Tables

NOTES applicable to Tables 3 through 6

1) *"Reportable Concentration" equals any amount above MDL.*
2) *Other EPA approved comparable methods, which target the same constituents and have equivalent or lower detection limits, may be used if analyses are conducted by a NC DWR certified laboratory that is certified for the method.*
3) *Submit copies of original laboratory reports.*
4) *Method Detection Limits and Reporting Limits: For target analytes with Maximum Soil Contaminant Concentrations below laboratory reporting limits, the MDL concentration must be indicated with the analytical result and results reported down to the MDL. Results above the MDL, but below the laboratory reporting limit, must be reported and qualified as estimated. The reporting limit concentration must be indicated for all target analytes and must be supported by the inclusion of a calibration standard at this concentration in the calibration curve.*
5) *Laboratories must be certified by the North Carolina DWR to perform the listed methods.*
6) *Required target analytes for the approved methods are listed in the Guidelines for Sampling, Appendix B.*

Table 1

(Version 1 – 2016_11_03)

Maximum Soil Contaminant Concentration Levels (MSCCs)

(See http://deq.nc.gov/about/divisions/waste-management/waste-management-permit-guidance/underground-storage-tanks-section/ust-guidance-documents for current version)

Constituent	CAS#	Soil-to-Water Maximum Contaminant Concentration (Soil mg/kg)	Residential Soil Cleanup Levels (mg/kg)	Industrial/ Commercial Soil Cleanup Levels (mg/kg)
Acenaphthene	83-32-9	8.2	940	24000
Acenaphthylene	208-96-8	11	469	12264
Acetone	67-64-1	24	14000	360000
Aliphatics, C5-C8	N/A	68	939	24528
Aliphatics, C9-C18	N/A	540	1500	40000
Aliphatics, C19-C36	N/A	#	31000	810000
tert-Amyl alcohol (TAA)	75-85-4	0.1		
tert-Amyl methyl ether (TAME)	994-05-8	0.52	1960	51100
Anthracene	120-12-7	940	4600	122000
Aromatics, C9-C22	N/A	31	469	12264
Barium	7440-39-3	290	3100	81000
Benzene	71-43-2	0.0056	18	164
Benzo(a)anthracene (benz(a)anthracene)	56-55-3	0.35	0.88	8
Benzo(b)fluoranthene	205-99-2	1.2	0.88	8
Benzo(g,h,i)perylene	191-24-2	6400	469	12264
Benzo(k)fluoranthene	207-08-9	12	9	78
Benzoic acid	65-85-0	120	62571	1635200
Benzo(a)pyrene	50-32-8	0.096	0.088	0.78
Benzyl alcohol	100-51-6	2	1000	40000
Bis(chloroethyl)ether (BCEE)	111-44-4	0.00016	0.58	5.2
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	6.6	46	410
Bromoform (tribromomethane)	75-25-2	0.026	81	724
Bromomethane (methylbromide)	74-83-9	0.4	22	570
Butanol	71-36-3	2	1000	40000
tert-Butyl alcohol (TBA) (tert-butanol)	75-65-0	0.04	213	1910
n-Butylbenzene	104-51-8	4.3	626	16350
sec-Butylbenzene	135-98-8	3.3	626	16350
tert-Butylbenzene	98-06-6	3.4	626	16350
tert-Butyl formate (TBF)	762-75-4	0.1		
Carbon disulfide	75-15-0	4.3	1564	40880
Chlorobenzene	108-90-7	0.44	312	8176
Chloroform (trichloromethane)	67-66-3	0.37	20	180
Chloromethane (methyl chloride)	74-87-3	0.02	49	440

