages. They are as follows:

(1) Immediate (3-4 hours): nausea, vomiting, diarrhea, and possibly hematemesis.

(2) Intermediate (hours to days): central nervous system dysfunction, peripheral nervous system dysfunction, autonomic nervous system dysfunction, ophthalmologic effects, and dermal effects.

(3) Late (2-4 weeks): dry and scaly skin, white stripes across nails, and scalp/facial hair loss;

(4) Residual (months): central/peripheral nervous system abnormalities (ataxia, tremor, foot drop, memory loss).

Thallium is an acknowledged cumulative, homicidal poison with an average lethal adult dose of 1 g (total) of soluble thallium salts [7]. Elemental thallium has shown lethality at a dosage of 4.4 mg/kg [8].

Inhalation Exposure. No reliable information was located on pulmonary absorption of thallium [4]. Occupational studies indicate that thallium may adversely affect the human nervous system following inhalation [4].

Dermal Exposure. No reliable information was located on the dermal absorption or adverse health effects of thallium following dermal contact [4].

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VANADIUM

CAS NUMBER

7440-62-2

COMMON SYNONYMS

None noted.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble at 20°C [1]
Vapor Pressure: ND
Henry's Law Constant: ND
Specific Gravity: 6.11 at 18.7/4°C [1]
Organic Carbon Partition Coefficient: ND

BACKGROUND CONCENTRATIONS

Vanadium is a naturally-occurring element. The earth's crust is estimated to be comprised of 0.01 percent vanadium (by weight). Elemental vanadium does not occur in nature [2], but may be found in over 65 known minerals including patronite (polysulfide), vanadinite, roscoelite, and carnotite [3]. In a 1984 United States Geological Survey (Department of the Interior), 1,319 total soils samples were gathered from across the conterminous United States and analyzed for vanadium content. Of the total samples gathered, 1,294 showed vanadium content in some concentration ranging from less than 7 ppm up to 500 ppm. Fourteen percent of the total soils samples gathered showed vanadium concentrations to be from less than 7 ppm up to 20 ppm; 28 percent showed concentrations of vanadium to be greater than 100 ppm up to a maximum of 500 ppm; geometric mean concentration of vanadium was 58 ppm. Sixteen soils samples were gathered in (or on a shared border of) Ohio: one showed vanadium concentrations from less than 7 ppm up to 20 ppm; two showed concentrations from >20 ppm up to 50 ppm; seven showed concentrations from >50 ppm to 70 ppm; three showed concentrations from >70 ppm up to 100 ppm; and three showed vanadium concentrations from >100 ppm up to 500 ppm [4].

FATE AND TRANSPORT

Elemental vanadium may be found in the following forms: light gray or white lustrous powder; fused hard lumps; or, body-centered cubic crystals. Vanadium does not tarnish in

air, nor does it appreciably react with air or moisture at ambient temperatures. It may exist in any of six oxidation states (1^-, 0, 2^+, 3^+, 4^+, and 5^+). In the natural environment, elemental vanadium exhibits a strong reducing ability, and will reduce mercuric and/or ferric salts to mercurous/ferrous salts (among others). It is not readily attacked by acids at ambient temperatures, but will react with heated acids [3]. Elemental vanadium can be expected to be relatively immobile in the environment, owing to its negligible solubility and vapor pressure. Vanadium compounds and complexes, however, exhibit varying degrees of solubility, volatility, etc., and therefore have varying degrees of mobility. The most likely way for it to get into the air is when fuel oil and coal are burned, as it is naturally present in both [1,3].

HUMAN TOXICITY

General. Elemental vanadium is considered to be nontoxic; however, some compounds of vanadium, especially the oxides, are toxic [2]. Inhalation of concentrated vanadium-containing dusts can cause coughing, sore throat, and eye irritation [1]. The USEPA has not placed vanadium in any weight-of-evidence group [5,6].

Oral Exposure. A chronic RfD of 0.007 mg/kg/day is based on a NOAEL of 5 ppm determined for rats in a chronic drinking water study [5]. The absorption of vanadium through the gastrointestinal tract is low. No more than 2.6% was absorbed from the GI tract of rats after 3 days. The acute oral LD_{50} for sodium metavanadate in rats is 41 mg/kg. The LOAEL in humans for vanadium pentoxide is 0.1 mg vanadium/kg (respiratory irritation). Some minor birth defects were observed in the offspring of rats receiving vanadium in drinking water while pregnant. Information on any possible carcinogenic effects following oral exposure were deemed inadequate [1].

Inhalation Exposure. The USEPA does not currently provide an inhalation RfC for vanadium [5,6]. The primary route of human exposure to vanadium is via inhalation (of vanadium pentoxide dust/fume) and subsequent pulmonary absorption [7]. Studies in rats indicate that rapid absorption of vanadium in humans may occur following acute inhalation exposure [1]. Once in the body, the most commonly found form of vanadium is vanadate (VO_3^-, 5^+ oxidation state). In this form, vanadate acts as an oxidizing agent and is one of the most potent oxidative-phosphorylase pump reaction inhibitors. Common symptoms of acute vanadium toxicity include, but are not limited to: respiratory tract irritation, rhinitis, wheezing, nasal hemorrhage, cough, sore throat, and chest pain. Chronic toxicity symptoms include: bronchitis, conjunctivitis, pneumonia, green discoloration of the tongue, and, metallic taste on the tongue [7]. Response to inhalation of vanadium (ore) was demonstrated at a dose as low as 4 mg/kg. Vanadium pentoxide dust/fumes do not exhibit as intense a degree of toxicity by comparison [8].

Dermal Exposure. Dermal absorption of vanadium is thought to be very low [1]. No other information was available regarding adverse health effects resulting from dermal exposure to vanadium.

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ZINC

CAS NUMBER

7440-66-6

COMMON SYNONYMS

None noted.

ANALYTICAL CLASSIFICATION

Inorganic.

PHYSICAL AND CHEMICAL DATA

Water Solubility: Insoluble [1]
Vapor Pressure: Insignificant at 25°C [1]
Henry's Law Constant: Not Applicable
Specific Gravity: 7.14 at 25/4°C [2]
Organic Carbon Partition Coefficient: NA

BACKGROUND CONCENTRATIONS

Zinc is a naturally occurring element essential to many life forms [1]. It is widespread in nature and may be found in many known compounds. The estimated occurrence of zinc in the earth's crust is 0.02 percent by weight [2]. The concentration of zinc in minimally disturbed soils varies tremendously. A collection of 1,248 soils samples from across the conterminous U.S. determined that 87 percent were less than or equal to 74 ppm, with a geometric mean of 48 ppm, but with a maximum as high as 3500 ppm [3].

FATE AND TRANSPORT

Elemental zinc is a bluish-white, lustrous metal having a distorted hexagonal close-packed structure [2]. It is stable in dry air, but upon exposure to moist air will form a white coating composed of basic carbonate. Zinc loses electrons (oxidizes) in aqueous environments [2]. In the environment, zinc is found primarily in the 2+ oxidation state. Elemental zinc is insoluble; most zinc compounds show negligible solubility as well, with the exception of elements (other than fluoride) from Group VIIa of the Periodic Table compounded with zinc (i.e., Zn Cl_2, ZnI_2) showing a general 4:1 compound to water solubility level. In polluted waters, zinc often complexes with a variety of organic and inorganic ligands. Therefore, the overall mobility of zinc in an aqueous environment, or through moist-to-wet soils, may be accelerated by compounding/complexing reactions [1].

Zinc has a tendency to adsorb to soils and sediment/suspended solids in waters. Adsorption to sediments/suspended solids is the primary fate for zinc in aqueous environments, and will greatly limit the amount of solubilized zinc. Zinc is an essential element and, therefore, is accumulated by all organisms. Zinc concentrations in air are relatively low except near industrial sources. Volatilization is not an important process from soil or water [1].

HUMAN TOXICITY

General. Zinc is an essential trace element, therefore, toxic effects can result if too much or too little is taken into the body. The Recommended Dietary Allowances (RDAs) for zinc are 15 mg/day for men and 12 mg/day for women [1]. The major targets of zinc toxicity are the gastrointestinal tract following oral exposure and the lungs following inhalation exposure [1]. Zinc is not mutagenic and has been placed in weight-of-evidence Group D, indicating that it is not classifiable as to human carcinogenicity, by the USEPA [4].

Oral Exposure. A chronic oral RfD of 0.2 mg/kg/day is based on a LOAEL of 2.14 mg/kg/day for anemia in humans [5]. Approximately 20-30% of an oral dose of zinc is absorbed by the gastrointestinal tract [1]. Zinc has not been reported to be fatal to humans and oral LD_{50} values in animals are not available [1]. In humans, gastrointestinal effects (vomiting, abdominal cramps, diarrhea) and hematological effects (anemia) have resulted from oral exposure to doses greater than 2 mg zinc/kg/day. Long-term administration of zinc can result in copper deficiency [1]. In animals, effects on the liver and kidneys, as well as the gastrointestinal and hematological systems, have been reported [1]. Studies in animals indicate that exposure to high doses of zinc (200 to 500 mg/kg/day) results in reduced fetal growth and altered concentrations of zinc and copper in both the mother and fetus [1]. There is no evidence that exposure to zinc affects development or reproduction in humans. There is no evidence that zinc causes cancer in humans or animals following oral exposure, therefore, an oral Slope Factor is not available [4].

Inhalation Exposure. A chronic inhalation RfC is not available for zinc [4]. Zinc is absorbed through the respiratory tract, but the extent of absorption is not known. In humans, death has resulted from exposure to high concentrations (estimated at 97,635 mg/m^3) of zinc-containing smoke [1]. In mice, the reported LCT_{50} (product of lethal concentration and time to kill 50% of the animals) of zinc chloride was 11,800 $mg\text{-}min/m^3$ [1]. Short-term exposure to zinc dust and zinc fumes results in "metal fume fever". This condition is characterized by an acute impairment of pulmonary function. Acute (10-12 minutes) inhalation of 600 mg $zinc/m^3$ as zinc oxide has resulted in nasal passage irritation, cough, chest pain, lung rales, and decreased vital capacity. No symptoms of metal fume fever were reported following exposure to zinc oxide at 14 mg/m^3 for 8 hours, 45 mg/m^3

for 20 minutes, or occupational exposure to 8-12 mg/m3 [1]. Information is not available regarding effects on reproduction or development in human or animals following inhalation exposure. There is no evidence that inhaled zinc causes cancer in humans or animals, therfore, an inhalation Unit Risk is not available [4].

Dermal Exposure. Zinc has not been reported to be fatal in humans or animals following dermal exposure. Topical application of zinc (in the form of zinc oxide or calamine lotion), however, is used to promote healing of burns and wounds [1].

ECOLOGICAL TOXICITY

General. Zinc is an essential trace element for plants and animals. It is the most mobile of the metals in surface water systems, but only moderately mobile in soil/water systems [6]. Zinc is bioaccumulated by all organisms, but it does not biomagnify in terrestrial or aquatic food chains.

Vegetation. Studies of bulrush, sedge, cattail, and reeds indicate relatively high zinc absorption ability [7]. Bioavailable zinc is readily accumulated in the leaves of many plants; however, it is of low availability to animals, probably due to the formation of insoluble complexes of zinc with calcium and phytic acid in the plants [8]. The phytotoxic level of zinc in the soil ranges from 500 to 2000 ppm, with toxicity being enhanced under acidic soil conditions. The normal range of zinc in leaves of various plants is 15 to 150 ppm, and the maximum suggested concentration in plants to avoid phytotoxicity is 300 ppm [9]. Plant species exhibit a wide range of tolerances to zinc concentrations in soils.

Aquatic Life. Extensive test data are available for zinc effects on aquatic life. The acute lethal toxicity of zinc is greatly affected by water hardness, with soft water being more toxic than hard water. Both an increase in temperature and a reduction in dissolved oxygen also increase zinc toxicity [7]. Zinc is most toxic in aquatic biota at a pH of 8.0, and least toxic at a pH of 6.0 [6]. Fish growth was inhibited by zinc at a concentration of 0.05 to 0.08 mg/L, swimming was impaired at 0.06 to 0.3 mg/L, and reproduction was reduced at 0.05 to 0.88 mg/L [7]. The 96-hour LC_{50} for fathead minnows was 33,000 μg/L at a water hardness of 360 mg/L $CaCO_3$ [10]. The federal chronic freshwater quality criterion for zinc is 343 μg/L based on a water hardness of 400 mg/L $CaCO_3$ [11].

Wildlife. Animals are generally protected from zinc poisoning through plant consumption because high concentrations of zinc are phytotoxic before they accumulate in toxic concentrations in plant tissues eaten by animals [9]. Zinc compounds are relatively nontoxic to animals, particularly mammals, because animals can physiologically regulate the absorption and excretion of this metal. For example, a dietary intake of 2,500 ppm zinc produced no discernable effects in rats, while 10,000 ppm is required to induce high

mortality. A zinc concentration of 2.2 g/kg in rats and 1.9 to 2.2 g/kg in rabbits was lethal [8].

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APPENDIX I

WETLAND DELINEATION DATA SHEETS

Flags 1-1 thru 1-9

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD OB 10D State: NY County: SENECA
Applicant/Owner: ACOE Plant Community #/Name: #1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes ____ No X (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	50	11.		
2. Sphagnum moss	OBL	40	12.		
3. Aster sp.		10	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 90
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: Dominant species > 50% wetland species

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes / No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No X Surface water depth: 1" - 2"
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: Not taken due to surface water + wet soil from surface
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

flags 2-1 thru 2-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD OB State: NY County: SENECA
Applicant/Owner: ACOE Plant Community #/Name: # 2
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	25%	11.		
2. Sphagnum moss	OBL	40	12.		
3. white aster sp.		10	13.		
4. Eleocharis sp. - unidentified			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC > 50%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: grey - clay

HYDROLOGY

Is the ground surface inundated? Yes ____ No X Surface water depth: ____
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes ____ No ____
Rationale: Water about 5" from surface in demolition pit (HFA) at wetland edge

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 3-1 thru 3-7

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. OLSEN Date: 11/20/91
Project/Site: SEAD OB State: NY County: SENECA
Applicant/Owner: ACOE Plant Community #/Name: #2 CATTAIL DITCH
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back) drainage ditch
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum moss	OBL	25	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC X 85%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1"-4"
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 4-1 thru 4-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: OB SEAD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 4 Cattail Stand
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	40	11.		
2. Sphagnum sp.	OBL	20	12.		
3. White Aster sp.		20	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 60
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1-2"
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes ____ No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 5-1 thru 5-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): Bolzen Date: 11/20/91
Project/Site: SEAD CB State: NH County: Sullivan
Applicant/Owner: ACOE Plant Community #/Name: # 5 Cattail Small
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	30%	11.		
2. Sphagnum mosses	OBL	40	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC X 70%
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1-2" in spots
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags Col Three 6-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: CB SEAD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #6 (cattail ditch)
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No _____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes _____ No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Sphagnum moss	OBL	20%	11.		
2. Typha angustifolia	OBL	40	12.		
3. Rhynchospora capitellata	OBL	20	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 80%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-4"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 7-1 thru 7-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: OP. SEAD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #7 Small ditch
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	Stratum (%)	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	40	11.		
2.		20	12.		
3.		20	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 80%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 8-1 thru 8-14

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. OLSEN Date: 11/20/91
Project/Site: SENECA OB State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #2, Large cattail
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back) not recently

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	70	11.		
2. Sphagnum moss	OBL	10	12.		
3. Scirpus cyperinus	FACW+	10	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 90%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-4" in spots
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Maps 9-1 thru 9-12

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): B. Olson Date: 11/20/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 9 Cattail Patch Open Water
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	50	11.		
2. Rynchospora capitellata	OBL	10	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC > 60
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-2" in spots
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
water level high in, recently drained by several ft.
Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Maps 10-1 thru 10-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD CB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 10
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum (%)	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	50	11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No X Surface water depth: ____
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation: Sphagnum moss stunted Signs of being inundated
Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 11-1 thru 11-4 (orange)

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 11 - cattail ditch
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	100	11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: organic soil
Is the hydric soil criterion met? Yes X No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: _____
Is the soil saturated? Yes X No _____ Very damp but not saturated
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

flags 12-1 thru 12-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ~~OB/OD~~ ACOE Plant Community #/Name: #12 Cattail remergent
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	c/c Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	50	11.		
2. Sphagnum moss	OBL	20	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 70
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1" in spots
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
Sphagnum moss shows signs of water flow & inundation
Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 13-1 thru 13-8

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): K. Olsen Date: 11/26/91
Project/Site: SEAD COE/OD State: NY County: Seneca
Applicant/Owner: _____ Plant Community #/Name: #13 Large Cattail wetland old field
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

Soil boring location

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum miss	OBL	20	12.		
3. Other	—	20	13.		
4. Juncus effusus	FACW+	10	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: water not present now, but had been recently
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flagging 14-1 thru 14-9

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/26/91
Project/Site: SEAD OU/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #14 Cattails + Open water
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	30	11.		
2. Sparganium spp	OBL		12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC _____
Is the hydrophytic vegetation criterion met? Yes _____ No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: _____
Is the soil saturated? Yes _____ No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 15-1
Hill 15-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: CEAD CR1/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #15 small Cattail
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. ~~Typha~~			11.		
2. Typha angustifolia			12.		
3. ~~Sphagnum~~ moss			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC _____
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: spots 1-2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 16-1 thru 16-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #16 small cattail
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) trucks or vehicles run over recently

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Sphagnum misc	OBL		12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC ____
Is the hydrophytic vegetation criterion met? Yes ____ No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1-2" some areas
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 17-1 thru 17-13

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R Olsen Date: 11/21/91
Project/Site: SEAD 53/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #17 Small cattail
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) fire tracks thru middle

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum moss	OBL	20	12.		
3. Rhynchospora	OBL	10	13.		
4. capitellata			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 90
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1" in spots
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.
____
Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 8-1 thru 18-13

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD 52/ICD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #19 Large Culvert Ditch
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Sphagnum moss	OBL		12.		
3. Rhynchospora	OBL		13.		
4. capitellata			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC >80%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-4"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 19-1 thru 19-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/94
Project/Site: OBS / OD SEAD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 19
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back) Near demolition mound
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back) recently created and disturbed in edge

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Phragmites australis	FACW		11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 90
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No X Surface water depth: ____
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.
Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Map 20-1 thru 20-3

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD CB/CD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #20 Small cattail marsh
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	85	11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 85
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-2" in spots
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 21-1 thru 21-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 21 Small
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No _____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes _____ No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum sp.	OBL	15	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 75
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1" Some spots
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 22-1 thru 22-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/20/91
Project/Site: SEAD 26/OD State: NY County: Seneca
Applicant/Owner: ACCE Plant Community #/Name: # 22
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum moss	OBL	15	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 75
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Plots 23-1 thru 23-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R.01 Date: 11/21/91
Project/Site: CB/OD SEAD State: NY County: Seneca
Applicant/Owner: ACE Plant Community #/Name: #23
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back) Recent tire tracks through area

VEGETATION

Dominant Plant Species	Indicator Status	% Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	40	11.		
2. Sphagnum moss	OBL	20	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC >60
Is the hydrophytic vegetation criterion met? Yes _____ No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: Recently on surface
Is the soil saturated? Yes X No _____ 1-2" last week in pits
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Page 24-1 thru 24-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R Olsen Date: 11/21/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 24 Cattail wetland
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum (%)	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	65	11.		
2. Sphagnum sp.	OBL	35	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Page 25-1 thru 25-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD 03/00 State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #25 Cattail Ditch via Dike; pond.
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum moss	OBL	10	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 70
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1"-2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Plots 26-1 thru 26-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: CB/CD SEAD State: NM County: Sierra
Applicant/Owner: ACE Plant Community #/Name: # 26
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	65	11.		
2. Rhynchospora capitellata	OBL	20	12.		
3. Sphagnum moss	OBL	15	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No / Surface water depth: 1-2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Page 27-1 thru 27-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD 06/05 State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: #27
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Sphagnum sp.	OBL	20	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 80
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Map 28-1 thru 28-9

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: OB / GD SEAD State: NM County: Socorro
Applicant/Owner: ACOE Plant Community #/Name: # 28
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	T	11.		
2. Rhynchospora capitellata	OBL	U	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No X Surface water depth: _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Maps 29-1 thru 29-6

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SB/OD HEAD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 29
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	70	11.		
2. Sphagnum sp.	OBL	10	12.		
3. Rhynchospora capillata	OBL	20	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1-2"
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 30-1-30-19

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: CB/CD SEAP State: NY County: Seneca
Applicant/Owner: ACE Plant Community #/Name: # 30
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum (%)	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	40	11.		
2. Rhynchospora capitellata	OBL	50	12.		
3. Sphagnum moss	OBL	10	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes ____ No X Surface water depth: ____
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Page 31-1 thru 31-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD OB/OD State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 31
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Rhynchospora			12.		
3. capitellata	OBL		13.		
4. Sphagnum moss	OBL		14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 32-1 thru 32-3

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: DOT/GD Scan State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 32
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes ____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No ____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Rhynchospora capillata	OBL		12.		
3. Sphagnum sp.	OBL		13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No ____
Rationale: ____

SOILS

Series/phase: ____ Subgroup:[2] ____
Is the soil on the hydric soils list? Yes ____ No ____ Undetermined ____
Is the soil a Histosol? Yes ____ No ____ Histic epipedon present? Yes ____ No ____
Is the soil: Mottled? Yes ____ No ____ Gleyed? Yes ____ No ____
Matrix Color: ____ Mottle Colors: ____
Other hydric soil indicators: ____
Is the hydric soil criterion met? Yes ____ No ____
Rationale: ____

HYDROLOGY

Is the ground surface inundated? Yes X No ____ Surface water depth: 1"
Is the soil saturated? Yes X No ____
Depth to free-standing water in pit/soil probe hole: ____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No ____
Rationale: ____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No ____
Rationale for jurisdictional decision: ____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Map 33-1 thru 33-5

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD Wood State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 33
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Dulichium spathaceum	OBL		12.		
3. Sphagnum moss	OBL		13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1/2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Map 34-1 thru 34-4

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SCATD CD/LD State: NJ County: Sussex
Applicant/Owner: ACOE Plant Community #/Name: # 34
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL		11.		
2. Rhynchospora capitellata	OBL		12.		
3. Sphagnum mosses	OBL		13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 100
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1/4"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Page 35-1 thru 35-3

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. Olsen Date: 11/21/91
Project/Site: SEAD CB10D State: NY County: Seneca
Applicant/Owner: ACOE Plant Community #/Name: # 35
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	40	11.		
2. Dichanthelium capillata	OBL	10	12.		
3. Bidens coronata	OBL	10	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 60
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: _____
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Flags 361 thru 36-9

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): R. OLSEN Date: 11/21/91
Project/Site: SEAD AB/OD State: NY County: Seneca
Applicant/Owner: ARCF Plant Community #/Name: # 36
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Typha angustifolia	OBL	60	11.		
2. Juncus effusus	FACW	10	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 70
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 1-2"
Is the soil saturated? Yes X No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

APPENDIX J

CALCULATIONS

ES ENGINEERING-SCIENCE, INC.

Client U.S. Army Corps of Engineers | Job No. 720446-01022 | Sheet 1 of 5
Subject SEAD- OB Grounds | By D. Kelmar | Date 8/13/93
Estimate of Wind Erosion | Checked | Rev.

Estimate wind erosion using method of Skidmore and Woodruff, 1968 in "Wind Erosion Forces in the United States and their Use in Predicting Soil Loss" USDA ARS Handbook No. 346

$$E = f(I', K', C', L', V')$$

where:
E = erosion, tons per acre per year
I' = soil erodibility index
K' = soil ridge roughness factor
C' = climatic factor
L' = field length along prevailing wind erosion direction
V = equivalent quantity of vegetative cover

⇒ Look at months May - November - assume ground is wet, frozen, or snow covered the remainder of the year.

assume $\boxed{K' = 1.0}$ - this is the highest value

for V = from Soil Survey of Seneca County
crop yield for grass ranges from 2-4 tons/acre

Use 3 tons/acre = 6000 lbs/acre
so, from Figure 9 of USDA reference:

$\boxed{V = 4000 \text{ lbs/acre}}$

for I' = From soil survey % passing 0.42 mm sieve ranges from 86-94% in Angola silt loam near Romulus, NY. This soil is very similar to Darien silt loam found at site.

Use 90% for calculation ⇒ $\boxed{I' = 134 \text{ tons/acre}}$ (from table 3, USDA)
- This value applies

C' = climatic factor - use figures 15-21 from USDA reference

Month	C'
May	0.002
June	0.002
July	0.002
August	0.002
September	0.002
October	0.002
November	0.002

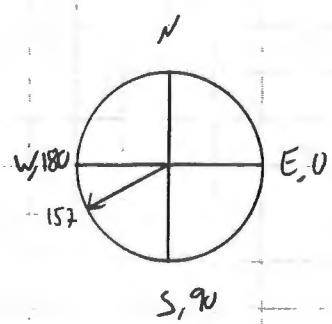
Determine L'

L' from USDA document is complicated. Entire width of OB grounds ≈ 1800 ft, in an east-west orientation, see - 1600 ft north-south

L'

From wind data for Rome, NY (Table 1, USDA)

Month	Magnitude	Direction	Prepondorance Pm	A'	Ksu	Dsu
May	131	157	2.5	0	1.3	2600
June	79	135	2.1	-18	1.4	2800
July	56	157	1.7	-0	1.3	2600
August	91	157	2.1	0	1.3	2600
September	70	157	1.9	0	1.3	2600
October	85	135	1.7	-18	1.3	2600
November	140	157	2.62	0	1.3	2600



157 corresponds to west-southwest use as principle direction

Month	E_2	E_3	E_4	E
May	134	27	2.6	< 0.5 tons/acre
June	134	27	2.6	"
July	134	2.7	26	"
August	134	2.7	2.6	"
September	134	2.7	26	"
October	134	27	26	"
November	134	2.7	26	"

$E_2 = I' K' = 134$

$E_3 = I' K' C'$ or May $= 3 \times 134 = 402$

$E_4 = I' K' C' f(L')$

Note: for $E_4 < 3$ and vegetative cover of 1000 lb/acre the values are off-scale on Figure 24 in reference, and $<< 0.5$ tons/acre/year

Extrapolation of Figure 24 indicates an E value of 0.08 tons/acre/year

$0.08 \times \frac{7 \text{ months}}{12} = 0.05$ tons/acre/year

Site $\cong$ 30 acres, Σ emissions $= 0.05 \times 30 = 1.5$ tons/year

To determine respireable fraction, look at PM_{10}. PM_{10} is not available. From Soil Survey, $PM_{20} \cong 50\%$

Σ respireable emissions $\cong 0.75$ tons/year

0.75 kg/year = 682 Kg/year from entire site.

Next: calculate area of surface which is contaminated

-Assume 75% (Actual area is less)

Potentially contaminated soil emissions =

(0.75)(682) = 511 Kg/year

Estimated Annual Emission Rates are shown in Table 1

-These are based on 95% confidence limit concentrations

Next: Estimate Receptor Concentrations - look at on site personnel

Use Box Model from GRI Risk Assessment Manual

$$C_a = Q/(H_b W_b u_m)$$

where

C_a = concentration of contaminant in ambient air on site (ug/m3)
Q = emission rate of contaminant (Table 1), ug/s
H_b = downwind height of box (m)
W_b = width of box (m)
u_m = average wind speed through box (m/s)

H_b ranges from 1.4 m at 10 m from source
to 6.2 m at 100 m from source

Use 1.4 m for worst case scenario

$W_b = 1800\ ft \cong 550\ m$

For average wind speed: avg. wind ≡ 10 miles per hour (Soil Survey)

$10\ mile/hour = 4.47\ m/s$

Assume this is a 10 m value

$U_m = 0.22(4.47)\ln(2.5(1.4))$

$U_m = 1.23\ m/s$

$C_a = Q/(1.4)_m \times (550\ m) \times 1.23\ m/s)$

$C_a = \left(Q/947.1\right) \mu g/m3$

Results are in Table 1

Table 1
Summary of Wind Erosion Calculations

SOILFATE.WK4

COMPOUND	Number of Hits	Number of Samples	95 % Confidence Limit	Average	Potential Release (g/year)	Potential Receptor Concentration (ug/m3)
Volatile Organics (ug/kg)						
Methylene Chloride	3	118	8.24	4.84	0.004	1.41E-07
Acetone	2	114	40.23	7.97	0.021	6.88E-07
1,2-Dichloroethene (total)	2	118	7.28	4.59	0.004	1.25E-07
Chloroform	13	119	8.14	4.88	0.004	1.39E-07
2-Butanone	4	118	7.32	6.05	0.004	1.25E-07
Trichloroethene	4	118	19.05	5.29	0.010	3.26E-07
Tetrachloroethene	8	118	7.66	4.60	0.004	1.31E-07
Toluene	5	118	7.28	4.59	0.004	1.25E-07
Chlorobenzene	2	118	7.27	4.63	0.004	1.24E-07
Xylene (total)	2	118	7.33	4.64	0.004	1.25E-07
Semivolatile Organics (ug/kg)						
Benzoic acid	1	46	2387.40	1812.18	1.220	4.08E-05
Naphthalene	11	105	448.67	262.54	0.229	7.68E-06
2-Methylnaphthalene	20	112	561.78	279.97	0.287	9.61E-06
2-Chloronaphthalene	2	103	425.45	270.56	0.217	7.28E-06
2-Nitroaniline	1	111	2270.92	1102.23	1.160	3.89E-05
2,6-Dinitrotoluene	14	108	455.27	282.65	0.233	7.79E-06
Acenaphthene	5	105	428.14	268.72	0.219	7.32E-06
Dibenzofuran	2	104	428.60	271.23	0.219	7.33E-06
2,4-Dinitrotoluene	31	117	2631.60	643.70	1.345	4.50E-05
Diethylphthalate	9	107	452.13	265.78	0.231	7.74E-06
Fluorene	4	106	430.03	271.37	0.220	7.36E-06
N-Nitrosodiphenylamine	17	112	585.78	299.25	0.299	1.00E-05
Hexachlorobenzene	4	105	436.77	270.94	0.223	7.47E-06
Phenanthrene	27	115	610.94	277.44	0.312	1.05E-05
Anthracene	6	106	454.63	271.92	0.232	7.78E-06
Di-n-butylphthalate	35	113	1309.14	369.78	0.669	2.24E-05
Fluoranthene	18	113	860.23	302.67	0.440	1.47E-05
Pyrene	21	115	895.50	299.94	0.458	1.53E-05
Butylbenzylphthalate	3	104	426.93	268.83	0.218	7.30E-06
Benzo(a)anthracene	11	111	664.81	290.12	0.340	1.14E-05
Chrysene	11	113	718.18	303.45	0.367	1.23E-05
bis(2-Ethylhexyl)phthalate	46	115	3949.28	668.72	2.018	6.76E-05
Di-n-octylphthalate	2	103	419.47	270.53	0.214	7.18E-06
Benzo(b)fluoranthene	12	111	895.72	304.75	0.458	1.53E-05
benzo(k)fluoranthene	9	111	723.68	295.62	0.370	1.24E-05
Benzo(a)pyrene	12	111	725.53	292.42	0.371	1.24E-05
Indeno(1,2,3-cd)pyrene	7	109	555.43	284.71	0.284	9.50E-06
Dibenz(a,h)anthracene	3	104	444.32	273.69	0.227	7.60E-06
Benzo(g,h,i)perylene	10	106	472.28	273.15	0.241	8.08E-06

Table 1
Summary of Wind Erosion Calculations

SOILFATE.WK4

COMPOUND	Number of Hits	Number of Samples	95 % Confidence Limit	Average	Potential Release (g/year)	Potential Receptor Concentration (ug/m3)
Pesticides/PCBs (ug/kg)						
beta-BHC	1	111	11.58	4.69	0.006	1.98E-07
gamma-BHC (Lindane)	1	111	11.59	4.68	0.006	1.98E-07
Heptachlor	1	111	13.05	4.92	0.007	2.23E-07
Aldrin	7	111	11.59	4.77	0.006	1.98E-07
Endosulfan I	5	111	11.58	4.72	0.006	1.98E-07
4,4'-DDE	19	116	147.89	19.64	0.076	2.53E-06
Endrin	5	113	25.94	10.06	0.013	4.44E-07
Endosulfan II	6	114	90.36	15.00	0.046	1.55E-06
4,4'-DDD	9	111	23.16	9.39	0.012	3.96E-07
Endosulfan sulfate	5	111	23.22	9.41	0.012	3.97E-07
4,4'-DDT	11	116	64.80	13.68	0.033	1.11E-06
Endrin aldehyde	1	37	7.84	2.88	0.004	1.34E-07
alpha-Chlordane	7	112	125.84	41.59	0.064	2.15E-06
Aroclor-1254	1	111	244.78	96.80	0.125	4.19E-06
Aroclor-1260	1	111	233.00	93.43	0.119	3.99E-06
Explosives (ug/kg)						
HMX	3	117	652.39	249.49	0.333	1.12E-05
RDX	14	117	981.09	137.96	0.501	1.68E-05
1,3,5-Trinitrobenzene	20	117	247.43	89.21	0.126	4.23E-06
1,3-Dinitrobenzene	5	116	133.78	67.11	0.068	2.29E-06
Tetryl	8	117	353.00	140.09	0.180	6.04E-06
2,4,6-Trinitrotoluene	13	117	922.71	134.29	0.472	1.58E-05
4-amino-2,6-Dinitrotoluene	20	117	1681.15	225.40	0.859	2.88E-05
2-amino-4,6-Dinitrotoluene	21	117	2000.40	245.19	1.022	3.42E-05
2,4-Dinitrotoluene	46	117	2054.22	456.71	1.050	3.51E-05
Metals (mg/kg)						
Aluminum	117	117	22179.70	15667.86	11333.8	3.79E-01
Antimony	92	99	31.22	6.99	16.0	5.34E-04
Arsenic	116	117	8.38	5.30	4.3	1.43E-04
Barium	111	111	4538.16	978.70	2319.0	7.76E-02
Beryllium	75	75	1.03	0.71	0.5	1.77E-05
Cadmium	70	117	8.30	2.68	4.2	1.42E-04
Chromium	117	117	70.57	29.39	36.1	1.21E-03
Cobalt	117	117	16.89	12.15	8.6	2.89E-04
Copper	111	111	3899.69	583.60	1992.7	6.67E-02
Iron	117	117	40202.73	28935.90	20543.6	6.88E-01
Lead	115	115	3398.66	709.99	1736.7	5.81E-02
Manganese	117	117	955.67	554.55	488.3	1.64E-02
Mercury	82	94	0.39	0.12	0.2	6.59E-06
Nickel	117	117	58.35	39.00	29.8	9.98E-04
Selenium	101	116	1.07	0.38	0.5	1.83E-05
Silver	28	112	1.32	0.53	0.7	2.26E-05
Thallium	18	117	0.59	0.31	0.3	1.01E-05
Vanadium	114	114	33.17	23.97	17.0	5.68E-04
Zinc	117	117	20977.77	1623.91	10719.6	3.59E-01
Cyanide	1	116	0.47	0.34	0.2	8.09E-06

WIND EROSION FORCES IN THE UNITED STATES AND THEIR USE IN PREDICTING SOIL LOSS

Agriculture Handbook No. 346

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
in cooperation with
Kansas Agricultural Experiment Station

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WIND EROSION FORCES IN THE UNITED STATES AND THEIR USE IN PREDICTING SOIL LOSS

By E. L. SKIDMORE, *research soil scientist*, and N. P. WOODRUFF, *research investigations leader, Soil and Water Conservation Research Division, Agricultural Research Service*

Soil blowing of agricultural lands is a serious problem in arid and semiarid regions and on sandy soils of the United States. Soil loss from a given cultivated field depends on cloddiness, surface roughness, and surface moisture of the soil; on amount, kind, and orientation of the vegetation; on wind velocity or force; and on distance across the field along the direction of the wind force (*11*).[1] Information on soil and residue effects on erosion is available in considerable detail (*7, 11*). However, published information on wind forces for use in determining amounts of wind erosion and for designing wind erosion control practices is meager and is limited to specific areas of the United States (*6, 8*).

