WASTES
List of Acronyms

SW 6010	*Inductively Coupled Plasma (ICP) (Analytical Method)*
SW 6020	*Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) (Analytical Method)*
A	*Standard Methods*
AOAC	*Association of Official Analytical Chemists*
ASTM	*American Society for Testing & Materials*
BTEX	*Benzene, Toluene, Ethylbenzene, Xylenes*
DRO	*Diesel Range Organics*
E or EPA	*US Environmental Protection Agency*
FLAA	*Flame Atomic Absorption*
GRO	*Gasoline Range Organics*
ICP	*Inductively Coupled Plasma*
ICP-MS	*Inductively Coupled Plasma - Mass Spectrometry*
MWMP	*Meteoric Water Mobility Procedure*
NIOSH	*National Institute of Occupational Safety & Health*
PCBs	*Polychlorinated Biphenyls*
RCRA	*Resource Conservation Recovery Act*
SW	*Solid Waste 846*
SPLP	*Synthetic Precipitation Leaching Procedure*
TCLP	*Toxicity Characteristic Leaching Procedure*
TPH	*Total Petroleum Hydrocarbons*
TPH-IR	*Total Petroleum Hydrocarbons - Infrared Spectroscopy*
VOCs	*Volatile Organic Chemicals*

The analytical methods listed above are typically referenced for liquid and solid waste regulations.

WASTES

1. RESOURCE CONSERVATION RECOVERY ACT (RCRA) CHARACTERISTICS - IGNITABILITY, CORROSIVITY, REACTIVITY, AND TOXICITY.

PARAMETER	METHOD	REGULATORY LIMIT, mg/L	REPORTING LIMIT, mg/L
IGNITABILITY, flashpoint	SW1010	>140 ° F	° F
CORROSIVITY, pH of solids or liquids	SW9045D/ SW9040C	pH 2 to 12.5	0.01 std. units
REACTIVITY, reactive cyanide and sulfide			
Reactive Cyanide	SW Sec. 7.3.3.2	250 mg/Kg	0.05 mg/Kg
Reactive Sulfide	SW Sec. 7.3.4.2	500 mg/Kg	20 mg/Kg
TOXICITY - Toxicity Characteristic Leaching Procedure (TCLP)			
TCLP Extractions - Prior to analysis			
TCLP Metals Digestion as Totals for water		SW3010	
TCLP Metals Digestion as Totals for oil matrix		SW3050 / SW7471 (Hg)	
TCLP extraction for metals, base neutrals, acid extractables, pesticides and herbicides.		SW1311	
TCLP zero headspace extraction for volatiles		SW1311	
TCLP METALS	**CAS No.**		
Arsenic	7440-38-2	SW7062/ SW6010	5.0	0.1
Barium	7440-39-3	SW6010	100	1
Cadmium	7440-43-9	SW6010	1.0	0.01
Chromium	7440-47-3	SW6010	5.0	0.1
Lead	7439-92-1	SW6010	5.0	0.1
Mercury	7439-97-6	SW7470A/ SW6010	0.2	0.002
Selenium	7782-49-2	SW7742/ SW6010	1.0	0.01
Silver	7440-22-4	SW6010	5.0	0.02

WASTES

1. RESOURCE CONSERVATION RECOVERY ACT (RCRA) CHARACTERISTICS - IGNITABILITY, CORROSIVITY, REACTIVITY, AND TOXICITY (continued)

PARAMETER	CAS No.	METHOD	REGULATORY LIMIT, mg/L	REPORTING LIMIT, mg/L
Analysis of TCLP extracts continued				
TCLP BASE NEUTRALS/ACID EXTRACTABLES		**SW8270C**		
2,4-Dinitrotoluene	121-14-2		0.13	0.05
Hexachloro-1,3-Butadiene	87-68-3		0.5	0.05
Hexachlorobenzene	118-74-1		0.13	0.05
Hexachloroethane	67-72-1		3.0	0.05
Nitrobenzene	98-95-3		2.0	0.05
Pyridine	110-86-1		5.0	0.1
Cresols (m,p,o)	108-39-4, 106-44-5, 95-48-7		200	0.15
Pentachlorophenol	87-86-5		100	0.25
2,4,5-Trichlorophenol	95-95-4		400	0.05
2,4,6-Trichlorophenol	88-06-2		2.0	0.05
TCLP PESTICIDES		**SW8081B**		
Chlordane	57-74-9		0.03	0.025
Heptachlor(+hydroxide)	76-44-8		0.008	0.0005
Endrin	72-20-8		0.02	0.0005
Lindane	58-89-9		0.4	0.0005
Methoxychlor	72-43-5		10	0.0005
Toxaphene	8001-35-2		0.5	0.05
TCLP HERBICIDES		**SW8151A**		
2,4-D	94-75-7		10	0.01
2,4,5-TP(Silvex)	93-72-1		1	0.002

