

Torrent Laboratory, Inc.

Sample Guide 2007

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General Sample Collection Guidelines

Waters

- Use correct sampling bottles as indicated on container guide
- Fill bottles leaving enough space for the addition of preservative unless tests are “NO HEADSPACE” tests (see following guide)
- For “NO HEADSPACE” parameters use the procedures to minimize loss:
 - Collect samples with as little agitation of sample volume as possible
 - Collect sample into bottles that already contain required preservative
 - Minimize bubble formation by over filling collection bottle before sealing
- Collect enough volume to assure required quality control parameters can be met

Soils/Sediments

- Fill all collection containers as full as possible
- Before sealing, assure correct lids are used to prevent cross contamination
- For sediments containing liquid, take a representative ratio of soil to liquid
- When possible, remove any extraneous materials not relevant to analysis (large rocks, plant material, etc.)

Wipes

- Make sure the material used for wiping is appropriate for the parameter of interest
- If ppm results are required, be sure to include the size of the area wiped
- Take wipe samples in a “back and forth” then “up and down” motion in order to assure that wiped is accurately represented
- If volatiles or semi-volatiles are required, assure correct solvent is used on wipe
- Take a separate wipe for each test required because the entire wipe is required for each method (e.g., metal, pH, pesticides, PCBs, volatiles, Fluoride, etc.)

For All Samples

- Seal sample containers well. For litigation cases apply custody tape
- Label all samples with non-removable marking and water resistant labels
- Keep all samples cold (4°C) but avoid freezing (unless otherwise indicated) until samples are delivered to the laboratory or until a laboratory courier takes custody
- Fill out all laboratory submission forms (Chain of Custody) with correct information
- Pack samples carefully to avoid breakage during transport to the laboratory
- Arrange for sample delivery to the laboratory or sample pick-up by the laboratory as soon as possible in order to avoid the possibility of hold time violations

Tests By Program

California Storm Water Program (Title 22)

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Oil & Grease	EPA 1664/SM5520B
pH	EPA 150.1
Specific Conductance (EC)	EPA 120.1
Total Suspended Solids (TSS)	EPA 160.1
Total Organic Carbon (TOC)	EPA 415.1/415.2
Other Specific Permit Requirements (metals, TTOs, etc)	Various (200.7/624)

CERCLA (Superfund sites including Brownfields, Abandoned Mine Lands, CLP)

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Metals (As, Ba, Cd, Cr, Pb, Hg, Ni, Zn)	EPA 6010B
Pesticides – Aldrin, Dieldrin, DDT, DDE, DDD, Chlordane	EPA 8081
Pentachlorophenol (PCP)	EPA 8270C
Polychlorinated Biphenyls (PCBs)	EPA 8082
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA 8270C/8310
Volatile Halogenated and Aromatic Compounds: Acetone, Benzene, 2-Butanone, Carbon Tetrachloride, Chloroform, 1,1-DCE, 1,2-DCA, Methylene Chloride, Naphthalene, PCE, Toluene, TCE, Vinyl Chloride, Xylene	EPA 8260B

Clean Water Act (NPDES)

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Organic Parameters – Volatile and Semi-Volatile	
Halogenated Compounds by GC	EPA 601
Aromatic Compounds by GC	EPA 602
Phenols	EPA 604
Nitrosamines	EPA 607
Organochlorine Pesticides and PCBs	EPA 608
Polynuclear Aromatic Hydrocarbons (PNAs)	EPA 610
Haloethers	EPA 611
Chlorinated Hydrocarbons	EPA 612
Purgeables by GCMS	EPA 624
Base, Neutrals, Acids (BNAs)	EPA 625
Carbamates and Urea Pesticides	EPA 632
Inorganic Parameters – Metals	
Metals Analysis by GFAA (except Hg)	EPA 200.9
Metals Analysis by ICP-AES (except Hg)	EPA 200.7
Metals Analysis by ICP-MS (except Hg)	EPA 200.8
Mercury Analysis by CVAA	EPA 245.1/245.2
Mercury Analysis by Oxidation P&T, CVAA Fluorescence (ppt levels)	EPA 1632

Tests By Program

Clean Water Act (NPDES)

Commonly Tested Compounds of Concern

Inorganic Parameters –General Chemistry

Asbestos in Water	EPA 100.1
Acidity	EPA 305.1/SM2310-B
Alkalinity	SM 2320B
Ammonia	EPA 350.1/SM4500NH3-B
BOD (Biological Oxygen Demand)	SM 5210B
CBOD (Carbonaceous Oxygen Demand)	SM 5210B
COD (Chemical Oxygen Demand)	EPA 410.4/HACH8000
Chloride	EPA 300.0
Chlorine	SM 4500-Cl G
Chromium, Hexavalent	EPA 218.6
Color	SM 2120 B/C/E
Cyanide and Cyanide, Amenable	EPA 335.4/SM450-CN-E
Fluoride	EPA 300.0
Hardness	EPA 130.1/SM2340B
pH	EPA 150.1/SM4500-H-B
TKN (Total Kjeldahl Nitrogen)	EPA 351.2/351.2/SM4500NH3-D
Nitrate	EPA 300.0/SM4500NO3-D
Nitrate-Nitrite	EPA 300.0/SM4500NO3-E
Nitrite	EPA 300.0/HACH8057
Oil and Grease	EPA 413.1/SM5520B
Organic Carbon (Total)	SM 5310 B,C or D
Ortho-Phosphate	EPA 300.0/SM4500-P-E
Oxygen, dissolved	SM 4500-O C or G
Phenols, Total	EPA 420.1/420.4
Phosphorus	EPA 365.2/SM4500-P-E
Residue, total (TS)	SM 2540B
Residue, Filterable (TDS)	SM 2540C
Residue, Non-Filterable (TSS)	SM 2540D
Residue, Settleable (SS)	SM 2540F
Residue, Volatile (TVS)	EPA 160.4
Specific Conductance	SM 2510B
Sulfate	EPA 300.0/375.2
Sulfide	SM 4500 –S ²⁻ E or D
Sulfite	SM 4500 –SO ₃ ²⁻ B
Surfactants	SM 5540 B
Temperature	SM 2550 B
Turbidity	EPA 180.1/SM2130-B
Biological Tests	
Coliform (total/fecal)	SM9222B/SM9222C
Fecal Streptococci	SM 9230B
Heterotrophic Plate Count	SM 9215B
Radiological Tests	
Gross Alpha and Gross beta	EPA 900
Radium, Total	EPA 903
Aquatic Bioassay Tests (Freshwater)	
Percent Survival, 96 Hour (Non renewal)	EPA 600/2000
Static Renewal, 96 hour	EPA 600/2000/2019

