MISCHARACTERIZING P- AND U- LISTED USED ITEMS AS HAZARDOUS WASTE (E.G., BERYLLIUM)

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ABSTRACT

Wastes must be properly characterized to determine if they are hazardous. Regulations applicable to a beryllium/soil mixture are examined to conclude that it is not a listed hazardous waste. Additional analytic testing is suggested to determine if the mixture exhibits a hazardous characteristic. Process knowledge and analytic results are both needed to properly characterize waste.

DANGEROUS MATERIAL CATEGORIES

Managers of facilities with large quantities of material need information about that material. Some material may be dangerous. Some material may be considered "waste" by regulatory bodies. In the U.S., regulation of material often depends on what is to be done with the material. Material may be subject to reporting requirements of SARA Title III if the material is dangerous. It may be subject to Department of Transportation requirements if it is to be transported. If it is considered "waste" by EPA, it becomes subject to RCRA regulations. The statutes that agencies use to regulate material contain specific definitions that include or exclude various materials. These definitions depend on the purpose of the statute. For example, hazardous waste that is regulated by EPA and states pursuant to RCRA needs to be included in EPA's definitions of "solid waste" and "hazardous waste." Hazardous materials that are regulated by the Department of Transportation need not be wastes. "Toxic substances," "hazardous substances," and "extremely hazardous substances" are subject to various SARA Title III and OSHA requirements regardless of their status as wastes or whether they are to be transported.

SOLID WASTE

Note that material may be considered "solid waste" by EPA even if it is not considered waste by its owner. If an owner plans to recycle or recover substances from the material, EPA may well consider the material to be waste and attempt to regulate the management of the material before it is recycled or recovered.

HAZARDOUS WASTE

With such a broad regulatory net, material managers need to consider whether EPA considers their material "solid waste" and, if so, whether it is "hazardous waste." It may be a hazardous waste if it has been specifically listed by EPA's regulations (listed waste), or if it exhibits a hazardous characteristic (characteristic waste). EPA regulations require that a waste manager determine the EPA waste code (consisting of a letter followed by three digits). These waste codes are the key to regulation of subsequent storage, transport, treatment, and disposal. This "waste characterization" process is necessary both to determine the proper EPA waste code, as well as for planning subsequent management of the waste. Knowledge of a waste's characteristics is necessary in order to design storage containers, plan for treatment, transport, disposal, and contingencies.

CHEMICAL AND REGULATORY ANALYSES NEEDED

EPA allows waste managers to use both analytic results and process knowledge to characterize wastes. Some EPA and State inspectors attempt to force use of analytic results, but this is not supported by EPA's regulations, nor by many State hazardous waste regulations. For listed wastes, analytic results, standing alone are not sufficient for a proper waste characterization. Analytic results can determine what substances are in a waste container, but they cannot determine with any degree of certainty how those substances were used before they were placed in the container. Thus, a waste manager may be given analytic results that reveal the presence of xylene in a waste container. Although xylene is listed as a spent solvent (F003) hazardous waste, it is possible that the xylene is part of a paint formulation and therefore not considered a listed hazardous waste by EPA. Both analytic results and process knowledge are necessary in order to properly characterize listed wastes. Analytic results may be sufficient, however, to determine waste codes for characteristic wastes. These wastes are hazardous, independent of their prior history.

REGULATORY INFORMATION SOURCES

In order to understand regulations applicable to their waste, managers may need to review the RCRA statute, regulations found in the Code of Federal Regulations, preambles and proposed regulations found in the Federal Register, and written interpretations available from EPA. The remainder of this paper will demonstrate how these documents are used to determine whether a waste that contains

beryllium is regulated as a hazardous waste by EPA. Other wastes may require a similarly detailed regulatory analysis (as well as a more familiar chemical analysis) in order to determine their regulatory requirements. In this case, a product that contains beryllium has been tested, and the residual materials from the test have been scraped up, along with desert soil, and placed into a waste drum.

Is all beryllium to be considered a hazardous waste?