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1. RESOURCE CONSERVATION RECOVERY ACT (RCRA) CHARACTERISTICS - IGNITABILITY, CORROSIVITY, REACTIVITY, AND TOXICITY (continued)

PARAMETER	CAS No.	METHOD	REGULATORY LIMIT, mg/L	REPORTING LIMIT, mg/L
Analysis of TCLP extracts continued				
TCLP VOLATILES		SW8260B	-	-
Benzene	71-43-2		0.5	0.01
Carbon Tetrachloride	56-23-5		0.5	0.01
Chlorobenzene	108-90-7		100	0.01
Chloroform	67-66-3		6	0.01
1,4-Dichlorobenzene	106-46-7		7.5	0.01
1,2-Dichloroethane	107-06-2		0.5	0.01
1,1-Dichloroethylene	75-35-4		0.7	0.01
Methyl Ethyl Ketone	78-93-3		200	0.25
Tetrachloroethylene	127-18-4		0.7	0.01
Trichloroethylene	79-01-6		0.5	0.01
Vinyl Chloride	75-01-4		0.2	0.01
Benzene only in TCLP extract	71-43-2	SW8260B	0.5	0.01

2. USED OIL ANALYSIS

PARAMETER	CAS No.	METHOD	REGULATORY LIMIT, mg/Kg	REPORTING LIMIT, mg/Kg
Arsenic	7440-38-2	SW7062/SW6010	5	1
Cadmium	7440-43-9	SW6010	2	0.5
Chromium	7440-47-3	SW6010	10	0.5
Lead	7439-92-1	SW6010	100	5
Metals Digestion	-	SW3050	-	-
Total Halogens	-	ASTM D808	1000*	200
Flashpoint	-	SW1010	100°F min.	-
NOTE: Total Halogens of 4000 mg/Kg is acceptable if it can be proven that the oil was not mixed with a hazardous waste.				

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3. HYDROCARBONS AND HYDROCARBON CONTAMINATED MATERIALS

PARAMETER	METHOD
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)	E602/SW8021B/SW8260B
Gasoline Range Organics (GRO)	SW8015C
BTEX and GRO together	E602/SW8021B + SW8015C (GRO)
Purgeable Organics (VOCs)	SW8260B
Hydrocarbons in headspace gas	GC/FID
Diesel Range Organics (DRO)	SW8015C
Extractable Petroleum Hydrocarbons (EPH) Screen	MT DEQ MA EPH
Extractable Petroleum Hydrocarbons (EPH) (after screening option without PAHs – if required)	MT DEQ MA EPH
Extractable Petroleum Hydrocarbons (EPH) (after screening option with PAHs-if required)	MT DEQ MA EPH
Extractable Petroleum Hydrocarbons (EPH) (complete without screening)	MT DEQ MA EPH
Volatile Petroleum Hydrocarbons (VPH)	MT DEQ MA VPH
Carbon Scan with DRO (product identification – fingerprinting)	SW 8015C or GC/FID – SimDist
Total Petroleum Hydrocarbons	TCEQ 1005
Total Petroleum Hydrocarbons by Infrared Spectroscopy (TPH-IR)	E418.1
Oil and Grease, gravimetric	1664
Oil and Grease, infrared spectroscopy	E413.2
TPH by Soxhlet Extraction	SW9071

4. ICP SCAN

Aluminum	Calcium	Lead	Phosphorus	Strontium
Barium	Chromium	Magnesium	Potassium	Thallium
Beryllium	Cobalt	Manganese	Silicon	Titanium
Boron	Copper	Molybdenum	Silver	Vanadium
Cadmium	Iron	Nickel	Sodium	Zinc
Notes: The elements are analyzed by ICP to 50 mg/Kg (solids) reporting limit. Other elements available on request.				