Tests By Program

Clean Air Act

Commonly Tested Compounds of Concern

Common EPA Method

US EPA Compendium Ambient Air Methods

BTEX/TPH	EPA TO-3
Pesticides/PCBs	EPA TO-4
Aldehydes and Ketones	EPA TO-5
Pesticides/PCBs	EPA TO-10
Aldehydes and Ketones	EPA TO-11
Non-methane Organic Compounds	EPA TO-12
Polynuclear Aromatic Hydrocarbons (PAH), Semivolatiles (SVOC)	EPA TO-13
Volatile Organic Compounds (VOC)	EPA TO-14
Volatile Organic Compounds (VOC)	EPA TO-14A
Volatile Organic Compounds (VOC)	EPA TO-15
Volatile Organic Compounds (VOC)	EPA TO-17

US EPA Stationary Source Methods

Volatile Organic Compounds (VOCs)	5041 "VOST"
Non-methane Organic Compounds	EPA 25C
Atmospheric Gases	EPA 3C
Semivolatiles, PAHs	Mod Method 5
Formaldehyde, Other Carbonyl Compounds	Method 00111
Formaldehyde, Other Carbonyl Compounds	Method 0100

EPA CA Air Resources Board Stationary Source Methods

Formaldehyde and Acetaldehyde	CARB 430
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ASTM Methods

Light Hydrocarbon	D-1945
Atmospheric Gases, Ethane, Ethylene	D-1946
Reduced Sulfur Compounds - extended list	D-5504

Miscellaneous Methods

Semivolatiles	EPA 8270
Volatile Organic Compounds	NIOSH 1500
Total Petroleum Hydrocarbons	NIOSH 1501
Total Petroleum Hydrocarbons - Diesel	NIOSH 1550
Methanol	NIOSH 2000
Methane, Ethane, Ethylene(headspace)	RSK-175
Acetone, Acetaldehyde, MEK	NCASI 94.02
MeOH, Phenol, Formaldehyde	NCASI 98.01

Tests By Program

Landfill Monitoring (40 CFR Part 258 Appendix I, II and IX)

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Appendix I	
Metals (Sb,As,Ba,Be,Cd,Cr,Co,Cu,Pb,Ni,Se,Ag,Tl,V,Zn)	EPA 6010B
Volatile Organic Constituents	EPA 8260B
Appendix II	
Cyanide	EPA 9010/9014
Herbicides	EPA 8151
Metals (as above plus Tin)	EPA 6010B
Metals – Mercury	EPA 7470/7471
Pesticides (Chlorinated)	EPA 8081
Pesticides (Organophosphorus)	EPA 8141
Poly Chlorinated Biphenyls (PCBs)	EPA 8082
Semi-Volatile Organic Constituents	EPA 8270C/D
Sulfide	EPA 9030
Volatile Organic Constituents	EPA 8260B
Appendix IX	
Cyanide	EPA 9010/9014
Dioxins/Furans (Congeners)	EPA 8290
Herbicides	EPA 8151
Metals (as above plus Tin)	EPA 6010B
Metals – Mercury	EPA 7470/7471
Pesticides (Chlorinated)	EPA 8081
Pesticides (Organophosphorus)	EPA 8141
Poly Chlorinated Biphenyls (PCBs)	EPA 8082
Semi-Volatile Organic Constituents	EPA 8270C/D
Sulfide	EPA 9030
Volatile Organic Constituents	EPA 8260B
TCLP Extraction for Metals and Semi-volatiles	EPA 1311
TCLP Extraction for Volatiles (Zero Headspace)	EPA 1311
TCLP with DI H2O for Cyanide	EPA 1311 Modified
Misc. Inorganics per specific regulation including but not Limited to – Alkalinity, Anions, Ammonia, EC, Ferrous Iron, pH, TDS, Temp., TOC	EPA 9000 series and SM 2000, 4000, 5000

