January 5, 1998

MEMORANDUM

TO: The Record

FROM: Rita Chow, Environmental Protection Specialist

SUBJECT: Treatment of Underlying Hazardous Constituents in Toxicity Characteristic Metal (D004-D011) Wastes

As with other characteristic wastes (ignitable, corrosive, reactive, and toxicity characteristic (TC) organics), toxicity characteristic metal wastes and newly identified mineral processing wastes cannot be land disposed until the characteristic is removed by: (1) treating the characteristic constituent to its universal treatment standard (UTS); and (2) treating all underlying hazardous constituents (UHCs), as defined in 40 CFR 268.2(i), to meet their universal treatment standards. EPA's review of the treatment data on TC metal and mineral processing wastes shows that UTS are achievable for the UHCs in TC metal wastes (including mineral processing wastes).

The treatment of UHCs to the UTS levels in characteristic wastes satisfies RCRA section 3004(m) in minimizing the threat of hazardous wastes to human health and the environment. The application of the UHC treatment requirement to TC wastes is consistent with the Court's opinion on the treatment of ignitable, corrosive, and reactive characteristic wastes in Chemical Waste Management v. EPA, 976 F. 2d 17 (D.C. Cir. 1992), cert. denied 113 U.S. 1961 (1993). The Court held that all hazardous constituents in characteristic wastes must meet the levels satisfying the requirements in RCRA section 3004(m) before land disposal, and that treatment standards cannot be achieved by dilution (provided, of course, that treatment standards are not established below the level at which threats to human health and the environment are minimized). (See 59 FR 47987 September 19, 1994).

Because the treatment standard for selenium is above its toxicity characteristic level, selenium is not considered an UHC in characteristic waste, according to the definition at 40 CFR 268.2(i). Thus, a treated selenium waste can remain characteristically hazardous.

Other metals not considered UHCs in characteristic wastes include vanadium and zinc because they are not constituents on the Hazardous Constituents Table in 40 CFR 261, Appendix VIII. Vanadium and zinc are regulated only in specific listed wastes. Vanadium is regulated only in F039, P119, and P120. Zinc is regulated only in K061.

For more information on the Agency's review of the treatment data, commenters can refer to those items on the Index of Documents Supporting the Phase IV Final Rule. In addition, supporting documents on the Agency's action are available in the LDR Phase IV Final Rule docket, along with the Agency's response to comments document (placed in the docket upon promulgation). Examples of the effect of this final rule are presented in Attachment 1 as guidance.

Attachment 1

The following examples are possible scenarios which may occur. These are only examples presented as guidance, and will not represent every possible situation encountered in the field.

Example 1:
A generator determines that the following constituents are in its waste stream (concentrations as measured by the TCLP method):

beryllium: 4.0 mg/L
cadmium: 0.5 mg/L
chromium: 25.0 mg/L
selenium: 12.0 mg/L

This waste is a D007 and D010 multiple metals characteristic waste stream for chromium and selenium because these constituents have untreated levels which exceed their toxicity characteristic levels of 5.0 mg/L (TCLP) and 1.0 mg/L (TCLP), respectively. This waste stream is not toxicity characteristic for cadmium because its untreated level does not exceed its toxicity characteristic level of 1.0 mg/L (TCLP).

Treatment for this characteristic waste requires treating the toxicity characteristic constituents and any underlying hazardous constituents, as defined in 40 CFR 268.2(i), to meet universal treatment standards.

Constituents found in untreated waste stream	Untreated levels (TCLP)	RCRA TC Levels 40 CFR 261.24 (TCLP)	Applicable TC Waste codes	Applicable Underlying Hazardous Constituents as defined in 40 CFR 268.2(i)	Treat to UTS levels (TCLP):
beryllium	4.0 mg/L	N/A	N/A	√	1.22 mg/L
cadmium	0.5 mg/L	1.0 mg/L	N/A	√	0.11 mg/L
chromium	25.0 mg/L	5.0 mg/L	D007	N/A	0.60 mg/L
selenium	12.0 mg/L	1.0 mg/L	D010	N/A	5.7 mg/L[1]

N/A - Not Applicable

√ - Constituent is an underlying hazardous constituent in characteristic wastes

[1] Note, after treatment, this waste must be land disposed at a Subtitle C facility because it is still characteristically hazardous for selenium. If, however, all the underlying hazardous constituents are treated to their UTS levels or below and selenium is treated to below its toxicity characteristic level then the treated waste has been de-characterized, is no longer hazardous, and does not have to be disposed at a Subtitle C facility.