This handbook furnishes detailed information on wind erosion forces for locations throughout the United States for use in assessing erodibility of field soils and in designing control practices to combat the ravages of wind erosion.

The data presented include (1) relative magnitude of wind erosion forces or the capacity of the wind to cause erosion on unprotected soils, (2) prevailing wind erosion direction, and (3) preponderance of wind erosion forces in the prevailing wind erosion direction. These factors indicate, respectively, potential need for wind erosion protection, proper orientation of erosion control measures, and relative merits of proper orientation of the control methods. The data are presented by months for 212 locations.

A brief description of analysis is presented. Method of analysis in more detail is available elsewhere (*10*).

SOURCE AND DESCRIPTION OF WIND DATA

Determining magnitude and direction of wind erosion forces requires analyses of detailed wind data. Detailed wind data of hourly observations of windspeed and direction are scarce. Of the many stations reporting climatological data, only a few record these hourly observations. Those that do are generally airports or military bases. Percent frequency of windspeed and direction are given in Air Force Summaries of Surface Weather Observations (A–B Summaries); Navy Summaries of Monthly Aerological Records (SMAR); and Environmental Data Service publications, Local Climatological Data—Supplement and Summary of Hourly Observations. These wind-data summaries were obtained from the National Records Center, Asheville, N.C., and were used in the analysis described here.

Available data are for relatively short periods of time, especially data from military installations that were active only during World War II. The recording period for most of the data used ranged from 5 to 10 years, as detailed in table 1 (Appendix).

No effort was made to correct heights of observations to a standard because they were not known at all locations and an attempted correction might not be accurate. Windspeed-height relationships must be known to make valid corrections. Since these relationships are affected by such factors as temperature gradients, surrounding buildings, and surface conditions, they cannot be predicted accurately for the sundry unknown conditions.

[1] Italic numbers in parentheses refer to Literature Cited, p. 8.

METHOD OF ANALYSIS

The analysis is based on the principle that the capacity of a wind to cause soil movement is proportional to windspeed cubed times the duration of the wind.

Several investigators (*1, 3, 12*) found that when windspeed was greater than that required barely to move the soil, the rate of soil movement was directly proportional to friction velocity cubed. Friction velocity U_* is related to velocity profile as expressed by

$$U_*=\frac{U_z}{5.75 \log z/k} \quad (1)$$

where U_z is the windspeed at height z and k is roughness length. Over a specified type of surface and height, z and k are constant (*1, 5*). Therefore, U_* is proportional to U_z, and rate of soil movement is proportional to windspeed cubed after the windspeed attains some minimum or threshold speed required to initiate soil movement.

Threshold speeds were reported by Chepil (*2*) to range from 13 to 30 miles per hour at 1-foot height, depending on the history of the field. A threshold speed of about 11 miles per hour at 1.2 feet was indicated for the conditions of another investigation (*3*). Malina (*9*) reported data of O'Brien and Rindlaub in which the amount of sand transported was proportional to windspeed cubed after windspeed reached a "critical velocity" of 13.4 feet per second (9.1 miles per hour).

Wind data are commonly reported in climatological records by speed groups. One common division is between 12 and 13 miles per hour. That corresponds closely to the reported minimum windspeed required to initiate soil movement. Therefore, windspeeds 12 miles per hour and less are considered nonerosive and were not used in computations reported here.

Magnitude of Wind Erosion Forces

The magnitude of a wind erosion force vector r_j is obtained by summing, for all speed groups with windspeeds greater than 12 miles per hour, the product of mean windspeed cubed and a duration factor for a specified direction as expressed by equation 2

$$r_j=\sum_{i=1}^{n} \overline{U}_i^3 f_i \quad (2)$$

where $\overline{U}_i^3$ is the mean windspeed within the ith speed group cubed. f_i is a duration factor expressed as the percentage of total observations that occur in the jth direction within the ith speed group. The sub j's indicate direction and take values from 0 to 15, inclusive, representing the 16 principal compass directions. They are numbered counterclockwise starting with east, which is arbitrarily taken as the initial side of the coordinate system. Hence, $r_{j=0}$ and $r_{j=1}$ are wind erosion force vectors pointing east and east-northeast, respectively.

The sum of the magnitudes of the wind erosion force vectors for all directions gives the total magnitude of wind erosion forces for the location and is expressed by equation 3. The value obtained by evaluating equation 3 for some location indicates the relative capacity of the wind to cause soil blowing at the particular location.

$$F_T=\sum_{j=0}^{15} \sum_{i=1}^{n} \overline{U}_{ij}^3 f_{ij} \quad (3)$$

Prevailing Wind Erosion Direction

The magnitude of erosion forces parallel to a particular direction can be obtained from the wind erosion force vectors. If p is an imaginary straight line intersecting at the origin of a polar coordinate system and ϕ_j is the angle between r_j and the imaginary line p, the amount of erosion forces caused by r_j that occur parallel to p is $r_j \cos \phi_j$. The total wind erosion forces parallel to p as a function of the orientation of p are

$$F_{\parallel}=\sum_{j=0}^{15} r_j|\cos (j\times 22.5-\theta)| \quad (4)$$

where θ is the angle between p and the initial side. Similarly, the sum of the wind erosion forces perpendicular to p is

$$F_{\perp}=\sum_{j=0}^{15} r_j|\sin (j\times 22.5-\theta)| \quad (5)$$

Obtaining an orienting line p so the ratio of the wind erosion forces parallel to line p to those perpendicular to line p, symbolized by R, is maximum tends to maximize wind erosion forces parallel to p and to minimize wind forces perpendicular to p. Hence, when R is maximum, p is oriented in the prevailing wind erosion direction θ_R.

Preponderance of Wind Erosion Forces in Prevailing Wind Erosion Direction

The value of R maximum (R_m) indicates the preponderance of wind erosion forces in the prevailing wind erosion direction. The greater the value of R_m, the greater the prevalence of the prevailing wind erosion direction. A value for R_m of 1.0 indicates no prevailing wind erosion direction and a wind barrier would be equally effective in any direction, whereas an R_m of 2.0 indicates a prevailing wind erosion direction with wind erosion forces twice as great parallel as perpendicular to prevailing wind erosion direction.

Distance Across Field Along Direction of Wind Erosion Force Vectors

Since rate of soil movement begins at zero on the windward sides of isolated strips of land and increases with distance downwind (*4*, *5*), it is necessary to know the distance across the field along the direction of wind erosion force vectors. The distance depends on the angle of deviation of the wind erosion force vectors from right angles to field strip. That is visualized when one represents a field strip by drawing parallel lines on two sides of a wind erosion rose and extending each arm of the rose to the boundaries. The length of the arm then represents the distance wind would travel in traversing the field strip along the direction of the wind erosion force vector. When a force vector is at right angles to the field strip, the distance traveled is equal to field width. As the angles of deviation increase, the distance across the field increases as the reciprocal of the cosine (secant) of the angle of deviation.

It is convenient to express the angle of deviation of wind erosion force vector from right angles to field strip as a function of prevailing wind erosion direction, and angle of deviation of prevailing wind erosion direction from right angles to field strip.

$$A_j = j \times 22.5 - \theta_R \pm A \qquad (6)$$

where A_j is angle of deviation of jth wind erosion force vector from right angles to field strip, θ_R is prevailing wind erosion direction with east as zero reference, and A is angle of deviation of prevailing wind erosion direction from right angles to field strip. When θ_R is clockwise and counterclockwise of right angles to barrier, A is subtracted and added, respectively, in equation 6.

Therefore, the distance across field of width W along the direction of wind erosion force vector r_j is

$$D_j = W \sec (j \times 22.5 - \theta_R \pm A) \qquad (7)$$

By multiplying the distance across field along the direction associated with each vector by the portion of the total wind erosion forces represented by each wind erosion vector, a distribution of wind erosion forces traveling various distances to traverse the field is obtained.

RESULTS AND DISCUSSION

The data were analyzed on a high-speed digital computer by the previously described methods. Magnitude of wind erosion forces, prevailing wind erosion direction, and preponderance of wind erosion forces in the prevailing wind erosion direction are presented in table 1 (Appendix) for 212 locations in the United States.

Relative Magnitude of Wind Erosion Forces

The magnitude of wind erosion forces was above 1,000 for some months at some locations in the Great Plains (e.g., Wichita, Kans.; Great Falls, Mont.). Some coastal areas never reached 100 (e.g., Tallahassee and Jacksonville, Fla.), whereas other locations were never below 400 (e.g., Wichita and Great Falls).

Generally wind erosion forces are greatest in the spring and least in the summer; however, that is not true for all locations. Wind erosion forces were greatest in the summer for some (e.g., Laredo, Tex.; Riverside, Calif.) and greatest in the winter for others (e.g., Great Falls, Mont.; Windsor Locks, Conn.).

Orientation of Barriers, Stripcrops, and Other Erosion Control Practices

For maximum protection against wind erosion forces, an erosion control practice should be oriented perpendicular to the prevailing wind erosion direction. The prevailing wind erosion direction is consistently the same throughout the year for some locations but varies considerably for others.

One should orient wind barriers, stripcrops, and other erosion control practices for the time of year when field and climatic conditions are most conducive to blowing, i.e., when wind forces are maximum, when soil is dry and deficient in cover and cloddiness, and when crops are most susceptible to damage.

The protection given by a barrier depends not only on the characteristics of the barrier and its orientation relative to the prevailing wind erosion direction but also on the preponderance of wind erosion forces in the prevailing wind erosion direction R_m.

As an example, in figure 1 we compare the percent of wind erosion forces traveling various distances to traverse a field in December at Great Falls, Mont. (R_m=3.6) and in April at Midland, Tex. (R_m=1.1).

In figure 1, *a*, for Midland at A=0° (field strip at right angles to prevailing wind erosion direction), 80 percent of the wind erosion forces travel distances equal to or greater than 1.1 W, and 32 percent travel twice the field width. However, for Great Falls when R_m is larger (3.6), only 40 and 11 percent of the wind erosion forces travel distances equal to or greater than 1.1 and 2.0 W, respectively. In figure 1, *b*, where the field strip deviates 40° from right angles to prevailing wind erosion direction, the angle of deviation makes very little difference at Midland where R_m is small. However, the percentages for Great Falls at A=40° are much larger than for A=0° and are slightly larger than for Midland.

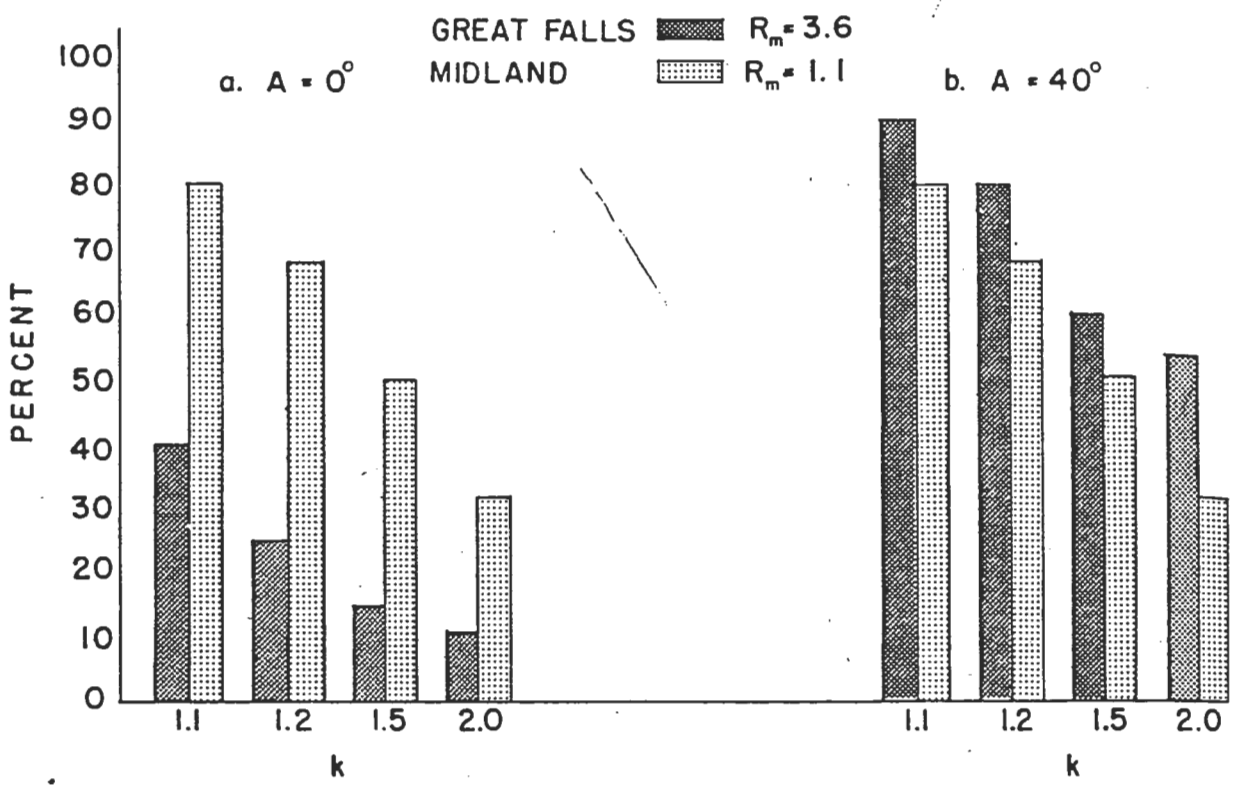


FIGURE 1.—Percent of wind erosion forces traveling distances equal to or greater than some value k times field width in traversing field strip of width W, when angle of deviation of prevailing wind erosion direction from right angles to field strip is 0° and 40° for (*a*) and (*b*), respectively, at Great Falls, Mont., and Midland, Tex.

As R_m approaches unity (the smallest value possible for R_m), the importance of a particular barrier orientation lessens. Wind erosion forces that occur parallel are equal to those that occur perpendicular to barrier regardless of barrier orientation.

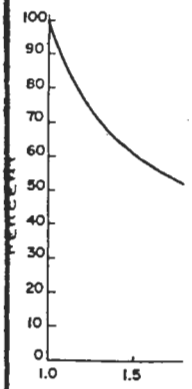
It follows that as R_m gets larger, more attention should be given to proper orientation of the barrier, as illustrated in figures 2–6. These charts give the percent of wind erosion forces that travel some specified multiple k of field width in traversing a field strip as a function of R_m and A. In general, as R_m gets larger, the percent of wind erosion forces traveling more than 1.5 times the field width decreases for small angles of deviation of the prevailing wind erosion direction from right angles to field strip. However, for large angles of deviation, the percent of wind erosion forces traveling 1.5 times the field width in traversing field strip increases. That fact should be considered when determining equivalent field width for use in the wind erosion equation and the distance between barriers.

Equivalent Field Width

Use of distance L' across the field along the prevailing wind erosion direction in the wind erosion equation is based on the wind traveling distance L' in traversing the field. Unless all wind erosion forces occur along the prevailing wind erosion direction, some of the wind will travel distances greater than L' in traversing the field. Also, at angles of deviation greater than zero, some wind will travel less than L' in traversing a field strip. A measure of equivalent field width based on the preponderance of wind erosion forces in the prevailing wind erosion direction as well as deviation of right angle of the strip from prevailing wind erosion direction would be more meaningful.

Suppose that by using the wind erosion equation (*11*) we have determined that the travel distance L' of wind in traversing a field strip should not exceed 150 feet to control erosion to a tolerable amount. We now desire to determine the width of a field strip so that no more than 50 percent of the wind erosion forces will travel more than 150 feet in traversing the field strip. Some percentage other than 50 could be selected, but 50 is desirable because half of the wind erosion forces will travel farther and half not so far, so 50 represents the median travel distance; also, it is the percentage best used with figures 2–6.

To illustrate, let us use R_m of 1.1 and 3.6 in combination with A values of 0° and 40°. The median distances that wind erosion forces will travel in traversing the field strip are determined by interpolation from figures 2–6.



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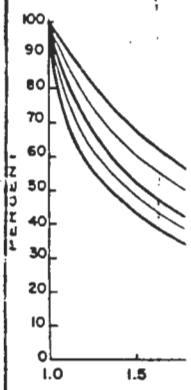

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TABLE 2.—*Determination of width of field strip* W_{50} *for median travel distance of 150 feet and of width of field strip* $W_{L'}$ *so distance across field in prevailing wind erosion direction is 150 feet when preponderance of wind erosion forces* (R_m) *is 1.1 and 3.6 and angle of deviation* (A) *is 0° and 40°*

R_m	A	k_{50}	W_{50}	$W_{L'}$
	(°)		*Feet*	*Feet*
1.1	0	1.8	83	150
	40	1.9	79	116
3.6	0	1.1	136	150
	40	2.1	71	116

When R_m equals 1.1, the angle of deviation of strip from right angles to prevailing wind erosion direction only slightly affects W_{50}, whereas when R_m equals 3.6, an increase in angle of deviation from 0° to 40° reduces W_{50} from 136 to 71 feet.

EXAMPLES OF FIELD APPLICATIONS

Data in this handbook can be used in several ways to design wind erosion control practices. Two examples are illustrative.

Determination of Potential Wind Erodibility of Farm Fields

The amount of erosion E, expressed in tons per acre per annum, that could occur from a given agricultural field can be expressed as $E=f(I',K',C',L',V)$, where I' is a soil erodibility index, K' is a soil ridge roughness factor, C' is a climatic factor, L' is field length along the prevailing wind erosion direction, and V is equivalent quantity of vegetative cover (*11*).

Assume we wish to use the equation and the information given in this handbook to determine the potential erosion E that might occur in March and October from a field with a 1,320-foot north-south width in the vicinity of Midland, Tex. Since the field is flat and smooth, soil ridge roughness $K_r=0$ and soil ridge roughness factor $K'=1.0$ (fig. 7). Because it has 800 pounds per acre of flat wheat stubble, V, the equivalent vegetative cover, is 2,500 (fig. 8). (For other vegetative covers, refer to figs. 9 and 10.) Since dry sieving indicates that 25 percent of the soil fractions are greater than 0.84 mm. in diameter, $I'=86$ (table 3). C', the climatic factor, appears in figures 11–22 for January through December. The factor is 102 percent for March and 64 percent for October. In this example we shall use median travel distance D_{50} for L'. D_{50} may be determined from this handbook in the following manner:

(1) Refer to data in table 1 (Appendix) for Midland, Tex. Find direction equal to 45° in March and 90° in October, thus indicating the prevailing wind erosion direction has an angle of

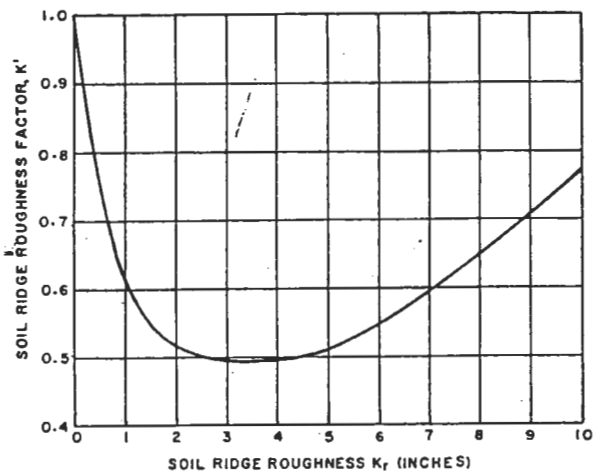


FIGURE 7.—Chart to determine soil ridge roughness factor K' from soil ridge roughness K_r.

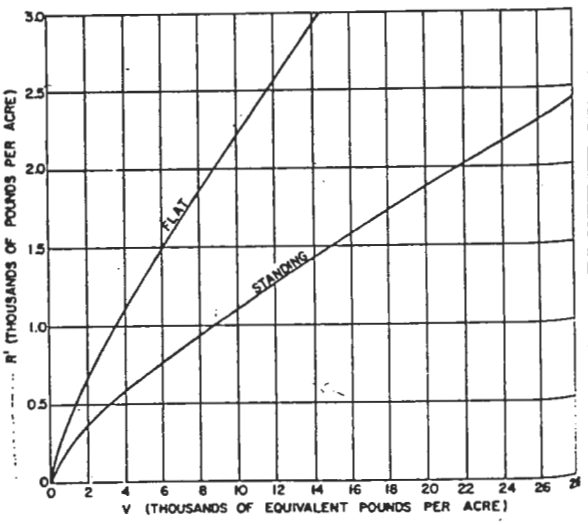


FIGURE 8.—Chart to determine V from R' or R' from V d standing and flat anchored small grain stubble with an row width up to 10 inches, including stover.

TABLE 3.—*Soil erodibility* I *for soils with different percentages of nonerodible fractions as determined by standard dry sieving* [1]

Dry soil fractions >0.84 mm. (percent) Units → / Tens ↓	0	1	2	3	4	5	6	7	8	9
	Tons per acre	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*	*Tons per acre*
0		310	250	220	195	180	170	160	150	140
10	134	131	128	125	121	117	113	109	106	102
20	98	95	92	90	88	86	83	81	79	76
30	74	72	71	69	67	65	63	62	60	58
40	56	54	52	51	50	48	47	45	43	41
50	38	36	33	31	29	27	25	24	23	22
60	21	20	19	18	17	16	16	15	14	13
70	12	11	10	8	7	6	4	3	3	2
80	2									

[1] For fully crusted soil surface, regardless of soil texture, erodibility I is, on the average, about one-sixth of that shown.

deviation A with reference to the north-south ield width of 45° in March and 0° in October. lso note from these data that preponderance or R_m equals 1.2 in March and 1.9 in October.

(2) To find D_{50} for March, use figures 2 and 3 o determine k_{50}. For A=45°, find k_{50}=1.90 hen R_m=1.0 and 1.85 when R_m=1.5. Since ctual R_m=1.2, then by interpolation k_{50}=1.88 nd $D_{50}=k_{50}$ field width=1.88×1,320=2,480.

(3) To find D_{50} for October, use figures 3 and 4 o determine k_{50}. For A=0°, find k_{50}=1.30 when R_m=1.5 and 1.18 when R_m=2.1. Since actual R_m=1.9, then by interpolation k_{50}=1.22 and D_{50}=1.22×1,320=1,610.

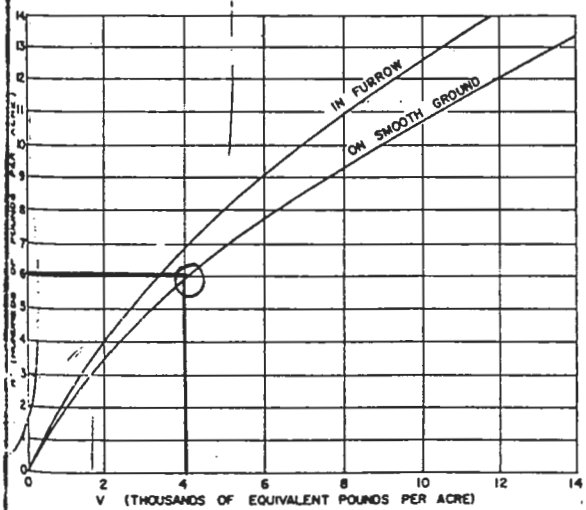


FIGURE 9.—Chart to determine V from R' or R' from V of live or dead small grain crops in seedling and stooling stage, above surface of ground, for crop in 3-inch-deep furrow as created by deep-furrow drill on smooth ground.

Values of I'=86, K'=1.0, C'=102 in March and 64 in October, D_{50}=2,480 in March and 1,610 in October, and V=2,500 may now be used in the wind erosion equation $E=f(I',K',C',L',V)$ to determine potential soil losses of 40 tons per acre in March and 21 tons per acre in October. The procedure for making these calculations is as follows:

(1) Determine $E_2=I'K'$. E_2=86×1.0=86 tons per acre.

(2) Determine $E_3=I'K'C'$. E_3=86×1.0×1.02 =88 tons per acre in March. E_3=86×1.0×0.64 =55 tons per acre in October.

(3) Determine $E_4=I'K'C'f(L')$

(a) $L'=D_{50}$=2,480 feet in March and 1,610 feet in October.

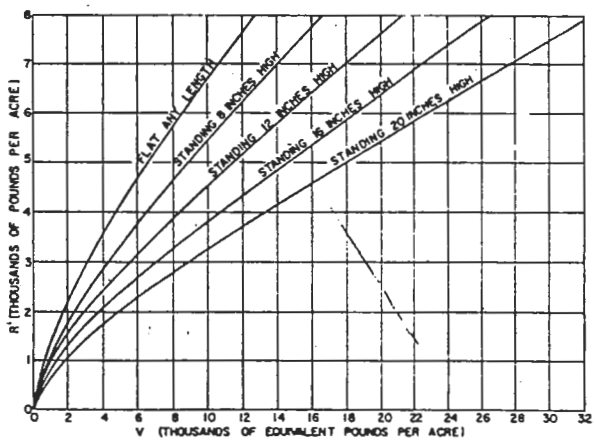


FIGURE 10.—Chart to determine V from R' or R' from V of standing and flat grain sorghum stubble of average stalk thickness, leafiness, and quantity of tops on ground.

(b) Use figure 23 to obtain E_4. Cut out movable $E_3=I'K'C'$ scale. For March, place it along $E_2=I'K'$ ordinate so that 88 on movable scale coincides with 86 on ordinate. From movable scale move to right down along 86 interpolated between curved lines 80 and 90 to intersection of $L'=2{,}480$ feet, then move horizontally left to movable E_3 scale and read $E_4=I'K'C'f(L')=82$ tons per acre. For October, place movable scale E_2 ordinate so that 55 on movable scale coincides with 86 on ordinate. Again from movable scale move to right down along 86 interpolated between curved lines 80 and 90 to intersection of $L'=$ 1,610 feet, then move horizontally left to movable E_3 scale and read $E_4=50$ tons per acre.

(4) Determine $E_5=E=I'K'C'f(L')f(V)$

(a) V as determined from figure 8 for 800 pounds per acre of residue R' is 2,500 equivalent pounds per acre.

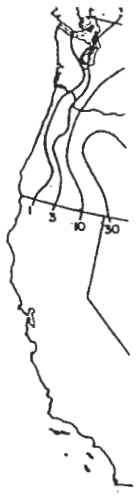
(b) Use figure 24 to determine $E_5=E$. For March, start with $E_4=82$ on abscissa of figure 24. Move vertically upward to intersection of $V=2{,}500$, then move horizontally left to ordinate E. $E=40$ tons per acre. For October, start with $E_4=50$ on abscissa of figure 24, move vertically to intersection of $V=2{,}500$ and horizontally to ordinate and read $E=21$ tons per acre.

Because these soil loss values are rather high, a farm operator might next logically ask "How much additional residue above the 800 pounds per acre would this field need to prevent soil losses from exceeding a tolerable 5 tons per acre?" That question can be answered by substituting 5 tons per acre for E in the equation and solving for V. If that is done using the field conditions for I', K', C', and L' indicated above, one finds that 1,800 pounds per acre of flattened wheat stubble would be required in March and 1,320 pounds per acre in October. Thus, 1,000 pounds per acre more residue than the existing 800 pounds would be required for adequate protection in March, but only an additional 520 pounds per acre would be needed in October.

Determination of Barrier Spacing

For an example of determining barrier spacing, assume we desire to establish windbreaks to reduce wind erosion of wheat and fallow fields near Goodland, Kans. Information from table 1 indicates that wind erosion forces are greatest in March and April when fields are susceptible to wind erosion. It is decided to design for conditions when wind erosion forces are greatest. Other pertinent information from table 1 indicates that the prevailing wind erosion direction is 112°, north-northwest, and preponderance or R_m is 2.5 and 2.1 for March and April, respectively. Since the field lies along grid lines and prevailing wind erosion direction is only 22° from north-south, it is decided to orient the barrier east-west.

It is decided to base the distance between barrier strips on the distance traveled by 50 percent of the wind in traversing the field strip, or the median travel distance. Based on properties of the barrier to be established and degree of protection desired, it is decided that the median travel distance should not exceed $30H$. H is barrier height. By using figure 4 and interpolating, it is found for $R_m=2.1$ and $A=22°$ that median travel distance is 1.5 (k_{50}) times the field width W. If we equate that distance (1.5 W) to $30H$ and solve for W, we obtain $20H$. Therefore, based on the design criteria and average wind conditions of the area, wind barriers should be spaced 20 times their height.



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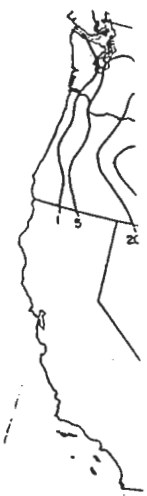

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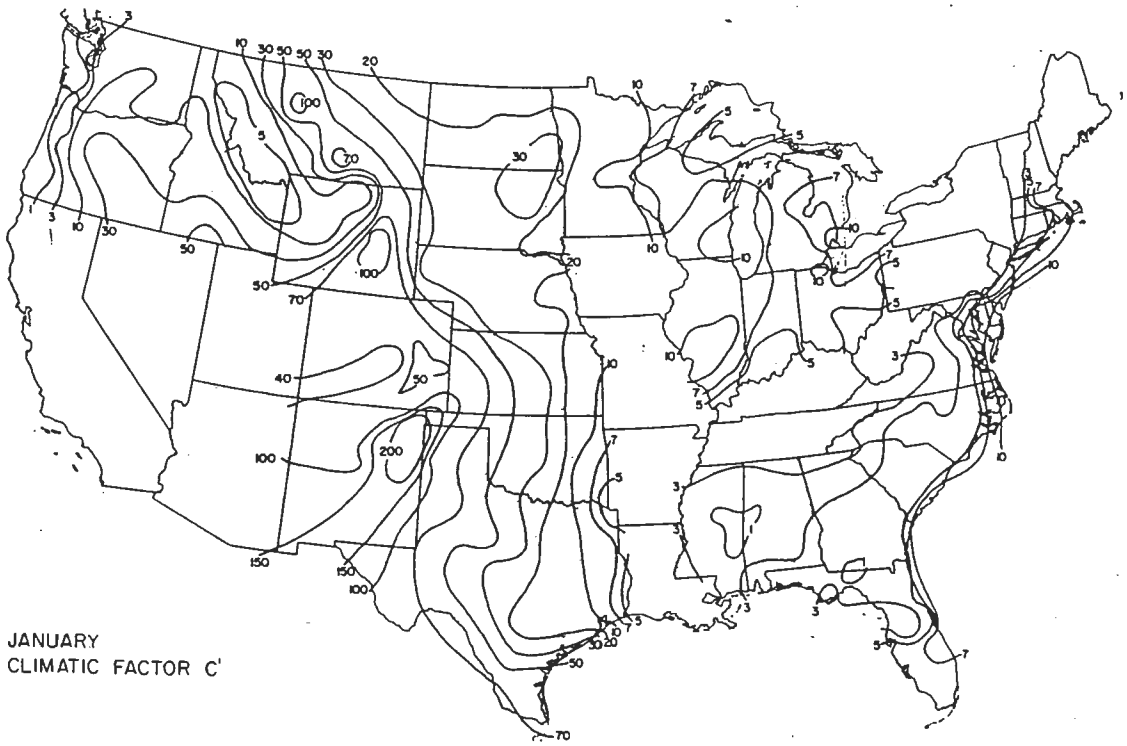

FIGURE 11.—Wind erosion climatic factor C' (percent) for January.