Tests By Program

LUFT (Leaking Underground Storage Tanks) part of RCRA

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Purgeable Analyses	
Aromatic Hydrocarbons (BTEX)	EPA 8260B/8021B
Hydrocarbon Speciation (C6-C12)	EPA 8015 Mod
Oxygenates (MTBE,DIPE,ETBE,TAME, TBA, Ethanol, 1,2-DCA, EDB	EPA 8260B
TPH as Gasoline, Aviation Gas, Mineral Spirits	GC-MS/8015 mod
Total Extractable Petroleum Hydrocarbons (TEPH)	DHS LUFT/8015 Mod.
TPH as Diesel, Kerosene, Jet Fuels, Oil (Cutting, Motor, Hydraulic, Transformer, Bunker C), Stoddard Solvent, Extractable Scan, Hydrocarbon Speciation (C10 – C24 or C10 – C36)	
Total Recoverable Petroleum Hydrocarbons (TRPH)	
Gravimetric	EPA 1664A/SM 5520
Infrared	EPA418.1 (Waters) SM 5520C (Water/Soil)
Natural Attenuation Parameters (LUFT)	
Alkalinity	EPA 310.1/SM2320B
Carbon Dioxide (CO2)	SM-4500-CO2 A/D
Ferrous Iron	HACH
Manganese	EPA 6010B
Methane/Ethane/Ethene/Dissolved CO2	RSK 175 Mod.
Nitrate	EPA 300.0
Oxygen, Dissolved	EPA 360.1/SM450-O,G
Oxidation-reduction Potential (REDOX)	ASTM D 1498
pH	EPA 150.1/9040B
Specific Conductance	EPA 120.1/9050
Sulfate	EPA 300.0
Sulfide, Dissolved	EPA 376.2/SM4500-S-D
Misc. LUFT Parameters	
Flashpoint	EPA 1010
LUFT Metals (Cd, Cr, Pb, Ni, Zn)	EPA 6010B
Organic Lead	DHS LUFT

RCRA (other than LUFT) Resource Conservation and Recovery Act

RCRA Toxicity Characterization

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Bioassay Fish Toxicity	
Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	EPA 6010B
Pesticides – Endrin, Heptachlor, Lindane, Methoxychlor	EPA 8081
Pentachlorophenol (PCP)	EPA 8270C
Polychlorinated Biphenyls (PCBs)	EPA 8082
Toxaphene	EPA 8081
Semi-Volatile Organics (full list)	EPA 8270C
Volatile Halogenated and Aromatic Compounds	EPA 8260B
Silvex (2,4,5-TP)	EPA 8151A

Tests By Program

RCRA (other than LUFT) Resource Conservation and Recovery Act (cont.)

RCRA EP Toxicity Procedure	EPA 1310
RCRA Toxicity Leaching Procedure (TCLP)	EPA 1311

RCRA Hazardous Waste Characterization

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
Reactivity – Cyanide and Sulfide reaction with water	SW-846 Chapter 7
Corrosivity – pH	EPA 9040B/1110
Ignitability - Pensky-Martens/Setaflash Closed Cup	EPA 1010/1020

Safe Drinking Water Act/Title 22 (California Specific)

<u>Commonly Tested Compounds of Concern</u>	<u>Common EPA Method</u>
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Primary Inorganic Constituents (With MCLs –ppm)

Aluminum	1.	EPA 200.7/200.8
Antimony	0.006	EPA 200.8/200.9
Arsenic	0.05	EPA 200.7/200.8
Asbestos	7 MFL*	EPA-600/M4-82-020
Barium	1.	EPA 200.7/200.8
Beryllium	0.004	EPA 200.7/200.8
Cadmium	0.005	EPA 200.7/200.8
Chromium	0.05	EPA 200.7/200.8
Copper	1.3	EPA 200.7/200.8
Cyanide	0.15	EPA 335.4/SM4500CN-C
Fluoride	2.	EPA 300.0
Lead	0.015	EPA 200.8/200.9
Mercury	0.002	EPA200.8/245.1
Nickel	0.1	EPA 200.7/200.8
Nitrate (as NO3)	45.	EPA 300.0
Nitrate + Nitrite as N	10.	EPA 300.0
Nitrite (as N)	1.	EPA 300.0
Perchlorate	4	EPA 314.0
Selenium	0.05	EPA 200.8/200.9
Thallium	0.002	EPA 200.8/200.9

Primary MCL Radioactivity Constituent (With MCLs - pci/L)

Combined Radium-226 and Radium-228	5	EPA 903/904
Gross Alpha (w/Radium-226 but wo/Radon and Uranium	15	EPA 903
Tritium	20,000	EPA 906
Strontium-90	8	EPA 905
Gross Beta particle activity	50	EPA 900
Uranium	20	EPA 200.8/908

Tests By Program

Safe Drinking Water Act/Title 22 (California Specific) –cont.