To be considered hazardous waste by EPA, it must first be a solid waste. If it is a solid waste, then it is hazardous if it is listed in 40 CFR § 261.31 - .33, or if it exhibits a hazardous characteristic defined at 40 CFR § 261.21 - .24. As this analysis shows, the beryllium waste is not listed as hazardous waste. The waste should be characterized to determine whether it exhibits a hazardous characteristic. If not, then it is not hazardous waste.

a. The beryllium-containing waste is not listed hazardous waste.

REGULATORY LANGUAGE

Beryllium is listed in 40 CFR § 261.33(e) as hazardous waste number P015. However, 40 CFR § 261.33 includes the substances on this list as hazardous wastes only when they are

(i) discarded,

(ii) intended to be discarded,

(iii)mixed with waste oil or used oil or other materials and applied to the land for dust suppression or road treatment,

(iv) otherwise applied to land or contained in products that are applied to the land in lieu of their original intended use, or

(v) produced for use as fuel, distributed for use as fuel, or burned as a fuel

AND are

(a) commercial chemical products or manufacturing chemical intermediates having generic names listed in (e) or (f),

(b) off-specification commercial chemical products or manufacturing chemical intermediates which, if they met specifications, would have the generic name listed in (e) or (f),

(c) residue remaining in a container ... which has held any commercial chemical product or manufacturing intermediate listed in (e) or (f), or

(d) residue or contaminated soil, water, or other debris resulting from the cleanup of a spill of any commercial chemical product, off-specification chemical product, or manufacturing intermediate named in (e) or (f).

Paragraph (e) lists various acute hazardous waste commercial chemical products, including P015 beryllium, and paragraph (f) lists various toxic waste commercial chemical products, the "U-listed" wastes.

THIS WASTE IS NOT A "COMMERCIAL CHEMICAL PRODUCT"

Note that this test has two parts that must be answered affirmatively before a suspected material can be characterized as a P- or U-listed waste: (1)(i) - (v) and (2)(a) - (d). The beryllium products have been used for their intended purpose and they have been discarded or are intended to be discarded, so they meet the first test described in (1) i. or (1) ii. above. However, they are NOT included in (a) through (d). They are similar to (d) because they are contaminated cleanup products, but (d) doesn't apply because the beryllium is not a commercial chemical product: it has been used. Note that a comment pertaining to (d) in the regulations would exclude this beryllium-containing waste as spill cleanup residue by clarifying the definition of commercial chemical product:

> [The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . ." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either § 261.31 or § 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this part.]

Clearly, EPA intended that the chemicals listed in (e) and (f) had to be in their unused commercial forms (or be spills of commercial forms) to be considered "P- or U-listed" hazardous waste. A bottle of commercial grade beryllium dust that is discarded, debris from spills from such a bottle, etc. are listed hazardous wastes with EPA waste code P015.

PREAMBLE EXPLANATION

In addition, EPA included the following explanation in the preamble to the final regulation:

> In listing these materials in the proposed rule, EPA intended to encompass those chemical products which possessed toxic or other hazardous properties and which, for various reasons, are sometimes thrown away in pure or undiluted form. The reasons for discarding these materials might be that the materials did not meet required specifications, that inventories were being reduced, or that the product line had changed. The regulation was intended to designate chemicals themselves as hazardous wastes, if discarded, not to list all wastes which might contain these chemical constituents. ... 45 FR 33115, May 19, 1980

In the example above, the waste contains beryllium, but the beryllium has not been thrown away in pure or undiluted form. It has been used and is mixed with other materials.

(Remember that EPA's letters on a regulatory topic are not as binding on EPA as are its Federal Register notices, so I've included these references only as illustrations of EPA's reasoning in the analogous CFC example. However, there is ample support for my reasoning in the Federal Register notices. There is no conflict between the regulatory language, Federal Register notices, and EPA's letter to industry.)