Constituent	CAS#	Soil-to-Water Maximum Contaminant Concentration (Soil mg/kg)	Residential Soil Cleanup Levels (mg/kg)	Industrial/ Commercial Soil Cleanup Levels (mg/kg)
4-Chlorotoluene (p-chlorotoluene)	106-43-4	0.1	1000	20000
Chromium (Total)	7440-50-8	5.4	47	1226
Chromium III	16065-83-1	4200	23460	613200
Chromium VI	18540-29-9	5.4	47	1226
Chrysene	218-01-9	39	88	780
Dibenz(a,h)anthracene	53-70-3	0.17	0.088	0.78
Dibenzofuran	132-64-9	4.7	62	1635
Dibromochloromethane	124-48-1	0.0021	7	68
1,2-Dichlorobenzene (orthodichlorobenzene)	95-50-1	0.23	1400	36000
1,3-Dichlorobenzene (metadichlorobenzene)	541-73-1	7.6	460	12000
1,4-Dichlorobenzene (paradichlorobenzene)	106-46-7	0.099	110	1000
Dichlorodifluoromethane (Freon-12; halon)	75-71-8	210	3129	81760
1,1-Dichloroethane	75-34-3	0.032	110	1000
1,2-Dichloroethane (ethylene dichloride)	107-06-2	0.0019	7	63
1,2-Dichloroethene (cis)	156-59-2	0.35	156	4000
1,2-Dichloroethene (trans)	156-60-5	0.54	310	8200
1,2-Dichloroethene (cis and trans)	540-59-0	0.35	100	3000
1,1-Dichloroethylene (vinylidene chloride)	75-35-4	0.045	780	20000
2,4-Dichlorophenol	120-83-2	0.0034	40	1000
1,2-Dichloropropane	78-87-5	0.003	10	92
1,3-Dichloropropene (cis and trans isomers)	542-75-6	0.001	5	57
2,4-Dimethylphenol (2,4-xylenol)	105-67-9	0.64	312	8176
Ethanol	64-17-5	16	7000	200000
Ethyl acetate	141-78-6	12	14078	367920
Ethylbenzene	100-41-4	4.9	1560	40000
Ethylene dibromide (1,2-dibromoethane)	106-93-4	0.000098	0.31	2.8
Ethylene glycol	107-21-1	40	31290	817600
Ethyl tert-butyl ether	63-79-23	0.2		
Fluoranthene	206-44-0	290	620	16400
Fluorene	86-73-7	47	620	16400
Hexachlorobutadiene	87-68-3	0.23	4.6	73
2-Hexanone (methyl n-butyl ketone, MBK)	591-78-6	0.1	70	2000
Indeno(1,2,3-cd)pyrene	193-39-5	3.4	0.88	8
Isopropyl benzene (cumene)	98-82-8	1.7	1564	40880
Isopropyl ether (diisopropyl ether)	108-20-3	0.37	156	4088
4-Isopropyltoluene (p-isopropyltoluene, p-cymene)	99-87-6	0.12	100	4000
Lead	7439-92-1	270	400	400
Methanol	67561	16	7821	204400
Methyl ethyl ketone (2-butanone; MEK)	78-93-3	16	9385	245280

Constituent	CAS#	Soil-to-Water Maximum Contaminant Concentration (Soil mg/kg)	Residential Soil Cleanup Levels (mg/kg)	Industrial/ Commercial Soil Cleanup Levels (mg/kg)
Methyl tert-butyl ether (MTBE)	1634-04-4	0.091	350	3100
Methylene chloride	75-09-2	0.02	85	763
Methyl isobutyl ketone (MIBK)	108-10-1	0.4	1200	32000
1-Methylnaphthalene	90-12-0	0.004	20	100
2-Methylnaphthalene	91-57-6	3.6	63	1635
2-Methylphenol	95-48-7	1	700	20000
Naphthalene	91-20-3	0.16	313	8176
Pentachlorophenol	87-86-5	0.0065	5	48
Phenanthrene	85-01-8	56	469	12264
Phenol	108-95-2	0.17	4693	122600
n-Propylbenzene	103-65-1	1.7	626	16350
Pyrene	129-00-0	270	469	12264
Silver	7440-22-4	0.25	78.2	2044
Styrene (ethenylbenzene)	100-42-5	1.5	3128	81760
1,1,1,2-Tetrachloroethane	360-20-6	0.004	20	200
1,1,2,2-Tetrachloroethane	79-34-5	0.001	0.78	20
Tetrachloroethylene (perchloroethylene; PCE)	127-18-4	0.0074	1.1	10
Toluene	108-88-3	4.3	1200	32000
1,2,4-Trichlorobenzene	120-82-1	2.6	156	4088
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	1.6	31000	810000
1,1,2-Trichloroethane	79-00-5	0.002	10	100
Trichloroethylene (TCE)	79-01-6	0.019	4.6	120
Trichlorofluoromethane	75-69-4	29	4692	122640
1,2,4-Trimethylbenzene	95-63-6	8.5	782	20440
1,3,5-Trimethylbenzene	108-67-8	8.3	782	20440
2,4,6-Trichlorophenol	88-06-2	0.01	10	400
Vinyl acetate	108-05-4	0.36	10000	400000
Vinyl chloride	75-01-4	0.00018	0.46	4.1
Xylenes (o-, m-, and p-; mixed)	1330-20-7	4.6	3129	81760

