Toxicity Characteristic Leaching Procedure

Businesses are often asked to perform an analysis on their waste using the Toxicity Characteristic Leaching Procedure (TCLP). The Code of Federal Regulations (CFR) 40 CFR §261.24, outlines the 40 contaminants the TCLP analysis tests for (See Table 1—Maximum Concentration of Contaminants for Toxicity Characteristic).

Table 1—Maximum Concentration of Contaminants for Toxicity Characteristic

EPA HW #	Contaminant	Regulatory Level (mg/l)
D004	Arsenic (As)	5.0
D005	Barium (Ba)	100.0
D018	Benzene	0.5
D006	Cadmium (Cd)	1.0
D019	Carbon Tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium (Cr)	5.0
D023	o-Cresol	200.0
D024	m-Cresol	200.0
D025	p-Cresol	200.0
D026	Cresol	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead (Pb)	5.0
D013	Lindane	0.4
D009	Mercury (Hg)	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium (Se)	1.0
D011	Silver (Ag)	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl Chloride	0.2

What does the TCLP Analysis Show?

The TCLP analysis simulates landfill conditions. Over time, water and other liquids percolate through landfills. The percolating liquid often reacts with the solid waste in the landfill, and may pose public and environmental health risks because of the contaminants it absorbs. The TCLP analysis determines which of the contaminants identified by the United States Environmental Protection Agency (EPA) are present in the leachate and their concentrations.

What is the Nevada "7-11 test"?

Protection (NDEP) allows the use of a pared-down version of the EPA TCLP. The "pared-down" test is referred to as the "7-11 test". The "7-11 test" analyzes only 7 metals, and 11 organics rather than the full TCLP. The cost of the "7-11 test" is between $200-$300, depending on the laboratory and location. A full TCLP analysis may cost as much as $3,000. The "7-11 test" should only be considered for wastes that that are under your control. The "7-11" should never be used for unknowns.

Who Performs the TCLP or "7-11 test"?

For generators of hazardous waste, it will required that testing be performed by a certified laboratory. NDEP manages a list of certified laboratories on their web site. http://www.ndep.nv.gov/bsdw/labservice.htm

Many laboratories will offer courier services for a nominal fee, and provide sampling containers and a chain of custody form. Businesses in remote areas should contact the nearest lab to discuss sampling protocol and sample preparation for transportation. Improper sample handling can result in unreliable test results and wasted money!

When is a waste Hazardous?

A waste is considered hazardous when it exhibits one or more of the following characteristics:

- Ignitable (Flashpoint <140 ºF)
- Corrosive (aqueous pH < 2 or > 12.5)
- Reactive (normally unstable, undergoes violent changes without detonating, water reactive)
- Toxic (exceeding the regulatory limits for contaminants under the TCLP or "7-11 test" analysis)
- OR it is "Listed" in the CFR (wastes which are pre-defined and categorized)

For the purposes of this fact sheet, a waste is considered hazardous due to toxicity if it exhibits results exceeding the regulatory limits outlined in Table 1 above. There are many exclusions and exemptions within the CFR. For this reason, call the Business Environmental Program (BEP), or talk to your hazardous waste inspector if you have ANY questions regarding this or any hazardous characteristic analysis.

EXAMPLES

AUTO REPAIR:

An auto repair shop uses "hi-flash" mineral spirits as parts washing solvent. The solvent does not contain any halogenated or listed solvents. When the solvent becomes dirty, it is distilled. The solvent extracted from the distillation is placed back into use, and the "still bottoms" or contaminants from the solvent extraction are the waste product. This waste product must be tested by an analytical laboratory before it is discarded. The laboratory performs the "7-11 test", and the results indicate the following:

- Lead……...0.8 mg/l
- Cadmium……...0.5 mg/l
- Chromium…….8.0 mg/l

Looking at the table on the front of this fact sheet, lead and cadmium exhibit concentrations below regulatory levels. Chromium exceeds regulatory levels. The still bottoms exhibit toxicity due to high chromium levels, and would be considered a hazardous waste D007.

AUTO BODY:

The exhaust filters in the spray booth have become saturated with overspray from paint application. Since the body shop uses many different types of paints and primers, it's difficult to determine if the filters are hazardous without an analysis. A representative filter is removed and sampled. The remaining filters are placed into containers and marked "filters pending analysis". The laboratory performs the "7-11 test", and the results indicate the following:

- Lead……..9.1 mg/l
- Chromium……0.4 mg/l
- Barium……..0.85 mg/l
- Methyl ethyl ketone….10 mg/l

Only lead exceeded the regulatory levels. The exhaust filters are deemed hazardous due to lead toxicity, and referred to as a D008 waste. The business owner remembered that he used a special primer a friend gave him. After looking at the Material Safety Data Sheet (MSDS), the business owner found out why the filters failed the test. The special primer contained high amounts of lead. Six months later, the filters need changing again. The business owner had kept detailed records of all the paints and primers sprayed, along with the total quantities since the last filter change out. Another analysis was performed, and the analytical report indicated all of the contaminants were well below the regulatory limits. The filters were not found to exhibit any characteristics of toxicity, and were allowed to be handled as regular municipal solid waste. Because the business owner maintained detailed records, further testing would not be required unless the types of paint and primers changed.

General Manufacturing:

The QRM company receives large steel components which they re-manufacture. The process requires them to dismantle the components, and surface prepare the outer housings for re-finishing. The metal components are placed into a sand blasting cabinet, and cleaned with special high pressure media. After months of use, the blasting media became ineffective, and needed to be replaced. The old blasting material was placed into a metal drum, and labeled "used blasting media pending analysis". A representative sample was taken to the laboratory for the "7-11 test" analysis. The results are:

- Arsenic……..0.5 mg/l
- Barium……..10 mg/l
- Cadmium……..2.0 mg/l
- Chromium……15.0 mg/l
- Lead……..25 mg/l

This analysis reported Cadmium, Chromium and Lead in excess of regulatory limits. The blaster media waste would be classified as toxic due to high concentrations of Cadmium D006, Chromium D007 and Lead D008. This waste would be labeled as a D006, D007, D008 hazardous waste.

Conclusion

If your business has a waste which may need analysis, or if you need ideas or information about modifying your processes to avoid generating hazardous waste, contact the BEP Assistance Line at (800) 882-3233.

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