<u>Commonly Tested Compounds of Concern</u>		<u>Common EPA Method</u>
Primary Volatile Organic Constituents (With MCLs –ppm)		
Benzene	0.001	EPA 502/524
Carbon Tetrachloride	0.0005	
1,2-Dichlorobenzene	0.6	
1,4-Dichlorobenzene	0.005	
1,1-Dichloroethane	0.005	
1,2-Dichloroethane	0.0005	
1,1-Dichloroethylene	0.006	
cis-1,2-Dichloroethylene	0.006	
trans-1,2-Dichloroethylene	0.01	
Dichloromethane	0.005	
1,2-Dichloropropane	0.005	
1,3-Dichloropropene	0.0005	
Ethylbenzene	0.3	
Methyl-tert-butyl ether	0.013	
Monochlorobenzene	0.07	
Styrene	0.1	
1,1,2,2-Tetrachloroethane	0.001	
Tetrachloroethylene	0.005	
Toluene	0.15	
1,2,4-Trichlorobenzene	0.005	
1,1,1-Trichloroethane	0.200	
1,1,2-Trichloroethane	0.005	
Trichloroethylene	0.005	
Trichlorofluoromethane	0.15	
1,1,2-Trichloro-1,2,2-TFE	1.5	
Vinyl Chloride	0.0005	
Xylenes, Total or Single	1.750	
Primary Non-Volatile Synthetic Organic Constituents (With MCLs –ppm)		
Alachlor	0.002	EPA 505/525.2
Atrazine	0.001	EPA 505/525.2
Bentazon	0.018	EPA 525.2/555
Benzo(a)pyrene	0.0002	EPA 525.2/550/555
Carbofuran	0.018	EPA 531.1/531.2
Chlordane	0.0001	EPA 525.2
2,4-D	0.07	EPA 515.2/555
Dalapon	0.2	EPA 515.2
Dibromochloropropane (DBCP)	0.0002	EPA 551
Di(2-ethylhexyl)adipate	0.4	EPA 506
Di(2-ethylhexyl)phthalate	0.004	EPA 506
Dinoseb	0.007	EPA 547
Diquat	0.02	EPA 549.2
Endothall	0.1	EPA 548.1
Endrin	0.002	EPA 505/525.2

Test By Program

Safe Drinking Water Act/Title 22 (California Specific) –cont.

Commonly Tested Compounds of Concern Common EPA Method

Primary Non-Volatile Synthetic Organic Constituents (With MCLs –ppm)

Ethylene Dibromide (EDB)	0.00005	EPA 505/524
Glyphosate	0.7	EPA 547
Heptachlor	0.00001	EPA 505/525.2
Heptachlor Epoxide	0.00001	EPA 505/525.2
Hexachlorobenzene	0.001	EPA 505/525.2
Hexachlorocyclopentadiene	0.05	EPA 505/525.2
Lindane	0.0002	EPA 505/525.2
Methoxychlor	0.03	EPA 505/525.2
Molinate	0.02	EPA 507
Oxamyl	0.05	EPA 531.2
Pentachlorophenol	0.001	EPA 515/555
Picloram	0.5	EPA 515
Polychlorinated Biphenyls	0.0005	EPA 508
Simazine	0.004	EPA 525.2/551
Thiobencarb	0.07	EPA 525.2
Toxaphene	0.003	EPA 525.2
2,3,7,8-TCDD (Dioxin)	3 x 10 ⁻⁸	EPA 1613
2,4,5-TP (Silvex)	0.05	EPA 555

Secondary Inorganic Constituents (With MCLs)

Aluminum	0.2 mg/L	EPA 200.7/200.8
Chloride	500 mg/L	EPA 300.0
Color	15 Units	SM 2120 B/C/E
Copper	1.0 mg/L	EPA 200.7/200.8
Corrosivity	Non-corrosive	SM 4500 H ⁺ B
Foaming Agents (MBAS)	0.5 mg/L	SM 5540C
Iron	0.3 mg/L	EPA 200.7/200.8
Manganese	0.05 mg/L	EPA 200.7/200.8
Methyl-tert-butyl ether (MTBE)	0.005 mg/L	EPA 502/524
Odor—Threshold	3 Units	
Silver	0.1 mg/L	EPA 200.7/200.8
Specific Conductance	1600 micromhos	SM2510B
Sulfate	500 mg/L	EPA 300.0
Thiobencarb	0.001 mg/L	EPA 507
Total Dissolved Solids	1000 mg/L	EPA 160.1
Turbidity	5 Units	EPA 180.1
Zinc	5.0 mg/L	EPA 200.7/200.8

Torrent Sample Volume, Container, Preservation and Hold Time Guide - Waters/Soil/Sediments