Health based level > 100%

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Table 2
Gross Contamination Levels for Groundwater

(See http://deq.nc.gov/about/divisions/waste-management/waste-management-permit-guidance/underground-storage-tanks-section/ust-guidance-documents for current version)

Compound	CAS #	North Carolina Groundwater Quality Standards* (GWQS) (ug/l)	Gross Contamination Levels for Groundwater (GCL) (ug/l)	BASIS
Acenaphthene	83-32-9	80	2120	SOL
Acenaphthylene	208-96-8	200	1965	SOL
Acetone	67-64-1	6000	6000000	STD
tert-Amyl alcohol (TAA)	75-85-4	40	40000	PQL
tert-Amyl methyl ether (TAME)	994-05-8	128	12800	STD
Anthracene	120-12-7	2000	2000	GWQS
Barium	7440-39-3	700	700000	STD
Benzene	71-43-2	1	5000	DWSTD
Benzo(a)anthracene (benz(a)anthracene)	56-55-3	0.05	4.7	SOL
Benzo(b)fluoranthene	205-99-2	0.05	0.75	SOL
Benzo(g,h,i)perylene	191-24-2	200	200	GWQS
Benzo(k)fluoranthene	207-08-9	0.5	0.5	GWQS
Benzoic acid	65-85-0	30000	1700000	SOL
Benzo(a)pyrene	50-32-8	0.005	0.81	SOL
Benzyl alcohol	100-51-6	700	700000	STD
Bis(2-chloroethyl)ether (BCEE)	111-44-4	0.03	30	STD
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	3	170	SOL
Bromoform (tribromomethane)	75-25-2	4	4000	STD
Bromomethane (methylbromide)	74-83-9	100	100000	STD
Butanol	71-36-3	700	700000	STD
tert-Butyl alcohol (TBA) (tert-butanol)	75-65-0	10	10000	STD
n-Butylbenzene	104-51-8	70	6900	SOL
sec-Butylbenzene	135-98-8	70	8500	SOL
tert-Butylbenzene	98-06-6	70	15000	SOL
tert-Butyl formate (TBF)	762-75-4	40	40000	PQL
Carbon disulfide	75-15-0	700	590000	SOL
Chlorobenzene	108-90-7	50	50000	STD
Chloroform (trichloromethane)	67-66-3	70	70000	STD
Chloromethane (methyl chloride)	74-87-3	3	3000	STD
4-Chlorotoluene (p-chlorotoluene)	106-43-4	24	7500	SOL
Chromium	7440-50-8	10	10000	STD
Chrysene	218-01-9	5	5	GWQS
Dibenz(a,h)anthracene	53-70-3	0.005	1.2	SOL
Dibenzofuran	132-64-9	28	28000	STD
Dibromochloromethane	124-48-1	0.4	400	STD