In answering a question about whether CFCs that had been used as refrigerants were hazardous waste, EPA stated

> ...[T]he U-Listings found at 40 CFR 261.33(f) apply to commercially pure grades of listed chemicals, technical grades, and formulations in which the listed chemical is the sole active ingredient. The U-list does not include chemical mixtures where the listed chemical is not the sole active ingredient, and does not apply to chemicals that have been used for their intended purpose. Thus, CFC refrigerants that are removed from a refrigeration system and are reclaimed would not be classified as "commercial products," but rather would be classified as "spent materials." 54 FR 31336, July 28, 1989

EPA INFORMAL MATERIALS

Similarly, in a letter to a refrigeration company, EPA wrote

> The used refrigerant would not meet the listing description in Section 261.33(e) for trichlorofluoromethane (U122) or dichlorodifluoromethane (U075) because it has been used. The listings in Section 261.33(e) and (f) apply to the commercially pure grades of the listed chemicals, technical grades, . . . but not to used chemicals. Sylvia K. Lowrance, Director, Office of Solid Waste to Marshall R. Turner, Racon Refrigerants, July 21, 1988. (If the CFC had been used as a solvent, then it would be an F001 or F002 listed waste.)

Since the beryllium-containing waste has been used, it is not a commercial grade of the chemical, and therefore is not regulated by § 261.33(d). Beryllium is not listed in either § 261.31 (F-listed wastes from nonspecific sources) or § 261.32 (K-listed wastes from specific sources). Thus, it is not a listed hazardous waste.

b. The beryllium-containing waste may be hazardous if it exhibits a hazardous characteristic.

The beryllium-containing waste needs to be examined to determine if the waste exhibits any of the characteristics of § 261.21-.24. Standard references should be checked, or testing performed, to determine whether it would cause the waste to be ignitable, reactive, or corrosive. Although beryllium is not one of the toxicity characteristic contaminants listed in Table 1 of § 261.24(b), if the wastes contain any of the other Table 1 toxic constituents, the wastes might still exhibit the characteristic of toxicity. If the beryllium-containing wastes have the potential to contain some of these other contaminants, this possibility should be examined further. Note that EPA has substantially revised the Toxicity Characteristic as a result of the March 29, 1990, final rule, which is effective September 25, 1990, for large quantity generators.

Unless the beryllium-containing waste is ignitable, reactive, or corrosive, then it is not a hazardous waste.

The answers to other characterization questions for the beryllium-containing waste depend on this answer to this first question.

Is the Environmental Protection Agency (EPA) Code P015 appropriate or should another code be used?

P015 is not the correct waste code to use for the beryllium-containing waste. The correct code is D001 if it is ignitable, D002 if it is corrosive, or D003 if it is reactive. Otherwise, it is not hazardous and no hazardous waste code applies.

If beryllium is the only metallic constituent in a radioactive waste package, is the package mixed waste?

If beryllium is the only metallic constituent in a radioactive waste package, the package is not mixed waste unless

i. the waste is a D001, D002, or D003 waste, or contains non-metallic contaminants above concentrations that exhibit the characteristic of toxicity, or

ii. other, listed, hazardous wastes (e.g., F001 solvents) are present in the package. Then it would, with cer-

tain exceptions, be hazardous pursuant to the mixture rule (40 CFR § 261.3(a)(2)).

If beryllium is mixed with other metallic constituents (that may be characteristic wastes) in a radioactive waste package, how do the Land Disposal Restrictions apply to the package?

If beryllium is mixed with other metallic constituents, the land disposal restrictions of 40 CFR Part 268 apply if either (1) the beryllium-containing waste is a D001, D002, or D003 hazardous waste, (2) the other metallic constituents or any nonmetallic constituents of the package exceed levels that exhibit the hazardous characteristic of toxicity, or (3) other, listed, hazardous wastes are present. If so, then the waste must be treated to meet the applicable LDR treatment standards before it may be land disposed.

CONSIDER STATE LAW

This discussion has considered only the regulatory status of the beryllium-containing waste pursuant to federal law. State laws and regulations may differ. Although State RCRA programs are similar to the federal program, some states may have specific identifications or listings for beryllium-containing wastes.

Note also that, under the provisions of 40 CFR Part 302, releases of "beryllium dust" and "beryllium and compounds" to the environment are subject to notification if they exceed the designated reportable quantity of one pound.

Characterizing wastes is not a simple matter of comparing analytic results with lists of substances in EPA's regulations. Rather, the definitions and limitations of the various lists must be considered before concluding that a waste is subject to regulation. The increased costs from handling nonhazardous wastes as if they were hazardous, or the increased enforcement risk from handling hazardous wastes as if they were nonhazardous, are too high for any simplistic regulatory characterization.