



## METALS ANALYSIS: INDIVIDUAL TESTS

Test Parameters	Method	Technique
ICP Element	200.7/6010D	ICP
ICP-Mass Spec Element	200.8/6020B	ICP-MS
Mercury	245.1/7470A, 7471B	CVAA
Priority Pollutant List (PPL) Metals Ag, Be, Cd, Cr, Cu, Ni, Sb, Zn As, Pb, Se, Tl Hg	200.7/6010D 200.8/6020B 245.1/7470A	8 by ICP 4 by ICP-MS 1 by CVAA
Priority Pollutant List Soils ICP 6010B only, plus Hg	6010 B/7471B	
Target Analyte List Metals (TALM) Al, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mg Mn, Ni, K, Ag, Na, Sb, V, Zn As, Pb, Se, Tl Hg	200.7/6010D 200.8/6020B 245.1/7470A	18 by ICP 4 by ICP-MS 1 by CVAA
Target Analyte List (TAL), includes CN		
CAM 17 Metals Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, V, Zn, Hg	6010D/7470A/7471B	ICP/CVAA
RCRA 8 Analysis - Ag, As, Ba, Cd, Cr, Pb, Se, and Hg	6010D/7470A	ICP/CVAA
NOTE: For PPL and TALM lists, ICP can be used for all metals. Please call for quote.		

## SAMPLE PREPARATION

Test Parameters	Method	Technique
Digestions Water, Waste Water Soil, Sediment, Sludge Air Filters - 37-mm cassettes Tissue Used Oil	200.2/3005/3010/3020 3050B 40 CFR, part 50, app G 3050B	Acid digestion
Filtration Percent Moisture (% solids) Sieve (per screen size) Crush, Roll Crush, Pulverize - 100 mesh		



## ORGANICS: INDIVIDUAL TESTS

Test Parameters	Method	Technique
Volatile Organics (VOCs) in Drinking Water	524.3	GC-MS
Chlorinated Pesticides and PCBs	608/8081B/8082A	GC-ECD
Chlorinated Herbicides	615/8151A	GC-ECD
PCBs	8082A	GC-ECD
PCBs in Oil	8082A	GC-ECD
Chlorinated Pesticides Only	608/8081A	GC-ECD
Semi-volatile Organics (SVOCs) Acid Fraction (Phenols) Base/Neutral Fraction (PAHs etc.)	625/8270D	GC-MS
Volatile Organics (VOCs)	624/8260C	GC-MS
Volatile Organics in Difficult Matrix (e.g., organic solvent)		
Total Organic Halides (TOX)	9020/9076	Micro coulometric titration
VPH	MADEP	GC-FID, PID
VPH, BTEX, MTBE, Naphthalene	MADEP	
TPH - Diesel/Motor Oil	8015B MOD	GC-FID
NWTPH - Dx	NWTPH-DX	GC-FID
TPH - Gasoline/BTEX	8015D MOD/8021B MOD or 8260B	GC/FID, PID
NWTPH - Gx	NWTPH-GX	GC-FID
TPH - HCID	8015D MOD	GC-FID
BTEX	8260C	GC-PID
TPH - Gasoline	8015B MOD	GC-PID
Oil and Grease	1664/9070	Gravimetric
Oil and Grease (with silica-gel cleanup)	1664	Gravimetric

## LEACHING PROCEDURES

Test Parameters	Method	Technique
TCLP* Extraction: Metals and Semi-volatiles Volatiles only	1311 1311	Extraction ZHE
SPLP** Extraction	1312	Extraction
STLC Extraction (CA Waste Extraction Test)	CAL Title 32	Extraction
TCLP Volatiles	8260C	GC-MS
TCLP Semi-volatiles	8270D	GC-MS
TCLP Pesticides	8081A	GC-ECD

\*TCLP: Toxicity characteristic leaching procedure    \*\*SPLP: Synthetic precipitation leaching procedure



## INORGANICS: INDIVIDUAL TESTS

Test Parameters	Method	Technique
Acidity - Total as CaCO <sub>3</sub>	2310B	Titrimetric
Alkalinity - Total	2320B	Titrimetric
CO <sub>3</sub> , HCO <sub>3</sub> , OH	2320B	Titrimetric
Chemical Oxygen Demand (COD)	410.4	Colorimetric
Chromium, hexavalent*	SM 3500 CR-B	Colorimetric
Cyanide Total Weak Acid Dissociable (WAD) Free	335.4/9012B/Kelada-01 4500CN-I ASTMD-7237-10	Colorimetric Colorimetric Amperometric
Anions: Chloride, fluoride, sulfate, nitrite**, nitrate**, bromide Thiocyanate Cyanate	300.0 MOD 300.0 MOD	IC IC
MBAS (surfactants)**	5540C	Colorimetric
Total Nitrogen	ASTM D 5176 TN	Pyrolysis
Ammonia	350.1	Colorimetric
Nitrate + Nitrite	353.2	Colorimetric
Total Kjeldahl (TKN)	351.2	Colorimetric
Phosphate Ortho** Phosphorus Total	4500 PE 4500 PE	Colorimetric Colorimetric
Specific Gravity	SM 2710F	Water displacement
Sulfide	4500-S <sup>2-</sup> F	Titrimetric
Arsenic Speciation (As <sup>+3</sup> As <sup>+5</sup> )	HPLC/ICP-MS	HPLC/ICP-MS
TOC (Total Organic Carbon)	5310B	Combustion/IR

\* 24-hour holding time

\*\*48-hour holding time

Note: Cr<sup>+6</sup> - unpreserved - 24-hour holding time, preserved - 28-day holding time