Compound	CAS #	North Carolina Groundwater Quality Standards* (GWQS) (ug/l)	Gross Contamination Levels for Groundwater (GCL) (ug/l)	BASIS
1, 2-Dichlorobenzene (orthodichlorobenzene)	95-50-1	20	20000	STD
1, 3-Dichlorobenzene (metadichlorobenzene)	541-73-1	200	61500	SOL
1, 4-Dichlorobenzene (paradichlorobenzene)	106-46-7	6	6000	STD
Dichlorodifluoromethane (Freon-12; halon)	75-71-8	1000	140000	SOL
1, 1-Dichloroethane	75-34-3	6	6000	STD
1. 2-Dichloroethane (ethylene dichloride)	107-06-2	0.4	400	STD
1, 2-Dichloroethene (cis)	156-59-2	70	70000	STD
1, 2-Dichloroethene (trans)	156-60-5	100	100000	STD
1,2-Dichloroethene (cis and trans)	540-59-0	60	60000	STD
1, 1-Dichloroethylene (vinylidene chloride)	75-35-4	7	7000	STD
2,4-Dichlorophenol	120-83-2	0.98	980	STD
1, 2-Dichloropropane	78-87-5	0.6	600	STD
1, 3-Dichloropropene (cis and trans isomers)	542-75-6	0.4	400	STD
2,4-Dimethylphenol	105-67-9	100	100000	STD
Ethanol	64-17-5	4000	4000000	STD
Ethyl acetate	141-78-6	3000	3000000	STD
Ethylbenzene	100-41-4	600	84500	SOL
Ethylene dibromide (1,2-Dibromoethane, EDB)	106-93-4	0.02	50	DWSTD
Ethylene glycol	107-21-1	10000	10000000	STD
Ethyl tert-butyl ether	63-79-23	47	47000	STD
Fluoranthene	206-44-0	300	300	GWQS
Fluorene	86-73-7	300	990	SOL
Hexachlorobutadiene	87-68-3	0.4	400	STD
2-Hexanone (methyl n-butyl ketone)	591-78-6	40	40000	STD
Indeno(1,2,3-cd)pyrene	193-39-5	0.05	0.05	GWQS
Isopropyl benzene (cumene)	98-82-8	70	25000	SOL
Isopropyl ether (diisopropyl ether)	108-20-3	70	70000	STD
4-Isopropyltoluene (p-isopropyltoluene, p-cymene)	99-87-6	25	11700	SOL
Lead	7439-92-1	15	15000	STD
Methanol	67-56-1	4000	4000000	STD
Methyl ethyl ketone (2-butanone; MEK)	78-93-3	4000	4000000	STD
Methyl isobutyl ketone (MIBK)	108-10-1	100	100000	STD
1-Methylnaphthalene	90-12-0	1	1000	STD
2-Methylnaphthalene	91-57-6	30	12500	SOL
2-Methylphenol	95-48-7	400	400000	STD
Methyl tert-butyl ether (MTBE)	1634-04-4	20	20000	STD
Methylene chloride	75-09-2	5	5000	STD
Naphthalene	91-20-3	6	6000	STD
Pentachlorophenol	87-86-5	0.3	300	STD

Compound	CAS #	North Carolina Groundwater Quality Standards* (GWQS) (ug/l)	Gross Contamination Levels for Groundwater (GCL) (ug/l)	BASIS
Phenanthrene	85-01-8	200	410	SOL
Phenol	108-95-2	30	30000	STD
n-Propylbenzene	103-65-1	70	30000	SOL
Pyrene	129-00-0	200	200	GWQS
Silver	7440-22-4	20	20000	STD
Styrene (ethenylbenzene)	100-42-5	70	70000	STD
1,1,1,2-Tetrachloroethane	630-20-6	1	1000	STD
1,1,2,2-Tetrachloroethane	79-34-5	0.2	200	STD
Tetrachloroethylene (perchloroethylene; PCE)	127-18-4	0.7	700	STD
Toluene	108-88-3	600	260000	SOL
1,2,4-Trichlorobenzene	120-82-1	70	70000	STD
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	200	200000	STD
1,1,2-Trichloroethane	79-00-5	0.6	600	STD
Trichloroethylene (TCE)	79-01-6	3	3000	STD
Trichlorofluoromethane	75-69-4	2000	2000000	STD
1,2,4-Trimethylbenzene	95-63-6	400	28500	SOL
1,3,5-Trimethylbenzene	108-67-8	400	25000	SOL
2,4,6-Trichlorophenol	88-06-2	4	4000	STD
Vinyl acetate	108-05-4	88	88000	STD
Vinyl chloride	75-01-4	0.03	30	STD
Xylenes (o-, m-, and p-; mixed)	1330-20-7	500	85500	SOL

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SOL – 50% of the solubility at 25 degrees Celsius
DWSTD – 1000 x federal drinking water standard (40 CFR 141)
STD – 1000 x North Carolina groundwater quality standard (15A NCAC 2L .0202)
GWQS – 50% Solubility is less than GWQS
* includes interim Groundwater Quality Standards

Table 3
Approved Methods for Soil Analyses at Petroleum UST Closures and Over-Excavation and at Site Checks