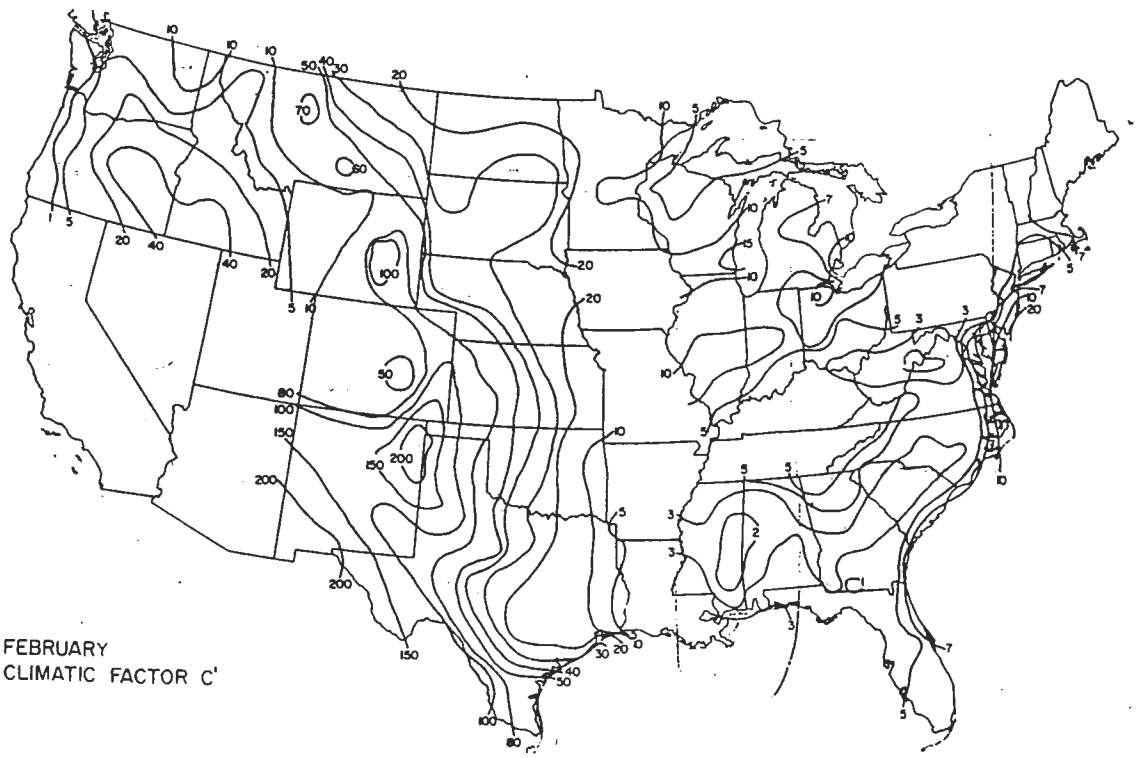

FIGURE 12.—Wind erosion climatic factor C' (percent) for February.

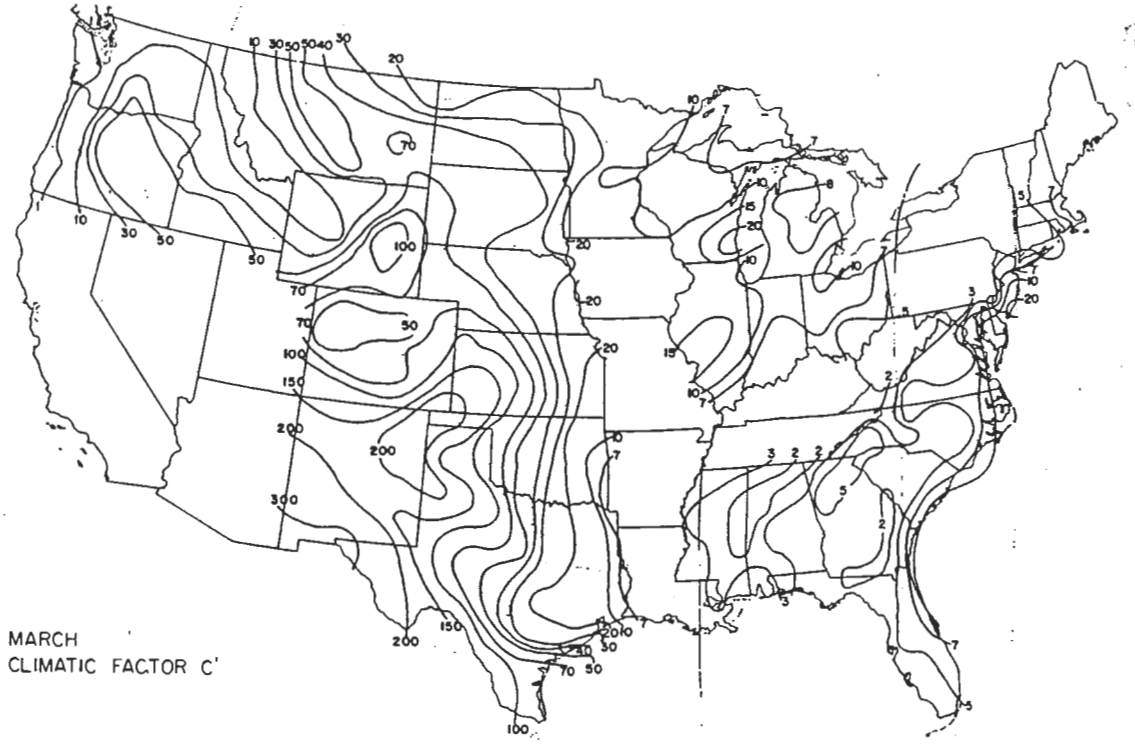

FIGURE 13.—Wind erosion climatic factor C' (percent) for March.

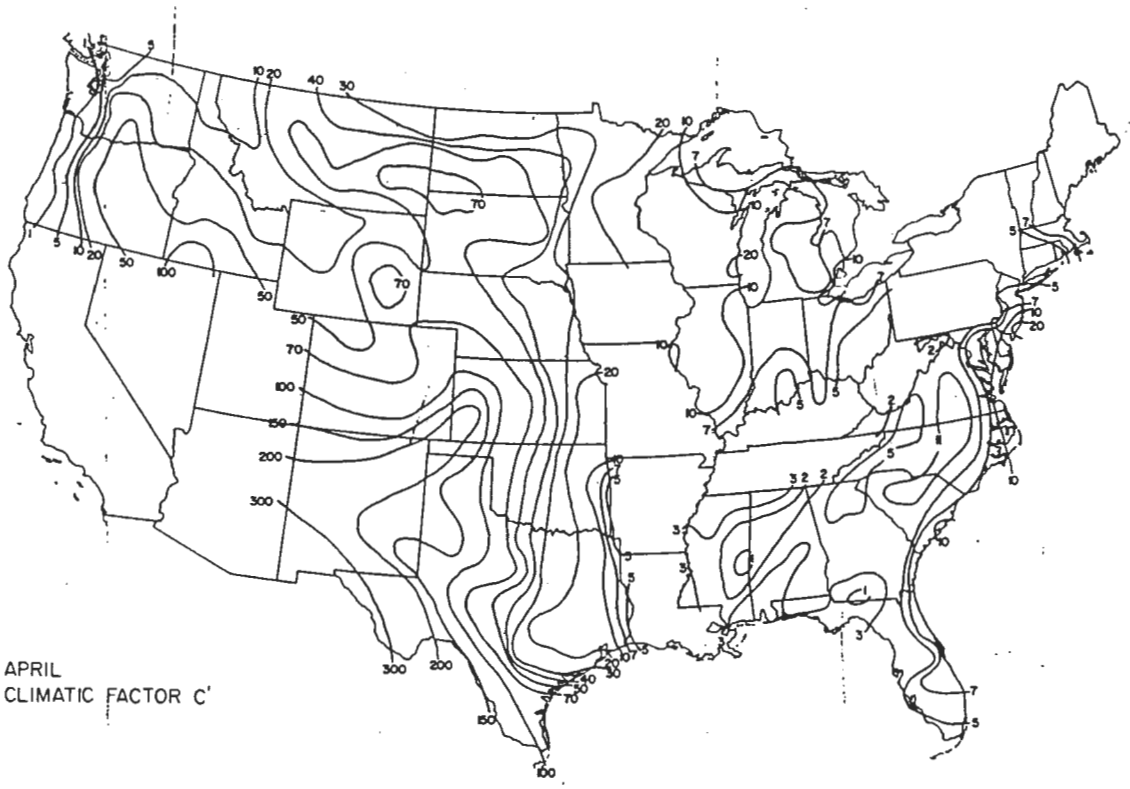

FIGURE 14.—Wind erosion climatic factor C' (percent) for April.

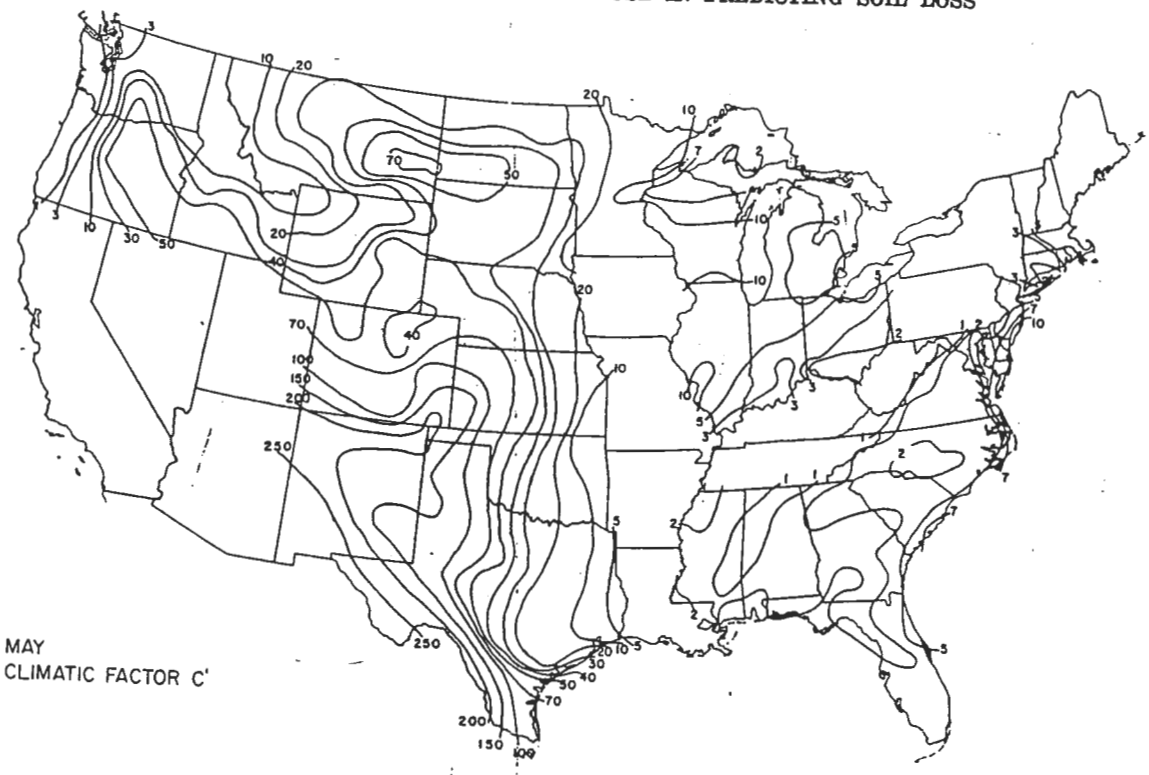

FIGURE 15.—Wind erosion climatic factor C' (percent) for May.

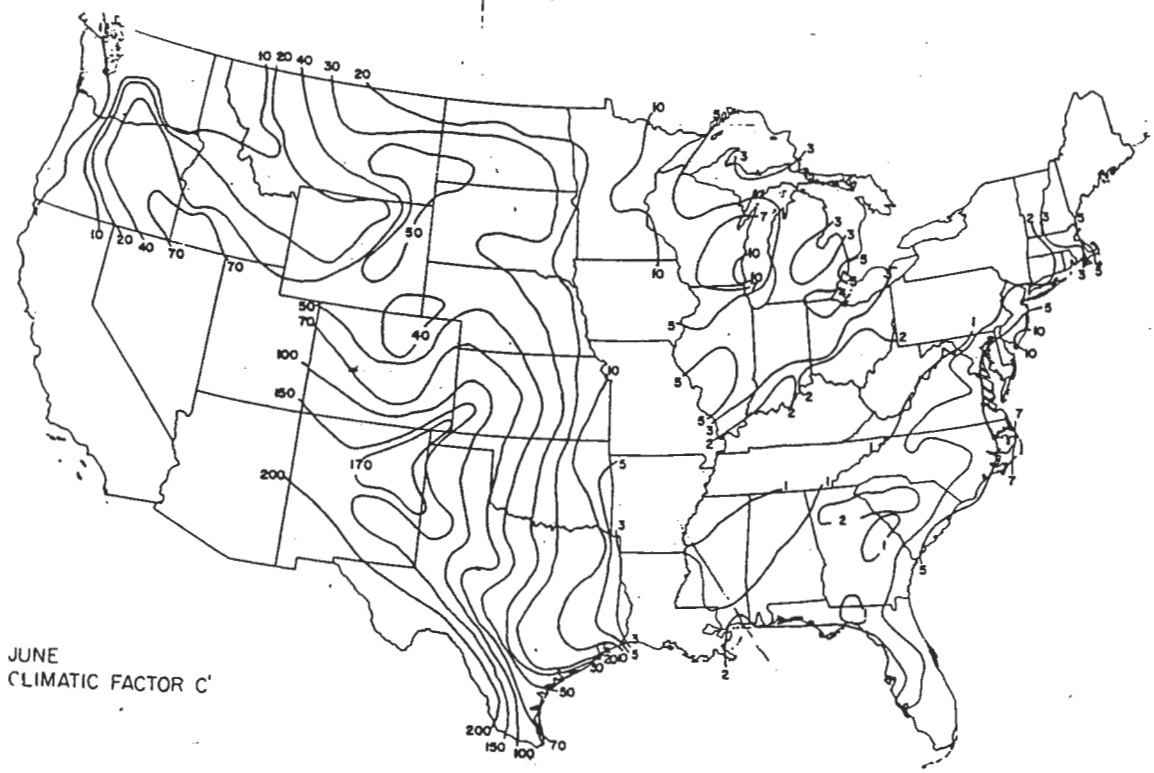

FIGURE 16.—Wind erosion climatic factor C' (percent) for June.

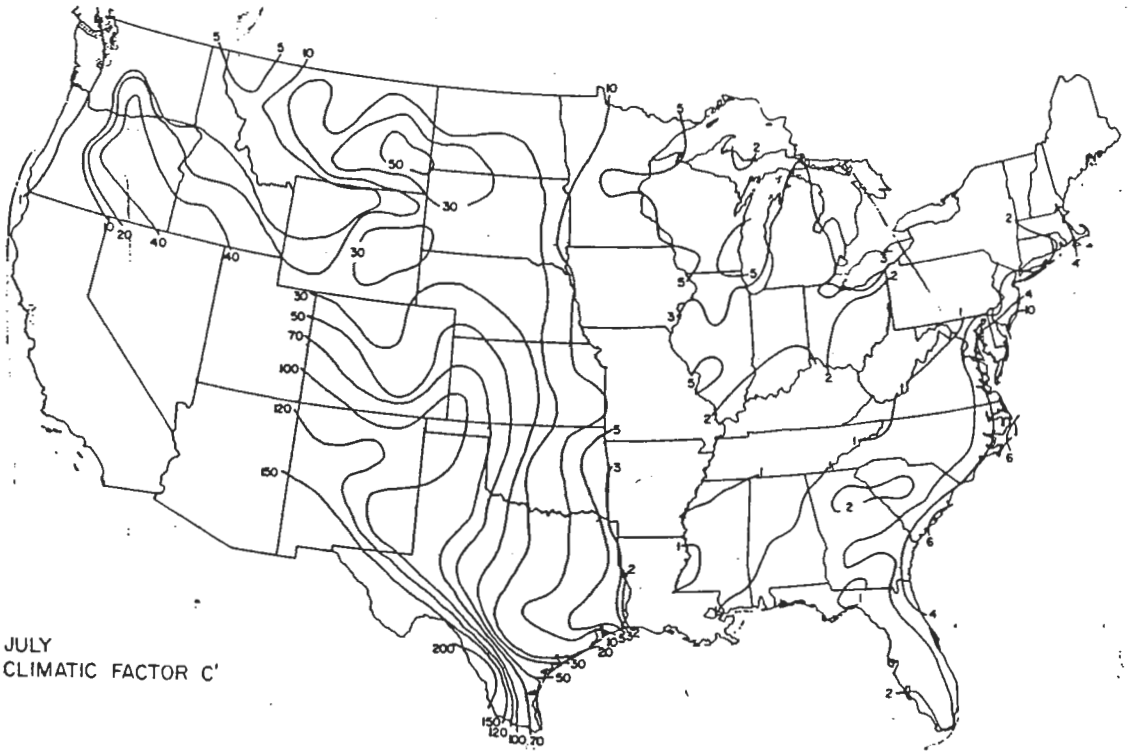

FIGURE 17.—Wind erosion climatic factor C' (percent) for July.

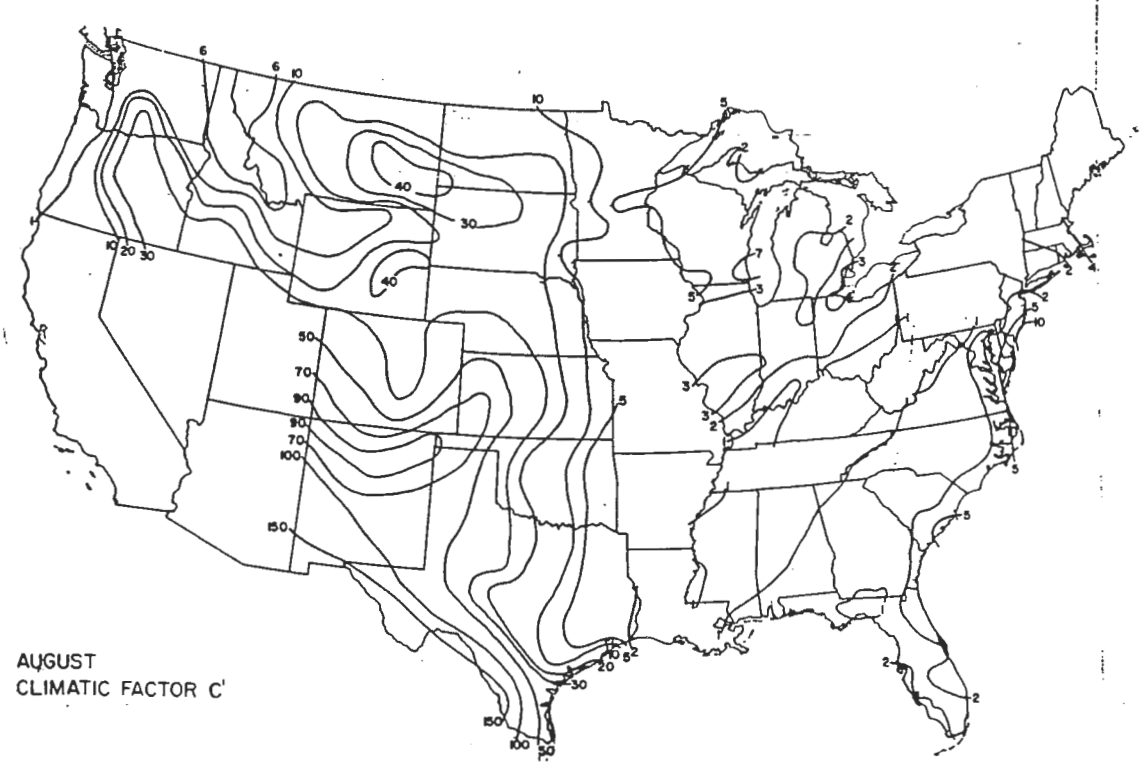

FIGURE 18.—Wind erosion climatic factor C' (percent) for August.

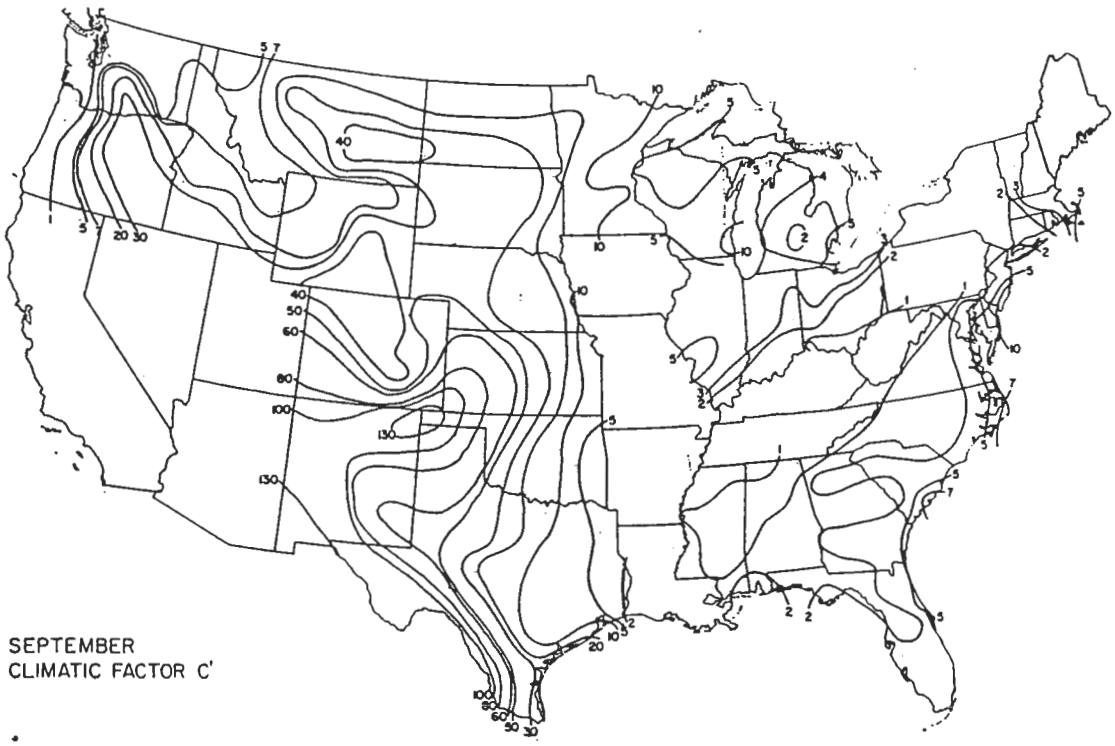

FIGURE 19.—Wind erosion climatic factor C' (percent) for September.

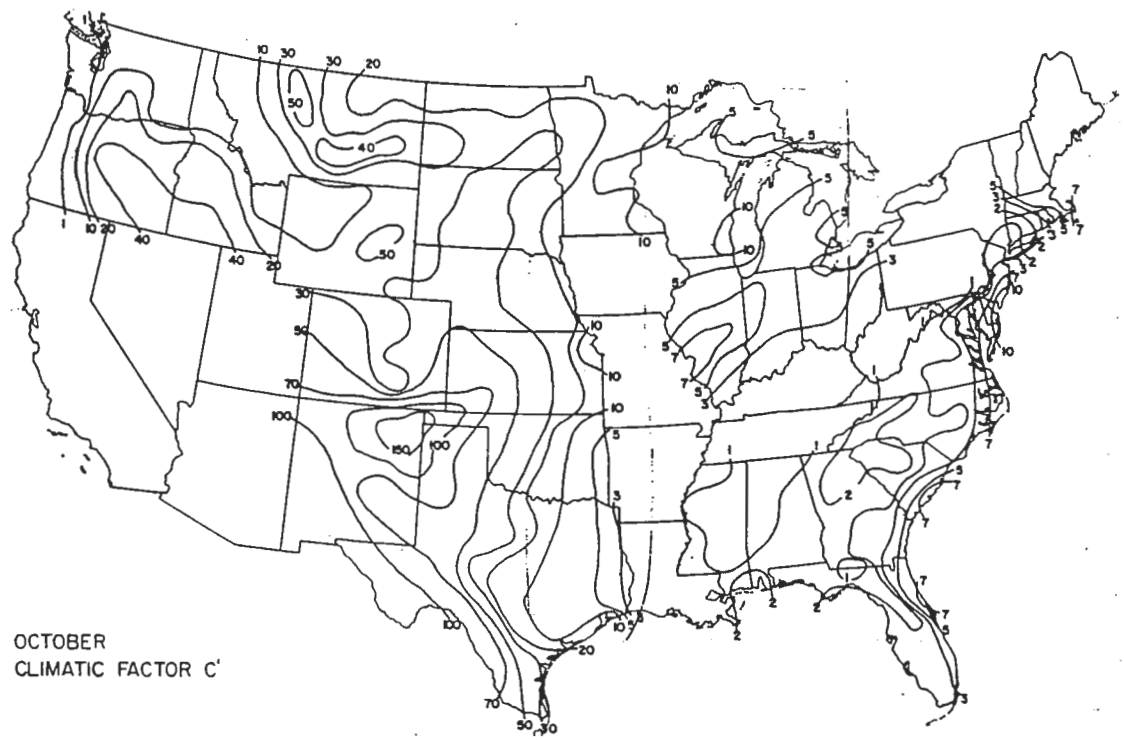

FIGURE 20.—Wind erosion climatic factor C' (percent) for October.

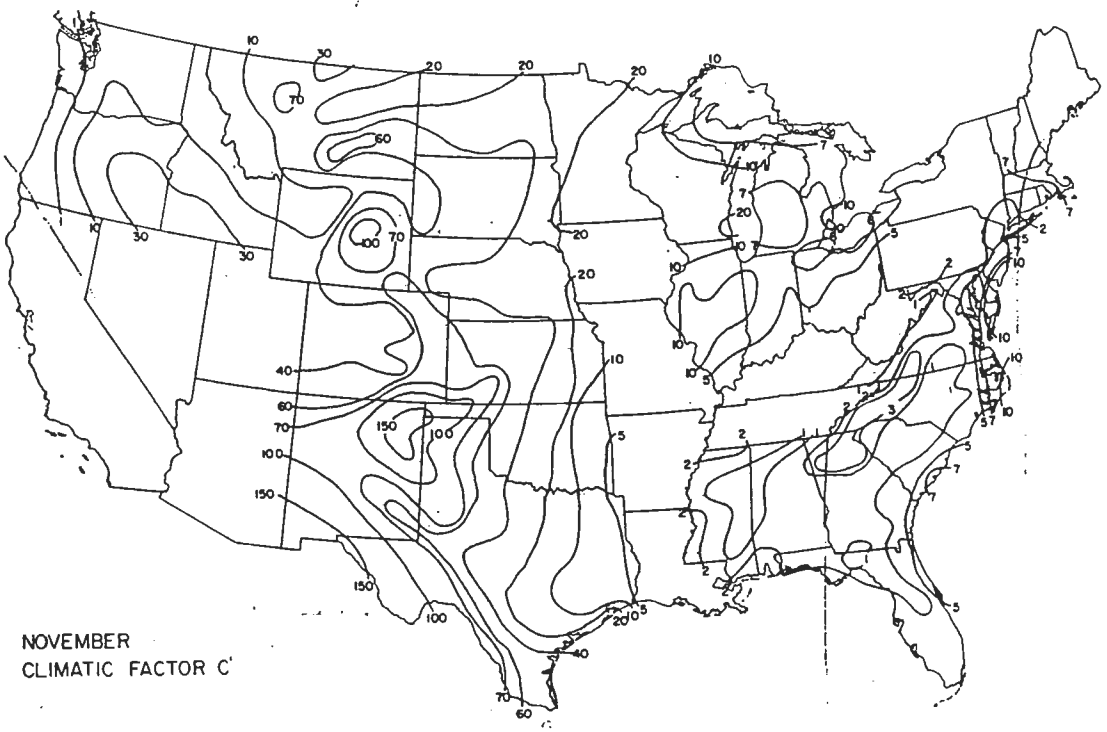

FIGURE 21.—Wind erosion climatic factor C' (percent) for November.

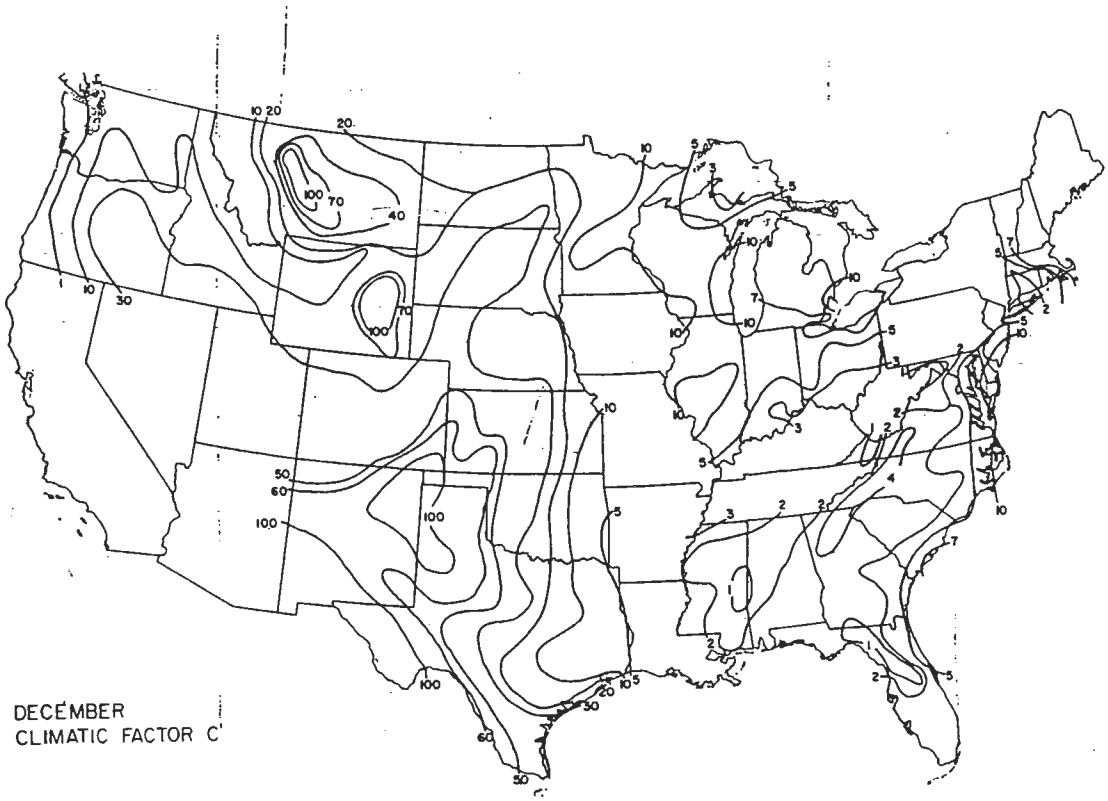

FIGURE 22.—Wind erosion climatic factor C' (percent) for December.

SOIL LOSS $E_2 = I'K'$ (TONS/ACRE/ANNUM)

FIGURE 23.-

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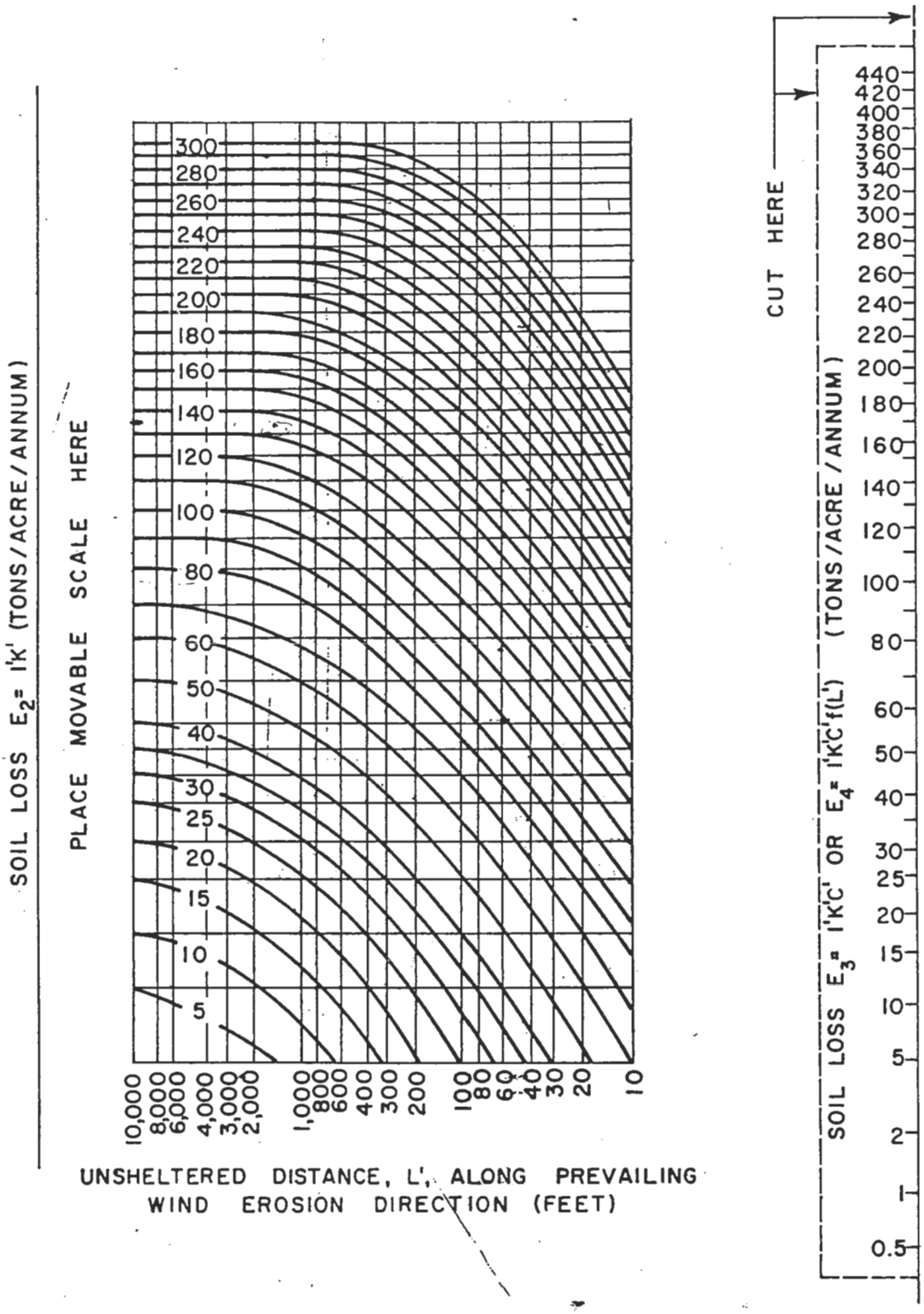

FIGURE 23.—Chart to determine soil loss $E_4 = I'K'C'f(L')$ from soil loss $E_2 = I'K'$ and $E_3 = I'K'C'$ and from unsheltered distance L' across field.

