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TWO MINUTE TRAINING

TO: CENTRAL PLATEAU CLEANUP COMPANY

FROM: PAUL W. MARTIN, RCRA Subject Matter Expert
CPCCo Environmental Protection, Hanford, WA

SUBJECT: MERCURY DEBRIS - IMERC, RMERC OR MACROENCAPSULATION

DATE: AUGUST 18, 2022

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TWO MINUTE TRAINING

SUBJECT: Mercury Debris - IMERC, RMERC or Macroencapsulation

Q: A customer has D009 mercury contaminated debris destined for disposal. Per the land disposal restriction (LDR) treatment standards at [40 CFR 268.40](#), a nonwastewater mercury waste with ≥ 260 ppm mercury must be treated via incineration or recovery of mercury. Since D009 mercury has LDR standards as specified technologies (required treatment methods), does this mean the customer cannot manage the mercury waste as hazardous debris under the [40 CFR 268.45](#), e.g., macroencapsulation?

A: 40 CFR 268.45(a), basically states that hazardous debris must be treated per the debris treatment standards at 40 CFR 268.45 or the waste-specific treatment standards in 40 CFR 268.40. This means that the customer has a choice to treat the mercury debris via one of the debris standards such as macroencapsulation, incineration ([IMERC](#)), or recovery of mercury ([RMERC](#)). Note that this is assuming the customer's mercury waste meets the definition of debris found at [40 CFR 268.2\(g\)](#). As an example, if the waste was unbroken mercury batteries, the waste would be considered intact containers and not debris. The only LDR treatment options in this case would be the specified treatment standards of IMERC or RMERC. However, if the waste was broken mercury batteries and therefore nonintact containers, the alternative treatment standards for debris would be another viable LDR treatment option.

Also note that the [August 18, 1992, Federal Register](#) on page 37224, 1st column, 2nd paragraph, basically states that EPA indicated that "debris-like" material for which the Agency has promulgated a specific treatment standard is not included in the definition of debris. The reason is that EPA determined that specific treatment standards are appropriate for certain debris-like materials, rather than the assortment of debris treatment methods outlined in 268.45. Examples of debris-like material with specific treatment standards are the LDR subcategories of D006 Cadmium Batteries and D008 Lead-acid Batteries. These debris have specific subcategories under their respective waste codes, thus excluding the materials from the option of treating via the debris standards. A debris without a specific debris-like subcategory (such as this mercury wastes) has the option of meeting either the waste code specific LDR treatment standards of 268.40 or the debris LDR treatment standards of 268.45.

Therefore, a mercury contaminated waste (D009) that meets the definition of debris, may be treated by either the specified technology (IMERC, RMERC) or the debris treatment standards (e.g., macroencapsulation). If the mercury waste did not meet the definition of debris, then the debris standards would not apply and the waste code specific treatment standards would apply.

SUMMARY:

- Hazardous debris wastes can be treated by either the waste code specific treatment standards of 268.40 or the debris treatment standards of 268.45.
- The definition of debris does not include intact containers or debris-like materials with specific treatment standards such as cadmium batteries or lead-acid batteries.
- Debris-like material with no specific treatment standards retain the option of meeting either the waste code specific treatment standards of 268.40 or the debris standards of 268.45.

Excerpts from 40 CFR 268.2, [268.42](#), and 268.45 are attached to the e-mail. If you have any questions, please contact me at [Paul W Martin@rl.gov](mailto:Paul_W_Martin@rl.gov) or at (509) 376-6620.

FROM: Paul W. Martin

DATE: 8/18/2022

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TWO MINUTE TRAINING - ATTACHMENT

SUBJECT: Mercury Debris - IMERC, RMERC or Macroencapsulation

40 CFR 268.2 Definitions applicable in this part.

When used in this part the following terms have the meanings given below:

(g) *Debris* means solid material exceeding a 60 mm particle size that is intended for disposal and that is:

- A manufactured object; or
- Plant or animal matter; or
- Natural geologic material.

However, the following materials are not debris:

- Any material for which a specific treatment standard is provided in Subpart D, Part 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids;
- Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and
- Intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume.

A mixture of debris that has not been treated to the standards provided by §268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.

40 CFR 268.42 Treatment standards expressed as specified technologies.

(a) The following wastes in the table in §268.40 "Treatment Standards for Hazardous Wastes," for which standards are expressed as a treatment method rather than a concentration level, must be treated using the technology or technologies specified in the table entitled "Technology Codes and Description of Technology-Based Standards" in this section.

Table 1-Technology Codes and Description of Technology-Based Standards

Technology code	Description of technology-based standards
IMERC:	Incineration of wastes containing organics and mercury in units operated in accordance with the technical operating requirements of 40 CFR part 264 subpart 0 and part 265 subpart 0. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per waste code with consideration of any applicable subcategories (e.g., High or Low Mercury Subcategories).
RMERC:	Retorting or roasting in a thermal processing unit capable of volatilizing mercury and subsequently condensing the volatilized mercury for recovery. The retorting or roasting unit (or facility) must be subject to one or more of the following: (a) a National Emissions Standard for Hazardous Air Pollutants (NESHAP) for mercury; (b) a Best Available Control Technology (BACT) or a Lowest Achievable Emission Rate (LAER) standard for mercury imposed pursuant to a Prevention of Significant Deterioration (PSD) permit; or (c) a state permit that establishes emission limitations (within meaning of section 302 of the Clean Air Act) for mercury. All wastewater and nonwastewater residues derived from this process must then comply with the corresponding treatment standards per waste code with consideration of any applicable subcategories (e.g., High or Low Mercury Subcategories).

TWO MINUTE TRAINING -ATTACHMENT

SUBJECT: Mercury Debris - IMERC, RMERC or Macroencapsulation

40 CFR 268.45 Treatment standards for hazardous debris

(a) *Treatment standards.* Hazardous debris must be treated prior to land disposal as follows unless EPA determines under §261.3(f)(2) of this chapter that the debris is no longer contaminated with hazardous waste or the debris is treated to the waste-specific treatment standard provided in this subpart for the waste contaminating the debris:

Table 1-Alternative Treatment Standards For Hazardous Debris

Technology description	Performance and/or design and operating standard	Contaminant restrictions
C. Immobilization Technologies:		
1. <i>Macroencapsulation:</i> Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media	Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes)	None.
2. <i>Microencapsulation:</i> Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents. ⁵	Leachability of the hazardous contaminants must be reduced	None.
3. <i>Sealing:</i> Application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy, silicone, and urethane compounds, but paint may not be used as a sealant	Sealing must avoid exposure of the debris surface to potential leaching media and sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes)	None.