Suspected Contaminant	Analytical Methods for Tank Closure, Site Check, or Other Preliminary Investigation Samples	Analytical Methods for Samples from an Over-Excavation Following a Release Abatement
1a. Low Boiling Point Fuels: *(gasoline, gasohol, aviation gasoline, etc.)*[a]	MADEP VPH – GRO Range[b] **or** EPA 8260B – GRO Range[b] **or** EPA 8015C TPH-GRO[b] **or** UVF-TPH (GRO)[b,c]	EPA 8260B **and** MADEP VPH
1b. Ethanol-Gasoline Blends *(of E85 and greater)*	EPA 8260B *(w/ Ethanol, ETBE, TAA, TAME, TBA, & TBF)*	EPA 8260B *(w/ Ethanol, ETBE, TAA, TAME, TBA, & TBF)* **and** MADEP VPH
2. Medium/High Boiling Point Fuels: *(kerosene, diesel, jet fuels, fuel oil #2, biodiesel containing diesel, Varsol, mineral spirits, naphtha, etc.)*	MADEP VPH – GRO Range[b] **or** EPA 8260B – GRO Range[b] **or** EPA 8015C TPH-GRO[b] **or** UVF-TPH (GRO)[b,c] **and** EPA 8015C TPH-DRO **or** UVF for TPH (DRO)[c]	EPA 8260B, EPA 8270D, MADEP VPH, **and** MADEP EPH
3. Heavy Fuels: *(#4, #5, #6 fuel oils, motor oil, hydraulic fluid, Mineral oil*[d]*, etc.)*	EPA 8015C for TPH-DRO **or** UVF for TPH (DRO)[c]	EPA 8270D **and** MADEP EPH
4. Used / Waste Oil[e]	EPA 8260B, EPA 8270D, MADEP VPH, MADEP EPH, (**or** UVF for TPH and PAH)[c] **and** EPA 3050B or 3051A Prep: Total Metals (Cr & Pb),	EPA 8260B, EPA 8270D, MADEP VPH, MADEP EPH, **and** EPA 3050B or 3051A Prep: Total Metals (Cr and Pb),

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a For tanks in operation prior to 1996 with a potential for storage of leaded fuel, or tanks used to store aviation gasoline or leaded racing gasoline at any point, analyze for Pb, EPA 3050B or 3051A Prep: Total Metals (Pb).

b During DEQ evaluation of alternate TPH Action Limits, also analyze and report individual benzene, ethylbenzene, toluene, and xylenes (o-, m-, & p-; mixed) using EPA 8260, EPA 8021, or MADEP VPH.

c Only UVF technology with product (fuel) identification and calibration approved by DWM is allowed as a TPH equivalent. (Other equivalent methods for TPH analysis may be approved by DWM for the initial investigation if determined to meet these requirements.)

d Carbon chains in mineral oils range from approximately C_{12}-C_{45}.

e For any waste oil investigations other than at a service station or garage, also sample for pesticides using EPA 8081B and polychlorinated biphenyl (PCBs) using EPA 8082A

Table 4
Approved Methods for Groundwater Analyses at Petroleum UST Closures and Release Investigations (All Phases)

Suspected Contaminant	Analytical Methods (See Notes)
1. Low Boiling Point Fuels: *(gasoline, aviation gasoline, gasohol, ethanol-gasoline blends, etc.)*	SM 6200B[a,b], MADEP VPH, **and** Metals (Pb)[d,e],
2. Medium/High Boiling Point Fuels: *(jet fuels, kerosene, diesel, fuel oil #2, biodiesel cont. diesel, Varsol, mineral spirits, naphtha, etc.)*	EPA 602[f] with Xylenes, **or** EPA 6200B EPA 625 Base/ Neutrals and Acids plus 10 largest non-target peaks, MADEP VPH, **and** MADEP EPH
3. Heavy Fuels: *(#4, #5, #6 fuel oils; motor oil, hydraulic fluid, Mineral oil[c], etc.)*	EPA 625 Base/ Neutrals and Acids plus 10 largest non-target peaks, **and** MADEP EPH
4. Used / Waste Oil	SM 6200B, EPA 625 Base/ Neutrals and Acids plus 10 largest non-target peaks, MADEP VPH, MADEP EPH, **and** Metals (Cr and Pb)[d]

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a For EDB, also use EPA Method 504.1, initially and at closure.

b Only analyze for full list of target analytes for SM 6200B (in *Guidelines for Sampling*, Apx. B) at initial ground water investigation (e.g., IAA/ IAR or LSA) unless DWM directs otherwise.

c Carbon chains in mineral oils range from approximately C_{12}-C_{45}.

d Use methods for metals from sources listed in 15A NCAC 2L .0112 and .0413

e For tanks in operation prior to 1996 with a potential for storage of leaded fuel, or tanks used to store aviation gasoline or leaded racing gasoline at any point, analyze for Pb, EPA 3050B or 3051A Prep: Total Metals (Pb)

f May use Standard Method 6200B in lieu of EPA 602.