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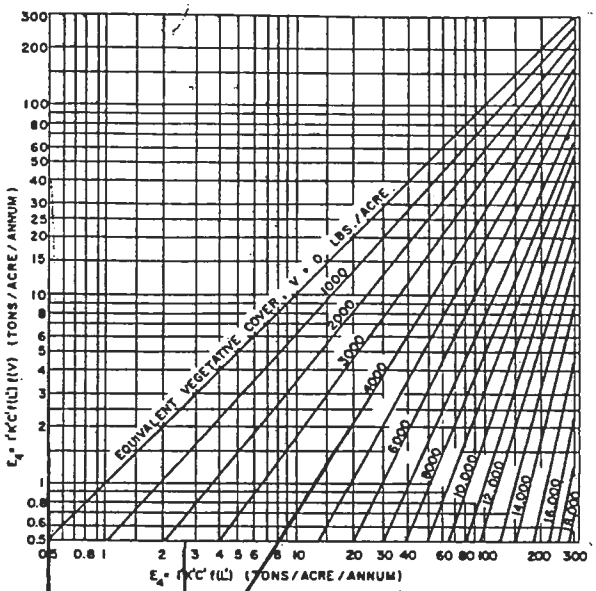

FIGURE 24.—Chart to determine soil loss $E=I'K'C'f(L')f(V)$ from soil loss $E_1=I'K'C'f(L')$ and from vegetative cover factor V. Chart can be used in reverse to determine V needed to reduce soil loss to any degree.

APPENDIX

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,*[1] *and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months*

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Anchorage, Alaska (Jan. 1956 – Dec. 1960)												
Magnitude	66	108	75	48	115	73	63	42	66	56	45	36
Direction	68	68	90	90	90	90	90	90	90	90	90	90
Preponderance	2.0	3.4	2.7	2.7	3.4	3.1	2.7	3.2	3.1	3.2	3.1	3.1
Fairbanks, Alaska (Jan. 1956 – Dec. 1960)												
Magnitude	3	12	28	30	68	34	40	24	31	25	9	2
Direction	45	45	45	45	45	23	23	23	23	23	45	45
Preponderance	2.6	2.9	2.5	1.3	1.9	2.1	2.2	2.4	2.0	2.5	1.3	3.3
Ajo, Ariz. (Jan.–Sept. 1942; Nov. 1942 – Dec. 1946)												
Magnitude	54	73	91	83	80	95	69	44	62	37	24	28
Direction	90	90	113	45	45	67	45	90	68	90	90	90
Preponderance	1.9	2.1	1.2	1.2	1.4	1.8	1.3	1.2	1.6	1.5	1.7	1.4
Douglas, Ariz. (Nov. 1942 – Nov. 1945)												
Magnitude	84	140	230	294	177	215	80	37	69	86	74	53
Direction	69	67	45	23	22	45	113	135	180	180	180	90
Preponderance	1.3	1.6	1.5	1.4	1.5	1.6	1.4	1.4	1.5	1.8	1.0	1.0

See footnote at end of table.

n forces

TABLE 1.—*Relative magnitude, prevailing wind erosion direction,[1] and preponderance of wind erosion forces in prevailing wind erosion direction for 212 locations in 39 States by months*—Continued

Dec.	Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	New York, N.Y. (Apr. 1945 – Aug. 1957)												
140	Magnitude	431	481	523	399	305	198	153	136	182	241	434	437
135	Direction	158	158	158	158	158	113	112	90	112	180	180	158
1.4	Preponderance	1.6	1.9	1.7	1.5	1.1	1.4	1.4	1.2	1.1	1.1	1.5	1.7
	Niagara, N.Y. (June 1951 – July 1960; Nov.–Dec. 1961; Jan. 1962 – July and Oct. 1962)												
321	Magnitude	347	320	276	280	171	143	130	126	174	212	246	344
157	Direction	23	23	44	45	45	45	45	45	45	45	45	23
1.6	Preponderance	1.7	1.5	1.6	2.0	1.6	1.8	2.1	2.2	1.7	1.7	1.8	2.0
	Plattsburgh, N.Y. (Jan. 1956 – Dec. 1962)												
206	Magnitude	104	153	137	122	126	90	66	63	72	94	109	94
180	Direction	157	135	135	135	135	135	135	135	113	135	113	113
1.8	Preponderance	1.3	1.3	1.6	1.6	2.0	1.8	1.6	2.1	1.8	2.1	1.3	1.5
	Rome, N.Y. (July 1942 – Mar. 1955)												
198	Magnitude	177	230	231	177	131	79	56	41	70	85	140	178
158	Direction	158	157	157	157	157	135	157	157	157	135	157	158
1.4	Preponderance	2.7	3.1	2.6	2.5	2.5	2.1	1.7	2.1	1.9	1.7	2.2	2.5
	Schenectady, N.Y. (Sept. 1950 – Feb. 1953; June 1953 – Aug. 1955)												
271	Magnitude	203	193	254	238	195	117	117	128	146	115	179	131
157	Direction	157	157	157	157	157	158	158	157	157	157	158	157
1.5	Preponderance	5.6	2.8	2.4	1.6	2.6	2.2	2.5	1.9	1.5	2.1	2.0	2.7
	Westhampton Beach, N.Y. (Aug. 1943 – Nov. 1945; June 1951 – Jan. 1959)												
145	Magnitude	274	268	315	275	224	179	148	172	217	236	280	247
23	Direction	135	157	158	22	45	45	45	45	45	23	89	158
1.3	Preponderance	1.2	1.5	1.2	1.2	1.2	1.4	1.8	1.6	1.6	1.3	1.1	1.2
	Cherry Point, N.C. (Mar. 1945 – Mar. 1959)												
105	Magnitude	199	219	274	281	169	132	108	125	155	143	129	140
90	Direction	67	67	67	67	67	67	67	67	67	67	67	68
1.5	Preponderance	1.7	1.7	2.0	2.6	2.9	2.5	2.8	2.2	2.5	2.3	2.0	1.7
	Hatteras, N.C. (Jan. 1953 – May 1963)												
154	Magnitude	350	387	365	363	238	217	190	270	284	264	276	318
90	Direction	90	68	68	68	67	67	67	67	67	67	90	68
1.4	Preponderance	1.2	1.5	1.4	1.8	2.8	2.6	2.9	1.6	1.7	1.9	1.6	1.3

See footnote at end of table.

for the purpose of making maps and reports that can be used readily by engineers.

8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

With the use of the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be strongly emphasized, however, that the interpretations generally will not eliminate the need for subsurface investigation, subsequent testing, and engineering analysis at the site of the proposed engineering works. In most places the intensity of investigation needed is proportional to the weight of the loads to be applied, to the depth and amount of earthwork involved, and to the cost of the contemplated works. Engineers and others should not apply specific values to the estimates given for bearing capacity of soils. Nevertheless, this engineering subsection, with the soil map and the soil descriptions, is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Much of the information in this subsection is in tables 4, 5, and 6. Table 4 lists engineering test data that were obtained when selected soils in the county were tested. Table 5 lists the soils and gives an estimate of their engineering properties. In table 6 are interpretations of the engineering properties of the soils for highway location, embankments, and structures for controlling water and erosion.

Additional information about the soils in the county can be obtained by referring to other parts of this survey,

neering test data

ment of Commerce, Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [3]											Classification			
Percentage passing sieve—							Percentage smaller than—				Liquid limit	Plasticity index [4]	AASHO [5]	Unified [6]
3 in.	2 in.	1 in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
												Pct.			
	100. 0	99. 5	94. 8	92. 2	89. 4	83. 0	67. 1	59. 9	41. 4	19. 2	11. 0	35. 6	11. 1	A–6(7)	ML–CL
	100. 0	97. 9	92. 3	90. 4	88. 6	85. 2	72. 5	64. 5	45. 0	26. 0	16. 8	29. 2	12. 5	A–6(8)	CL
93. 9	89. 7	82. 4	74. 2	69. 9	66. 0	61. 1	49. 8	44. 3	31. 5	19. 1	13. 8	29. 5	12. 5	A–6(4)	SC
	100. 0	90. 1	85. 0	81. 5	78. 7	71. 8	49. 1	42. 0	26. 6	16. 3	13. 8	29. 5	10. 7	A–6(3)	SC
	100. 0	98. 6	93. 5	89. 9	84. 5	76. 0	60. 9	55. 0	40. 1	26. 8	20. 2	28. 4	11. 3	A–6(6)	CL
	100. 0	100. 0	98. 2	95. 5	92. 0	86. 7	71. 8	66. 0	52. 2	26. 9	16. 1	37. 8	10. 4	A–4(7)	ML
	100. 0	99. 9	99. 6	98. 4	96. 9	94. 3	83. 2	75. 0	56. 1	36. 4	25. 0	29. 8	11. 7	A–6(9)	CL
		96. 4	95. 0	93. 1	91. 0	86. 1	68. 0	59. 5	40. 6	26. 9	20. 5	26. 0	11. 0	A–6(7)	CL
	100. 0	96. 7	95. 9	94. 8	93. 0	89. 4	79. 1	71. 8	53. 8	35. 1	23. 1	42. 8	14. 6	A–7–6(11)	ML, OL
		100. 0	93. 4	82. 6	72. 9	66. 4	62. 9	59. 6	51. 9	37. 6	25. 3	47. 0	20. 2	A-7-6(10)	ML, CL
	100. 0	85. 8	40. 2	29. 1	23. 9	21. 5	20. 9	19. 5	15. 7	9. 9	6. 3	32. 3	10. 8	A-2-6(0)	GC
	100. 0	99. 9	98. 6	97. 1	94. 4	89. 2	69. 2	60. 4	39. 9	16. 9	10. 5	37. 1	12. 1	A–6(8)	ML–CL
	100. 0	99. 7	98. 6	96. 2	91. 9	86. 1	69. 3	60. 9	42. 4	30. 0	21. 3	26. 8	9. 9	A–4(7)	CL
	100. 0	98. 4	87. 1	81. 7	77. 2	69. 2	55. 5	51. 0	39. 7	21. 9	15. 2	24. 4	8. 4	A–4(4)	CL
100. 0	87. 5	80. 1	64. 8	56. 3	47. 2	36. 1	26. 0	22. 9	15. 8	7. 5	5. 8	20. 0	6. 4	A–2–4(0)	GM–GC
	100. 0	98. 9	97. 1	95. 4	93. 9	89. 6	75. 4	[10]				52. 2	13. 7	A–7–5(12)	MH
100. 0	97. 0	91. 1	85. 7	81. 9	78. 0	73. 8	61. 3	56. 2	43. 6	29. 9	20. 8	35. 7	16. 8	A–6(8)	CL
100. 0	98. 1	97. 2	94. 5	91. 2	87. 3	82. 8	69. 6	63. 0	47. 6	32. 2	23. 0	26. 9	10. 3	A–4(7)	CL
95. 6	89. 6	87. 2	79. 1	72. 8	67. 9	61. 7	51. 4	47. 0	35. 6	20. 9	13. 7	25. 0	10. 4	A–4(3)	CL
96. 5	91. 5	84. 3	76. 2	71. 8	66. 1	58. 8	47. 5	42. 8	31. 7	17. 5	12. 3	21. 4	8. 7	A–4(3)	GC

maintenance of roads, airports, pipelines, building foundations, and sewage disposal systems. Among the properties important to the engineer are permeability to water, shear strength, grain size, compaction characteristics, soil drainage, plasticity, and pH. Topography, depth to water table, and depth to and kind of bedrock are also important.

Information in this survey can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, commercial, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in the planning of agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway locations and in planning detailed investigations of the selected locations.
4. Locate probable sources of gravel and other construction material.
5. Correlate performance of engineering structures with soil mapping units, and thus develop information that is useful in designing and maintaining similar structures on like soils.
6. Determine the suitability of soil units for cross country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs.

TABLE 4.—*Engineering*

[Tests performed by the New York State Department of Transportation, Bureau of Soil Mechanics, in cooperation with the U.S. Depart

Soil name and location	Parent material	SCS report No. S65NY50	Depth	In-place moisture content	In-place dry density	Moisture-density relationship [1]		Percolation rate [2]
						Optimum moisture content	Maximum dry density	
			In.	*Pct.*	*Lb. per cu. ft.*	*Pct.*	*Lb. per cu. ft.*	*Min. per in.*
Angola silt loam:								
Town of Lodi, 1,400 feet south of South Town Line Road and 500 feet east of Neeley Road. (More acid and coarser textured than modal profile.)	Acid, shaly glacial till, moderately deep over Genesee Shale.	13–1	0–9	25. 6	87. 6	26. 0	94. 5	
		13–2	9–12			16. 5	109. 8	
		13–3	12–20	20. 2	102. 3	16. 6	110. 0	>120
		13–4	20–22			13. 4	116. 8	
		13–5	22–29	18. 5	109. 3	14. 3	115. 0	
			29–36	(7)				
Town of Romulus, 300 feet south of Yerkes Road and 2,260 feet east of State Route 414. (Coarser textured than modal profile.)	Semiresidual and moderately deep over fine-grained, calcareous, gray to dark-gray sandstone and shale of the Moscow Formation.	8–1	0–10	28. 1	79. 6	28. 2	91. 5	
		8–2	10–15	22. 8	97. 2	19. 5	105. 0	>120
		8–3	15–24			15. 5	114. 5	
			24–36	(7)				
Town of Fayette, 100 feet west of Woodworth Road and 1,200 feet north of State Route 96A, southeast of Geneva. (Modal profile.)	Moderately deep over soft, gray, calcareous Skaneateles Shale bedrock.	4–1	0–10	26. 7	85. 3	22. 7	95. 0	
			10–12					
		4–3	12–18			17. 7	107. 0	
		4–4	18–32	(9)				>120
		4–5	32–44	18. 0	109. 3	18. 2	107. 0	
Appleton silt loam:								
Town of Ovid, 100 feet southeast of junction of County Road 131 and Combs Road.[8] (Modal profile.)	Calcareous glacial till, moderately high shale content.	10–1	0–7	27. 3	88. 5	28. 2	91. 5	
		10–2	7–16	18. 3	103. 8	16. 6	110. 0	
		10–3	16–28	12. 3	118. 0	11. 2	123. 5	29. 7
		10–4	28–56			8. 5	131. 5	
Town of Romulus, 20 feet east of Wells Hollow Road and 400 feet south of West Blaine Road.[8] (Finer textured than modal profile.)	Calcareous glacial till dominated by dark-gray shale and limestone.	9–1	0–12	37. 6	74. 6	34. 2	81. 0	
		9–2	12–28	21. 2	101. 7	18. 5	106. 5	>120
		9–3	28–37			15. 5	114. 1	>120
		9–4	37–50	(7)				
		9–5	50–60	10. 5	122. 6	11. 3	123. 6	

See footnotes at end of table.

incipal crops under two levels of management

, under improved management. Absence of an entry in a column indicates that crop is not information is available on which to base an estimate]

Dry beans		Sugar beets		Forage mixtures (hay)						Fruit			
				Alfalfa-grass		Alfalfa-birdsfoot trefoil-grass		Birdsfoot trefoil-grass		Grapes		Peaches	
A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*
	40		22					1. 5	2. 5				
	35		18					1. 5	2. 5				
15	30	10	15	2. 5	3. 5	2. 5	3. 5	2. 0	3. 0				280
20	30	10	15	2. 5	3. 5	2. 5	3. 5	2. 0	3. 0				
15	30				4. 5	2. 0	3. 5	2. 0	3. 0				
20	30				4. 5	2. 5	3. 5	2. 0	3. 0				
15	35		22		5. 0	2. 0	4. 0	2. 0	3. 0				
20	35	10	20		5. 0	2. 5	4. 0	2. 0	3. 0				
15	25	10	15	2. 5	3. 5	2. 0	3. 0	1. 5	2. 0				
15	20			2. 5	3. 5	2. 0	3. 0	1. 5	2. 0				
				2. 0	3. 0	1. 5	2. 5	1. 0	1. 5				
				2. 5	3. 0	2. 0	2. 5	1. 5	2. 0				
15	25	10	10	3. 0	4. 0	2. 5	3. 0	2. 0	2. 5				
				3. 0	4. 0	2. 5	3. 0	2. 0	2. 5				
						2. 0	2. 5	1. 5	2. 0				
	40		22					. 5					
25	30	15	20	3. 0	5. 0	2. 5	4. 0	3. 0		4. 0	6. 5	200	300
15	20	10	10	2. 5	4. 0	2. 0	3. 5	1. 5	3. 0				
20	30			3. 0	4. 5	2. 5	4. 0	2. 0	3. 0	4. 0	6. 5	200	300
15	15			2. 5	4. 0	2. 0	3. 5	1. 5	3. 0				
				2. 5	4. 0	2. 0	3. 5	1. 5	2. 5				
								1. 0	2. 0				
20	30	10	15	2. 0	3. 0	2. 0	3. 0	1. 5	2. 5				
25	30	10	15	3. 0	3. 5	2. 5	3. 0	1. 5	2. 5				
20	35	10	20	2. 5	3. 5	2. 5	4. 0	2. 0					
30	35	15	20	3. 0	4. 0	3. 0	4. 0	2. 0					
20	30			3. 0	4. 0	3. 0	4. 0	2. 0	3. 0				
15	30	10	20	3. 0	4. 0	3. 0	4. 0	2. 0	3. 0				
20	35	10	20	3. 0	5. 0	3. 0	4. 0	2. 0	3. 0	4. 0	9. 0	150	200
20	35			2. 0	3. 5	2. 5	3. 5	2. 0	3. 0	4. 0	8. 0	150	225
30	35			2. 5	3. 5	2. 5	3. 5	2. 0	3. 0	4. 0	8. 0	150	225
	30		15		4. 0		3. 5	2. 0	3. 0				
20	35	10	20	2. 5	4. 0	3. 0	4. 0	2. 0		4. 0	8. 0	150	200
30	35	15	20	3. 0	4. 0	3. 0	4. 0	2. 0	3. 0	4. 0	8. 0	150	200
30	35	20	20	3. 0	5. 0	2. 5	4. 0	2. 0		5. 0	10. 0	175	225
				3. 0	4. 0	2. 5	3. 5	2. 0	3. 0				
				3. 0	4. 0	2. 5	3. 0	2. 0	3. 0				
25	30	10	15	2. 5	5. 0	2. 5	4. 0	2. 0		4. 0	9. 0	150	200
20	30	15	25						3. 0				
20	30	10	20	2. 0	3. 5	2. 5	3. 5	2. 0	2. 5				
20	30	10	15	2. 0	4. 0	2. 0	3. 0	1. 5	2. 0				
25	30	10	15	2. 0	4. 0	2. 0	3. 0	1. 5	2. 0				
						2. 0	3. 0	2. 0	3. 0				
						2. 5	3. 0	2. 0	3. 0				
						2. 0	2. 5	2. 0	3. 0				
						3. 0	3. 5	2. 5	3. 0				
	30		20				3. 5	2. 0	3. 0				
30	40	15	20	3. 5	5. 0	3. 0	4. 0			4. 5	10. 0	200	300
				3. 5	5. 0	3. 0	4. 0			4. 0	10. 0	200	300

TABLE 1.—*Estimated average acre yields of the*

[Yields in columns A are those to be expected under average management; those in column suited to the soil or is not commonly grown on it, or that no

Soil	Corn for silage		Corn for grain		Oats		Wheat	
	A	B	A	B	A	B	A	B
	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.	Bu.
Alden mucky silt loam		20		100				
Alden mucky silt loam, till substratum		16		80				
Alluvial land								
Angola silt loam, 0 to 3 percent slopes	8	18	40	90	40	70	25	40
Angola silt loam, 3 to 8 percent slopes	10	18	50	90	40	70	30	40
Appleton gravelly silt loam, 0 to 3 percent slopes	10	17	50	85	40	90	25	50
Appleton gravelly silt loam, 3 to 8 percent slopes	12	17	60	85	50	90	30	50
Appleton silt loam, 0 to 3 percent slopes	10	20	50	100	40	90	25	50
Appleton silt loam, 3 to 8 percent slopes	12	20	60	100	50	90	30	50
Arkport loamy fine sand, 1 to 6 percent slopes	10	16	50	80	35	60	25	40
Arkport loamy fine sand, 6 to 12 percent slopes	8	14	40	70	30	50	25	40
Arkport loamy fine sand, 12 to 20 percent slopes								
Arnot channery silt loam, 15 to 25 percent slopes					40	50		
Aurora silt loam, 3 to 8 percent slopes	8	16	40	80	45	70	30	40
Aurora silt loam, 8 to 15 percent slopes	8	14	40	70	40	60	25	30
Aurora silt loam, 15 to 25 percent slopes								
Aurora and Farmington soils, 25 to 75 percent slopes								
Canandaigua silt loam		20		100				
Cazenovia silt loam, 3 to 8 percent slopes	12	20	60	100	55	80	40	60
Cazenovia silt loam, 3 to 8 percent slopes, eroded	8	18	40	90	40	60	30	35
Cazenovia silt loam, 8 to 15 percent slopes	10	15	50	75	50	70	35	50
Cazenovia silt loam, 8 to 15 percent slopes, eroded	7	10	35	50	30	40	25	30
Cazenovia soils, 15 to 25 percent slopes								
Cazenovia soils, 25 to 40 percent slopes								
Claverack loamy fine sand, 0 to 2 percent slopes	12	18	60	90	45	70	35	45
Claverack loamy fine sand, 2 to 6 percent slopes	12	18	60	90	45	70	40	45
Collamer silt loam, 0 to 2 percent slopes	12	22	60	110	45	80	35	60
Collamer silt loam, 2 to 6 percent slopes	16	22	80	110	55	80	40	60
Collamer silt loam, 6 to 12 percent slopes	12	20	60	100	40	70	35	50
Collamer silt loam, moderately shallow variant, 0 to 2 percent slopes	10	20	50	100	40	70	35	50
Collamer silt loam, moderately shallow variant, 2 to 6 percent slopes	10	18	50	90	50	80	40	55
Conesus gravelly silt loam, 0 to 3 percent slopes	10	18	60	90	50	90	35	50
Conesus gravelly silt loam, 3 to 8 percent slopes	12	18	60	90	60	90	35	50
Cosad loamy fine sand	8	18	40	90	40	70		50
Darien silt loam, 0 to 3 percent slopes	10	18	50	90	50	90	35	55
Darien-Danley-Cazenovia silt loams, 3 to 8 percent slopes	12	18	60	90	55	80	40	55
Dunkirk silt loam, 1 to 6 percent slopes	12	20	60	100	60	80	45	60
Dunkirk silt loam, 6 to 12 percent slopes, eroded	8	16	40	80	30	50	30	40
Dunkirk silt loam, 12 to 20 percent slopes					30	50	25	30
Dunkirk silt loam, limestone substratum, 1 to 6 percent slopes	10	17	50	85	50	90	40	60
Edwards muck	8	20		100				
Eel silt loam	10	18	50	90	40	70		
Elnora loamy fine sand, 0 to 2 percent slopes	10	18	50	90	40	80		40
Elnora loamy fine sand, 2 to 6 percent slopes	10	18	50	90	50	80		45
Erie channery silt loam, 0 to 3 percent slopes		16		80				
Erie channery silt loam, 3 to 8 percent slopes	10	16	50	80	50	70	25	30
Erie channery silt loam, moderately shallow variant, 0 to 3 percent slopes		16		80				
Erie channery silt loam, moderately shallow variant, 3 to 8 percent slopes	10	16	50	80	45	55		
Fonda mucky silty clay loam		16		80				
Fresh water marsh								
Honeoye silt loam, 2 to 8 percent slopes	15	22	75	110	70	100	50	60
Honeoye silt loam, 8 to 15 percent slopes	12	16	60	80	60	90	40	50

1.2.2. Near Field Box Model (Pasquill, 1975 and Horst, 1979)

This analysis is applicable to those exposure scenarios where the receptor group is on site or very close to the site. This model (1.2.2) is accurate at short downwind distances (i.e., less than 100 meters).

The box model results directly from simple conservation of mass considerations with the only difficulty being estimating an average flux out of the box since the wind speed increases from zero at the ground surface with height. See Exhibit 1.2.2-1 for a diagram of the box model scenario.

$C_a = Q/(H_b W_b u_m)$

C_a = concentration of contaminant in ambient air on site ($\mu g/m^3$)

Q = emission rate of contaminant; obtained as a result from the models of section 1. (Ambient Air) ($\mu g/s$)

H_b = downwind height of box, see Exhibit 1.2.2-2 for values of H_b where x is the downwind distance (as depicted in Exhibit 1.2.2-1) (m)

W_b = width of box, crosswind dimension of area of contamination, determined by site survey (m)

u_m = average wind speed through the box, calculated below (m/s)

$u_m = 0.22\ (u_{10})\ \ln(2.5\ H_b)$

u_{10} = wind speed at 10 m, measured at site; in the absence of site specific data see Appendix B for annual mean wind speeds for major cities, wind direction is not critical in this model (m/s)

The box model should be used where W_b (width of box) is larger than the sector width, which is defined as $(\pi/8)x$, and "x" is the distance to the receptor. In other words, $x < W_b(8/\pi)$ should hold in order to use the box model.

Exhibit 1.2.2-1

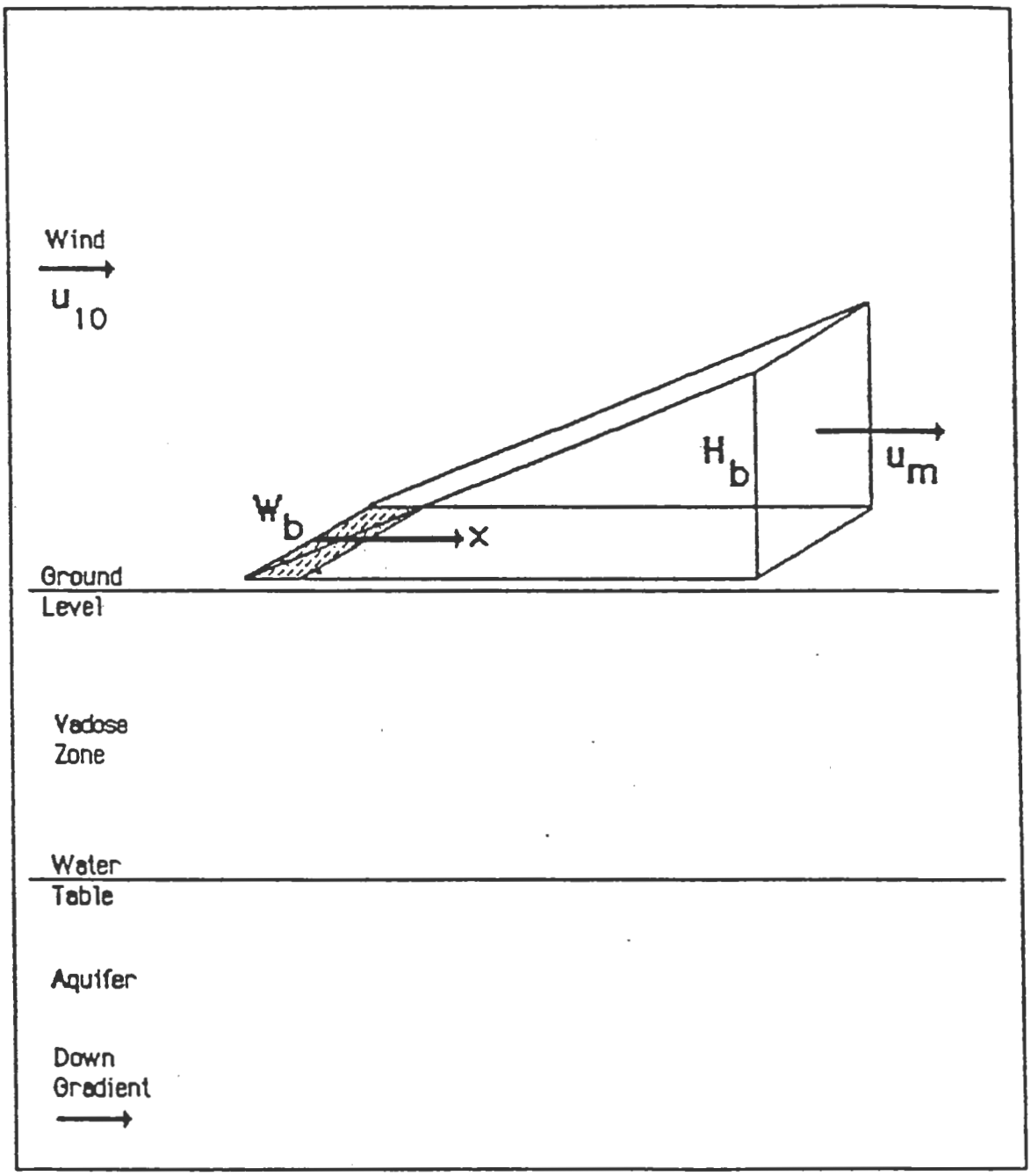

Diagram for Model 1.2.2.

Exhibit 1.2.2-2

Plume Heights Used in Near Field Box Model

Length of Side of Box, x (m)	Box Height, H_b (m)
10	1.4
20	2.1
30	2.7
40	3.3
50	3.8
60	4.3
70	4.8
80	5.3
90	5.8
100	6.2

Reference: Derived from work by Pasquill, 1975 and Horst, 1979.

ES ENGINEERING-SCIENCE, INC.

Client U.S. Army Corps of Engineers Job No. 720446-01022 Sheet 1 of 6
Subject Seneca Army Depot - OB Grounds By DMT Date 8/17/93
Estimate Sediment Losses in Runoff Checked Rev.

Estimate Sediment Losses in Surface Water Runoff using the Modified Universal Soil Loss Equation presented in EPA, 1988.

$$Y(S)_E = a(V_r q_p)^{.056} KLSCP$$

where:

$Y(S)_E$ = sediment yield (tons per event)
a = conversion constant, 95
V_r = volume of runoff, acre-feet
q_p = peak flow rate, ft^3/sec
K = soil erodibility factor, tons per acre
L = slope length factor, dimensionless
S = slope steepness factor, dimensionless
C = cover factor, dimensionless
P = erosion control factor, dimensionless

$K = 0.37$ - from Seneca County Soil Conservation District

Find LS - slopes at site vary from >10% on berms to less than 1% on flats. assume 2% as average value for entire site, slope length vary from 20 ft to 750 ft. use 500 ft as a conservative value (Note: slopes on site are cut short by roadways which are slightly elevated)

$LS = 0.32$ from Figure 2-6, EPA, 1988

$C = 0.012$ - from Table 2-4, EPA, 1988 - Assume canopy height of 0.5m, 25% canopy cover and 80% ground cover - since site is covered by grass and weeds, and berms are vegetated. Only pads and roads have no vegetation

P-1 EPA, 1988 - worst case assumption, implies no erosion control practices

$$V_r = a A Q_r$$

where
- a = conversion constant, 0.083
- A = contaminated area, acres
- Q_r = depth of runoff, in

A = Area of site × % of site contaminated } conservative estimate
= 30 acres × 40%
= 12 acres

$$Q_r = (R_+ - 0.2 S_w)^2 / (R_+ + 0.8 S_w)$$

where
- R_+ = total storm rainfall, in
- S_w = water retention factor, in

$$S_w = \frac{1000}{CN} - 10_q$$

where
- CN = SCS runoff curve number
- a = conversion factor, 1

$CN = 86$ - from Table 2-6, EPA, 1988 - This is highest value - indicates clay soils and little infiltration

$$S_w = 1000/86 - 10(1) = 1.63$$

$$Q_r = \frac{(R_+ - (0.2)(1.63))^2}{(R_+ + (0.8)(1.63))} = \frac{(R_+ - 0.33)^2}{(R_+ + 0.13)}$$

$$q_p = \frac{a A R_e Q_r}{T_r (R_+ - 0.25 S_w)}$$

where

q_p = peak runoff rate, ft^3/sec
a = conversion constant, 1.01
A = contaminated area, acres
R_+ = total storm rainfall
Q_r = depth of runoff from watershed area, in
T_r = storm duration, hour
S_w = water retention factor, in

Use 1-year 24-hour storm for R_+

$$q_p = \frac{(1.01)(12) R_+ Q_r}{(24)(R_+ - (0.2)1.63)} = \frac{12.1 R_+ Q_r}{24 (R_+ - 0.33)}$$

From TP-40 $\boxed{R_+ = 2.25 \text{ inches}}$

$$\boxed{Q_r = \frac{(2.25 - 0.33)^2}{(2.25 + 0.13)} = \frac{3.68}{2.38} = 1.55} \qquad 0.018$$

$$\boxed{q_p = \frac{(12.1)(2.25)(1.55)}{24 (2.25 - 0.33)} = 0.926} \qquad 0.039$$

$V_r = a\ A\ Q_r$

$Vr = (0.083)(12)(1.55)$

$\boxed{Vr = 1.54 \text{ acre-feet}}$ 0.018

Sediment Yield

$Y(S)_E = (15)[(1.54)(0.92)]^{0.56}(0.37)(0.32)(0.012)(1)$

$Y(S)_E = 0.16$ tons/event $= 0.002$
$= 0.14$

Determine storm events per year

Annual rainfall = 34.3 in

34.3 in / 2.25 in/event = 15.2 events

15.2 events × 0.16 tons/event = 2.43 tons/year

Next, estimated sorbed and dissolved contaminant loading by:

$$S_s = \left[\frac{1}{(1+\theta_c/K_d\beta)}\right] C_i A$$

and

$$D_s = \left[\frac{1}{(1+K_d\beta/\theta_c)}\right] C_i A$$

where:

S_s = sorbed substance quantity, lb
θ_c = available water capacity (difference between wilting point & field capacity), dimensionless
K_d = sorption partition coefficient, cm^3/g
β = soil bulk density (g/cm^3)
C_i = total substance concentration (lb/acre-cm)
A = contaminated area (volume) acre-cm
D_s = dissolved substance quantity (lb)

$\theta_c = 0.18$ in/in - from soil survey

$\beta = 1.69\ g/cm^3$

Convert concentrations from µg/kg to lb/acre-cm

$$X \frac{\mu g}{kg} \left| \frac{1\ kg}{1000\ g} \right| \frac{10^9\ g}{cm^3} \left| \frac{1\ cm^2}{(0.03281)^2\ ft^2} \right| \frac{43{,}560\ ft^2}{acre} \left| \frac{1\ g}{10^6\ \mu g} \right| \frac{1\ lb}{454\ g}$$

$= (1.5 \times 10^{-4}) \times lb/acre\text{-}cm$

Next, $PX_i = \left[\frac{\gamma_{(s)}\theta_c}{100\beta}\right] S_s$ and $PQ_i = \left[\frac{Q_r}{R_T}\right] D_s$

where PX_i = sorbed substance loss per event
PQ_i = dissolved substance loss per event

For metals: assume all metals are in solid phase (EPA, 1985). This accounts for sorbed and insoluble metals.

from EPA, 1985

$$LS = (0.001) C_s X$$

where

LS = solid phase chemical load in runoff (Kg/ha)
C_s = concentration of chemical in eroded soil mg/Kg
X = soil loss (t/ha) t is metric tons (1000 Kg)

Note: This model tends to overestimate dissolved losses. After 2 rainfall events, more dissolved contaminants will runoff than there actual amount in the soil. In essence, this model implies that 0.8 (1.55/2.25) or 69% of the dissolved contaminant runs off after each event. This is not possible.