Inorganic Parameters - Water	Minimum Volume	Container Type	Preservation & Storage	Holding Time (Sample Extract)
Acidity / Alkalinity	100 mL	P or G	4°C	14 d
Ammonia	100 mL	P or G	4°C, H ₂ SO ₄ ^(1,2,9)	28 d
Ammonia – low level	100 mL	P or G	4°C	24 hrs
Bacteriological Tests	250 mL	G Sterile	Na ₂ S ₂ O ₃	24 hrs
BOD	500 mL	P or G	4°C	48 hrs
Chloride or Sulfate	100 mL	P or G	4°C	28 d
Chromium IV	100 mL	P or G	4°C	24 hrs
COD	50 mL	P or G	H ₂ SO ₄ ^(1,2,9)	28 d
Color	50 mL	P or G	4°C	48 hrs
Conductivity	100 mL	P or G	4°C	28 d
Cyanide, Total and Amenable	250 mL	P or G	4°C, NaOH, Dark ^(4,5,7)	14 d
Dissolved Oxygen	100 mL	G N/Hd Space	Dark	8 hrs
Fluoride	100 mL	P	4°C	28 d
Hardness	100 mL	P or G	HNO ₃ ^(2,12)	6 m
Metals, Dissolved	100 mL	P or G	Filter prior to HNO ₃ ^(2,12)	6 m (after Filtration)
Metals, Total	100 mL	P or G	HNO ₃ ⁽⁷⁾	6 m
Mercury	100 mL	P or G	HNO ₃ ⁽⁷⁾	28 d
Nitrate or Nitrite	100 mL	P or G	4°C	48 hrs
Nitrate + Nitrite (N+N)	100 mL	P or G	4°C/H ₂ SO ₄ ^(2,9)	48hrs/28 d
Perchlorate	100 mL	P or G	4°C	28 d
pH	50 mL	P or G	4°C	upon receipt
Phenols (4AAP, colorimetric)	100 mL	P or G	H ₂ SO ₄ ^(1,2,9)	28 d
Phosphate	100 mL	P or G	4°C	48 hrs
Phosphorus, Total	100 mL	P or G	H ₂ SO ₄ ^(1,2,9)	28 d
Residual Chlorine	100 mL	P or G	4°C	upon receipt
Solids (TDS / TSS)	250 ml	P or G	4°C	7 d
Sulfide	100 mL	P or G	ZnAcetate & NaOH	7 d
Sulfide, Dissolved	100 mL	G N/Hd Space	4°C	upon receipt
Surfactants	500 mL	P or G	4°C	48 hrs
TKN / Organic N	100 mL	P or G	H ₂ SO ₄ ^(1,2,9)	28 d
TOC	100 mL	G	H ₂ SO ₄ ^(1,2,9)	28 d
Turbidity	100 mL	P or G	4°C, Dark	48 hrs
Organic Parameters - Water	Minimum Volume	Container Type	Preservation & Storage	Holding Time (Sample Extract)
Volatile Organics			No Headspace	
VOC, BETX, VPH (Gas), MTBE, Oxys	4 x40 mL	G Vial, Teflon Cap	HCl or H ₂ SO ₄	7- 14 d
Semi-Volatile (Extractable) Organics:				
Phenolics (Chlorinated & Non-Chlorinated)	1000 mL	AG, Teflon Cap	4°C ^(1,9)	7d /40 d
Extractable Petroleum Hydrocarbons (TEH)	1000 mL	AG, Teflon Cap	4°C ⁽⁹⁾	7d /40 d
Chlorinated Herbicides	1000 mL	AG, Teflon Cap	4°C ^(1,9)	7d /40 d
Oil & Grease (Total or Mineral)	1000 mL ⁽⁹⁾	AG, Teflon Cap	HCl or H ₂ SO ₄ ^(2,9)	28 d /40 d
Organochlorine Pesticides (OCP)	1000 mL	AG, Teflon Cap	4°C ^(1,9)	7d /40 d
Organophosphorous Pesticides (OPP)	1000 mL	AG, Teflon Cap	NaOH or H ₂ SO ₄ ⁽⁷⁾	7d /40 d
Hydrocarbons (PAH/PNA)	1000 mL ^(9,11)	AG, Teflon Cap	4°C ^(1,9) , Dark	7d /40 d
Polychlorinated Biphenyls (PCB)	1000 mL	AG, Teflon Cap	4°C ^(1,9)	7d /40 d
Dioxins / Furans	1000 mL	AG, Teflon Cap	4°C ^(1,9,10) , Dark	30 d/ 45 d
Inorganic parameters - Soil/Sediment	Minimum Volume	Container Type	Preservation & Storage	Holding Time (Sample Extract)
Anions	100 g	G,P,Sleeve	4°C	28 d
Asbestos	10 g	G,P,Sleeve	4°C	14 d
Chromium, Hexavalent	100 g	G,P,Sleeve	4°C	28 d/ 24 hrs
Cyanide	100 g	G,P,Sleeve	4°C	14 d
Mercury	100 g	G,P,Sleeve	4°C	28 d
Metals	100 g	G,P,Sleeve	4°C	6 m
Moisture	100 g	G,P,Sleeve	4°C	7 d
Nitrogen, Total	100 g	G,P,Sleeve	4°C	28 d/ 48 hrs
Particle Size	250 g	G,P,Sleeve	4°C	6 m
Perchlorate	100 g	G,P,Sleeve	4°C	28 d
Sulfide, Total	100 g	G,P,Sleeve	4°C	7 d
STLC (CA WET)	200 g	G,P,Sleeve	4°C	6 m/ 40 d
TCLP	200 g	G,P,Sleeve	4°C	6 m/ 40 d
TOC	10 g	G,P,Sleeve	4°C	14 d
Organic parameters - Soil/Sediment	Minimum Volume	Container Type	Preservation & Storage	Holding Time (Sample Extract)
Volatile Organics (All)	100 g	Sleeve, Tef. Lid	4°C, No Headspace	14 d/ 40 d
Semi-Volatile Organics (All)	100 g	Sleeve, Tef. Lid	4°C	14 d/ 40 d
Oil & Grease (Total or Mineral)	100 g	Sleeve, Tef. Lid	4°C	28 d/ 40 d
TCLP-ZHE (Volatiles)	100 g	Sleeve, Tef. Lid	4°C	14 d / 40 d
TCLP- Semi-Volatiles	200 g	Sleeve, Tef. Lid	4°C	14 d / 40 d
STLC-Semi Volatiles	200 g	Sleeve, Tef. Lid	4°C	14 d / 40 d

¹ For samples where free chlorine might be present, EPA recommends preservation with 80mg Na₂S₂O₃/L sample.

² Adjust samples to pH<2 with specified acid.

³ Adjust samples to pH 6-8 using NaOH or H₂SO₄

⁴ If oxidising agents (eg. Chlorine) present add 0.1g NaAsO₂ /L.