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5. METALS – ANALYSIS BY SW 6000 SERIES METHODS, MERCURY METHOD SW7471

METAL	REPORTING LIMIT, mg/Kg
Total Metals Digestion (Method SW 3050)	
Total Metals Digestion, Mercury (Method SW 7471)	
Aluminum	5
Antimony	1
Antimony, Low Level	0.02
Arsenic	1
Arsenic, Low Level	0.2
Barium	1
Barium, Low Level	0.05
Beryllium	1
Beryllium, Low Level	0.05
Bismuth	1
Boron	1
Boron, Low Level	0.1
Cadmium	1
Cadmium, Low Level	0.05
Calcium	5
Calcium, Low Level	1
Chromium	1
Chromium, Low Level	0.1
Cobalt	1
Cobalt, Low Level	0.05
Copper	1
Copper, Low Level	0.5
Gallium	1
Iron	0.6
Lead	1
Lead, Low Level	0.05
Lithium	1
Lithium, Low Level	0.1
Magnesium	5
Magnesium, Low Level	1
Manganese	1
Manganese, Low Level	0.05
Mercury	1
Mercury, SW7473	0.1
Molybdenum	1
Molybdenum, Low Level	0.05
Nickel	1
Nickel, Low Level	0.5
Phosphorus	5
Phosphorus, Low Level	0.5
Potassium	5
Selenium	1
Selenium, Low Level	0.2
Silicon	5
Silver	1
Silver, Low Level	0.05
Sodium	5
Strontium	0.05

(1) There is no additional digestion fee.

5. METALS – ANALYSIS BY SW 6000 SERIES METHODS, MERCURY METHOD SW7471, continued

METALS, CONTINUED	REPORTING LIMIT, mg/Kg
Strontium, Low Level	0.05
Thallium	1
Thallium, Low Level	0.05
Tin	1
Tin, Low Level	0.5
Titanium	1
Titanium, Low Level	0.05
Vanadium	1
Vanadium, Low Level	0.1
Zinc	1
Zinc, Low Level	0.5

6. 503 ANALYSIS – TEST GROUP PARAMETERS FOR SOLID WASTE/SLURRY ANALYSIS OF WASTEWATER SYSTEM SOLIDS AS PRESCRIBED BY 40CFR PART 503

PARAMETER	METHOD	DETECTION LIMIT, mg/Kg
Arsenic	SW6010	1
Cadmium	SW6010	1
Chromium	SW6010	1
Copper	SW6010	1
Lead	SW6010	1
Nickel	SW6010	1
Mercury	SW7471	1
Molybdenum	SW6010	1
Selenium	SW6010	1
Zinc	SW6010	1
Total Metals Digestion	SW3050 and SW7471	N/A
OTHER ANALYSIS		
Ammonia as Nitrogen	ASA Monograph No. 9, Method 33-7.3.3	1
Fecal Coliform Bacteria, dry	A9222D	100 cfu/g
… or Fecal Coliform Bacteria, dry	A9221E	1 MPN/g
Nitrate plus Nitrite as Nitrogen	ASA Monograph No. 9, Method 33-8.1	1
Percent Solids	Loss @ 105°C	0.1 wt %
Total Kjeldahl Nitrogen	ASA Monograph No. 9, Method 31-3	1
NOTE: Reported detection limit is dependent on the % solids of the sample.		

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7. OTHER ANALYSIS OF WASTES

PARAMETER	METHOD
Digestion for Total Metals	SW3010/SW3050B/ SW7471
Synthetic Precipitation Leaching Procedure (SPLP)	SW1312
Meteoric Water Mobility Procedure (MWMP) Column Leaching Procedure	E2242-13
Modified MWMP Bottle Roll Procedure	MWMP Mod
NOTE: Analysis of the above digestions or extracts are done according to TCLP or Water methods and fees	
Asbestos, soil	Point Count Method
Asbestos, bulk sample, 1-3 Layers	E600/M4-82-020
Asbestos, bulk sample – Each Additional	E600/M4-82-020
Ash	A2540G
Density	ASTM E1109
Lead in paint	SW3050 with SW6010/SW6020
Loss on ignition, calculated from % ash	A2540G
Moisture and Total Solids	Loss at 105°C/A 254OG
Paint Filter Test	SW9095
PCBs in transformer oil, 5 µg/g	SW8082A
pH	SW9045D / SW9040C
Sulfur, Total	LECO Combustion IR Detection
Total Organic Halogen (TOX)	ASTM D808

8. CYANIDE

PARAMETER	METHOD	DETECTION LIMIT, mg/Kg
Cyanide, Total	SW9012	0.5 mg/Kg
Cyanide, Weak Acid Dissociable	ASTM D2036 Mod.	0.5 mg/Kg
Cyanide, Free	Electrode Manufacturer's Instruction	2.0 mg/Kg

9. PREPARATORY METHODS

SAMPLE PREPARATIONS	DESCRIPTION
METHOD 3010	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by ICP or ICP-MS.
METHOD 3050	Acid Digestion of Sediments, Sludges, and Soils

NOTES: These preparatory methods from SW-846, Test Methods For Evaluating Solid Waste, are used to extract, prepare or cleanup samples for analysis. Unless specified by the sample submitter, the laboratory will select the appropriate method based on the matrix, the analytical method, and the data objectives.