Each event loses 0.16 tons of soil. Over 12 acres, this is a depth of less than 0.001 cm over the contaminated area. Therefore, for the second event there should only be 31% of the original dissolved mass left, and the capacity for dissolved runoff would quickly diminish. Therefore, dissolved runoff will be omitted from this analysis.

Table 1
Summary of Surface Water Transport Calculations

surffate.wk3

Compound	Number of Hits	Number of Samples	95 % Confidence Limit	Average	Koc (ml/g)	Kd	Sorbed Fraction	Sorbed Loss per Event (grams)	Total Loss per Year (grams)
Volatile Organics (ug/kg)									
Methylene Chloride	3	118	8.24	4.84	8.80E+00	8.80E−02	0.45	2.89E−03	0.043853
Acetone	2	114	40.23	7.97	2.80E−01	2.80E−03	0.03	7.97E−04	0.012119
1,2−Dichloroethene (total)	2	118	7.28	4.59	3.50E+01	3.50E−01	0.77	4.32E−03	0.065648
Chloroform	13	119	8.14	4.88	4.70E+01	4.70E−01	0.82	5.13E−03	0.07802
2−Butanone	4	118	7.32	6.05	9.40E−01	9.40E−03	0.08	4.59E−04	0.006979
Trichloroethene	4	118	19.05	5.29	1.26E+02	1.26E+00	0.92	1.36E−02	0.206556
Tetrachloroethene	8	118	7.66	4.60	3.64E+02	3.64E+00	0.97	5.76E−03	0.087572
Toluene	5	118	7.28	4.59	3.00E+02	3.00E+00	0.97	5.44E−03	0.082705
Chlorobenzene	2	118	7.27	4.63	3.33E+02	3.33E+00	0.97	5.45E−03	0.082807
Xylene (total)	2	118	7.33	4.64	6.91E+02	6.91E+00	0.98	5.58E−03	0.08485
Semivolatile Organics (ug/kg)									
Benzoic acid	1	46	2387.40	1812.18	2.48E+02	2.48E+00	0.96	1.77E+00	26.91961
Naphthalene	11	105	448.67	262.54	1.30E+03	1.30E+01	0.99	3.44E−01	5.233439
2−Methylnaphthalene	20	112	561.78	279.97	8.50E+03	8.50E+01	1.00	4.34E−01	6.598247
2−Chloronaphthalene	2	103	425.45	270.56	4.16E+03	4.16E+01	1.00	3.28E−01	4.99049
2,6−Dinitrotoluene	14	108	455.27	282.65	2.49E+02	2.49E+00	0.96	3.38E−01	5.134331
Acenaphthene	5	105	428.14	268.72	4.60E+03	4.60E+01	1.00	3.30E−01	5.023254
Dibenzofuran	2	104	428.60	271.23	4.16E+03	4.16E+01	1.00	3.31E−01	5.027438
2,4−Dinitrotoluene	31	117	2631.60	643.70	2.01E+02	2.01E+00	0.95	1.93E+00	29.39012
Diethylphthalate	9	107	452.13	265.78	1.42E+02	1.42E+00	0.93	3.25E−01	4.946072
Fluorene	4	106	430.03	271.37	7.30E+03	7.30E+01	1.00	3.32E−01	5.049788
N−Nitrosodiphenylamine	17	112	585.78	299.25	6.50E+02	6.50E+00	0.98	4.46E−01	6.777687
Hexachlorobenzene	4	105	436.77	270.94	3.90E+03	3.90E+01	1.00	3.37E−01	5.12238
Phenanthrene	27	115	610.94	277.44	1.40E+04	1.40E+02	1.00	4.72E−01	7.179196
Anthracene	6	106	454.63	271.92	2.60E+04	2.60E+02	1.00	3.52E−01	5.344207
Di−n−butylphthalate	35	113	1309.14	369.78	1.70E+05	1.70E+03	1.00	1.01E+00	15.39445
Fluoranthene	18	113	860.23	302.67	3.80E+04	3.80E+02	1.00	6.65E−01	10.11337
Pyrene	21	115	895.50	299.94	3.80E+04	3.80E+02	1.00	6.93E−01	10.52811
Butylbenzylphthalate	3	104	426.93	268.83	2.84E+04	2.84E+02	1.00	3.30E−01	5.018809
Benzo(a)anthracene	11	111	664.81	290.12	1.38E+06	1.38E+04	1.00	5.14E−01	7.818066
Chrysene	11	113	718.18	303.45	2.00E+05	2.00E+03	1.00	5.56E−01	8.445353
bis(2−Ethylhexyl)phthalate	46	115	3949.28	668.72	5.90E+03	5.90E+01	1.00	3.05E+00	46.35966
Di−n−octylphthalate	2	103	419.47	270.53	2.40E+06	2.40E+04	1.00	3.25E−01	4.932902
Benzo(b)fluoranthene	12	111	895.72	304.75	5.50E+05	5.50E+03	1.00	6.93E−01	10.5334
benzo(k)fluoranthene	9	111	723.68	295.62	5.50E+05	5.50E+03	1.00	5.60E−01	8.510294
Benzo(a)pyrene	12	111	725.53	292.42	5.50E+06	5.50E+04	1.00	5.61E−01	8.532146
Indeno(1,2,3−cd)pyrene	7	109	555.43	284.71	1.60E+06	1.60E+04	1.00	4.30E−01	6.531815
Dibenz(a,h)anthracene	3	104	444.32	273.69	3.30E+06	3.30E+04	1.00	3.44E−01	5.225125
Benzo(g,h,i)perylene	10	106	472.28	273.15	1.60E+06	1.60E+04	1.00	3.65E−01	5.553979

Table 1
Summary of Surface Water Transport Calculations

surffate.wk3

Compound	Number of Hits	Number of Samples	95 % Confidence Limit	Average	Koc (ml/g)	Kd	Sorbed Fraction	Sorbed Loss per Event (grams)	Total Loss per Year (grams)
Pesticides/PCBs (ug/kg)									
beta–BHC	1	111	11.58	4.69	3.80E+03	3.80E+01	1.00	8.93E–03	0.135802
gamma–BHC (Lindane)	1	111	11.59	4.68	1.08E+03	1.08E+01	0.99	8.88E–03	0.134917
Heptachlor	1	111	13.05	4.92	1.20E–04	1.20E–06	0.00	1.14E–07	1.7E–06
Aldrin	7	111	11.59	4.77	9.60E+04	9.60E+02	1.00	8.96E–03	0.136246
Endosulfan I	5	111	11.58	4.72	3.55E+03	3.55E+01	1.00	8.93E–03	0.135765
4,4'–DDE	19	116	147.89	19.64	4.40E+06	4.40E+04	1.00	1.14E–01	1.739138
Endrin	5	113	25.94	10.06	1.91E+04	1.91E+02	1.00	2.01E–02	0.30483
Endosulfan II	6	114	90.36	15.00	4.17E+03	4.17E+01	1.00	6.97E–02	1.059973
4,4'–DDD	9	111	23.16	9.39	2.40E+05	2.40E+03	1.00	1.79E–02	0.272369
Endosulfan sulfate	5	111	23.22	9.41		0.00E+00			
4,4'–DDT	11	116	64.80	13.68	2.43E+05	2.43E+03	1.00	5.01E–02	0.762064
Endrin aldehyde	1	37	7.84	2.88	NA				
alpha–Chlordane	7	112	125.84	41.59	1.40E+05	1.40E+03	1.00	9.74E–02	1.47979
Aroclor–1254	1	111	244.78	96.80	4.25E+04	4.25E+02	1.00	1.89E–01	2.877923
Aroclor–1260	1	111	233.00	93.43	1.30E+06	1.30E+04	1.00	1.80E–01	2.740069
Explosives (ug/kg)									
HMX	3	117	652.39	249.49	5.08E+02	5.08E+00	0.98	4.94E–01	7.514467
RDX	14	117	981.09	137.96	5.38E+02	5.38E+00	0.98	7.44E–01	11.31358
1,3,5–Trinitrobenzene	20	117	247.43	89.21	5.20E+02	5.20E+00	0.98	1.88E–01	2.851339
1,3–Dinitrobenzene	5	116	133.78	67.11	1.50E+02	1.50E+00	0.93	9.66E–02	1.46897
Tetryl	8	117	353.00	140.09	NA				
2,4,6–Trinitrotoluene	13	117	922.71	134.29	5.34E+02	5.34E+00	0.98	7.00E–01	10.63886
4–amino–2,6–Dinitrotoluene	20	117	1681.15	225.40	NA				
2–amino–4,6–Dinitrotoluene	21	117	2000.40	245.19	NA				
2,4–Dinitrotoluene	46	117	2054.22	456.71	2.01E+02	2.01E+00	0.95	1.51E+00	22.94189

Table 1
Summary of Surface Water Transport Calculations

surffate.wk3

Metals (mg/kg)	Number of Hits	Number of Samples	95 % Confidence Limit	Average	Sorbed Fraction	Sorbed Loss per Event (grams)	Sorbed Loss per Year (grams)
Aluminum	117	117	22179.70	15667.86	1	3216.1	48884.1
Antimony	92	99	31.22	6.99	1	4.5	68.8
Arsenic	116	117	8.38	5.30	1	1.2	18.5
Barium	111	111	4538.16	978.70	1	658.0	10002.1
Beryllium	75	75	1.03	0.71	1	0.1	2.3
Cadmium	70	117	8.30	2.68	1	1.2	18.3
Chromium	117	117	70.57	29.39	1	10.2	155.5
Cobalt	117	117	16.89	12.15	1	2.4	37.2
Copper	111	111	3899.69	583.60	1	565.5	8594.9
Iron	117	117	40202.73	28935.90	1	5829.4	88606.8
Lead	115	115	3398.66	709.99	1	492.8	7490.6
Manganese	117	117	955.67	554.55	1	138.6	2106.3
Mercury	82	94	0.39	0.12	1	0.1	0.8
Nickel	117	117	58.35	39.00	1	8.5	128.6
Selenium	101	116	1.07	0.38	1	0.2	2.4
Silver	28	112	1.32	0.53	1	0.2	2.9
Thallium	18	117	0.59	0.31	1	0.1	1.3
Vanadium	114	114	33.17	23.97	1	4.8	73.1
Zinc	117	117	20977.77	1623.91	1	3041.8	46235.0
Cyanide	1	116	0.47	0.34	1	0.1	1.0

toxics can be quantified directly by measuring (sampling) the source material and determining the volume and rate of release. Alternatively, runoff release estimation procedures, less costly than monitoring or modeling approaches, can also be applied to uncontrolled sites.

In addition, surface waters may be contaminated by inflows of ground water through bank seepage and springs. In order to estimate the rate of such inflows, one must conduct modeling of ground-water/surface water linkages (see Chapter 3 for a discussion of ground-water modeling options).

This section reviews methods for estimating toxic releases of uncontrolled hazardous waste sites to surface waterbodies. Note, however, that only the surface runoff component of release to surface water is addressed here. Other sources must be estimated for each site based on judgment and experience.

2.4.1 Beginning Quantitative Analysis

2.4.1.1 Dissolved and Sorbed Contaminant Migration

Many of the organic substances of concern found at Superfund sites are relatively nonpolar, hydrophobic substances (Delos et al., 1984). Such substances can be expected to sorb to site soils and migrate from the site more slowly than will polar compounds. As discussed in Haith (1980) and Mills et al. (1982), estimates of the amount of hydrophobic compounds released in site runoff can be calculated using the Modified Universal Soil Loss Equation (MUSLE) and sorption partition coefficients derived from the compound's octanol-water partition coefficient. The MUSLE allows estimation of the amount of surface soil eroded in a storm event of given intensity, while sorption coefficients allow the projection of the amounts of contaminant carried along with the soil, and the amount carried in dissolved form.

(1) Soil Loss Calculation

Equation 2-20 is the basic equation for estimating soil loss. Equations 2-21 through 2-24 are used to calculate certain input parameters required to apply Equation 2-20. The modified universal soil loss equation (Williams 1975), as presented in Mills et al. (1982), is:

$$Y(S)_E = a(V_r q_p)^{0.56} KLSCP \qquad (2\text{-}20)$$

where

- $Y(S)_E$ = sediment yield (tons per event, metric tons per event).
- a = conversion constant, (95 English, 11.8 metric).*
- V_r = volume of runoff, (acre-feet, m^3).
- q_p = peak flow rate, (cubic feet per second, m^3/sec).
- K = the soil erodibility factor, (commonly expressed in tons per acre per dimensionless rainfall erodibility unit). K can be obtained from the local Soil Conservation Service office.
- L = the slope-length factor, (dimensionless ratio).
- S = the slope-steepness factor, (dimensionless ratio).
- C = the cover factor, (dimensionless ratio: 1.0 for bare soil; see the following discussion for vegetated site "C" values).
- P = the erosion control practice factor, (dimensionless ratio: 1.0 for uncontrolled hazardous waste sites).

Soil erodibility factors are indicators of the erosion potential of given soil types. As such, they are highly site-specific. K values for sites under study can be obtained from the local Soil Conservation Service office. The slope length factor, L, and the slope steepness factor, S, are generally entered into the MUSLE as a combined factor, LS, which is obtained from Figures 2-4 through 2-6. The cover management factor, C, is determined by the amount and type of vegetative cover present at the site. Its value is "1" (one) for bare soils. Consult Tables 2-4 and 2-5 to obtain C values for sites with vegetative covers. The factor, P, refers to any erosion control practices used on-site. Because these generally describe the type of agricultural plowing or planting practices, and because it is unlikely that any erosion control would be practiced at an abandoned hazardous waste site, use a worst-case (conservative) P value of 1 (one) for uncontrolled sites.

Storm runoff volume, V_r, is calculated as follows (Mills et al. 1982):

$$V_r = aAQ_r \qquad (2\text{-}21)$$

where

- a = conversion constant, (0.083 English, 100 metric).
- A = contaminated area, (acres, ha).
- Q_r = depth of runoff, (in, cm).

Depth of runoff, Qr, is determined by (Mockus 1972):

$$Q_r = (R_t - 0.2S_w)^2/(R_t + 0.8S_w) \qquad (2\text{-}22)$$

* Metric conversions presented in the following runoff contamination equations are from Mills et al. (1982).

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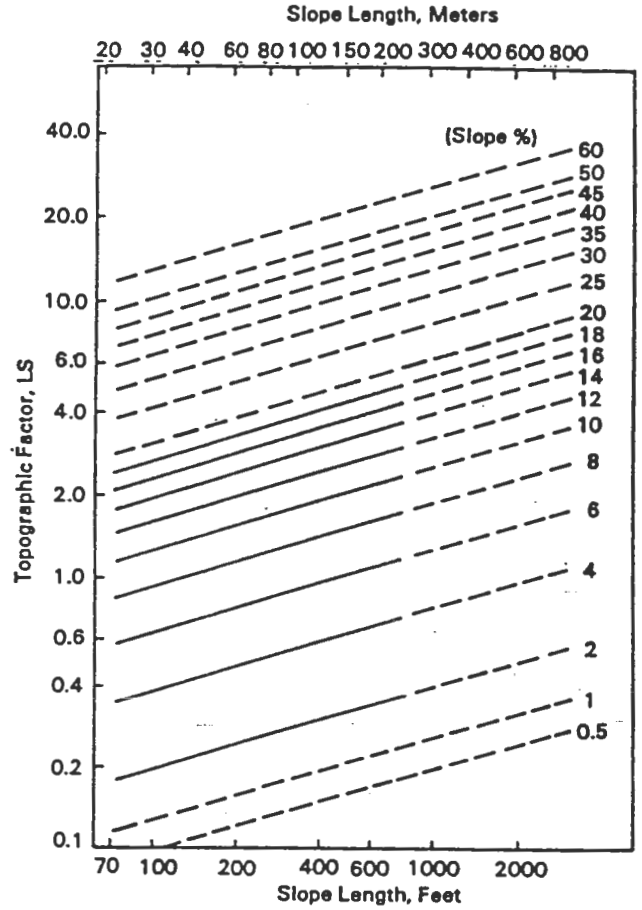
Figure 2-4. Slope effect chart applicable to areas A-1 in Washington, Oregon, and Idaho, and all of A-3: see Figure 2-5 (USDA 1974 as presented in Mills et al. 1982).



NOTE: Dashed lines are extension of LS formulae beyond values tested in studies.

where

R_t = the total storm rainfall, (in, cm).
S_w = water retention factor, (in, cm).

The value of S_w, the water retention factor, is obtained as follows (Mockus 1972):

$$S_w = \frac{1000}{CN} - 10\,a \qquad (2\text{-}23)$$

where

S_w = water retention factor, (in, cm).
CN = the SCS Runoff Curve Number, (dimensionless, see Table 2-6).
a = conversion constant (1.0 English, 2.54 metric).

The CN factor is determined by the type of soil at the site, its condition, and other parameters that establish a value indicative of the tendency of the soil to absorb and hold precipitation or to allow precipitation to run off the surface. The analyst can obtain CN

Figure 2-5. Soil moisture-soil temperature regimes of the western United States (USDA 1974 as presented in Mills et al. 1982).

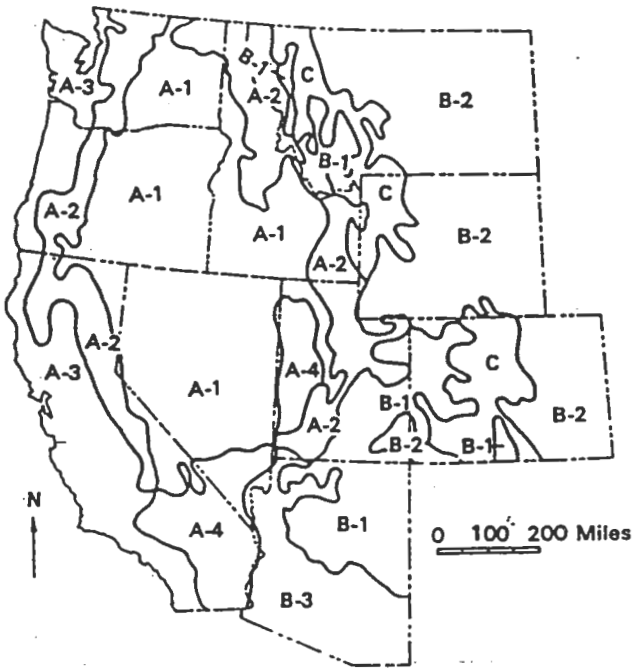
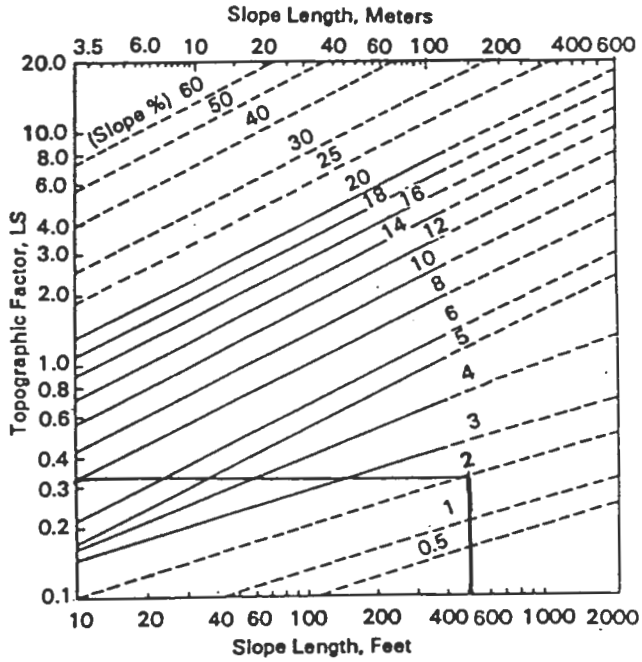


Figure 2-6. Slope effect chart for areas where Figure 2-5 is not applicable (USDA 1974 as presented in Mills et al. 1982).



NOTE: The dashed lines represent estimates for slope dimensions beyond the range of lengths and steepnesses for which data are available.

values of uncontrolled hazardous waste sites from Table 2-6.

The peak runoff rate, q_p, is determined as follows (Haith 1980):

$$q_p = \frac{aAr_tQ_r}{T_r(R_t - 0.2S_w)} \qquad (2\text{-}24)$$

where

- q_p = the peak runoff rate, (ft^3/sec, m^3/sec).
- a = conversion constant, (1.01 English, 0.028 metric).
- A = contaminated area, (acres, ha).
- R_t = the total storm rainfall, (in, cm).
- Q_r = the depth of runoff from the watershed area, (in, cm).
- T_r = storm duration, (hr).
- S_w = water retention factor, (in, cm).

(2)Dissolved/Sorbed Contaminant Release
As discussed in Mills et al. (1982), the analyst can predict the degree of soil/water partitioning expected for given compounds once the storm event soil loss has been calculated with the following equations. First, the amounts of adsorbed and dissolved substances are determined, using the equations presented below as adapted from Haith (1980):

$$S_s = [1/(1 + \Theta_c/(K_d\beta))](C_i)(A) \qquad (2\text{-}25)$$

and

$$D_s = [1/(1 + (K_d\beta)/\Theta_c)](C_i)(A) \qquad (2\text{-}26)$$

where

- S_s = sorbed substance quantity, (kg, lb).
- Θ_c = available water capacity of the top cm of soil (difference between wilting point and field capacity), (dimensionless).
- K_d = sorption partition coefficient, (cm^3/g).
- β = soil bulk density, (g/cm^3).
- C_i = total substance concentration, (kg/ha-cm, lb/acre-cm).
- A = contaminated area, (ha-cm acre-cm). (Actually a volume; assumption is contamination in upper 1 cm is available for release.)
- D_s = dissolved substance quantity, (kg, lb).

This model assumes that only the contaminant in the top 1 cm of soil is available for release via runoff.

The soil sorption partition coefficient for a given chemical can be determined from known values of certain other physical/chemical parameters, primarily the chemical's octanol-water partition coefficient, solubility in water, or bioconcentration factor. Lyman et al. (1982) present regression equations that allow the analyst to determine sorption coefficients for specified groups of chemicals (e.g., herbicides, polynuclear aromatics). If parameter values required by the appropriate equations are not available in chemical reference literature, they can be estimated according to procedures described in Lyman et al. (1982). Initially, the octanol-water partition coefficient can be estimated based on the substance's molecular structure. If necessary, this value can be used, in turn, to estimate either solubility in water or bioconcentration factor.

After calculating the amount of sorbed and dissolved contaminant, the total loading to the receiving waterbody is calculated as follows (adapted from Haith 1980):

$$PX_i = [Y(S)_E/100\,\beta]\,S_s \qquad (2\text{-}27)$$

plus

$$PQ_i = [Q_r/R_t]\,D_s \qquad (2\text{-}28)$$

where

- PX_i = sorbed substance loss per event, (kg, lb).
- $Y(S)_E$ = sediment yield, (tons per event, metric tons).
- β = soil bulk density, (g/cm^3).
- S_s = sorbed substance quantity, (kg, lb).
- PQ_i = dissolved substance loss per event, (kg, lb).
- Q_r = total storm runoff depth, (in, cm).
- R_t = total storm rainfall, (in, cm).
- D_s = dissolved substance quantity, (kg, lb).

PX_i and PQ_i can be converted to mass per volume terms for use in estimating contaminant concentration in the receiving waterbody by dividing by the site storm runoff volume (V_r, see Equation 2-21).

2.4.2 In-Depth Analysis

Releases to surface waterbodies at uncontrolled hazardous waste sites can be quantified most accurately by direct measurement (sampling and analysis) of the contaminant flow. Alternatively, upcurrent and downcurrent sampling can be conducted to determine the release level at the site that would be used to estimate the ambient concentration (i.e., the difference between the upcurrent and downcurrent concentrations). Either simple dispersion equations or sophisticated computer modeling approaches (see Chapter 3) can be used to "back calculate" the measured ambient concentration to the "virtual point source."

Table 2-4. "C" Values for Permanent Pasture, Rangeland, and Idle Land

Vegetal canopy Type and height of raised canopy[b]	Canopy cover[c] (%)	Cover that contacts the surface: Type[d]	Percent ground cover: 0	20	40	60	80	95-100
No appreciable canopy		G	0.45	0.20	0.10	0.042	0.013	0.003
		W	0.45	0.24	0.15	0.090	0.043	0.011
Canopy of tall weeds or short brush (0.5 m fall height)	25	G	0.036	0.17	0.09	0.038	0.012	0.003
		W	0.036	0.20	0.13	0.082	0.041	0.011
	50	G	0.026	0.13	0.07	0.035	0.012	0.003
		W	0.026	0.16	0.11	0.075	0.039	0.011
	75	G	0.17	0.10	0.06	0.031	0.011	0.003
		W	0.17	0.12	0.09	0.067	0.038	0.011
Appreciable brush or brushes (2 m fall height)	25	G	0.40	0.18	0.09	0.040	0.013	0.003
		W	0.40	0.22	0.14	0.085	0.042	0.011
	50	G	0.34	0.16	0.085	0.038	0.012	0.003
		W	0.34	0.19	0.13	0.081	0.041	0.011
	75	G	0.28	0.14	0.08	0.036	0.012	0.003
		W	0.28	0.17	0.12	0.077	0.040	0.011
Trees but no appreciable low brush (4 m fall height)	25	G	0.42	0.19	0.10	0.041	0.013	0.003
		W	0.42	0.23	0.14	0.087	0.042	0.011
	50	G	0.39	0.18	0.09	0.040	0.013	0.003
		W	0.39	0.21	0.14	0.085	0.042	0.011
	75	G	0.36	0.17	0.09	0.039	0.012	0.003
		W	0.36	0.20	0.13	0.083	0.041	0.011

Source: Wischmeier 1972

[a]All values shown assume: (1) random distribution of mulch or vegetation, and (2) mulch of appreciable depth where it exists.
[b]Average fall height of waterdrops from canopy to soil surface: m = meters.
[c]Portion of total-area surface that would be hidden from view by canopy in a vertical projection (a bird's-eye view).
[d]G: Cover at surface is grass, grasslike plants, decaying compacted duff, or litter at least 5 cm (2 in) deep.
W: Cover at surface is mostly broadleaf herbaceous plants (as weeds) with little lateral-root network near the surface and/or undecayed residue.

Table 2-5. "C" Values for Woodland

Stand condition	Tree canopy percent of area[a]	Forest litter percent of area[b]	Undergrowth[c]	"C" factor
Well stocked	100-75	100-90	Managed[d]	0.001
			Unmanaged[d]	0.003-0.011
Medium stocked	70-40	85-75	Managed	0.002-0.004
			Unmanaged	0.01-0.04
Poorly stocked	35-20	70-49	Managed	0.003-0.009
			Unmanaged	0.02-0.09[e]

Source: Wischmeier 1972

[a]When tree canopy is less than 20 percent, the area will be considered as grassland or cropland for estimating soil loss.
[b]Forest litter is assumed to be at least 2 in deep over the percent ground surface area covered.
[c]Undergrowth is defined as shrubs, weeds, grasses, vines, etc., on the surface area not protected by forest litter. Usually found under canopy openings.
[d]Managed - grazing and fires are controlled.
Unmanaged - stands that are overgrazed or subjected to repeated burning
[e]For unmanaged woodland with litter cover of less than 75 percent, C values should be derived by taking 0.7 of the appropriate values in Table 3-4. The factor of 0.7 adjusts for much higher soil organic matter on permanent woodland.

Table 2-6. Runoff Curve Numbers

Soil group	Description	Site type			
		Overall site[a]	Road/right of way	Meadow	Woods
A	Lowest runoff potential: Includes deep sands with very little silt and clay, also deep, rapidly permeable loess (infiltration rate = 8-12 mm/h).	59	74	30	45
B	Moderately low runoff potential: Mostly sandy soils less deep than A, and loess less deep or less aggregated than A, but the group as a whole has above-average infiltration after thorough wetting (infiltration rate = 4-8 mm/h).	74	84	58	66
C	Moderately high runoff potential: Comprises shallow soils and soils containing considerable clay and colloids, though less than those of group D. The group has below-average infiltration after presaturation (infiltration rate = 1-4 mm/h).	82	90	71	77
D	Highest runoff potential: Includes mostly clays of high swelling percent, but the group also includes some shallow soils with nearly impermeable subhorizons near the surface (infiltration rate = 0-1 mm/h).	86	92	78	83

Source: Adapted from Schwab et al. 1966.
[a]Values taken from farmstead category, which is a composite including buildings, farmyard, road, etc.

2.4.3 *Long-Term and Short-Term Release Calculation*

For surface runoff releases, the long-term release value can be calculated as follows:

- Characterize an average storm event for the area in terms of duration. This can best be accomplished by consulting local or regional climatological experts, or the National Climatological Data Center in Asheville, North Carolina. Then, using USDC (1961), determine the amount of rainfall corresponding to the selected duration rainfall event on a one year-return frequency basis. Divide this amount into the mean annual rainfall for the area to obtain the average number of average rainfall events per year.

- Use these data and the equations presented in this section to calculate runoff contaminant release associated with each yearly average storm.

- Estimate the potential total long-term release for both dissolved and sorbed runoff loss* as follows:

$$E_{Ai} = BN \qquad (2\text{-}29)$$

where

E_{Ai} = long-term release of contaminant i in runoff, (mass/70 years).
B = dissolved or sorbed loss per storm event, (i.e., PX_i or PQ_i; see Equations 2-27 and 2-28).
N = number of "average" storm events in 70 years.

- Determine the total amount of soil that will erode from the site over 70 years. This can be accomplished by applying the Universal Soil Loss Equation (USLE-Wischmeier and Smith 1978). This equation, from which the MUSLE (see Equation 2-20) was developed, estimates annual soil losses in runoff. The USLE takes the same form as the MUSLE, except that the storm event-specific volume and flow rate variables are replaced by a factor, R, the rainfall runoff factor. Therefore, the USLE is:

$$Y(S)_A = R_\tau KLSCPAS_d \qquad (2\text{-}30)$$

where

$Y(S)_A$ = annual soil loss in runoff, (tons/yr, tonnes/yr).

* This approach is overly conservative as it assumes that the contaminant concentration in surface soil remains essentially the same during the entire 70-year period.

R_r = the rainfall and runoff factor, expressing the erosion potential of average annual rainfall in the locality (can be obtained from the local Soil Conservation Service office), (dimensionless).

K = the soil-erodibility factor, commonly expressed in tons per acre per R_r unit (can be obtained from the local Soil Conservation Service office) (in metric tons/ha/R_r unit), (English K*1.292 = metric K).

L = the slope length factor, (dimensionless).

S = the slope steepness factor, (dimensionless).

C = the cover factor, (dimensionless ratio: 1.0 for soil, see the following discussion for vegetated site "C" values).

P = the erosion control practice factor, (dimensionless: 1.0 for uncontrolled hazardous waste sites).

A = acreage of area, (acres, ha).

S_d = the sediment delivery ratio, (dimensionless).

The sediment delivery ratio (S_d) can be estimated using the following equation:

$$S_d = D_d^{-0.22} \qquad (2\text{-}31)$$

where

D_d = the overland distance between the site and the receiving waterbody (ft).

Mills et al. (1982) note that this equation was empirically derived from data for D values from 0 to 800 feet, and caution that it may require further testing, particularly in sites located in the Midwest and Central U.S.

Note that in certain areas of the Pacific Northwest and central western states, thaw and snowmelt may contribute most of the runoff erosive force on an annual basis. In such cases, an additional erosion factor, R_s, must be added to the rainfall and runoff factor, R, to calculate the total R value for use in the USLE. Limited field data have indicated that an approximate estimate of R_s may be obtained by multiplying 1.5 times the local average total rainfall (in inches) for the period December 1 through March 31 (Wischmeier and Smith 1978). However, the local Soil Conservation Service office can provide the overall R value (R_r plus R_s).

- Based on site monitoring data, estimate the average contaminant concentration in the layer of soil that must be eroded to equal the total estimated amount of soil lost over 70 years (based on site soil sampling data and the calculated vertical depth of soil that will erode over that time period).

- Multiply the average contaminant concentration on site by the site area to calculate the mass of contaminant present in that amount of soil estimated to be eroded over 70 years. This represents the maximum amount of contaminant available for erosion losses over the 70-year period.

- Compare the estimated potential contaminant runoff losses over 70 years with the mass of contaminant present (in 70-year erodible soils at the site). If the estimated total loss to runoff is less than the amount available, divide the estimated total 70-year losses by the total volume of stormwater runoff estimated over 70 years. This will approximate the contaminant concentration in runoff (both dissolved and sorbed).

- If the total estimated contaminant runoff losses exceed the amount of contaminant present in 70-year erodible site soils, divide the total mass of contaminant present in such soils by the volume of runoff estimated to leave the site over 70 years to develop adsorbed and dissolved contaminant loss estimates in concentration form. In either case, the runoff value needed to estimate contaminant transport and dispersion in surface waterbodies can be estimated by dividing the total volume of runoff estimated to leave the site over 70 years by the number of seconds, minutes, etc. in 70 years to estimate runoff volume per unit time.