⁵ For samples where sulfide may be present, analyze immediately or pre-treat with PbCO₃

⁶ Analyse immediately if not preserved

⁷ Adjust samples to pH>12 with NaOH

⁸ If sample is preserved, NO₂ and NO₃ can not be speciated

⁹ Full volumes needed for analysis, field duplicates recommended

¹⁰ If sample has pH>9, adjust to pH7-9 with H₂SO₄

Test By Classification

Air Toxics (Monitored by California Air Resources Board - CARB)

<u>Category I Contaminants</u>	<u>Common EPA Method</u>
PCE (Tetrachloroethene)	TO-14/TO-15/NIOSH 1500
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<u>Category IIa Contaminants</u>	
Dioxins/Furans	TO-17
Inorganics – Metals	NIOSH/ASTM
Inorganics – General Chemistry	NIOSH/ASTM
Organics – Herbicides	TO-12
Organics - Pesticides/PCBs	TO-4/TO-10
Organics – Semi-Volatile	TO-13
Organics – Volatile	TO-3,5,11,14,,14A,15,17
Total Petroleum Hydrocarbons	TO-3/NIOSH 1501 & 1550

Bacteriological

<u>Common Constituents</u>	<u>EPA Approved Methods</u>
Coliforms, Fecal	SM9221E/SM9222D
Coliform, Total	SM9221A,B,C/SM9222A,B
E. Coli	SM9223
Enterococci	EPA1600/SM9230B,C
Fecal Streptococci	SM9230B,C
Heterotrophic Bacteria	SM9215B

California Title 22 Toxic Substances (Persistent and Bio-accumulative)

<u>Inorganic Constituents</u>	<u>California Approved Methods</u>
Asbestos	EPA-600/M4-82-020
Chromium, Hexavalent	EPA 7196A/7199
Fluoride	EPA 300.0/340.1/340.2
STLC Metals Title 22 (CAM 17)	EPA 6010B/7470(Hg)
TTLT Metals Title 22 (CAM 17)	EPA 6010B/7471(Hg)
Waste Extraction Test (WET) – Citric Acid	Title 22
Waste Extraction Test (WET) – DI H2O	Title 22 (mod.)
<u>Organic Constituents</u>	<u>California Approved Methods</u>
Chlordane	EPA 8082
Chlorinated Pesticides	EPA 8081
Chlorinated Herbicides	EPA 8151
Dioxin(2,3,7,8-TCDD)	EPA 8290
Organic Lead	LUFT
PCBs	EPA 8082
PCP (Pentachlorophenol)	EPA 8270C
Semi-Volatiles	EPA 8270C/EPA 8310
STLC SVOC Title 22	EPA 8270C
TCE (Trichloroethene)	EPA 8260B
Toxaphene	EPA 8082
Waste Extraction Test (WET) – Citric Acid	Title 22

Test by Classification

Drinking Water (California) – see Safe Drinking Water List (Test by Program)

Hazardous Waste/RCRA (Inorganic)

<u>California ELAP Constituent - Metals</u>	<u>Common California EPA Methods</u>
Aluminum	EPA 200.7/200.8/6010B/6020
Antimony	EPA 200.7/200.8/6010B/6020
Arsenic	EPA 200.7/200.8/6010B/6020
Barium	EPA 200.7/200.8/6010B/6020
Beryllium	EPA 200.7/200.8/6010B/6020
Boron	EPA 200.7/200.8/6010B/6020
Cadmium	EPA 200.7/200.8/6010B/6020
Calcium	EPA 200.7/200.8/6010B/6020
Chromium, Hexavalent	EPA 218.6/7196A/7199
Chromium, Total	EPA 200.7/200.8/6010B/6020
Cobalt	EPA 200.7/200.8/6010B/6020
Copper	EPA 200.7/200.8/6010B/6020
Gold	EPA 231.2/SM3111-B
Iridium	EPA 235.2/SM3111-B
Iron	EPA 200.7/200.8/6010B/6020
Lead	EPA 200.7/200.8/6010B/6020
Magnesium	EPA 200.7/200.8/6010B/6020
Manganese	EPA 200.7/200.8/6010B/6020
Mercury	EPA 245.1/245.2/7470/7471
Molybdenum	EPA 200.7/200.8/6010B/6020
Nickel	EPA 200.7/200.8/6010B/6020
Osmium	EPA 252.2/SM3111-D
Palladium	EPA 253.2/SM3111-B
Platinum	EPA 255.2/SM3111-B
Potassium	EPA 200.7/200.8/6010B/6020
Rhodium	EPA 265.2/SM3111-B
Ruthenium	EPA 267.2/SM3111-B
Selenium	EPA 200.7/200.8/6010B/6020
Silica	EPA 200.7/200.8/6010B/6020
Silver	EPA 200.7/200.8/6010B/6020
Sodium	EPA 200.7/200.8/6010B/6020
Thallium	EPA 200.7/200.8/6010B/6020
Tin	EPA 200.7/200.8/6010B/6020
Titanium	EPA 200.7/200.8/6010B/6020
Vanadium	EPA 200.7/200.8/6010B/6020
Zinc	EPA 200.7/200.8/6010B/6020

Test By Classification

Hazardous Waste/RCRA (Inorganic)