For samples being examined for organic constituents, see page Organics – 5.

WASTES
SAMPLING AND PRESERVATION

MEASUREMENT	MATRIX	SAMPLE SIZE/ SAMPLE BOTTLE [1]	PRESERVATIVE [2]	HOLDING TIME
Flashpoint	liquid	100 mL P or G	None	NA
pH	water	25 mL P or G	None	analyze as soon as possible
pH	non-aqueous	50 g P or G	None	analyze as soon as possible
Cyanide, Reactive	water	250 mL P or G	NaOH to pH >12	14 days
Cyanide, Reactive	non-aqueous	50 g P or G	None	NA
Sulfide, Reactive	water	250 mL P or G	Zinc Acetate and NaOH to pH >9	7 days
Sulfide, Reactive	non-aqueous	50 g P or G	None	NA
TCLP	water	See individual methods in the *water* or *organics* sections.		
TCLP	solids	500 g P or G	None	See chart at the end of this section.
TCLP	multiphasic	Call the laboratory for advice on sampling.		
Metals, total	water	250 mL P or G	HNO_3 to pH < 2	6 mo. (Hg: 28 days)
Metals, total	non-aqueous	50 g P or G	None (Hg: cooled to 6°C, when possible)	6 mo. (Hg: 28 days)
BTEX	water	3-40 mL VOA vials [3]	5-10 drops HCl to pH <2	14 days
BTEX	solids	4oz w/m Amber Glass	None, No headspace	14 days
GRO	water	3-40 mL VOA vials [3]	5-10 drops HCl to pH <2	14 days
GRO	solids	4oz w/m Amber Glass	None, No headspace	14 days
DRO	water	2-1000 mL G	H_2SO_4 to pH <2	7 days to extract; 40 to analysis
DRO	solids	4oz w/m Amber Glass	None	14 days to extract; 40 to analysis
VPH	water	3-40 mL VOA vials[3]	5-10 drops HCl to pH <2	14 days to analysis
VPH	solids	4oz w/m Amber Glass	None	7 days to extract; 28 days to analysis
EPH	water	2-1000 mL G	H_2SO_4 to pH <2	14 days to extract; 40 to analysis
EPH	solids	4oz w/m Amber Glass	None	14 days to extract; 40 to analysis
TPH, IR	water	1-1000 mL G	H_2SO_4 to pH <2	7 days to extract; 40 to analysis
TPH, IR	solids	4oz w/m Amber Glass	None	14 days to extract; 40 to analysis
TPH, Soxhlet ext.	solids	4oz w/m Amber Glass	None	NA
PCBs, Transformers	Oil	5 mL G	None	40 days
Waste oil analysis	Oil	250 mL P or G	None	Refer to individual parameter
BTU	NA	25 g P or G	None	NA

WASTES
SAMPLING AND PRESERVATION, continued

MEASUREMENT	MATRIX	SAMPLE SIZE/ SAMPLE BOTTLE [1]	PRESERVATIVE [2]	HOLDING TIME
Density	solids	100 g depends on particle size	None	NA
Loss on ignition	solids	50 g P or G	None	NA
Moisture/solids	solids	50 g P or G	None	NA
Paint filter test	-	100 + g P or G	NA	NA
Lead in paint	solids	5 g P or G	NA	NA

NOTES:
1. Sample bottles: P = plastic; G = glass; w/m = wide mouth.
2. Most parameters should be shipped and stored at 6°C.
3. Samples collected for volatiles must be taken with zero headspace. The VOA vial must be completely full, no headspace.

HOLDING TIMES FOR TCLP ANALYSIS (days)

ANALYSIS	SAMPLING TO TCLP EXTRACTION	TCLP EXTRACTION TO METHOD EXTRACTION	METHOD EXTRACTION TO ANALYSIS	TOTAL SAMPLING TO ANALYSIS
Metals (not mercury)	180	NA	180	360
Mercury	28	NA	28	56
Base Neutrals	14	7	40	61
Acid Extractables	14	7	40	61
Pesticides	14	7	40	61
Herbicides	14	7	40	61
Volatiles	14	NA	14	28