Many factors can influence the actual degree of contaminant loss in given storm events. Because such factors vary from locale to locale, no single method will guarantee accurate estimates of short-term contaminant losses in runoff from all sites. However, the following approach should yield reasonable approximations of the magnitude of such short-term loss. While short duration, high intensity storm events (thunderstorms) clearly cause significant erosion, the water quality effects of such storms are too ephemeral to adequately reflect short-term releases as defined (i.e., 10 to 90 days). Therefore, a storm event is needed that will generate contaminant releases adequate to affect water quality over a time period approaching the 10-day lower bound of the short-term time frame. For this analysis, a 1-year, 24-hour storm event has been selected. Data quantifying the amount of rainfall that corresponds to the 1-year, 24-hour storm event (as well as similar data for other storm return periods and durations) are provided in USDC (1961). To estimate short-term runoff release, the average site contaminant concentration should be estimated based on sampling

data for the top cm of soil only. This value is then used in Equations 2-27 and 2-28 to estimate runoff losses on a single storm event basis.

Research based on the work of Haith et al. (1980) is currently underway at Cornell University* to develop runoff loading factors for organic chemicals in soils. After these factors are devised, the analyst will be able to obtain average loading values based solely on a chemical's octanol/water partition coefficient and the geographic location under study. This will greatly simplify the generation of long-term average release estimates.

Note that in order to estimate long-term and short-term contaminant concentrations in surface water, the long-term and short-term release values are used, along with average and minimum streamflow data as described in Chapter 3, Environmental Fate Analysis.

2.5 Quantitative Analysis of Ground-Water Contamination

Surface soils at uncontrolled hazardous waste sites may become contaminated with toxic materials as a result of (1) the intentional placement of wastes on the ground (dumping, landfarming), (2) spills, (3) lagoon failure (overland flow), or (4) contaminated site runoff. Leaching of toxics from a contaminated soil surface can carry contaminants into subsurface layers.

2.5.1 Beginning Quantitative Analysis

2.5.1.1 Leachate Release Rate

This section presents simplified approaches for estimating contaminant release rates to ground water. Such estimation can be determined for dry landfills, lagoons, or wet landfills, whether unlined or lined with clay or flexible membrane liners.

(1) Estimating Release Rate from Facilities Lined with Clay or Natural Soil

Release rate estimation involves the determination of both the contaminant concentration in the leachate and the volumetric flux of leachate. The determination of contaminant concentration is made using equilibrium conditions (steady state), whereas the volumetric flux can be ascertained with instantaneous time-varying models or with steady state equations.

Modeling the release rate of toxic constituents can thus be done in terms of either the instantaneous time-varying releases or the annual average release (i.e., steady state release rate based on an annual average). This section discusses the determination of the steady state release rate (annual average); the equations are simpler than the computer models necessary for instantaneous time-varying releases. Analysts interested in performing instantaneous time-varying release rate determinations are referred to Chapter 3, where the HELP and SESOIL models are discussed. HELP and SESOIL are appropriate for modeling dry solid waste in a landfill or landfarm situation; they are not appropriate for modeling the release rate of liquids from lagoons, landfills, or landfarms. Rainstorms come in discrete intervals separated by dry periods. Using steady state equations to model rainfall-induced leaching, however, assumes that 1/365th of the annual recharge occurs each day. Although this is an assumption, it is felt to be a useful one for most cases. Most abandoned hazardous waste sites have received liquids in the past; very few have received only dry solids. Hence, the question of the assumption of steady state conditions is relatively moot. For the bulk of the modeling situations (liquid wastes), the steady state and the instantaneous rates are the same, and since the steady state equations are simpler, they are the method of choice.

For lagoons, the analyst should use the concentration of contaminant in the lagoon as the concentration of the contaminant leaving the lagoon, since the "leachate" is the waste itself. The waste leaves the lagoon by percolating through the clay liner or the native soil, or it permeates the flexible membrane liner (FML).

For landfills, the analyst should use the equilibrium solubility of the solid waste, assuming that the contaminant will have fully equilibrated with the percolating rainwater. The use of the equilibrium solubility concentration as the leachate concentration is an assumption, it is based on a typical residence time of 21 years for rain percolating through a covered (10^{-7} cm/sec) secure landfill. The assumption is that the time used for determining the equilibrium solubility of the chemical is much shorter than the residence time in the fill. If the fill is uncovered (or covered with a permeable cover), the travel time through the landfill may be too short for the above assumptions to be valid. In these cases, the analyst should calculate the travel time and compare it to the time used in the solubility test. If the travel time is not longer than the test time, the analyst should estimate the leachate concentration as a fraction of the equilibrium solubility concentration. Additionally, the above assumptions assume a landfill of only one waste stream, if the fill has only a small quantity of the subject waste in it, the contact time is the time for travel through the isolated material. In these conditions, the leachate concentration will typically be a fraction of the equilibrium solubility. The analyst may wish, in some instances, to model the solubility of the contaminant within a complex leachate. In this case, the solubility of a hydrophobic

* Contact Douglas A. Haith, Cornell University, Ithaca, N.Y., (607)256-2280.

C-5

Grounds

TABLE C-7. LABORATORY ANALYSIS OF SOILS

Bore Hole No.	1	2	2	4	8
Depth of Sample	3	4	7	4	3
Sample Type	Bag	ST	Bag	ST	Bag
Grain Size Analysis					
% Passing No. 4 (sieve)	91.1	99.3	97.3	100.0	98.7
% Passing No. 10 (sieve)	78.8	98.4	91.4	99.7	96.3
% Passing No. 20 (sieve)	61.3	97.8	88.1	99.4	94.5
% Passing No. 40 (sieve)	50.6	91.8	79.2	96.0	82.6
% Passing No. 100 (sieve)	50.6	91.8	79.2	96.0	82.6
% Passing No. 200 (sieve)	45.8	84.7	76.6	92.7	71.8
Atterberg Limits					
Liquid Limit W_L	36.2	41.9	34.6	44.0	37.1
Plastic Limit W_P	30.1	24.2	20.7	30.9	23.4
Plastic Index I_P	6.1	17.7	13.9	13.1	13.7
Unified Soil Classification	SH	CL	CL	ML	CL
Permeability Cm/sc (k)					
Proctor Density - compaction mold	3.01×10^{-7}	1.41×10^{-3}	4.22×10^{-7}	6.88×10^{-3}	3.30×10^{-7}
Void Ratio (k)	0.588	0.685	0.620	0.793	0.515
% Saturation (k)	101.05	112.10	98.69	110.25	100.64
% Porosity (k)	37.0	36.9	34.2	44.2	34.0
Dry Density (k)	1.70	1.70	1.78	1.61	1.78
% Moisture Content (k)	22.0	24.3	19.0	32.4	19.2
Specific Gravity *assumed	2.7*	2.7*	2.7*	2.7*	2.7*

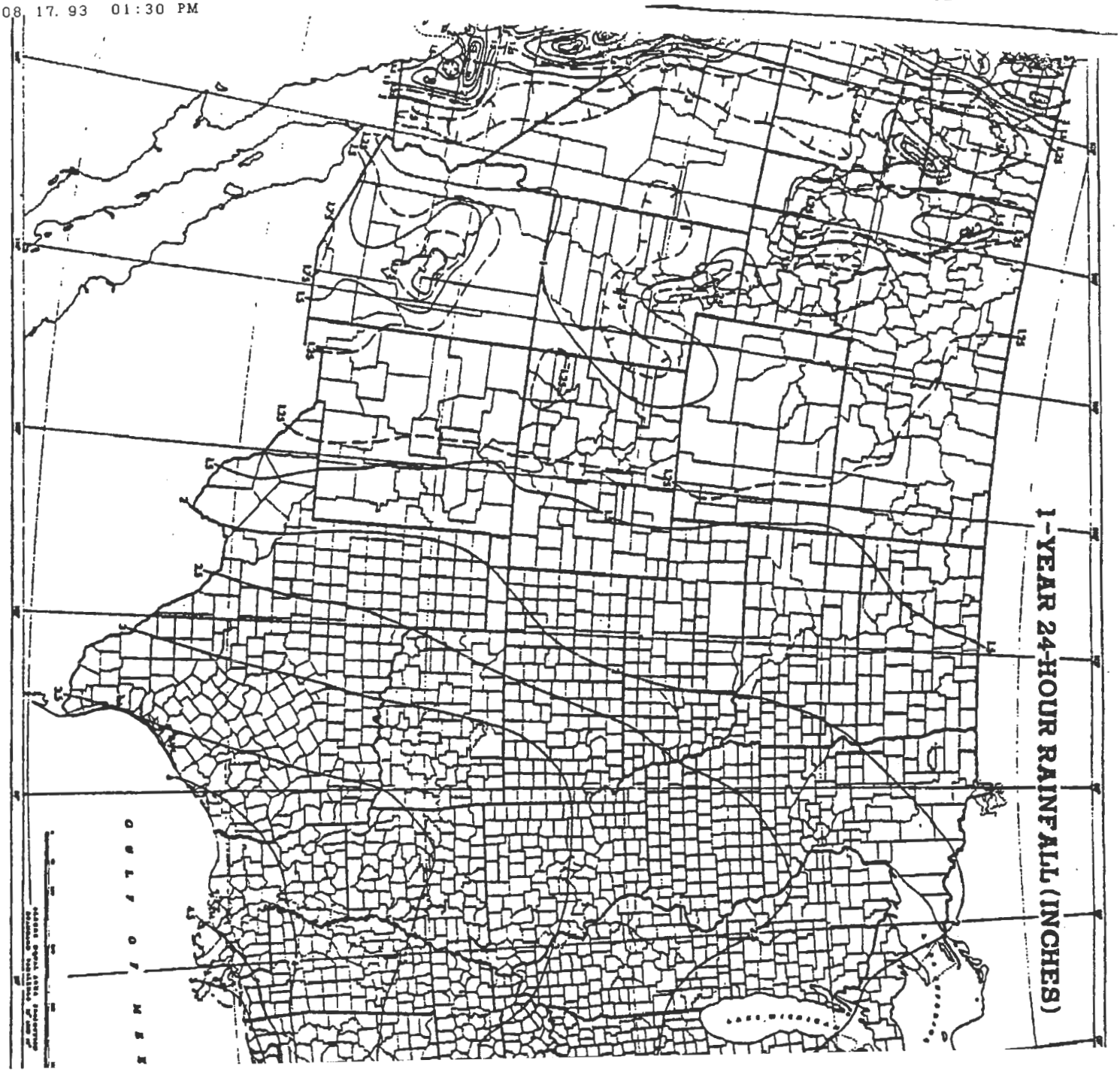
Ave 37.3%

Use avg = 1.69

Samples are from just below the crushed shale base of the burn pads

see page 2 of report

Hazardous Waste Study No. 37-26-0479-85, SEAD, NY, 13-19 Aug 84


1-YEAR 24-HOUR RAINFALL (INCHES)

ES ENGINEERING–SCIENCE

MEMORANDUM TO FILE

JOB NUMBER 720446-01022
FILE DESIGNATION SEAD-UB-RF
DATE 8/17/93 TIME 1400

PHONE CALL FROM Dan Kelmar PHONE NUMBER
PHONE CALL TO Neil Levenx - Seneca County PHONE NUMBER

SUBJECT Weather and Soil Data for Seneca County

I called the Seneca County Soil Conservation District to ask about local evapotranspiration and soil erodibility data.

Mr. Levenx said that there was no evapotranspiration data that they had.

He said that the erodibility index for both the Darien and Angola series is 0.37 for the top 10-inches of soil.

SIGNED Daniel Kelmar

maintenance of roads, airports, pipelines, building foundations, and sewage disposal systems. Among the properties important to the engineer are permeability to water, shear strength, grain size, compaction characteristics, soil drainage, plasticity, and pH. Topography, depth to water table, and depth to and kind of bedrock are also important.

Information in this survey can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, commercial, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in the planning of agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway locations and in planning detailed investigations of the selected locations.
4. Locate probable sources of gravel and other construction material.
5. Correlate performance of engineering structures with soil mapping units, and thus develop information that is useful in designing and maintaining similar structures on like soils.
6. Determine the suitability of soil units for cross country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photograph

TABLE 4.—*Eng*

[Tests performed by the New York State Department of Transportation, Bureau of Soil Mechanics, in cooperation with the U.S. Depar

Soil name and location	Parent material	SCS report No. S65NY50	Depth	In-place moisture content	In-place dry density	Moisture-density relationship [1]		Percolation rate [2]
						Optimum moisture content	Maximum dry density	
			In.	*Pct.*	*Lb. per cu. ft.*	*Pct.*	*Lb. per cu. ft.*	*Min. per in.*
Angola silt loam:								
Town of Lodi, 1,400 feet south of South Town Line Road and 500 feet east of Neeley Road. (More acid and coarser textured than modal profile.)	Acid, shaly glacial till, moderately deep over Genesee Shale.	13-1	0-9	25.6	87.6	26.0	94.5	
		13-2	9-12			16.5	109.8	
		13-3	12-20	20.2	102.3	16.6	110.0	>120
		13-4	20-22			13.4	116.8	
		13-5	22-29	18.5	109.3	14.3	115.0	
			29-36	(?)				
Town of Romulus, 300 feet south of Yerkes Road and 2,260 feet east of State Route 414. (Coarser textured than modal profile.)	Semiresidual and moderately deep over fine-grained, calcareous, gray to dark-gray sandstone and shale of the Moscow Formation.	8-1	0-10	28.1	79.6	28.2	91.5	
		8-2	10-15	22.8	97.2	19.5	105.0	>120
		8-3	15-24			15.5	114.5	
			24-36	(?)				
Town of Fayette, 100 feet west of Woodworth Road and 1,200 feet north of State Route 96A, southeast of Geneva. (Modal profile.)	Moderately deep over soft, gray, calcareous Skaneateles Shale bedrock.	4-1	0-10	26.7	85.3	22.7	95.0	
			10-12					
		4-3	12-18			17.7	107.0	
		4-4	18-32	(?)				>120
		4-5	32-44	18.0	109.3	18.2	107.0	
Appleton silt loam:								
Town of Ovid, 100 feet southeast of junction of County Road 131 and Combs Road.[3] (Modal profile.)	Calcareous glacial till, moderately high shale content.	10-1	0-7	27.3	88.5	28.2	91.5	
		10-2	7-16	18.3	103.8	16.6	110.0	
		10-3	16-28	12.3	118.0	11.2	123.5	29.
		10-4	28-56			8.5	131.5	
Town of Romulus, 20 feet east of Wells Hollow Road and 400 feet south of West Blaine Road.[3] (Finer textured than modal profile.)	Calcareous glacial till dominated by dark-gray shale and limestone.	9-1	0-12	37.6	74.6	34.2	81.0	
		9-2	12-28	21.2	101.7	18.5	106.5	>120
		9-3	28-37			15.5	114.1	>120
		9-4	37-50	(?)				
		9-5	50-60	10.5	122.6	11.3	123.6	

See footnotes at end of table.

for the purpose of making maps and reports that can be used readily by engineers.

8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

With the use of the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be strongly emphasized, however, that the interpretations generally will not eliminate the need for subsurface investigation, subsequent testing, and engineering analysis at the site of the proposed engineering works. In most places the intensity of investigation needed is proportional to the weight of the loads to be applied, to the depth and amount of earthwork involved, and to the cost of the contemplated works. Engineers and others should not apply specific values to the estimates given for bearing capacity of soils. Nevertheless, this engineering subsection, with the soil map and the soil descriptions, is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Much of the information in this subsection is in tables 4, 5, and 6. Table 4 lists engineering test data that were obtained when selected soils in the county were tested. Table 5 lists the soils and gives an estimate of their engineering properties. In table 6 are interpretations of the engineering properties of the soils for highway location, embankments, and structures for controlling water and erosion.

Additional information about the soils in the county can be obtained by referring to other parts of this survey,

neering test data

ment of Commerce, Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [3]												Liquid limit	Plasticity index [4]	Classification	
Percentage passing sieve—								Percentage smaller than—							
3 in.	2 in.	1 in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [5]	Unified [6]
												Pct.			
	100. 0	99. 5	94. 8	92. 2	89. 4	83. 0	67. 1	59. 9	41. 4	19. 2	11. 0	35. 6	11. 1	A–6(7)	ML–CL
	100. 0	97. 9	92. 3	90. 4	88. 6	85. 2	72. 5	64. 5	45. 0	26. 0	16. 8	29. 2	12. 5	A–6(8)	CL
93. 9	89. 7	82. 4	74. 2	69. 9	66. 0	61. 1	49. 8	44. 3	31. 5	19. 1	13. 8	29. 5	12. 5	A–6(4)	SC
	100. 0	90. 1	85. 0	81. 5	78. 7	71. 8	49. 1	42. 0	26. 6	16. 3	13. 8	29. 5	10. 7	A–6(3)	SC
	100. 0	98. 6	93. 5	89. 9	84. 5	76. 0	60. 9	55. 0	40. 1	26. 8	20. 2	28. 4	11. 3	A–6(6)	CL
	100. 0	100. 0	98. 2	95. 5	92. 0	86. 7	71. 8	66. 0	52. 2	26. 9	16. 1	37. 8	10. 4	A–4(7)	ML
	100. 0	99. 9	99. 6	98. 4	96. 9	94. 3	83. 2	75. 0	56. 1	36. 4	25. 0	29. 8	11. 7	A–6(9)	CL
		96. 4	95. 0	93. 1	91. 0	86. 1	68. 0	59. 5	40. 6	26. 9	20. 5	26. 0	11. 0	A–6(7)	CL
	100. 0	96. 7	95. 9	94. 8	93. 0	89. 4	79. 1	71. 8	53. 8	35. 1	23. 1	42. 8	14. 6	A–7–6(11)	ML, OL
		100. 0	93. 4	82. 6	72. 9	66. 4	62. 9	59. 6	51. 9	37. 6	25. 3	47. 0	20. 2	A-7-6(10)	ML, CL
	100. 0	85. 8	40. 2	29. 1	23. 9	21. 5	20. 9	19. 5	15. 7	9. 9	6. 3	32. 3	10. 8	A-2-6(0)	GC
	100. 0	99. 9	98. 6	97. 1	94. 4	89. 2	69. 2	60. 4	39. 9	16. 9	10. 5	37. 1	12. 1	A–6(8)	ML–CL
	100. 0	99. 7	98. 6	96. 2	91. 9	86. 1	69. 3	60. 9	42. 4	30. 0	21. 3	26. 8	9. 9	A–4(7)	CL
	100. 0	98. 4	87. 1	81. 7	77. 2	69. 2	55. 5	51. 0	39. 7	21. 9	15. 2	24. 4	8. 4	A–4(4)	CL
100. 0	87. 5	80. 1	64. 8	56. 3	47. 2	36. 1	26. 0	22. 9	15. 8	7. 5	5. 8	20. 0	6. 4	A–2–4(0)	GM–GC
	100. 0	98. 9	97. 1	95. 4	93. 9	89. 6	75. 4	[10]				52. 2	13. 7	A–7–5(12)	MH
100. 0	97. 0	91. 1	85. 7	81. 9	78. 0	73. 8	61. 3	56. 2	43. 6	29. 9	20. 8	35. 7	16. 8	A–6(8)	CL
100. 0	98. 1	97. 2	94. 5	91. 2	87. 3	82. 8	69. 6	63. 0	47. 6	32. 2	23. 0	26. 9	10. 3	A–4(7)	CL
95. 6	89. 6	87. 2	79. 1	72. 8	67. 9	61. 7	51. 4	47. 0	35. 6	20. 9	13. 7	25. 0	10. 4	A–4(3)	CL
96. 5	91. 5	84. 3	76. 2	71. 8	66. 1	58. 8	47. 5	42. 8	31. 7	17. 5	12. 3	21. 4	8. 7	A–4(3)	GC

APPENDIX K

RESPONSE TO COMMENTS

COMMENTS - EPA - OB

Outstanding Issues: EPA's Phase II Recommendations and Data Gaps Noted in the PSCROBG

General Comment

- Additional monitoring wells were installed as part of the Phase II field investigation to help better define groundwater flow patterns at the site. Specifically, EPA was concerned that groundwater flow direction may not flow entirely west to east, as indicated in the PSCROBG, but may also include radial flow components and include flow to the northeast and southwest. Consequently, ES installed six additional monitoring wells as part of the Phase II field investigation.

  It is noted, however, that groundwater elevations from several monitoring wells were not included in the determination of groundwater flows patterns at the site. Groundwater elevations from monitoring wells MW-1, MW-4, MW-16, MW-17, and MW-41 do not appear to have been included in the analysis of groundwater flow patterns at the site based on the information presented on Figure 3-16. No explanation was provided in the text of the RI Report for omitting this data.

  This information should be considered because groundwater flow patterns are not necessarily flowing in a distinct easterly direction in all areas east of the groundwater divide at the site, as is indicated on Figure 3-16. Based on available groundwater level data, there appear to be several areas (e.g., Burn Pad H) at the OB site at which groundwater flow patterns are not as distinct as has been presented on Figures 3-12 through 3-16 of the RI Report. Although groundwater flow patterns determined by ES based on April 1993 data appear to accurately characterize the general directions of groundwater flow at the site and that the current monitoring well network, in most cases, is adequate to monitor groundwater quality downgradient of potential source areas, it is recommended that groundwater flow patterns at the site be reanalyzed and that all available groundwater elevation data be utilized to fully define ground water flow patterns at the OB Ground site. Based on an analysis of groundwater flow patterns at the site which utilizes all available data, it may be determined that a monitoring well is not located directly downgradient of all potential source areas.

Response:

Groundwater elevation data for monitoring wells MW-1, MW-16 and MW-41 have been added to the appropriate groundwater elevation maps and used in further refining the groundwater flow pattern. Data from MW-17 had been included in constructing the groundwater maps of the RI report. Refer to Response #144 for a more detailed discussion of groundwater data from these monitoring wells. Sampling and surveying of wells MW-2 through MW-4 were not included in the OB Grounds workplan. Since they were too distant from the OB Grounds to be deemed relevant these wells will be sampled during the investigation of the Open Detonation grounds. Therefore data for wells MW-2 through MW-4 is unavailable.

The Regional groundwater flow patterns have been reanalyzed for the site utilizing all available groundwater measurements. Groundwater flow patterns cannot be extended to on

the northern section of the site (OD grounds) because there is no groundwater elevation data for that area. It should be noted that during the process of mapping the groundwater pattern, Figures 3-12 through 3-15 were used as preliminary maps to present all groundwater data from wells screened in the till and in the weathered shale. Figure 3-16 presents the combined data for the till and weathered shale aquifer and the final groundwater flow pattern for the site.

General **Comment**

- The RI Report states (p. 6-19, Section 6.2.3) "A compound was determined to be non-detected if its qualifier was a U, UJ, UR, or R." The use of UR and R as "non-detect" data is incorrect. Rejected data indicates that the data quality is so deficient that the data is not usable for both the quantitation and identification of that analyte. The only way to confirm the presence (or absence) of that analyte is with re-sampling and re-analysis. Consequently, it important that ES review the existing raw analytical data for the OB Grounds property to verify that all compounds or analytes that have been previously declared as non-detect values are truly non-detect. If specific compounds or analytes have Rs as qualifiers in a significant number of samples, it may be necessary to resample to determine whether these analytes are absent or present in site media. This data gap (i.e., a significant number of rejected data) could severely impact the results of the FS.

Response:

The consideration of UR and R as "non-detects" was misstated. This statement has been clarified. Data flagged as UR or R were not considered to be part of the database. Section 6.2.3 describes the procedure used to eliminate compounds from the risk assessment. Essentially, a compound was eliminated from consideration if it was not detected in any sample. This means that all the data for a specific compound was flagged with a "U". Samples with the "UR" and "R" flag were eliminated from the database prior to the search for non-detected compounds. This process was correct however, the statement that UR and R were non-detects was inaccurate. Following the data validation guidelines some data points were unfortunately rejected. Most of these rejected data points were due to poor recoveries due to matrix interferences and were unavoidable. However, there were sufficient data to conduct the risk assessment, so there was no need to resample. More importantly, the completeness goals for the RI were met.

Data Quality Review

Appendix G presents a glossary of laboratory data qualifiers but the summary tables only qualify data with a "U","J",or "R". The data qualifier glossary does not define the qualifier "R". The "R" qualifier usually indicates that the result has been rejected due to data quality problems identified during data validation. The presence of the "R" data qualifier and the lack of laboratory data qualifiers (which are no longer significant following data validation) in the summary tables presented in Appendix G indicates that data have been validated according to Regional data validation guidelines. Section 6.2.2.4of the report defines the data qualifiers used in the validation of the data.

Regional Hydrogeologic Setting

Comment #5 The comment is partially addressed.

The text explains in more detail solution cavities in limestone and indicates that "limestone wells" yield up to 150 gallons per minute (gpm). However, the locations of drinking water wells in the area that are screened in the limestone aquifer have not been identified. To avoid confusion, ES should discuss in the RI Report any data that is available which would verify whether or not a hydraulic interconnection exists between groundwater beneath the site and these hydrogeologic units.

Response #5 Regional hydrogeologic data and a regional well survey for this RI report were obtained from the "Groundwater Resources of Seneca County, New York" by Andrew J. Mozola of the U.S. Geological Survey (1951). According to that reference, four aquifers in the area of SEDA include the following formations, listed from oldest to youngest: (1) a deep shale aquifer within the Salina formation, (2) a series of limestone units between the Bertie and Onondaga formations, (4) a thick shale sequence containing beds of limestone, and (3) unconsolidated glacial drift.

Mozola discusses three reasons for the lack of hydrologic interconnection between the groundwater near the surface and the deeper aquifers. First, the shales in this region are relatively impermeable and yield water very slowly. Joints and other openings in the shales are generally very narrow and are filled with fine silt and clay. This impermeability tends to inhibit downward seepage of water from the surficial deposits. Second, the slope of the bedrock and the land surfaces toward Seneca Lake favors rapid drainage of surface water. Third, the overlying glacial drift is considered too thin to hold large quantities of water for gradual recharge of the bedrock. This is consistent with the information gathered for this RI.

It should be noted that there is one well in the vicinity of SEDA with a yield of 150 gallons per minute. This well is located approximately 3.5 miles southeast of the site and is 787 feet deep. The well penetrates the Salina and Bertie formations, which are the high yielding deep aquifers. The water level in the well is 100 feet below ground surface and has been known to contain small chips of gypsum ($CaSO_4$).

Section 2.0 - Study Area Investigation

Tables and Figures

Comment #44 The comment is partially addressed.

In the RI Report, Table 2-7, 2-8, 2-9 have been changed to Tables 2-9, 2-10, and 2-11, respectively. The analytical parameters and results are presented in the tables and an explanation of the sampling criteria is presented in Section 2.5.5. The tables now include footnotes for Levels IV and V analyses;

however, the footnotes do not indicate whether all other samples were subject to Level II analyses.

Response #44 Level II analyses were performed on all samples listed on Tables 2-9, 2-10, and 2-11. The footnotes have been revised to indicate this point.

Comment #45 The comment is not addressed.

Table 2-10 has been changed to Table 2-13 in the RI Report. Although Table 2-13 has been revised, information concerning monitoring well MW-19 is contradictory and needs to be addressed. Table 2-13 states the depth of monitoring well MW-19 is 5.28 feet below ground surface (bgs); however, it is further stated that the screened interval is 13.0 to 15.0 feet.

Response #45 The original well installation form and boring log form for MW-19 were checked and compared to the data in Table 2-13 as well as the overburden monitoring well installation diagram in Appendix E. The correct depth of MW-19 is 7.10 feet below ground surface and the screened interval is 3.0 to 5.0 feet below ground surface. Both Table 2-13 and the well installation form have been revised to show the correct depths.

Comment #49 The comment is not addressed.

Figure 2-1 has been changed to Figure 2-9 in the RI Report. However, it has not been revised to include the requested information (graphic depictions of site features.

Response #49 Figure 2-9 has been revised to include a legend, extended contour lines, and labels of roadways.

Section 2.0 - Detailed Site Description

Site Hydrogeology

Comment #59 The comment is not fully addressed.

Groundwater elevations in monitoring wells MW-4, MW-5, MW-6, MW-7 and MW-16 are not included in the RI Report. See the evaluation of the response to Comment #144 for further discussion of this issue.

Response #59 Refer to the Response to Comment #144 for the response to Comment #59.

Comment #60 The comment is not addressed.

See the evaluation of the response to Comment #144 for further discussion.

Response #60 Refer to the Response to Comment #144 for the Response to Comment #60.

Comment #71 The comment is addressed.

The RI Report has been revised to state that no impacts to wildlife is expected since few individuals are expected to be on the site due to the limited habitat present. However, it should be noted that this is a current situation. In the future, any changes that may occur at the site (e.g., revegetation of the area and general improvement of habitat) could result in additional wildlife species being attracted to the site and exposure of these individuals to site contaminants would increase. Although not significant at this time, it should be considered in future use scenarios for the site.

Response #71 Agreed. The discussion has been added to the text in Section 3.

Section 4.0 - Nature and Extent of Contamination

Comment #78 The comment is not addressed.

No additional information regarding the quantitation of total VOCs using screening methods has been included in the RI Report.

Response #78 All Level II VOC screening results have been presented in Table 2-9, 2-10, 2-11 and 2-12. The field screening headspace results are provided in the boring logs in Appendix C.

Comment #100 The comment is not addressed.

A discussion of the pertinence of background samples and background concentrations from other sources/references is important to the analytical results; however, this information has not yet been provided. Section 6.2.1.2, Background Sampling (Section 6.0 contains the Baseline Risk Assessment), indicates that a discussion of analytical results of background samples is presented in Section 4.0 of the RI Report. However, the data from background samples and discussions regarding inorganic results in relation to background levels presented in Section 4.0 of The RI Report are difficult to follow. A more detailed discussion of background samples and respective analytical results in relation to the distribution of contaminants observed in site media is needed.

Response #100 Agreed. A discussion regarding background at the site has been included in Section 3.5. Table 3-3 has also been expanded to include all soil and groundwater data used in calculating the background concentration. The reference in Section 6.2.1.2has been changed to reference Section 3.5.

Comment #101 The comment is not addressed.

Although stated on p. 2-14 paragraph 1, the use of sample SW-196 as a reference sample is not reiterated in Section 4.6, where appropriate. A discussion of the pertinence of background samples is important to the analytical results. See evaluation of response to Comment #100.

Response #101 Agreed. Discussion of the chemical concentrations measured in the background sample (SW-196) have been included where appropriate.

Tables and Figures

General Comments

Comment #112 The comment is not addressed.

The data qualifier J (estimated) has not been added to the results for chrysene in sample PBG-6-1 in Table 4-8.

Response #112 Agreed. Chrysene in Table 4-10 for PBG-6-1 has been qualified with J. There appears to be confusion on Tables. The EPA refers to Table 4-8, which is data for Pad E. This comment has been resolved and corrected.

Comment #115 The comment is addressed.

The RI Report has been revised, as requested. However, the highest concentrations of 2-methylphenol and 4-methylphenol were noted in sample PCB-1-4A, not PCB-1-4, as stated on p.4-34, paragraph 4. The text should be edited and a colon (:) inserted following "four" in the second sentence to clarify the statement.

Response 115 Agreed. The text has been corrected on page 4-34 ¶2 to indicate PBC-1-4A. In addition, the second sentence has been revised to clarify the fact that four compounds were detected at concentrations exceeding the TAGM value.

Comment #117 The comment is not addressed.

Data qualifiers have not been revised in paragraph 4 on page 4-57. Also, refer to our general comments regarding data quality.

Response #117 Agreed. The text has been revised in paragraph 4 on page 4-57 to include data qualifiers.

Comment #123 The comment is not addressed.

The data qualifier and the sample designation do not agree between Table 4-7 and the text on page 4-41, paragraph 4.

Response #123 Agreed. The text has been revised on page 4-41, paragraph 4 to show the correct sample designation as PBD-1-3A.

Comment #131 The comment is partially addressed.

The presentation of the boring logs is still not of high quality. It is suggested that logs of all wells at the site (if available) be provided in the RI Report.

Response #131 Monitoring wells MW-1 through MW-4 were installed in August, 1979, and wells MW-5 through MW-7 were installed in July, 1981 by Parratt-Wolff, Inc. No boring log information is available for these wells.

Monitoring wells MW-8 through MW-17 were installed by Metcalf & Eddy, Inc. in 1988. The boring logs and coring logs for these wells were available and have been included in Appendix C.

Appendix E (Appendix F in the PSCROBG)

Comment #132 The comment is not addressed in Appendix E.

It should be stated as to whether construction diagrams are available for MW-5 to MW-7.

Response #132 Construction diagrams for monitoring wells MW-5 through MW-7 are unavailable. These wells were installed by Parratt-Wolff, Inc. for O'Brien & Gere Engineers, Inc. in 1979 and 1981. All available information for these wells has been presented in a table in Appendix E.

Appendix F (Appendix I in the PSCROBG)

Comment #133 The comment is partially addressed in Section 3.

Additional information and references for the specific software and methods used for the analysis of the hydraulic conductivity are still needed.

Response #133 Agreed. Section 2.6.4 in the RI Report describes the software and methods used for the analysis of the hydraulic conductivity. A detailed description of the slug test procedure, slug test data reduction method, and description of use of the software, AQTESOLV, is included in that section. A note has been added to the text in Section 3.7.3 referring to Section 2.6.4 of the report for a detailed description of methodology.

EPA Water Management Division Comments

Comment #136 The comment is partially addressed in Table 1-6.

The Federal Maximum Contaminant Levels (MCLs) have been revised in Table 1-6 for barium, cadmium, chromium, lead and selenium. However, a note should be made for the value for lead, which is an action level, not an MCL. Silver and fluorine do not have MCLs but do have Secondary Maximum Contaminant Levels (SMCLs), which should also be noted.

Response #136 Agreed. Notes have been added to Table 1-6 for lead, silver and fluorine.

Comment #138 The comment is not addressed.

Toxic Compound Leaching Program (TCLP) limits have not been added to Table 1-4.