<u>California ELAP Constituent - General</u>	<u>Common California EPA Methods</u>
Acidity	EPA 305/SM2310B
Alkalinity	EPA 310/SM2320B
Ammonia	EPA 350/SM4500-NH3F
BOD	EPA 405/SM5210B
Bromide	EPA 300/9056
Chloride	EPA 300/SM450-C1-B/9056
Chlorine, Total Residual	EPA 330/SM450-C1-G
COD	EPA 410.4/HACH8000
Conductivity (Specific Conductance)	EPA 120/SM2510B
Cyanide (Total and Amenable)	EPA 335/SM450-CN E/9014
Dissolved Oxygen	EPA 360/SM4500-O_G
Fluoride	EPA 300/340/9056
Hardness, Total (Calc)	SM 2340
Nitrate	EPA 300/353/9056
Nitrite	EPA 300/HACH8507/9056
Nitrogen, Total Kjeldahl	EPA 351/SM450-NH3_C
Oil & Grease	EPA 413.1/1664A
pH	EPA 150/9040/9045
Phenols, Total	EPA 420
Phosphate, ortho	EPA 300/365/9056/SM4500-PE
Phosphorus, Total	EPA 365/SM4500-P-B,E
Residue, Filterable	EPA 160.1/SM2540-C
Residue, Non-Filterable	EPA 160.2/SM2540-D
Residue, Settleable	EPA 160.5/SM2540-F
Residue, Total	EPA 160.3/SM2540-B
Residue, Volatile	EPA 160.4
Sulfate	EPA 300/375.2/9056
Sulfide, Dissolved and Total	EPA 376/SM4500-S-F/9030
Sulfite	EPA 377/SM4500-SO3-B
Surfactants	EPA 425/SM 5540 C
Tannin and Lignin	SM 5550 B
TOC/DOC (Total and Dissolved Organic Carbon)	EPA 415/SM5310-B,C,D
TRPH (Total Recoverable Petroleum Hydrocarbons)	EPA 418.1/1664A
Turbidity	EPA 180/SM2130-B

Test By Classification

Hazardous Waste/RCRA (Organic)

<u>California ELAP Constituent</u>	<u>Common California EPA Methods</u>
Aromatic Volatiles	EPA 602/8021
Benzidines	EPA 605
Carbamates	EPA 632/8321A
Chlorinated Hydrocarbons	EPA 612/8121
Dioxins/Furans	EPA 1613/8280/8290
Haloethers	EPA 611/8111
Halogenated Volatiles	EPA 601/8021
Nitrosamines	EPA 607/8070
Organochlorine Pesticides/PCBs	EPA 608/8081A/8082
Pesticides/PCBs/PAH/Adiphates/Phthalates	EPA 625/8270C
Phenols	EPA 604/8041
Phthalate Esters	EPA 606/8061A
Polynuclear Aromatics (PNAs)	EPA 610/8100/8270C
Purgeable Volatiles (C4-C16)	EPA 624/8260B
2,3,7,8 – TCDD	EPA 613/8280/8290
Ethanol/Methanol	EPA 8015B
Gasoline Range Organics	EPA 8015B/LUFT GC-MS
Diesel Range TPH	EPA 8015B/LUFT GC-MS

Tests By Common Group Names - Inorganic

Metals

<u>CAM 17</u>	<u>Priority Pollutants(13)</u>	<u>RCRA 8</u>
Antimony	Antimony	Arsenic
Arsenic	Arsenic	Barium
Barium	Beryllium	Cadmium
Beryllium	Cadmium	Chromium
Cadmium	Chromium	Lead
Chromium	Copper	Mercury
Cobalt	Lead	Selenium
Copper	Mercury	Silver
Lead	Nickel	
Mercury	Selenium	<u>Plating 7 - 9</u>
Molybdenum	Silver	(Arsenic/Selenium)
Nickel	Thallium	Cadmium
Selenium	Zinc	Chromium
Silver		Copper
Thallium	<u>LUFT 5</u>	Lead
Vanadium	Cadmium	Nickel
Zinc	Chromium	Silver
	Lead	Zinc
	Nickel	
	Zinc	

Test By Common Group Names - Inorganic

General Minerals

<u>Anions</u>	<u>Cations</u>	<u>General Mineral Tests (other)</u>
Bromide	Aluminum	Alkalinity
Chloride	Calcium	Conductivity
Fluoride	Iron	Hardness
Nitrate as N	Magnesium	pH
Nitrite as N	Manganese	Silica
o-Phosphate as P	Potassium	TDS
Sulfate	Sodium	

Nutrients

<u>Simple</u>	<u>Complex</u>	Demand
Ammonia	Phosphorus	BOD
Nitrate	Total Kjeldahl Nitrogen	CBOD
Nitrite	Total Kjeldahl Phosphorus	COD
o-Phosphate as P		

Test By Common Group Names – Organic

Volatile Organics

<u>Aromatics</u>	<u>Gas Range Organics</u>	<u>Oxygenates</u>
Benzene	TPH as Gasoline (C ₆ -C ₁₀)	DIPE
Ethyl Benzene	TPH as Aviation Gas	ETBE
Toluene	TPH as Mineral Spirits	Ethanol
o-Xylene		MTBE
m,p – Xylene		TAME
		TBA

<u>Alcohols</u>	<u>Lead Scavengers</u>	<u>Ketones</u>
Ethylene Glycol	1,2 – DCA	Acetone
Glycerol	EDB	MEK
Methanol		MIBK
Isopropyl Alcohol (IPA)		

Halogenated Volatiles (EPA 624/8021B)

Bromodichloromethane	1,2-Dichloroethane
Bromoform	1,1 -Dichloroethene
Bromomethane	cis-1,2- Dichloroethene
Carbon tetrachloride	trans-1,2 -Dichloroethene
Chlorobenzene	1,2 -Dichloropropane
Chloroethane	cis-1,3-Dichloropropene
2-Chloroethylvinyl ether	trans-1,3 -Dichloropropene
Chloroform	Methylene Chloride
Chloromethane	1,1,2,2-Tetrachloroethene
Dibromochloromethane	Tetrachloroethene
1,2-Dichlorobenzene	1,1,1-Trichloroethene
1,3-Dichlorobenzene	1,1,2 -Trichloroethene
1,4-Dichlorobenzene	Trichloroethene
Dichlorodifluoromethane	Trichlorofluoromethane
	Vinyl Chloride

