

"Use of Total Waste Analysis in Toxicity Characteristic Determinations"

Key Words: TCLP; test methods; toxicity characteristic

QUESTION: A generator suspects that his waste may exhibit the Toxicity characteristic and thus be subject to regulation as a RCRA hazardous waste. Since he is unsure of the types and Concentrations of hazardous contaminants present in the waste, he Performs a total waste analysis. Can he use the results of the Total waste analysis to make a toxicity characteristic Determination, or must he perform Method 1311, the toxicity Characteristic leaching procedure (TCLP), to determine the Waste s regulatory status?

ANSWER: While a toxicity characteristic determination under §261.24 typically involves application of the TCLP followed by Analysis of the TCLP extract, a generator may be able to use Total waste analysis to demonstrate that a waste does not exhibit The toxicity characteristic. Section 1.2 of the TCLP states, If A total analysis of the waste demonstrates that individual Analytes are not present in the waste, or that they are present But at such low concentrations that the appropriate regulatory Levels could not possibly be exceeded, the TCLP need not be run. This analysis can provide the generator with a convenient and Cost-effective means of determining if he needs to run the TCLP In order to definitively characterize a waste.

The means for using total waste analysis results to make a Toxicity characteristic determination reflect TCLP methodology And therefore vary depending on whether the waste is defined as a Liquid, a solid, or a dual-phase waste. Under the TCLP, liquid Wastes (i.e., Those wastes that contain less than 0.5% dry Solids) do not require extraction. The waste, after filtration, Is defined as the TCLP extract (Part 261, Appendix II, §2.1). A Generator can therefore characterize a liquid waste by filtering The waste, measuring total constituent concentrations in the Resulting filtrate, and comparing these concentrations to the Appropriate regulatory limits under §261.24.

Wastes which are either 100% solid (i.e., wastes that contain no filterable liquid (Part 261, Appendix II, §7.1.1.1)) or which contain both a liquid and a solid component require conversion of total waste analysis data to estimates of constituent concentrations in the TCLP extract, or maximum theoretical leachate concentrations.

For instance, to evaluate the regulatory status of a 100% solid, a generator can simply divide each total constituent concentration by 20 and then compare the resulting maximum theoretical leachate concentration to the appropriate regulatory limit (the division factor reflects the 20-to-1 ratio of extraction fluid to solid used in the TCLP). If no maximum theoretical leachate concentration equals or exceeds the appropriate regulatory limit, the solid cannot exhibit the toxicity characteristic and the TCLP need not be run.

The generator of a dual-phase waste (i.e., A waste which has both A solid and a filterable liquid component) can perform a total Waste analysis on the liquid and solid portions and calculate Maximum theoretical leachate concentrations for the waste as a Whole by combining results mathematically through use of the Following formula:

$$\frac{[A \times B] + [C \times D]}{B + [20 \text{ L/kg} \times D]} = M$$

Where:

A = concentration of the analyte in the liquid portion of the Sample (mg/L)

B = volume of the liquid portion of the sample (L)

C = concentration of the analyte in the solid portion of the Sample (mg/kg)

D = weight of the solid portion of the sample (kg)

M = maximum theoretical leachate concentration (mg/L)

For example:

A generator who receives the results of a total waste analysis
Wishes to determine if his waste exhibits the toxicity
Characteristic for lead. Since he knows the lead concentration
In each phase of the waste (0.023 mg/L in the liquid phase, 85
Mg/kg in the solid phase), the volume of the liquid phase (0.025
L), and the weight of the solid phase (0.075 kg), he can
Calculate the waste s maximum theoretical leachate concentration:

$$\frac{[A \times B] + [C \times D]}{B + [20 \text{ L/kg} \times D]}$$
$$\frac{[0.023 \text{ mg/L} \times 0.025 \text{ L}] + [85 \text{ mg/kg} \times 0.075 \text{ kg}]}{0.025 \text{ L} + [20 \text{ L/kg} \times 0.075 \text{ kg}]}$$
$$= 4.18 \text{ mg/L}$$

Because the 4.18 mg/L maximum theoretical leachate concentration is below the 5.0 mg/L regulatory limit, the generator determines that the waste cannot exhibit the toxicity characteristic for Lead.

If maximum theoretical leachate concentrations are less than the applicable limits under §261.24, the waste does not exhibit the toxicity characteristic and the TCLP need not be run. If, on the other hand, total waste analysis data yield a maximum theoretical leachate concentration that equals or exceeds the toxicity characteristic threshold, the data cannot be used to conclusively demonstrate that the waste does not exhibit the toxicity characteristic. The generator may have to conduct further testing to make a definitive toxicity characteristic determination. (January 1994 Monthly Hotline Report)