Response #138 Agreed. Analytical results presented on Table 1-4 are from studies conducted between 1981 and 1984. In September 1990, the Toxicity Characteristic

Leaching Procedure replaced EP Toxicity. However, the EP Toxicity limits are identical to the TLP limits. The historical data collected and analyzed between 1981 and 1984 were reproduced as shown in the reports. The EP Toxicity test procedure was used for soils and borehole water samples to test for the presence of heavy metals. However, the TCLP limits have been added to Table 14 and footnote has been added to Table 1-3.

Comment #141 The comment is not addressed.

Field data sheets have not been included in the appendices.

Response #141 Agreed. Field data sheets for the on-site wetlands delineation have been added to the appendix. On-site wetlands were flagged and were later surveyed for presentation on the site maps. (See Figure 2-1, site plan).

Recommendations for the Phase II RI

The comment is partially addressed.

This comment provided a summary of outstanding issues from the Phase I RI and made several recommendations for the Phase II RI. Except for one outstanding issue, which dealt with contaminant distribution and migration

pathway analysis, these issues are discussed in detail in the comments that follow (see Comment #144 through Comment #154). The issue regarding contaminant migration and migration pathway analyses is discussed below.

The PSCROBG did not present a conceptual model of the site and, therefore, an evaluation of ES's interpretation of data and site-specific conditions in relation to potential sources of contamination, migration pathways, and exposure routes was not possible. A Contaminant Fate and Transport section (Section 5.0) is presented in the RI Report. The Contaminant Fate and Transport section generally discusses the physical site characterization, chemical characterization of media, contaminant persistence, and contaminant migration via the surface water and air pathways. The most significant issue identified during our review of this section is the failure of the conceptual model for the site to address the groundwater migration pathway and to clearly define each of the potential exposure routes via each pathway (i.e., groundwater, surface water, and air) for human and environmental receptors. It is recommended that ES revise the conceptual model for the site to address the groundwater pathway and clearly identify all potential exposure routes for human and environmental receptors. Additional discussion of these and other issues relating to the Contaminant Fate and Transport section of the RI Report is presented below.

Response: Several factors determined that analysis of groundwater as a migration pathway was unnecessary for the conceptual model developed in the Contaminant Fate and Transport section of this RI Report.

- Very few organics were detected in the groundwater samples, and most were common laboratory contaminants (acetone) and were not known to be used at the site. None of these were found in the same

well in both Phase I and Phase II, which further supports the notion that these are lab artifacts.

- No leachable plume from the OB grounds was detected.

- It has been determined that the groundwater beneath the site flows generally in a northeasterly direction toward Reeder Creek and may be recharging the creek. Because there may be a potential for a groundwater contaminant contribution to this surface water body, this exposure route has been identified and analyzed as surface water and sediment exposure pathways.

- Groundwater is retained in the risk assessment (Section 6) and exposure pathways are identified in that section. The risk assessment considers that for future land use it may be assumed that residential populations would use OB groundwater as well water for showering and ingestion. The human health risk assessment concluded that for the ingestion of drinking water and for dermal exposure while showering, the total hazard index is 1.5×10^{-2}, which is well below the USEPA-defined target of unity, and the total cancer risk is 9.9×10^{-8} which is also well below the target ranges of 10^{-6} to 10^{-4}.

Comment #144 The comment is partially addressed.

ES installed six additional monitoring wells as part of the Phase II field investigation. Two monitoring wells (MW-36 and MW-37) were installed approximately 375 feet west of existing monitoring well MW-10 to allow better definition of groundwater flow along the southwestern boundary of the OB Ground site. One monitoring well (MW-38) was install approximately 275 feet north-northwest of existing monitoring well MW-16 and two monitoring wells (MW-39 and MW-40) were installed approximately 475 feet north-northwest of existing monitoring well MW-15 to help better define groundwater flow north of the site. Monitoring well MW-41 was installed approximately 525 feet south of monitoring well cluster MW-25 and MW-26 to better define groundwater flow southeast of the site.

It is noted, however, that groundwater elevations from several monitoring wells were not included in the determination of groundwater flows patterns at the site. Groundwater elevations from monitoring wells MW-16, MW-17, and MW-41 were not included on Figure 3-16 and no explanation was provided in the text of the RI Report for omitting this data. The groundwater elevation data from monitoring well MW-41 should have been included in the analysis of groundwater flow patterns at the site and presented on Figure 3-16 (and, where appropriate, Figures 3-12 through 3-15). The groundwater elevation contour lines should have been drawn to incorporate this data so as to provide a better delineation of groundwater flow patterns south of the OB Ground property.

Groundwater elevations for monitoring wells MW-1 and MW-4 also do not appear to have been included in the analysis of groundwater flow at the site. The RI Report states (page 2-45, paragraph 2) that "...MW-1 through MW-4

were located in the OD area and are not relevant to this investigation." This statement is not accurate. Monitoring well MW-1 is located along the northern portion of the OB Ground site, approximately 200 feet northeast of monitoring well MW-31. Monitoring well MW-4 is located approximately 800 feet north of monitoring well MW-21. Inclusion of the groundwater elevation data for these wells in the analysis of groundwater flow at the site (and on Figure 3-16) would have provided better definition of groundwater flow patterns along the northern boundary of the OB Ground site. This information should be considered because groundwater flow patterns are not necessarily flowing in a distinct easterly direction in all areas east of the groundwater divide at the site, as is indicated on Figure 3-16. For example, the groundwater elevation difference between monitoring wells MW-19 and MW-31 is approximately 2.2 feet. Groundwater flow may be flowing in an easterly direction, as indicated in Figure 3-16, but it may also be flowing from Burn Pad H (a potential source area) in a northeasterly direction towards MW-1 and offsite. It is recommended that groundwater flow patterns at the site be reanalyzed and that all available groundwater elevation data be utilized to define groundwater flow patterns at the OB Ground site.

As noted above, there appears to be several areas (e.g., Burn Pad H) of the OB site at which groundwater flow patterns are not as distinct as has been presented on Figures 3-12 through 3-16 of the RI Report. Therefore, based on an analysis of groundwater flow patterns at the site which utilizes all available data, it may be determined that a monitoring well is not located directly downgradient of all potential source areas.

EPA also requested that the RI Report present the methodology that was used to determine the groundwater elevation contours on Figures 3-12 through 3-16. This information was not provided in the RI Report.

Response #144

Groundwater elevation data for monitoring well MW-17 (623.08) was included on the appropriate groundwater maps, Figures 3-12, 3-13, and 3-16.

According to Table 3-6, MW-16 has not been determined to be a till or weathered shale well. The Metcalf and Eddy well installation form shows MW-16 screened in the till. Therefore, groundwater elevation data has been added to Figures 3-12, 3-13 and 3-16. The contours on those maps have been revised to include the new data.

Groundwater elevation data for MW-41 has been added to Figures 3-13 and 3-16; data was not available from this well for Figure 3-12. Contours have been extended to include the new data from MW-41.

According to the Workplan for this RI, monitoring wells MW-1 through MW-4 were not included in the sampling or data collection program. Therefore, groundwater measurements, top of casing elevations, and well installation documents are unavailable for wells MW-2 through MW-4. Data has been found for MW-1 and has been added to Figures 3-13 and 3-16.

Data for monitoring wells MW-1, MW-5, MW-16 and MW-41 have been added to the appropriate figures and used to modify the groundwater flow patterns. Figures 3-12 through 3-15 are preliminary maps used in the process of defining the regional groundwater flow pattern for the OB grounds. The final groundwater flow pattern is presented on Figure 3-16 which shows all available groundwater data from wells screened in the till and the weathered shale.

The equipotential lines for the groundwater contours were drawn by interpolating between the static water level data from the monitoring wells at OB grounds and by refining the contours by comparison with the regional surface contours. Because the water table conforms roughly to the configuration of the land surface, the water table develops groundwater divides and troughs as illustrated at the site by the groundwater moving from the high ground on the west of the site toward the low area of Reeder Creek on the east.

Table 3-6 has been updated to include groundwater elevation data from monitoring well MW-1.

Comment #150 It is unclear it this comment is addressed.

Analytical results are presented in summary tables in Appendix G. Appendix G presents a glossary of laboratory data qualifiers but the summary tables only qualify data with a "U", "J", and "R". The data qualifier glossary does not define the qualifier "R". The "R" qualifier usually indicates that the result has been rejected due to data quality problems found during the data validation. The presence of the "R" data qualifier and the lack of laboratory data qualifiers, which are no longer significant following data validation, in the summary tables presented in Appendix G indicate that the data has been validated according to Regional data validation guidelines. Section 6.2.2.4of the report defines the data qualifiers used in the validation of the data.

Response #150 The data collected from the OB Grounds has been validated according to USEPA Region II guidelines. The glossary of laboratory data qualifiers in Appendix G has been revised with the list of data qualifiers defined in Section 6.2.2.4. These were the data qualifiers used in validating this data.

Comment #152 The comment is partially addressed.

See the response to Comment #144 above.

Response #152 Refer to Response to Comment #144.

Comment #153 The comment is partially addressed.

The discussion regarding hydraulic conductivities of the till and the weathered shale has been revised and the hydraulic conductivity values have been recalculated. ES has provided documentation in the RI Report to explain the

variation of the hydraulic conductivities in the till and weathered shale layers. However, ES does not discuss why the average values for the overburden wells included only those wells completed by ES.

Response #153 Hydraulic conductivity measurements were performed on 20 of monitoring wells MW-5 through MW-41, which were installed by ES, Metcalf and Eddy and O'Brien & Gere, Engineers, Inc. Well installation documentation was unavailable for monitoring wells MW-1 through MW-7 and therefore only wells MW-8 through MW-41 were used in the hydraulic conductivity calculations. The average value for hydraulic conductivity for the overburden (6.61×10^{-4} cm/sec) was calculated using data from wells MW-8 through MW-41 which were screened in the till layer. The text has been modified to clarify this point.

Comments, EPA letter received 22 July 1992

Comment #156 The RI Report as well as the site plans do not acknowledge the existence of the 100-year flood plain in the vicinity of the SEAD property. This data requirement will need to be addressed during the development of the feasibility study as it may be an applicable or relevant and appropriate requirement (ARAR).

Response #156 Agreed. Though not explicitly included in the report, flood plains were evaluated. As described in the FEMA map there are no 100-year floodplains on the depot. In fact, the floodplain for Seneca Lake only extends 1000 feet into Reeder Creek, which is several miles downstream from the depot boundary.

Analysis of New Information

Ecological Assessment (Sections 2.7, 3.9, and 6.6 of the RI Report)

- A terrestrial biotic assessment and a macroinvertebrate sampling program was performed as part of the Phase II field investigation at the OB Grounds property. The RI Report states that a clearly defined trend in the mayflies (Ephemeroptera), stoneflies (Plecoptera), and addisflies (Tricoptera) (also known as EPT) to chironomid ratio was not observed in Reeder Creek. Although the EPT to chironomid ratio could not be located in the RI Report, the lack of a clearly defined trend appears to be true. However, the ratio did decline substantially at Station SW-130. This sampling location is located downgradient of a surface water input from the OB Ground property. The likelihood that the observed decrease in EPT abundance may be attributable to the tributary input should be discussed in the ecological risk assessment.

- The RI report identified copper and lead as the primary ecological contaminants of concern at the OB grounds. This conclusion appears to be supported by the information provided in the Ecological Risk Assessment (ERA). However, concentrations of aluminum within the surface waters of the site (and within the adjacent Reeder Creek) are also of concern and need to be discussed further in the ERA.

- Tables 6-37 through 6-41 of the ERA provide a comparison of the 95th percentile upper confidence limit (UCL) of the contaminant concentration with applicable media

guidelines/criteria. It would be very helpful and insightful to provide in addition the mean concentrations of contaminants detected for each medium within these tables. Mean concentrations may be more indicative of exposure for some of the potential receptor species identified.

Response Agreed. Mean data has been added to the tables (New Table numbers 6-45 to 6-49).

Contaminant Fate and Transport (Section 5.0 of the RI Report)

The PSCROBG did not present a conceptual model of the site and, therefore, an evaluation of ES's interpretation of data and site-specific conditions in relation to potential sources of contamination, migration pathways, and exposure routes was not possible. A Contaminant Fate and Transport section (Section 5.0) is presented in the RI Report. The Contaminant Fate and Transport section generally discusses the physical site characterization, chemical characterization of media, contaminant persistence, and contaminant migration via the surface water and air pathways. The most significant issue identified during our review of this section is the failure of the conceptual model for the site to address the groundwater migration pathway and to clearly define each of the potential exposure routes via each pathway (i.e., groundwater, surface water, and air) for human and environmental receptors. It is recommended that ES revise the conceptual model for the site to address the groundwater pathway and clearly identify all potential exposure routes for human and environmental receptors. These and other issues relating to the Contaminant Fate and Transport section of the RI Report are discussed in more detail below.

Response: Agreed. Each of these comments will be incorporated into the revised ERA.

Page-Specific Issues

Specific issues identified during the review of these newly presented sections are discussed below on a page-specific basis.

Sections 2.7, 3.9, and 6.6 - Ecological Risk Assessment Issues

Comment on Page 3-49, ¶3 The RI report states that a clearly defined trend in the EPT to chironomid ratio was observed in Reeder Creek. Although the EPT to chironomid ratio could not be located in the RI, the lack of a clearly defined trend appears to be generally true. However, the ratio did decline substantially at Station SW-130. This sampling location is located downgradient of a surface water input from the Open Burning Grounds. The likelihood that the observed decrease in EPT abundance may be attributable to the tributary input should be discussed in the ERA.

Response on Page 3-49, ¶3 A table presenting the development of the EPT to chironomid ratio has been included in Section 3.9.1.1. Refer to the preceding comment under Ecological Assessment for a discussion of ERA changes.

Comment on Page 6-139, ¶2 The RI states that the U.S. Fish and Wildlife Service (USFWS) approves the deer management plan of the herd present at the Seneca Army Depot. Approval of game species management plans is typically conducted by the state wildlife agency (New York State Division of Fish and Wildlife). It is

unclear if the reference to USFWS is incorrect or is a result of special circumstances at the Depot such as the occurrence of the unusual white-pelage deer at the depot. Please clarify.

Response on Page 6-139, ¶2

Agreed. The sentence has been revised to clarify that NYSDFW is the agency conducts the deer management.

Comment on Page 6-151, ¶2

The RI states that the deer mouse was selected as a terrestrial receptor species. However, Table 6-36 identifies the white-footed mouse (Peromyscus leucopus) as a receptor species. Although the deer mouse (P. maniculatus) is closely related to the white-footed mouse, one or the other species should be retained as the receptor species in order to maintain consistency throughout the RI document.

Response on Page 6-151, ¶2

Agreed. The white-footed mouse will be used as the receptor species throughout the document.

Comment on Page 6-162, ¶2

The RI states that a total of 13 VOCs and 37 SVOCs were eliminated as chemicals of concern because they were detected at concentrations lower than those reported in the literature to be phytotoxic. This is incorrect as phytotoxicity values were not provided for all 13 VOCs and for 36 of the 37 SVOCs. It is recommended that the scientific literature (e.g., PHYTOTOX database) be reexamined in an attempt to locate plant toxicity concentrations for these contaminants and the pesticide/PCB contaminants detected in surface soils of the site.

Response on Page 6-162, ¶2

Agreed. The PHYTOTOX database has been searched for phytotoxic concentrations to plants. From this search, it is clear that the PHYTOTOX database is set up to assist herbicide applicator contractors in determining the proper application rate for various herbicides and plants. The application rates are presented in units of Kg per hectares or mass per area and are not readily convertible to a mass per mass format. Moreover, the chemicals in the database do not include many of the chemicals of concern at this site other than herbicides, which are not risk producing chemicals at the OB grounds. Accordingly, this database has not been useful in obtaining toxic concentrations for many chemicals in soil.

Comment on Page 6-163 Table 6-38

Sediment guidelines developed by New York State Department of Environmental Conservation (NYSDEC) (1989) are presented in this table. For organic contaminants, it appears that the organic carbon normalized sediment criteria presented in NYSDEC (1989) were adjusted by applying a total organic carbon (TOC) content of once percent to the criteria. The basis for the one percent TOC value is not provided. It is unclear if this value for TOC represents an actual value that was quantified from the sediment sampling or if it represents an estimate of the TOC. This should be clarified.

Response on Page 6-163 Table 6-38

Agreed. The value of one percent TOC represents an estimate of the TOC in the sediment. No data exist for TOC in sediment. The text will be clarified to better state this assumption.

Comment on Page 6-169 Table 6-40

NYSDEC Ambient Water Quality Criteria (AWQC) for various metals are presented in this table based on a water hardness value of 400 mg/L $CaCO_3$. It is unclear how this value was derived. The data or rationale for using this value should be provided. In addition, the NYSDEC AWQC presented for bis(2-ethylhexyl)phthalate is incorrect. The correct value is 0.6 micrograms per liter (ug/L). This value should be corrected.

Response on Page 6-169 Table 6-40

Agreed. The value for hardness of 400 mg/L $CaCO_3$ was derived using the 95th UCL data from Reeder Creek. The concentrations of calcium (102 mg/L = 255 mg/L as $CaCO_3$) and magnesium (16 mg/l = 66 mg/L as $CaCO_3$) were summed, a total of 321 mg/L. This value was rounded up to 400, in part to allow for contributions to the alkalinity from other polyvalent cations. The AWQC derived from the hardness are used for comparative purposes only. No discharge limits are going set. If future remedial activity requires a discharge to Reeder Creek actual hardness measurements will be made. The incorrect AWQC for bis(2-ethylhexyl)phthalate has been corrected. It should be noted that Table 6-40 is now Table 6-48.

Comment on Page 6-172, ¶5

Potential rare species identified in the RI report as potentially occurring within the vicinity of the site include the osprey and bog turtle. The scientific names of these species are incorrectly spelled. In addition, species (last work of paragraph) is also incorrectly spelled. Please correct these apparent typographical errors.

Response on Page 6-172, ¶5

Agreed. The spelling of the scientific names of osprey and bog turtle have been corrected.

Comment on Page 6-174, ¶1

The RI report states that risks to aquatic life are not anticipated as the 95th percentile UCL is below federal/state criteria as presented in Table 6-41. The comparison of AWQC and the 95th percentile UCL is presented in Table 6-40. From this table, criteria are exceeded for aluminum, iron, mercury, selenium, and bis(2-ethylhexyl)phthalate. Therefore, risks to aquatic life should be reassessed in this paragraph.

Response on Page 6-174, ¶1

Agreed. The risks to aquatic life were reassessed, and the metals noted were taken into account. In addition, distinctions were made between data from Reeder Creek, which is a stream known to support aquatic life, and the onsite wetlands which are ephemeral, and are not known to support aquatic fauna.

Comment on Page 6-177, ¶3

The RI report states that concentrations of contaminants detected in sediments were compared with proposed sediment guidelines developed by NYSDEC (1989) and Long and Morgan (1991). However, National Oceanic and Atmospheric Administration (NOAA) sediment guidelines (Long and Morgan, 1991) were not presented in the ERA. Please delete this reference.

Response on Page 6-177, ¶3

Exception. The NOAA sediment guidelines have been added to the text and tables in this section.

Comment on Page 6-179, ¶3

The RI report states that NYSDEC has not published aquatic life standards for aluminum. However, the NYSDEC surface water quality standard for aluminum that is protective and aquatic propagation is established at 100 ug/L (exceeded by the 95th percentile UCL aluminum concentration in Reeder Creek). This should be clarified.

Response on Page 6-179, ¶3

Agreed. The text will be modified to describe the 100 ug/L NYSDEC standard. It is also noted that the standard is for ionic aluminum, not total aluminum, and care should be taken when this criterion is compared to the measured total aluminum concentration. One contributor to the aluminum in the water is suspended aluminum-silicate compounds.

Comment on Page 6-179, ¶3

The RI concludes that surface water concentrations of aluminum and iron (95th percentile of UCL) are below chronic criteria for protecting the identified aquatic receptor species (pumpkinseed and fathead minnow). Therefore, these contaminants present low risk to aquatic biota. It is unclear whether chronic criteria (different from AWQC) were used to assess risk to the two fish receptor species (none were presented in the ERA). This should be clarified.

Response on Page 6-179, ¶3

Agreed. The criteria used for comparison were the federal AWQC, which were exceeded by some of the lead and aluminum concentrations. The text will be modified to more accurately describe the relationship between site concentrations and AWQC.

Comment on Page 6-180, ¶2

The RI report concludes that metals (primarily copper and lead) present low to moderate risk based on their low bioavailability and their low 95th percentile UCL. However, copper and lead 95th percentile UCL are substantially elevated above NYSDEC (1989) Limit of Tolerance sediment guidelines which would be detrimental to the majority of benthic species. It is also unclear how the bioavailability of copper and lead were determined. The acid-volatile sulfide (AVS) content of the sediment has been reported in previous studies within the scientific literature to be correlated with the bioavailability of some metals (including copper) but this parameter does not appear to have been assessed. Please clarify how the bioavailability of copper and lead was determined and the subsequent rationale for the low to moderate risk rating for these two metals.

Response on Page 6-180, ¶2

Agreed. The referenced paragraph is somewhat confusing. It should state that the bioavailability of all metals except copper and lead is low, due to the pH and other properties of the water, and the fairly low measured concentrations. It would be assumed that the bioavailability of copper and lead is somewhat higher due to the higher measured concentrations. No analyses were conducted to assess the bioavailability at the site. The conclusion that the risk is low to moderate. This based on several items, including the low measured concentrations and the results of the site evaluation.

The conclusions to the ERA, including the referenced paragraph, will be rewritten to more clearly present the conclusions, and to more accurately describe the rationale used to arrive at those conclusions.

Comment on Page 5-10, ¶1

The measure of the affinity of a compound for the organic fraction of the soil is based on several items. First, no adverse effects were observed during the site evaluation, which was conducted by trained ecologists. Second, the mean is the organic carbon coefficient K_{oc}. ES states that "compounds with a K_{oc} greater than 500 millimeters per gram (mL/g) are generally considered immobile". However, as indicated in Table 5-2 of the RI Report and in the reference (Dragun, 1988) used by ES, compounds with a K_{oc} between 500 and 2,000 mL/g are considered to have a low mobility, whereas compounds with a K_{oc} greater than 2,000 mL/g are considered to be immobile. Therefore, ES's statement is not entirely accurate.

Response on Page 5-10, ¶1

Agreed. The text will corrected.

Comment on Page 5-10, ¶5

ES indicates that the major migration pathways of concern at the site are surface water runoff, the interaction of surface water with surficial soils, and the air pathway. ES does not indicate that groundwater is a migration pathway of concern and does not provide any basis for dismissing groundwater as a pathway of concern. Without an evaluation of the groundwater migration pathway, the conceptual model for the site is incomplete. Elevated levels of several contaminants, including semi-volatile organic compounds (SVOCs), explosives, and metals, have been detected in groundwater at the site. Therefore, groundwater quality data indicate that contaminants have migrated to the saturated zone and impacted groundwater to some degree. It is recommended that ES give consideration to the groundwater pathway in the conceptual model for the site and identify any exposure pathways that may exist for human and environmental receptors (e.g., private drinking water wells, contaminant loadings to Reeder Creek due to any contaminated groundwater discharge to the stream and/or surface water runoff).

ES indicates that a "secondary pathway of concern is ingestion of fish from Reeder Creek". It should be noted that this is a potential exposure pathway and not a migration pathway. Discussion of this exposure pathway within the text which identifies potential migration pathways is inappropriate and confusing.

Response on Page 5-10, ¶5

Exception. Groundwater is not included in the conceptual site model because there is no evidence of impact from site activities. Very few organics were detected, and most were common laboratory contaminants (acetone) and were not known to be used at the site. None of these were found in the same well in both Phase I and II, which further supports the notion that these are lab artifacts. Groundwater is retained in the risk assessment (Section 6) and exposure pathways are identified in that section. With regards to fish ingestion the confusing sentence will be deleted from text.

Comment on Page 5-12, ¶2

ES indicates that "organic compounds are usually converted to less hazardous compounds, with carbon dioxide and water being the major end products of aerobic degradation". However, it should also be noted that there are a number of organic compounds (i.e., halogenated organic compounds) for which intermediate degradation products may be more hazardous (e.g., vinyl chloride). Because organic compounds may degrade to more hazardous constituents, it may be necessary to evaluate the exposure routes and associated risks to potential human and/or environmental receptors based on the more hazardous intermediate compounds that may occur. Although, currently, organic compounds may not be present in site media at concentrations which pose unacceptable risk to human and environmental receptors via potential exposure routes, discussions regarding the biodegradation of organic compounds should not omit discussion regarding the general potential for more hazardous intermediate degradation products to occur.

Response on Page 5-12, ¶2

Agreed. It will be noted in the text that organic compounds may degrade to more hazardous constituents. However, the low concentrations of organics at the OB Grounds make it highly unlikely that dangerous levels of degradation of products could accumulate. Vinyl chloride or any precursors of vinyl chloride have never been detected in any sample collected at this site.

Comment on Page 5-12, ¶3

ES indicates that a "half-life refers to the time it would take for half of the mass of the organic constituent to degrade". This statement, without, qualification, suggests that the organic compound will degrade to carbon dioxide and water. This is not necessarily correct. A half-life simply refers to the time it takes for half of the mass of a parent compound to degrade to another compound(s) (which could be more hazardous than the parent compound), which may or may not be carbon dioxide and water.

Response on Page 5-12, ¶3

Agreed. The text was confusing, and will be modified to more accurately define the term "half-life".

Comment on Page 5-13, ¶1

Another mechanism for bioaccumulation is the ingestion of contaminated surface water and sediments by fauna. The potential exists at the site for surface water runoff to transport contaminants to wetlands and low-lying areas at the site. Therefore, bioaccumulation may occur in wildlife which utilize

these areas as a source of water and/or food (e.g., insects, plants, inadvertent ingestion of sediments, etc.).

Response on Page 5-13, ¶1

Agreed. Bioaccumulation from the on-site wetlands is a viable pathway. This pathway is addressed in detail in Section 6 as part of the ecological risk assessment. A brief discussion of this pathway has been added to Section 5.

Comment on Page 5-24, ¶3

It is not clear how the value for the contaminated surface area of the site (12 acres or 40%) was calculated. It is suggested that ES provide calculations to support the use of this value and the calculations used to determine the quantity of soil to be eroded each year by surface water runoff.

Response on Page 5-24, ¶3

Agreed. The value of 12 acres was obtained by conservatively estimating the fraction of the site with contaminated surface soils. The calculations will be provided in an appendix.

Comment on Page 5-25, ¶3

ES does not appear to have considered impacts and/or exposure pathways associated with the accumulation of contaminants in low areas and wetlands at the site. Surface water accumulating in these low areas/wetlands may recharge the aquifer at the site and therefore may be a route of migration at the site that will result in future impacts to groundwater at the site. Also, the potential exposure routes for human and environmental receptors associated with contaminants that are present/accumulate in these areas should be identified and discussed in the conceptual model.

Response on Page 5-25, ¶3

Exception. The analytes which may be accumulating in the low areas on-site have been adequately considered. Surface water and sediment samples from each of these areas have been sampled. This data has been considered in the human health and ecological risk assessment. The insoluble forms of the metals would not be expected to percolate to groundwater and there is little or no evidence of heavy metal contamination in the groundwater. As described in Section 4, dissolved metals concentrations in the groundwater were very low. These routes of exposure have been discussed as part of the conceptual model, which was incorporated into the pathways of the risk assessment.

Comment on Page 5-31, ¶3

ES indicates that air samples were collected to evaluate the potential of contaminant migration due to wind dispersal of smoke and other particulates during open burning activities and that this data could also be used to evaluate the wind erosion pathway. However, as stated in paragraph 3, page 5-6, "burning was only performed during very low wind conditions". Therefore, it is likely that air samples collected during burning operations were collected at times at which low wind conditions existed. Air samples collected at these times would not likely represent worst-case scenarios for wind erosion of soils (i.e., average to high wind conditions) and, therefore, may not be useful for evaluating the wind erosion pathway.

Response on Page 5-31, ¶3

Exception. Air samples collected during a burn was not performed. The referenced text describes downwind soil samples collected to assess the impacts of wind dispersal during burning. These samples are in the path likely to be affected if wind dispersion is a significant pathway. Surficial soil samples were collected from the boundary of the site to Route 96A, on the west, and to the high security area of the east. These distances were approximately 2000 ft and were located along the centerline of the prevailing wind direction. Either mechanism of pollutant dispersal, i.e. dispersion of a burn cloud or erosion of soil, would have followed this pathway, and deposited suspended particulates, which was adequately sampled at selected intervals.

THE GROUNDWATER MANAGEMENT SECTION PROVIDED THESE COMMENTS:

Comment #1 The following concentrations should be substituted in Table 4-19:

Contaminant	NY MCL (ug/l)*
Diethylphthalate	50
Di-n-octylphthalate	50
Aluminum	50
Antimony	6
Beryllium	4
Chromium	100
Copper	1300
Nickel	100
Cyanide	200

Note:

* 10 NYCRR Part 5, subpart 5-1, 1992.

Response #1 Agreed. The concentrations as listed have been added to Table 4-19.

Comment #2 Chemical-specific, location-specific, and action-specific ARARS and to-be-considered (TBCs) information should be included in the document.

Response #2 Agree. This information when presented in the Tables of the risk assessment. This information has also been included in detail in the Feasibility Study.

Comment #3 Seneca Lake is a regional public water supply source and is considered a recipient of groundwater affected by this site. Therefore, WMD suggests a full range (same parameters as for each monitoring well in this investigation) of sampling be performed at the suspected groundwater drainage areas to determine if the quality of Seneca Lake has been adversely effected by site activities.

Response #3 Exception. Surface water and groundwater flow at the OB grounds are directed northeast into Reeder Creek, which discharges into Seneca Lake approximately 3 miles away. Station SW-110 was specifically established

downstream of the OB grounds on Reeder Creek to characterize the streamflow as it leaves the SEDA and provide a measure of the potential downstream transport of contaminants.

Surface water sampling was also performed in Reeder Creek at Station SW-320, which is downstream of the OB grounds. The sampling data presented in Table 4-18 indicate that no volatile or semi-volatile organic compounds, pesticides/PCB's or explosives were detected at these two sampling locations. Barium was detected in concentrations below the New York State Ambient Water Quality Standards. In general the surface water samples show high concentrations of calcium, iron, magnesium, potassium, and sodium, reflective of the general soil and bedrock chemistry for the site.

As discussed above, sampling data from the two downstream sites on Reeder Creek show no adverse effects on the water quality. It would appear that sampling at these two locations have provided adequate data to determine if adverse effects were created by site activities on Reeder Creek and in turn, Seneca Lake. Sampling Seneca Lake was not performed. This was not performed because the quality of Reeder Creek was not impacted, and it would be unlikely that the quality of Seneca Lake could be degraded given the dilution that occurs when Reeder Creek discharges into Seneca Lake.

Comment #4 On-site wetlands were delineated in 1992, according to the 1989 delineation manual. Numerous small, isolated emergent wetland areas were identified on and around the open burning grounds (OBG). It is reported that most of these wetlands resulted from soil excavation activities. Dominant plant species are cattails and rushes. The number of wetlands is variously listed as 38 or 32, and the largest wetland is said to be 140,000 square feet (approx. 3 acres) or 0.92 acre. These discrepancies should be corrected in the final document and the total acreage of mapped wetlands should be provided.

Response #4 Agreed. There are 38 on-site wetlands at the OB grounds. The text has been revised to indicate this number. The largest wetland is 140,000 square feet or approximately 3 acres in area. The total acreage of the on-site wetlands in 59 acres.

Comment #5 The discussion regarding wetland jurisdiction and regulation on page 6-173 is flawed. The Marine Wetlands protection Branch (MWPB) presumes that the mapped wetlands are jurisdictional unless a satisfactory contrary argument is made (we have not received field data sheets, which contain details regarding the wetlands). The discussion further implies that site wetland activities would be "...(exempt)... from regulatory permitting and mitigation requirements under Section 404..." (page 6-173). While Army Corps permits are not required on CERCLA sites, compliance with the Section 404 ARAR and Executive Order 11990 requires adherence to the 404(b)(1) guidelines - wetland impacts must first be avoided, then minimized, and then mitigated. The discussion mistakenly suggests that an acre of wetlands may be destroyed without compensation.

Response #5 Agreed. Text on Page 6-173 has been revised to reflect comment #5.

Comment #6 Sediment sampling revealed some rather elevated metal concentrations in several wetland areas (e.g., #5 and #16). During the screening of Contaminants of Concern, the calculated 95th percentile concentration for each contaminant was compared to various criteria. We suggest that use of maximum values would provide a more conservative, worst-case analysis:

metal	max conc ppm	95th%	NYSDEC criteria	phytotox
	(a)	(b)	(c)	(d)
copper	3790	319	114	70-640
lead	7400	458	250	150-1000
zinc	1200	261	800	300-3000
	a) Table 6-5	b) Table 6-38	c) 1989, LOT values	d) Table 6-37

While use of the 95th percentile concentrations provides a site-wide view of ecological risk, the figures are much lower than maxima because non-detects are included in the calculations. The calculated values tend to obscure potential "hot spots".

Response #6 Agreed. Maximum detected values have been included in the ERA tables. Where appropriate, these values have been used in evaluating risks. In many instances, the 95th UCL was greater than the maximum value, due to elevated detection limits of selected samples.

Comment #7 Finally, we note that sediment data, with the exception of summary tables, were not provided. Perhaps these data could be included as an appendix in the final document.

Response #7 Agreed. Sediment data has been included in Appendix G, after surface water data.

THE ENVIRONMENTAL IMPACTS BRANCH REITERATES THE FOLLOWING COMMENTS:

Comment #1 Information should be provided concerning what steps are necessary to ensure that remedial actions comply with the requirements of the National Historic Preservation Act (NHPA). As you know, our review of the previous documents identified the NHPA as a potential ARAR for remedial actions. We also indicated that the September 1986 report, "An Archeological Overview and Management Plan for Seneca Army Depot," appears to satisfy the requirements of a Stage IA Cultural Resources Survey. Consequently, RPM Carla Struble's March 26, 1992 letter to the Army recommended that future RI/FS documents for areas potentially impacting cultural resources include an appropriately scaled map showing the proximity of the site(s) to the identified resources, that the Army address potential impacts of the contamination and remedial action(s) upon these resources, and that they include a recommendation concerning the appropriate level of field work

(Stage IB Survey) needed to ensure compliance with NHPA. However, none of this information is presented or discussed in the draft RI. Therefore, we reiterate the points contained in EPA's March 26, 1992 letter.