## SOIL/OVERBURDEN TESTING & NDEP REQUIREMENTS: INDIVIDUAL TESTS

Test Parameters	Method	Technique
Paste pH	EPA 600	ISE
Cation Exchange Capacity (CEC)	SW846-9081	ICP
Loss on Ignition (LOI)	Combustion	Gravimetric
Sand, Silt, Clay (textural class)	EPA 600	Hydrometer
Conductivity	ASA Mono. 9	Electrometric
Total Sulfur	EPA 600 ASTM 1915-11	Combustion/IR
Total Carbon	ASTM 1915-11	Combustion/IR
Total Organic Carbon (TOC)	EPA 600/SM 5310B	Titrimetric
Total Organic Matter (TOM)	Calculation	Calculated
Acid/Base Account (ABA) Acid Neutralization Potential (ANP) Acid Generation Potential (AGP) Total Sulfur Sulfate Sulfur (water-soluble) Pyritic Sulfur (HNO <sub>3</sub> -extractable) Non-extractable Sulfur HCl Extractable (if requested as add'l sulfur form)	CaCO <sub>3</sub> equiv. LECO-EPA600 LECO-EPA600 LECO-EPA600 LECO-EPA600 LECO-EPA600 LECO-EPA600	Titration Combustion/IR Combustion/IR Combustion/IR Combustion/IR Combustion/IR Combustion/IR
ANP Siderite	CaCO <sub>3</sub> equiv.	Titration
NAG - Net Acid Generation	NSW2041 Australia	ISE
Meteoric Water Mobility (MWM) Extraction Sample preparation (12 kg), 2-in. screening, % feed moisture, pH measurement, 24-hour single-pass column leach, filtration (0.45 μm) Analysis of NDEP Profile II Analytes on MWM Extract	NDEP	
WAD CN Extraction/Analysis	ASTM D7572	Extraction
Humidity Cell Testing	ASTM D5744-13	Extraction



## SOIL/OVERBURDEN TESTING & NDEP REQUIREMENTS: INDIVIDUAL TESTS (continued)

Test Parameters	Method	Technique
NDEP Profile I Analyses (includes digestion)		
Alkalinity (CO <sub>3</sub> /HCO <sub>3</sub> )	2320B	Titration
Tl, Sb, Se, As, Pb	200.8	5 by ICP-MS
Ag, Al, Ba, Be, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Zn	200.7	16 by ICP
Cl, F, SO <sub>4</sub>	300.0	3 by IC
NO <sub>2</sub> +NO <sub>3</sub> -N	353.2	Colorimetric
Total N (calculation from NO <sub>2</sub> +NO <sub>3</sub> -N + TKN)		
Hg	245.1	CVAA
pH	4500 H+B	Electrometric
TDS	2540C	Gravimetric
WAD-CN	4500CN-I	Colorimetric
NDEP Profile II Analyses (includes digestion)		
Alkalinity (CO <sub>3</sub> /HCO <sub>3</sub> )	2320B	Titration
Tl, Sb, As, Pb	200.8	4 by ICP-MS
Ag, Al, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, K, Li, Mg, Mn, Mo, Na, Ni, P, Se, Sc, Sn, Sr, Ti, V, Zn	200.7	28 by ICP
Cl, F, SO <sub>4</sub>	300	3 by IC
NO <sub>2</sub> +NO <sub>3</sub> -N	353.2	Colorimetric
Total N (calculation from NO <sub>2</sub> +NO <sub>3</sub> -N + TKN)		
Hg	245.1	CVAA
pH	4500 H+B	Electrometric
TDS	2540C	Gravimetric
WAD-CN	4500CN-I	Colorimetric
NDEP Profile III Analyses (includes digestion)		
Alkalinity (CO <sub>3</sub> /HCO <sub>3</sub> )	2320B	Titration
U	200.8	1 by ICP-MS
Al, As, B, Ba, Be, Ca, Cd, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, Sr, Tl, V, Zn	200.7	26 by ICP
Cl, F, SO <sub>4</sub>	300.0	3 by IC
NO <sub>2</sub> +NO <sub>3</sub> -N	353.2	Colorimetric
Total N (calculation from NO <sub>2</sub> +NO <sub>3</sub> -N + TKN)		
Hg	245.1	CVAA
pH	4500 H+B	Electrometric
TDS	2540C	Gravimetric
TSS	2540D	Gravimetric



## PHYSICAL TESTS

Test Parameters	Method	Technique
Flash Point	1010A	Pensky-Martens
Conductance, Specific (EC)	120.1/2510B	Electrometric
Corrosivity as pH	9045D	Electrometric
Hardness	200.7	ICP, Calculation
pH	4500H+B/9045D	Electrometric
Total Dissolved Solids (TDS)	2540C	Gravimetric
Total Suspended Solids (TSS)	2540D	Gravimetric
Total Solids (TS)	2540B	Gravimetric
Total Volatile Solids (TVS)	2540E	Gravimetric
Total Suspended Particulates (TSP)	40 CFR	Gravimetric
Turbidity**	180.1	Turbidimetric
Color**	2120B	Colorimetric
Odor*	2150B	Comparison
* 24-hour holding time ** 48-hour holding time		

## BIOLOGICAL ANALYSIS

Test Parameters	Method	Technique
BOD	SM5210B	DO Meter - 5 day
Chlorophyll A	SM10200H	Spectrophotometric
Coliform (present/absent)*	SM9223B	Enzyme Substrate
Iron Bacteria	SM9240B	Microscopic
Quantitray Coliform	SM9223B	Enzyme Substrate
MPN (multiple tube)**	SM9221B	Tube Fermentation
HPC (heterotrophic plate count)	SM9215	Pour Plate
* Applies only to drinking waters ** For total coliform, fecal coliform, and <i>E. coli</i>		