Test By Common Group Names

Semi-Volatile Organics

Chlorinated Herbicides

2,4 -D
Dalapon
2,4,-DB
Dicamba
Dichlorprop
Dinoseb
MCPA
MCP
2,4,5-T
2,4,5-TP (Silvex)
Pentachlorophenol (PCP)

Organochlorine Pesticides

Aldrin
alpha-BHC
beta-BHC
gamma-BHC (Lindane)
Chlordane (alpha & gamma)
Chlordane (Technical)
4,4' -DDD/4,4,' -DDE/4,4' -DDT
Dieldrin
DPCP
Endosulfan and Endosulfan II
Endosulfan sulfate
Endrin
Endrin Aldehyde
Endrin Ketone
Heptachlor
Heptachlor epoxide
Methoxychlor
Toxaphene

Extractable Hydrocarbons (Fuels/Oils)

Asphalt
Cutting Oil
Diesel Fuel
Fuel Oils (#4,#5,#6)
Heating Oil
Hydraulic Oil
Jet Fuel A
JP-4 and JP-5
Kerosene
Lacquer Thinner
Mineral Oil
Motor Oil
Paint Thinner
Stoddard Solvent(s)
Transformer Oil
Transmission Oil

Polychlorinated Biphenyls (PCBs)

Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

Nitroaromatics/Nitroamines

HMX	4,Amino-DNT
RDX	2,Amino-DNT
1,3,5-TNB	2,4 - DNT
1,3-DNB	2,6 - DNT
Tertryl	2-Nitrotoluene
Nitrobenzene	3-Nirtotoluene
2,4,6-TNT	4-Nitrotoluene

Polynuclear Aromatic Hydrocarbons (PNAs or PAHs)

Acenaphthene	Chrysene
Acenaphthylene	Dibenzo(a,h)anthracene
Antracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(g,h,i)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene

Test By Common Group Names

Semi-Volatile Organics (cont.)

Organophosphorus Compounds

Aspon,a	Famphura
Azinphos-methyl	Fenitrothiona
Azinphos-ethyla	Fensulfothion
Bolstar (Sulprofos)	Fonophosa
Carbophenothiona	Leptophosa,d
Chlorfenvinphosa Fenthion 5	Malathion
Chlorpyrifos	Merphosc
Chlorpyrifos methyla	Mevinphose
Coumaphos	Monocrotophos
Crotoxyphosa	Naled
Demeton-Oc	Parathion, ethyl
Demeton-Sc	Parathion, methyl
Diazinon	Phorate
Dichlorofenthiona	Phosmeta
Dichlorvos (DDVP)	Phosphamidona
Dicrotophosa	Ronnel
Dimethoate	Stirophos (Tetrachlorovinphos)
Dioxathiona,c	Sulfotepp
Disulfoton	TEPPd
EPN	Terbufosa
Ethiona	Thionazina,b (Zinophos)
Ethoprop	

Dioxins(PCDDs) and Furans (PCDFs)

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
2,3,7,8-Tetrachlorodibenzofuran (TCDF)
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)

Title 22 TCLP Limits of Contaminants

<u>Contaminant</u>	<u>Regulatory level (mg/L)</u>
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	6.0
Cresol (o,m,p)	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichlorobenzene	0.5
Heptachlor	0.008
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
MEK	200.0
Nitrobenzene	2.0
Pentachlorophenol (PCP)	100.0
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetrachloroethylene(PCE)	0.7
Toxaphene	0.5
Trichloroethylene (TCE)	0.5
2,4,5-Trichlorophenol	400
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl Chloride	0.2

STLC and TTLC Values of Persistent Bioaccumulative Toxic Sunstances

Inorganic

<u>Substance</u>	<u>STLC (mg/L)</u>	<u>TTLC (mg/Kg)</u>
Antimony	15	500
Arsenic	5.0	500
Asbestos		1.0%
Barium	100	10000
Beryllium	0.75	75
Cadmium	1.0	100
Chromium VI	5	500
Chromium III	5	2500
Cobalt	80	8000
Copper	25	2500
Fluoride Salts	180	18000
Lead	5.0	1000
Mercury	0.2	20
Molybdenum	350	3500
Nickel	20	2000
Selenium	1.0	100
Silver	5.0	500
Thallium	7.0	700
Vanadium	24	2400
Zinc	250	5000

Organic

<u>Substance</u>	<u>STLC (mg/L)</u>	<u>TTLC (mg/Kg)</u>
Aldrin	0.14	1.4
Chlordane	0.25	2.5
DDT,DDE,DDD	0.1	1.0
2,4-DCPoxyacetic Acid	10	100
Dieldrin	0.8	8.0
Dioxin (2,3,4,7-TCDD)	0.001	0.01
Endrin	0.02	0.2
Heptachlor	0.47	4.7
Kepone	2.1	21
Lead, organic	----	13
Lindane	0.4	4.0
Methoxychlor	10	100
Mirex	2.1	21
Pentachlorophenol (PCP)	1.7	17
PCBs	5.0	50
Toxaphene	0.5	5.0
Trichloroethylene (TCE)	204	2040
2,4,5-TCPoxypropionic Acid	1.0	10

***If TTLC results are 10X greater than the STLC limits, an STLC must be performed. If the STLC limit is exceeded after analysis of leachate, a TCLP must be performed.