Response #1 Agreed. The NHPA is a potential ARAR for any remedial actions at SEDA. The depot has in place a "Natural Resources Management Plan" which describes the identified historical areas on the site. None of these sites are located within the boundaries of the OB Grounds, and are therefore, not shown on-site maps. At future sites, cultural resources will be identified when they are located within or near the sites under investigation.

Comment #2 With respect to ensuring compliance with the Endangered Species Act (ESA), we also reiterate our previous recommendation that the Army should initiate informal consultation directly with the U.S. Fish and Wildlife Service to determine whether any endangered species and/or their habitat may be present on or affected by the site. This will ensure that up-to-date information on this issue is available, since 13 years have elapsed since the January 1980 Installation Assessment that is referenced in the RI.

Response #2 Agreed. As described above, SEDA has in place a "Natural Resources Management Plan" which addresses the habitats, animals, and plants present on the depot. SEDA works in conjunction with the New York State Department of Fish and Wildlife to provide wildlife management for the depot and, in particular, for the management existing deer population. Regularly scheduled hunts are managed under this plan with the approval of the New York State Fish and Wildlife Department.

THE FOLLOWING RECOMMENDATIONS WERE PROVIDED BY EPA's PRE-REMEDIAL AND TECHNICAL SUPPORT SECTION:

BASELINE RISK ASSESSMENT (Human Health)

Comment #1 pages 1-20, 1-21, and Table 1-4:

a. it should be mentioned that EP Toxicity has been replaced by TCLP;

b. I am not clear on what the EP Toxicity data of 'page 3 of 3' is showing; the EP Toxicity procedure is run on a solid/matrix, not a water sample.

Response #1

a. Agreed - A footnote was added to Table 1-4 stating that EP Toxicity has been replaced by TCLP.

b. The EP toxicity, now the TCLP procedure, can be used to analyze a water sample. If the sample contains less than 0.5% solids then the sample is filtered and the filtrate, is considered to be the extract, which is then analyzed for the various analytes. The data in question were borehole samples collected from temporary wells designed to obtain a sample of the seepage that flowed into a soil boring. Since

the sample was mostly water the extraction portion of the method was not required and the only --- analytical portion of the method was performed. The data presented in Table 1-4 are results from analyses conducted earlier by another consultant. The data has been reproduced without changes.

Comment #2 Page 1-39, 2nd ¶: does this brief discussion bear on the risk assessment? That is, is the purpose of the ¶ only to acknowledge the presence of nearby private drinking water wells, or to indicate that samples from these were incorporated into the risk assessment? The text should be embellished to explain the significance of the noting that these nearby wells exist, and to indicate if data from them was used or not, and why or why not.

Response #2 Agreed. This discussion does not bear on the risk assessment. It was only mentioned to indicate that a search for possible receptors was performed. This information was obtained during a site background information search regarding land use and possible off-site receptors. The test will be expanded to clearly state that the discussion is for background information.

Comment #3 Tables 2-4/2-5 and 2-9 - 2-12: it's not clear in the document, how much of the soils data was incorporated into the risk assessment. Contaminants concentrations of varying depths/intervals is presented. For example, when evaluating the soil ingestion scenario, EPA (RAGS guidance) suggests the 0-2 foot composite fraction be used. Only a few samples listed over these tables satisfy that data need.

Response #3 Agreed. The referenced tables provide all the data. Only the 0- to 2- foot data were used in the risk assessment.

Comment #4 Section 4:

a. it's not clear that for the various sets (pads) of soil data, that only those of the <u>appropriate depths</u> (for each respective exposure) were used in the risk assessment. As an example, on Figure 4-7, soils data of 5 different intervals are presented. Only one of these could be used to evaluate a resident incidentally ingesting soil - the 0-2 foot fraction.

b. Table 4-3: the only data-rejected values are for copper, and curiously they are nearly all those of the 0-2 foot interval. Is there an explanation for this? Perhaps there should be a mention of how this may have impinged (if it did) on the derivation of an exposure point concentration for Cu in the risk assessment.

Response #4

a. Agreed. The figures and tables in Section 4 contain all the data, and are used to describe the extent of the chemicals of concern. A subset of this data (i.e., surface soils) was used in the risk assessment, as described in Section 6.

b. Agreed. The referenced copper data is almost entirely from one sample delivery group (SDG). During the data validation process, the copper data in that SDG was rejected because of an unacceptably high matrix spike recovery. This was in accordance with the functional guidelines established by EPA for data evaluation. This data did not affect the risk assessment. The rejected data values, were all within the site background range of 15 to 56 mg/Kg. The highest was 31.5 mg/Kg and the lowest value was 19.5 mg/Kg. Eight (8) surficial soil samples were eliminated from the risk assessment due to data validation issues related to copper. Four (4) additional soil samples from non-surficial sample depth were also eliminated for similar reasons. As shown in Table 6-3, there are still 189 data points for copper in surface soil samples.

Comment #5 Pages 6-14 - 6-25:

a. it's not clear that for any of the environmental data sets, that the formula provided at the top of page 6-14 is the appropriate one to have been used in determining exposure point concentrations. For example, on page 6-24, 2nd ¶, it is stated that 13 compounds in soil and 13 compounds in groundwater were 'non-normally' distributed. If that it is so, then log-normality should have been assumed, and the procedure outlined in OSWER directive #9285.7-081 (transforming data and using a different formula than that shown on page 6-14) should have been applied. I don't believe this was done as the formula for lognormally-distributed data is not shown in the document.

b. page 6-25, 1st ¶: re comment #6a above, the large number of samples noted here ('between 140 and 250') tells me that probably, the soils data of combined depths/intervals were used in the ingestion pathway. Clarification on this point should be provided.

Response #5

a. Agreed. The data were tested for normality, using the Coefficient of Variation (CV). If the CV was greater than 1, then a log-normal distribution was assumed. Following EPA guidance, the 95th UCL was calculated using the "H" statistic. If the CV was less than 1, then the data distribution was assumed to be normal and the 95th UCL was calculated using the T-statistic. The text has been updated to reflect this.

b. Agreed. The risk from soils was recalculated using only data from the 0- to 2-foot depth interval. The text has been corrected to reflect this change.

Comment #6 page 6-34, 1st ¶: this is awkward; correctly the document states that if a compound is without a toxicity factor, it is retained in the BRA. The document should just expand on this to say, that such compounds are retained in one or more of the following ways: qualitative discussion, uncertainty section, comparison with an agency approved benchmark or methodology (as was the case here with the evaluation of lead using the UBK model).

Response #6 Agreed. The text has been updated to reflect this change.

Comment #7 page 6-54, 2nd ¶, last sentence: this is vague and somewhat incorrect; instead of saying little or no volatiles in the groundwater, it should say that there was one (1) COC - acetone. Also, what is the level of detail, ordinarily extended to other pathways, that is lacking from the groundwater inhalation pathway?

Response #7 Agreed. The text has been clarified to state that only one volatile organic compound (acetone) was detected.

Comment #8 page 6-56, last sentence: this is editorializing, and should be deleted; it is not unreasonable for a leachable plume to migrate one mile or more. Fortunately for the document, the migrating groundwater contamination was considered in the future land use scenario.

Response #8 Agreed. The sentence has been changed to reflect the predicted travel time for groundwater using the groundwater velocity (32.8 feet/year) calculated in Section 3.

Comment #9 page 6-68, 6-99, 6-103-104, Tables 6-12 and 6-13, etc:

Presently, Region II and some others evaluate the dermal contact to **soils** pathway for only three compounds: cadmium, PCB's, and dioxin. As regards this risk assessment, of these three, only cadmium was present. Hence, a more accurate assessment would consider this metal alone, and eliminate all the other COC's found in soil and sediment. The text of the 2nd ¶ of page 6-96 should be modified to additionally explain that only these three compounds are presently evaluated owing to the lack of adequate toxicity information via this uptake route. As a consequence of removing all compounds but Cd from the soil-dermal exposure, it is highly unlikely that Cd will remain the largest contributor to any computed risk estimates. Hence, such statements (e.g., pages 6-104, 4th ¶, page 6-120, 2nd ¶) must be edited accordingly.

Response #9 Agreed. The dermal risk have been recalculated considering only cadmium since only cd was found on the site. The text and tables have been updated to reflect this change.

Comment #10 Table 6-14: the exposure assumption of 0.5 liters/hour as the contact rate for ingestion of surface water while swimming, should be **0.05** liters/hour. In the text of the document (page 6-74, 1st ¶), the correct value is mentioned.

Response #10 Agreed. The correct value of 0.05 liters/hour was used in the calculation, as shown in the body of the table. The typo graphic error at the bottom of the table has been corrected.

Comment #11 page 6-75 middle ¶, Tables 6-15, 6-19:

Although RAGS (Volume I) shows a value of 8.4×10^{-4} for the permeability constant of water, EPA's ORD (in its Interim Report 'Dermal Exposure Assessment: Principles and Applications') suggests the figure $\mathbf{5x10^{-4}}$. For the metals evaluated, the ORD report (page 5-49) provides a default value of $\mathbf{10^{-3}}$, in lieu of using the dermal permeability of water. The changes should be made.

Response #11 Agreed. The dermal permeability values have been changed to reflect the values tabulated in the referenced ORD document. In general, these values are $5x10^{-4}$ for organics and $1x10^{-3}$ for metals. However, the document provides values for certain compounds which, when available, were used.

Comment #12 page 6-125 - Figure 6-4: the application of the UBK model for assessment of lead health effects is somewhat misapplied. The model is intended to be fed **average**, and not site-specific RME concentrations. As is evident from the soil/dust value, RME numbers were used. This exercise should be re-run in accordance with the provisions of the model. [It is noteworthy that with the soil concentration that <u>was</u> used, the corresponding graph shows a decidedly higher blood lead concentration registering. This is consistent with the concentration used being substantially more (i.e., more than double) the 1,000 ppm upper bound of the Agency's soil Pb clean-up policy].

Response #12 Agreed. The UBK model has been rerun using mean values instead of 95th UCL values of the mean. The text has been updated to reflect the new modelling results.

Miscellany:

Comment #1 Acronyms and Abbreviation:

a. page 2: 'SEAD' is listed instead of the **'SEDA'** used throughout the document;
b. page 3: 'trichloroethene is misspelled

Response #1 Typographical errors have been changed in the text. The acronym for the Seneca Army Depot was SEAD, but was recently changed to SEDA because the name for the Seneca Army Depot was changed to Seneca Army Depot Activity.

Comment #2 page 3-1, 1st ¶, last sentence: 'After 1987, munitions **were** destroyed by...'

Response #2 The typographical error has been revised in the text.

Comment #3 page 6-126, 1st ¶: the CDC underwent a name-change (but not an acronym change) almost a year ago. It is now the 'Centers for Disease Control **and Prevention'**.

Response #3 Agreed. The correct name for the CDC has been added to the text.

ECOLOGICAL RISK ASSESSMENT

In general, the approach to putting together an ecological risk assessments is acceptable. Specific comments follow. Those marked with an * are the more significant technical comments.

Comment #1 Section 3.9:

*a. a map (of any sort, nevertheless to scale) is a requisite for evaluating the benthic invertebrate community/aquatic assessment program results. I didn't find the information I needed concerning the distance between sampling locations, and in general depicting other geographical/physiographical (e.g., substrate type) nuances of the locations.

b. Table 3-13: it wasn't clear why station SW-150 had three fish sampling modes applied, whereas the other stations had only electroshocking performed. There were several instances of significant differences in catch values between the two techniques (not unexpected); in calculating the total number of fish caught, there is no rationale given for using the 'S + E' value; one should be provided. Had the electroshock numbers been higher, would the sum of 'S' and 'E' still have been used? It appears that only because there were very small catches (i.e., < 10) by shocking, were these (catches) added to the seine catch numbers.

* An explanation should be provided for the upstream reference location (SW-196) having the least fish caught. It underscores comment #1a above, that calls for a refined description of the stations, and in this case, with the substantiation that SW-196 meets the criteria of a true reference location. See comment #8 below, for more regarding station SW-196.

Response #1

a. Agreed. Figure 3-20 has been revised to include the location of benthic invertebrate sampling in the drainage swale and in Reeder Creek.

b. Agreed. As discussed in Section 2.7.5 of this RI report, two methods of fish sampling, electroshocking and seining, were utilized at the site depending upon the stream conditions encountered. Seining was used at Station SW-150 because this was the only station on Reeder Creek where the stream bed was not clearly visible throughout the length of the station (the station is located upstream of a beaver dam). Collection from seining was carried out three weeks prior to electroshocking and was used to obtain voucher specimens for identification. Refer to Section 2.7.5 for a detailed discussion of the fish sampling procedures.

The results presented on Table 3-13 for Station SW-150 are for seining (S), electroshocking (E), and the sum of seining and electroshocking (S&E). This sum was added into the total number of fish collected in order to characterize the site. In a later discussion comparing the total number of individuals collected at each station, only the electroshocking data from Station SW-150 was used (¶4, Section 3.9.1.2) in order to be consistent with the sampling technique used at the other fish collection stations. A footnote has been added to Table 3-13 to clarify the S+E value.

SW-196 was selected as the reference sampling location during the planning phases of this investigation because it is the most upstream location from the site that has similar ecological characteristics to

Reeder Creek as the creek flows past the OB grounds. Further upstream of Location SW-196, the creek flows under a security access road and becomes a series of drainage ditches. It was not known during the selection of this location that the number of fish collected would be less but, following the requirements in the EPA approved workplan, sampling was performed at this location. One possible explanation for the small number of fish collected at this location could be due to the compacts the two (2) beaver dams may have upon the Dissolved Oxygen (DO) of that section of the stream of possibly the beavers are utilizing the fish trapped in the confines of the beaver dam as a source of food.

Comment #2 page 3-55, last sentence: the document must provide a substantiation for the claim regarding fish tumors, or else withdraw the claim.

Response #2 Agreed. The claim on page 3-55 regarding fish tumors has been withdrawn.

Comment #3 page 3-58, 2nd ¶, 2nd sentence: this should be deleted as it concerns human feeding habits, and as such is irrelevant to the ecological risk assessment.

Response #3 Agreed. The referenced sentence has been removed from the text.

Comment #4 page 3-59, 2nd ¶: delete for the same reason given in comment 3 above.

Response #4 Agreed. The referenced paragraph has been removed from the text.

Comment #5 * page 3-77, 2nd ¶: the author's acknowledgement here, that site surveys were conducted at less than an optimal time of the year, does not correct for the fact that critical eco-receptor information was never collected. It hampers the efficacy of the assessment, especially with regard to the plant species associated with the site. The 3rd ¶ of page 3-80 should be deleted, for there can be no basis to such statements when the field effort was admittedly less than intensive, as well as being conducted at the wrong time. Other similar statements to be removed are: the last sentence of page 3-81, page 6-129, 1st ¶, 3rd sentence, page 6-143, 2nd ¶, last 3 sentences, page 6-143, 3rd ¶, last two sentences (this one for the lack of a basis in addition to being irrelevant to the eco assessment), page 6-132, 2nd bullet point, and page 6-172, 4th ¶.

Response #5 Exception. The ecological assessment conducted at this site collected a substantial amount of critical ecological data. This includes the aquatic fish community data, the macroinvertebrates in sediments, vegetative species present and also the mammals present at the site. A wetland survey and small mammalian trapping survey were also performed. ES believes that this information is sufficient to address the goals of this effort which is to determine the ecological status of the site. The opinions expressed regarding the ecological communities observed at the site are valid and were based upon the collected data and the impressions of the ES ecological staff. If specific limitations can be identified than these limitations will be considered and the conclusions could be modified. Further, this program was described in an EPA and NYSDEC approved workplan. These workplans were revised to include any comments that EPA had. There was non indication from the comments that this ecological survey was inadequate or that performing the survey in the fall was unacceptable. The statement that no intensive sampling

was conducted was meant to indicate that an intensive tissue sampling program was not performed. This was deleted from the text since an intensive field data collection program was done, minus tissue sampling.

Comment #6 page 6-130, 2nd ¶: 'macroinvertebrate' is misspelled twice.

Response #6 Agreed. The misspelling has been corrected.

Comment #7 page 6-134, 2nd ¶: delete as this does not relate to the ecological assessment.

Response #7 Agreed. The referenced paragraph has been deleted.

Comment #8 page 6-136, next-to-last sentence: here again, an explanation is needed to justify SW196 as being a proper reference point; in addition to having the least fish catch numbers (see comment #1b, 2nd ¶), the fish at this station had the most tumors.

Response #8 Agreed. The reference station SW-196 was chosen because this location was the furthest upstream location which was ecologically similar in nature to the creek as it passes adjacent to the OB ground. SW-196 is adjacent to the SEDA security patrol road. As Reeder Creek passes below this patrol road, through a concrete culvert to the other side of the culvert, the creek becomes essentially a drainage ditch. During the construction of the depot, the course of the creek was diverted and controlled through the construction of this drainage ditch. The ecological nature of the creek on the other side of the road was not considered similar to the conditions at SW-196, therefore, the location at SW-196 was chosen as a reference station. A detailed description of station SW-196 as a reference point may be found in Section 2.7.2. Station SW-196 is located on Reeder Creek 0.5 mile upstream of the OB ground site and is away from the influence of OB ground runoff. Further, the movement of fish between Stations SW-150 and SW-196 is impeded by at least two beaver dams, and it is unlikely that fish collected at the reference station SW-196 would have spent time in areas of Reeder Creek influenced by any OB ground runoff. Thereby, providing a natural upstream "fishtank".

During the process of preparing the workplan and locating the reference station, this location was clearly identified as the reference station and accepted by all reviewers of the workplan. The fact that low numbers of fish were caught at this location is unexpected, however, may be attributable to the confined habitat caused by the beaver dam or to other unknown influences beyond the scope of this project.

Tumors on the fish at SW-196 appeared to be caused by parasites and did not appear to be cancerous in nature. Conditions at SW-196 may favor the growth of such parasites. In addition, since there was not a large number of fish caught at the site the number of parasite fish is a greater percentage of the total.

Comment #9 page 6-138:

a. 2nd ¶, 1st sentence: delete last five words (as per comment 3 above);

b. 4th ¶: delete as per comment #3.

Response #9 Agreed. The referenced text has been deleted.

Comment #10 page 6-143, 3rd ¶: delete as per comments #3 and 6.

Response #10 Agreed. The referenced paragraph has been deleted.

Comment #11 * the risk assessment, beginning with page 6-146, does not follow an anticipated approach of selecting representative receptor species, and applying a food (chain) modeling argument. In deference to page 6-156 1st ¶, last sentence, such an assessment would not have been beyond the scope of the study. Since a comparison of database and literature value contaminants information is set against organisms - by medium, I don't see the need to have honed in on a select receptor list. In other words, simply screening on-site contaminants concentrations against 'mammals' instead of selecting a particular representative member of that group, would have been sufficient.

*** The term '95% UCL' is not defined in the document, and therefore I cannot be sure what onsite concentrations the document is screening. This term affects all site media.** As the document is performing a screening, rather than a food chain-based appraisal, the preferred approach would have been to compare the maximum value of each contaminant against the benchmark for that particular medium/effect. [If there are no exceedances of the benchmark when using the max 'hit', we can assume, for a particular contaminant, that there is no eco risk issue to be concerned with.] Something may have been lost in using this undefined statistic.

* Nowhere is it stated what the soil and sediment depths are that are being screened, and therefore upon what the 95% UCL represents. If the 95% UCL's are of depths other than the classical 0-6 inch interval, or a mixture of the 0-6 inch fraction with shallower and deeper fractions, the comparisons are not valid.

Response #11 Exception: Although a food chain model was not performed, the criteria used for comparison with site data were based upon were formulated from food chain uptake considerations. For example, NYSDEC has developed guidelines to protect wildlife that consume aquatic life in contact with contaminated sediments. The approach used by NYSDEC in developing these criteria were based upon the accumulation of pollutants in from sediment to aquatic animals and then to wildlife. Exceedance of the wildlife residual residue based criterion for a chemical would be predicted to cause accumulation of the chemical in aquatic animals to levels that would be harmful to wildlife consumes of the animals. The same is true for the other guidelines used as guidelines. The ecological risk assessment has obtained

similar guidelines for protection of terrestrial vegetation that may accumulate pollutants from soils, (Table 6-45), for protecting wildlife that may accumulate pollutants from sediment and soils, (Table 6-46), for the protection of wildlife that may utilize surface water as a source of drinking water, (Table 6-47), for the protection of aquatic life is surface water, (Table 6-48), and for protection of aquatic life that may come into contact with sediment, (Table 6-48). ES believes that the approach of comparing such criteria is equivalent to a food chain modelling approach. Further, if such an approach were to be performed the procedures and assumption that would be required to estimate such values and methodologies would have to be discussed and agreed to. As for as ES is aware, EPA has not developed such a model. The sentence which suggested that performing site specific toxicological testing was beyond the scope of this study, originally on page 6-156 now on page 6-181, has been modified to indicate that toxicological testing was not performed as part of this study. The intent of the original statement was to suggest toxicological testing was beyond the scope of the existing contractual agreement between ES and the Army. However, it should be noted that toxicological testing was not necessary from the results of the Phase I ecological assessment. Further, if toxicological testing is a requirement, then ES will need to modify the existing delivery order with the Army to include this effort. This contractual process will require time to complete, delaying the completion of this report. Receptor species were selected because allowable acute or chronic data could be obtained or estimated from the literature. Such information was not available for groups such as mammals.

It is unclear as to what specific approach was anticipated to be used for selecting indicator species, however, the factors considered in selecting ecological indicator receptors are described in Section 6.6.4.2. Receptor species were selected for vegetation, invertebrates, fish, buds and mammals. The specific species and the reasons for selecting these receptors are listed in Table 6-44. The maximum detected value has been added to all ERA tables and when appropriate, used as the comparison concentration.

The 95% UCL is now defined in the document. The acronym has been corrected to "95th UCL" and refers to the 95th upper confidence limit of the mean. The 95th UCL was used for comparison because EPA risk assessment guidance indicates on page 6-19 of the Risk Assessment Guidance for Superfund (RAGS) that because of the uncertainties associated with any estimate of exposure concentration the 95th UCL of the mean will be used. For consistency, the exposure concentrations for both the human health and the ecological risk assessment were set at the 95th UCL of the mean. The soil depths used for evaluation purposes were the 0-to 2-foot interval, which corresponds to the surface soil database used for the human health risk assessment. During the Phase 2 sampling program, the surficial soil sampling interval was refined to include only the 0-6 inch zone. Both phases of data were combined to one database for evaluation of risk. All sediment samples are from the 0- to 6- inch interval.

Comment #12 page 6-153, last ¶, 2nd sentence: the source for the claim of organics other than herbicides not being a major plant stressor, should be provided.

Response #12 Agreed. No such reference exists and this sentence has been deleted.

Comment #13 page 6-156, 1st ¶, 2nd sentence: 'There are, **however,** toxicological testing..'

Response #13 Agreed. The text has been changed to reflect this change.

Comment #14 page 6-156, 2nd ¶, 2nd sentence: Table 6-38 does not present toxic contaminant concentrations for rabbit or mice, as the text implies it does.

Response #14 Agreed. The text has been changed to indicate that Table 6-46, previously Table 6-38, presents toxic concentrations for rats and mallard ducks.

Comment #15 page 6-159, last sentence: the words 'absent or' don't appear to belong; the sentence is incomprehensible with their inclusion.

Response #15 Agreed. The works "absent or" have been deleted from the text.

Comment #16 page 6-160, 1st sentence: this is not the correct definition of 'sediment'.

Response #16 Agreed. A new, more accurate, definition of "sediment" has been included.

Comment #17 page 6-166, 1st ¶: '..both the rat **and** mallard.'

Response #17 Agreed. The word "or" has been replaced by "and" in the referenced text.

Comment #18 page 6-166, 2nd ¶: an example should be provided where the literature-reported acute soil concentration is adjusted as described.

Response #18 Agreed. An example has been provided in the text.

Comment #19 page 6-168, 3rd ¶: it's not clear what the 'first approach' (see 3rd sentence) is that the ¶ is discussing. If it's not in the document, it should be deleted.

Response #19 Agreed. The first approach, described in the text was conducted separate to the ERA. The reference to this evaluation will be deleted.

Comment #20 * Table 6-40: the basis of 'note b' that the surface water standards/criteria are based on a hardness of 400 mg/L $CaCO_3$, should be provided. Although it is true that a number of the metals are hardness-dependent, there should be a reference to the regulatory standards having been adjusted from a different water quality (e.g., 100 ppm CaCO3 for AWQC), as well as a proof that the water quality onsite has 400 ppm $CaCO_3$. Finally, it would help if the table differentiated between those numbers that derive from the USEPA reference and those that derive from the NYSDEC reference.

Response #20 Agreed. The basis for using a hardness of 400 mg/L $CaCO_3$ for the standards and criteria in Table 6-40 will be described. The hardness was estimated using the Standard Methods equation for calculating hardness from calcium and magnesium concentrations. Using the 95th UCL calcium and magnesium concentrations yielded a hardness of approximately 320 mg/l. This value was rounded to 400 mg/l, partly to account for contributions to hardness from other polyvalent cations, and partly for ease of calculation. It should be noted that the values presented in this table are for comparison purposes only. If any remedial actions for Reeder Creek are necessary, actual hardness data will be obtained, and precise water quality standards and criteria will be developed.

The hardness dependent values were calculated using the formulas provided in the regulations. For example, the NYSDEC standard for copper is calculated by:

Std = exp (0.9422 ((Ln [ppm hardness])) - 1.464)
Std = exp (0.9422 ((Ln [400])) - 1.464)
Std = exp (0.9422 [5.99] - 1.464)
Std = exp (4.18)
Std = 65

In the table, the columns labeled "Federal Acute" and "Federal Chronic" derive from the EPA reference. The column labeled "NYSDEC AWQC" is the from NYSDEC reference.

Comment #21 * page 6-172, 2nd ¶: the 2nd sentence is an incorrect summarization of the degree to which the criteria are exceeded by the sediment 95% UCL's (of Table 6-41); the criteria are exceeded by anything but 'small amounts' (witness Cd, Hg, and Zn, for example). NOAA's ER-L and ER-M's should also have been used in Table 6-41 as screening numbers. As per comment #11(¶2), these NOAA numbers should have been compared with the max 'hits'.

Response #21 Agreed. The NOAA values and the max "hits" have been added to the table (now Table 6-49). For organics, because non-detects are considered as one-half of the detection limits, the max "hits" for sediment were typically much lower than the 95th UCL concentrations, indicating minimal risks. For metals, the maximum values did exceed some criteria.

Comment #22 page 6-173, 4th ¶, last word: 'species', whether the singular or plural case.

Response #22 The typographical error has been corrected.

Comment #23 * Page 6-174, 2nd ¶: the jurisdictional status of the wetland parcels has to be 'formally determined'.

Response #23 Agreed. Text has been added to the referenced paragraph to note that the jurisdictional status of the wetlands needs to be determined.

Comment #24 page 6-174: in all of the wetland sediments discussion, the TOC and grain size of the sediment is not provided; the 3rd ¶ of the page is a good example

of how the sediment information was only minimally used. The concentrations should have been used to make statements other than the possible influence on cattail survival. Knowing that the plant toxicological database is weak, the discussion should have looked beyond the effect on the plant, and also speculated on the possible ramifications of the cattails serving as a diet item for other wetland fauna. Also, should the contaminants favor stunting of the plant, the ecological consequences of reduced habitat might have been considered.

Response #24

Agreed. TOC and grain size analyses of the sediment were not collected or performed as part of this ecological investigation because it was not specified in the EPA approved workplan. During the preparation of the workplan the added expense of collecting this data could not be justified since the ultimate determination of environmental quality was to be based upon chemical specific sediment data, not TOC or grain size. The determination of analyte concentrations in various environmental media were considered more relevant in determining if any impacts had occurred because comparisons with criteria, standards and guidance could be made. To the extent possible, sediment samples were collected from locations in Reeder Creek and the on-site wetlands where fines and organic matter would accumulate the most. These locations were areas of low velocity and are described in the field sampling sheets. Although grain size and TOC analyses were not performed, the samples are representative of the sediment quality at locations where pollutants have the highest potential to accumulate.

Determining the bioaccumulation of constituents of concern from sediment or soil to plants or other wetland fauna could be determined but ultimately a comparison to some guideline, criteria or standard would have to be performed. This ecological assessment did these comparisons for soil quality considered harmful to terrestrial vegetation, for soil/sediment quality considered harmful to wildlife through the ingestion pollutants during daily foraging activities, for exposure to pollutants from ingestion of surface water considered harmful to wildlife, for surface water quality considered harmful to aquatic life and for sediment quality considered harmful to aquatic life. This effort has considered all pertinent ecological risk pathways and there is no need to other ecological risk assessment techniques.

APPENDIX K

U.S. FISH AND WILDLIFE SERVICES LETTER ON ENDANGERED OR THREATENED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, New York 13045

June 21, 1994

Mr. Michael Duchesneau
Project Manager
Engineering-Science, Inc.
Prudential Center
Boston, MA 02199

Dear Mr. Duchesneau:

This responds to your letter of May 12, 1994, requesting information on the presence of endangered or threatened species in the vicinity of the Seneca Army Depot located at Romulus, Seneca County, New York.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the U.S. Fish and Wildlife Service (Service). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered. A compilation of Federally listed and proposed endangered and threatened species in New York is enclosed for your information.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact:

New York State Department of
Environmental Conservation
Region 8
6274 East Avon-Lima Road
Avon, NY 14414
(716) 226-2466

New York State Department of
Environmental Conservation
Wildlife Resources Center - Information Serv.
New York Natural Heritage Program
700 Troy-Schenectady Road
Latham, NY 12110-2400
(518) 783-3932

The National Wetlands Inventory (NWI) maps of the Dresden, Geneva South, Ovid, and Romulus Quadrangles are now available in draft form and there may be wetlands in the project vicinity. Copies of NWI maps may be obtained through:

CLEARS
Cornell University
464 Hollister Hall
Ithaca, NY 14853
(607) 255-6520

An order form listing the topographic quadrangles that have been mapped in New York State is enclosed for your information. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes.

Work in certain waters and wetlands of the United States may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without stipulations, or recommend denial of the permit depending upon the potential adverse impacts on fish and wildlife resources associated with project implementation. The need for a Corps permit may be determined by contacting Mr. Paul Leuchner, Chief, Regulatory Branch, U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, NY 14207 (telephone: (716) 879-4321).

If you have any questions regarding this letter, contact Tom McCartney at (607) 753-9334.

Sincerely,

Mark W. Clough

ACTING FOR

David A. Stilwell
Acting Field Supervisor

Enclosures

cc: NYSDEC, Avon, NY (Regulatory Affairs)
NYSDEC, Latham, NY
COE, Buffalo, NY
EPA, Chief, Marine & Wetlands Protection Branch, New York, NY

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES IN NEW YORK

Common Name	Scientific Name	Status	Distribution
FISHES			
Sturgeon, shortnose*	*Acipenser brevirostrum*	E	Hudson River & other Atlantic coastal rivers
REPTILES			
Turtle, green*	*Chelonia mydas*	T	Oceanic summer visitor coastal waters
Turtle, hawksbill*	*Eretmochelys imbricata*	E	Oceanic summer visitor coastal waters
Turtle, leatherback*	*Dermochelys coriacea*	E	Oceanic summer resident coastal waters
Turtle, loggerhead*	*Caretta caretta*	T	Oceanic summer resident coastal waters
Turtle, Atlantic ridley*	*Lepidochelys kempii*	E	Oceanic summer resident coastal waters
BIRDS			
Eagle, bald	*Haliaeetus leucocephalus*	E	Entire state
Falcon, peregrine	*Falco peregrinus*	E	Entire state - re-establishment to former breeding range in progress
Plover, piping	*Charadrius melodus*	E	Great Lakes Watershed
		T	Remainder of coastal New York
Tern, roseate	*Sterna dougallii dougallii*	E	Southeastern coastal portions of state
MAMMALS			
Bat, Indiana	*Myotis sodalis*	E	Entire state
Cougar, eastern	*Felis concolor couguar*	E	Entire state - probably extinct
Whale, blue*	*Balaenoptera musculus*	E	Oceanic
Whale, finback*	*Balaenoptera physalus*	E	Oceanic
Whale, humpback*	*Megaptera novaeangliae*	E	Oceanic
Whale, right*	*Eubalaena glacialis*	E	Oceanic
Whale, sei*	*Balaenoptera borealis*	E	Oceanic
Whale, sperm*	*Physeter catodon*	E	Oceanic
MOLLUSKS			
Snail, Chittenango ovate amber	*Succinea chittenangoensis*	T	Madison County
Mussel, dwarf wedge	*Alasmidonta heterodon*	E	Orange County - lower Neversink River

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service.

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FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES IN NEW YORK (Cont'd)

Common Name	Scientific Name	Status	Distribution
BUTTERFLIES			
Butterfly, Karner blue	*Lycaeides melissa samuelis*	E	Albany, Saratoga, Warren, and Schenectady Counties
PLANTS			
Monkshood, northern wild	*Aconitum noveboracense*	T	Ulster, Sullivan, and Delaware Counties
Pogonia, small whorled	*Isotria medeoloides*	E	Entire state
Swamp pink	*Helonias bullata*	T	Staten Island - presumed extirpated
Gerardia, sandplain	*Agalinis acuta*	E	Nassau and Suffolk Counties
Fern, American hart's-tongue	*Phyllitis scolopendrium* var. *americana*	T	Onondaga and Madison Counties
Orchid, eastern prairie fringed	*Platanthera leucophea*	T	Not relocated in New York
Bulrush, northeastern	*Scirpus ancistrochaetus*	E	Not relocated in New York
Roseroot, Leedy's	*Sedum integrifolium* ssp. *Leedyi*	T	West shore of Seneca Lake
Amaranth, seabeach	*Amaranthus pumilus*	T	Atlantic coastal plain beaches

E=endangered T=threatened P=proposed

APPENDIX L

RESPONSE TO COMMENTS