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Table 5
Approved Methods for Soil Analyses at Non-Petroleum UST Closures and Release Investigations

Suspected Contaminant	Analytical Methods (See Notes)
1. Halogenated Solvents 2. Non-Halogenated Solvents	EPA 8260B
3. Non-Petroleum - Unknown	Contact NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171
4. Pesticides	Contact NC Dept. of Agriculture and Consumer Services / Pesticide Section (919) 707-3000 **and** NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171
5. For substances not covered in #1 through #4	Contact NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171

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Table 6
Approved Methods for Groundwater Analyses at Non-Petroleum UST Closures and Release Investigations

Suspected Contaminant	Analytical Methods* (See Notes)
1. Solvents: a. Halogenated/Non-Halogenated b. Ethanol, c. Ethylene Glycol d. Formaldehyde	 a. EPA 8260B b. EPA 8260B c. EPA 8260B d. EPA 8315A
2. Non-Petroleum - Unknown	Contact NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171
3. Pesticides	Contact NC Dept. of Agriculture and Consumer Services / Pesticide Section (919) 707-3000 **and** NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171
4. For substances not covered in #1 through #4	Contact NC DEQ/ UST Section Regional Office **or** Central Office - Corrective Action Branch (919) 707-8171

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Table 7
Sample Containers and Preservatives for Soil Analyses

Method	Number and Type of Containers	Preservation	Holding Times
EPA 8015C GRO or MADEP VPH	Duplicate pre-weighed VOA vials with methanol *and* Teflon-lined screw caps, **and** Extra VOA vial w/o preservative[a]	Cool to 4±2°C	28 days
	Duplicate pre-weighed empty VOA vials with Teflon-lined screw caps, **and** Extra VOA vial w/o preservative[a]	Cool to 4±2°C **and** Complete laboratory preservation[b] **or** analyze within 48 hours	
EPA 8260B[c]	Duplicate pre-weighed VOA vials w/ de-ionized water, sodium bisulfate, *and* stir bar, **and** Duplicate pre-weighed VOA vials with methanol, **and** Extra VOA vial w/o preservative[a]	Cool to 4±2°C **and** complete laboratory preservation[b] **or** analyze within 48 hours	14 days
EPA 8015C DRO, EPA 8270D, EPA 8081B, or EPA 8082A	8-oz glass jar with Teflon-lined screw cap	Cool to 4±2°C	Extract within 14 days **and** analyze extracts within 40 days of extraction.
MADEP EPH	4-oz (120-ml) wide-mouth amber glass jar with Teflon-lined screw cap	Cool to 4±2°C	Extract within 14 days **and** analyze extracts within 40 days of extraction.
Total Metals	500-ml polyethylene **or** glass jar	Cool to 4±2°C	6 months

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a Use for dry weight determination and for soil characterization (i.e., laboratory effervescence check) of low-concentration samples suspected to contain carbonate minerals.

b See the *Guidelines for Sampling*, current version, for details on preservation options. Consult with the laboratory when selecting the preservation option and ensure option is documented with analytical results. If low level sodium bisulfate or equivalent preservation is required, check with the laboratory that will be doing the analysis for any other requirements. Sample size should be limited to 5 to 10 grams, depending on soil type. See the *Guidelines for Sampling*, current version, for additional information.

c Soil Samples collected for the analysis of ethanol and ethanol-gasoline blend releases must be analyzed with no delay.

Table 8
Sample Containers and Preservatives for Groundwater Analyses

Method	Number and Type of Containers	Preservative[a]	Holding Times
EPA 8260B, SM 6200B, or MADEP VPH	Triplicate 40-ml VOA vials with Teflon-lined septa screw cap	Add 3 to 4 drops of 1:1 HCl **and** Cool to 4±2°C	14 days
MADEP EPH	1-L amber glass with Teflon-lined screw cap	Add 5 ml of 1:1 HCl (to pH<2) **and** Cool to 4±2°C	Samples must be extracted within 14 days **and** extracts analyzed within 40 days.
EPA 625	1-L amber glass with Teflon-lined screw cap	Cool to 4±2°C	Samples must be extracted within 14 days **and** extracts analyzed within 40 days.
Metals (Cr and Pb)	500-ml polyethylene **or** glass jar	Add 5 ml of 1:1 HNO_3 (to pH<2) **and** Cool to 4±2°C	Samples must be analyzed within 6 months.
EPA 504.1	40-ml VOA vials with Teflon-lined septa screw cap	Add 3mg sodium thiosulphate **and** Cool to 4±2°C	Samples must be extracted **and** extracts analyzed, all within 14 days.