Example 2:
A generator determines that the following constituents are in its waste stream (concentrations as measured by the TCLP method):

beryllium: 4.0 mg/L
chromium: 2.5 mg/L
nickel: 30 mg/L
selenium: 4.0 mg/L
vanadium: 2.0 mg/L
zinc: 5.0 mg/L

This waste is a D010 characteristic metal waste stream for selenium because its untreated level exceeds the selenium toxicity characteristic level of 1.0 mg/L (TCLP). This waste is not characteristic for chromium because its untreated level does not exceed its toxicity characteristic level of 5.0 mg/L (TCLP).

Treatment for this characteristic waste requires treating the toxicity characteristic constituent and any underlying hazardous constituents, as defined in 40 CFR 268.2(i), to meet universal treatment standards. The selenium would normally have to be treated to its UTS level of 5.7 mg/L (TCLP). However, in this case treatment of selenium is not required since the untreated selenium level does not exceed its UTS.

Constituents found in untreated waste stream	Untreated levels (TCLP)	RCRA TC Levels 40 CFR 261.24 (TCLP)	Applicable TC Waste codes	Applicable Underlying Hazardous Constituents as defined in 40 CFR 268.2(i)	Treat to UTS levels (TCLP):
beryllium	4.0 mg/L	N/A	N/A	√	1.22 mg/L
chromium	2.5 mg/L	5.0 mg/L	N/A	√	0.60 mg/L
nickel	30.0 mg/L	N/A	N/A	√	11 mg/L
selenium	4.0 mg/L	1.0 mg/L	D010	N/A	5.7 mg/L[2]
vanadium	2.0 mg/L	N/A	N/A	N/A[3]	N/A
zinc	5.0 mg/L	N/A	N/A	N/A[3]	N/A

N/A - Not Applicable

√ - Constituent is an underlying hazardous constituent in characteristic wastes

Example 3:

[2] Note, after treatment, this waste must be land disposed at a Subtitle C facility because it is still characteristically hazardous for selenium. If, however, all the underlying hazardous constituents are treated to their UTS levels or below and selenium is treated to below its toxicity characteristic level then the treated waste has been de-characterized, is no longer hazardous, and does not have to be disposed at a Subtitle C facility.

[3] Zinc and vanadium are not underlying hazardous constituents in this or other characteristic wastes because they are not constituents on Appendix VIII. Vanadium and zinc are regulated only in specific listed wastes. Vanadium is regulated only in F039, P119, and P120. Zinc is regulated only in K061.

A generator determines that the following constituents are in its waste stream:

Metals (concentrations as measured by the TCLP method):
chromium: 10.0 mg/L
lead: 12.0 mg/L
nickel: 30 mg/L
selenium: 0.5 mg/L

Organics:
acetone: 200 mg/kg
PCBs (total): 20 mg/kg

This waste is a D007 and D008 multiple metals characteristic waste stream for chromium and lead because these constituents have untreated levels which exceed their toxicity characteristic level of 5.0 mg/L (TCLP) and 5.0 mg/L (TCLP), respectively. This waste is not characteristic for selenium because its untreated level does not exceed its toxicity characteristic level of 1.0 mg/L (TCLP).

Treatment for this characteristic waste stream requires treating the toxicity characteristic constituents and any underlying hazardous constituents, as defined in 40 CFR 268.2(i), to meet universal treatment standards before the waste can be land disposed.

Constituents found in untreated waste stream	Untreated levels (concentrationi n TCLP unless noted as mg/kg)	RCRA TC Levels 40 CFR 261.24 (TCLP)	Applicable TC Waste codes	Applicable Underlying Hazardous Constituents as defined in 40 CFR 268.2(i)	Treat to UTS levels (concentration in TCLP unless noted as mg/kg):
METALS					
chromium	10.0 mg/L	5.0 mg/L	D007	N/A	0.60 mg/L
lead	12.0 mg/L	5.0 mg/L	D008	N/A	0.75 mg/L
nickel	30.0 mg/L	N/A	N/A	√	11 mg/L
selenium	0.5 mg/L	1.0 mg/L	N/A	N/A	N/A
ORGANICS[4]					
acetone	200 mg/kg	N/A	N/A	√	160 mg/kg
PCBS (total)	20 mg/kg	N/A	N/A	√	10 mg/kg

N/A - Not Applicable

√ - Constituent is an underlying hazardous constituent in characteristic wastes

[4] Note, since this characteristic metals waste stream also has organic underlying hazardous constituents, one type of treatment method may not be feasible for this waste stream. A treatment train may be necessary to meet the UTS levels for all the constituents in this waste stream.