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a Check with the laboratory that will be doing the analysis for any other requirements.

Table 9 - Worksheet for Calculating MADEP Soil Sample Results

Contaminant	Analytical Method	Hydrocarbon Fraction Ranges	Analytical Hydrocarbon Fractions		Laboratory Results Concentration	Final VPH and/or EPH Concentrations (mg/kg)	Residential MSCC (mg/kg)	Industrial/ Commercial MSCC (mg/kg)	Soil-to-Groundwater MSCC (mg/kg)
Low Boiling Point Fuels: (*gasoline, aviation gasoline, gasohol, etc.)*	MADEP VPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x mg/kg	x	939	24528	68
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a mg/kg	a	1500	40000	540
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c mg/kg	c	469	12264	31
Medium/ High Boiling Point Fuels*: (jet fuels, kerosene, diesel, fuel oil #2, Varsol, mineral spirits, naphtha, etc.)*	MADEP VPH and MADEP EPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x mg/kg	x	939	24528	68
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a mg/kg	a + b	1500	40000	540
			C9-C18 Aliphatics	EPH	b mg/kg				
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y mg/kg	y	31000	810000	Considered immobile
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c mg/kg	c + d	469	12264	31
			C11-C22 Aromatics	EPH	d mg/kg				
Heavy Fuels: (*#4, #5, #6 fuel oils; motor oils; hydraulic fluid; Mineral oil*; etc.)*	MADEP EPH	C9-C18 Aliphatics	C9-C18 Aliphatics	EPH	b mg/kg	b	1500	40000	540
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y mg/kg	y	31000	810000	Considered immobile
		C9-C22 Aromatics	C11-C22 Aromatics	EPH	d mg/kg	d	469	12264	31
Used / Waste Oil	MADEP VPH and MADEP EPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x mg/kg	x	939	24528	68
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a mg/kg	a + b	1500	40000	540
			C9-C18 Aliphatics	EPH	b mg/kg				
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y mg/kg	y	31000	810000	Considered immobile
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c mg/kg	c + d	469	12264	31
			C11-C22 Aromatics	EPH	d mg/kg				

* Carbon chains in mineral oils range from approximately C_{12}-C_{45}.

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Table 10 - Worksheet for Calculating MADEP Groundwater Sample Results

Contaminant	Analytical Method	Hydrocarbon Fraction Standard Ranges	Analytical Hydrocarbon Fractions		Laboratory Results Concentration	Final VPH and/or EPH Concentrations (µg/L)	Final and Interim Groundwater Quality Standards (µg/L)
Low Boiling Point Fuels: (*gasoline, aviation gasoline, gasohol, etc.)*	MADEP VPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x µg/L	x	400
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a µg/L	a	700
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c µg/L	c	200
Medium/ High Boiling Point Fuels: *(jet fuels, kerosene, diesel, fuel oil #2, Varsol, mineral spirits, naphtha, etc.*)	MADEP VPH and MADEP EPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x µg/L	x	400
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a µg/L	a + b	700
			C9-C18 Aliphatics	EPH	b µg/L		
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y µg/L	y	10000
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c µg/L	c + d	200
			C11-C22 Aromatics	EPH	d µg/L		
Heavy Fuels: *(#4, #5, #6 fuel oils; motor oils; hydraulic fluid; Mineral oil*, etc.)*	MADEP EPH	C9-C18 Aliphatics	C9-C18 Aliphatics	EPH	b µg/L	b	700
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y µg/L	y	10000
		C9-C22 Aromatics	C11-C22 Aromatics	EPH	d µg/L	d	200
Used / Waste Oil	MADEP VPH and MADEP EPH	C5-C8 Aliphatics	C5-C8 Aliphatics	VPH	x µg/L	x	400
		C9-C18 Aliphatics	C9-C12 Aliphatics	VPH	a µg/L	a + b	700
			C9-C18 Aliphatics	EPH	b µg/L		
		C19-C36 Aliphatics	C19-C36 Aliphatics	EPH	y µg/L	y	10000
		C9-C22 Aromatics	C9-C10 Aromatics	VPH	c µg/L	c + d	200
			C11-C22 Aromatics	EPH	d µg/L		

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* Carbon chains in mineral oils range from approximately C_{12}-C_{45}.