



Department of Energy
National Nuclear Security Administration
Nevada Site Office
P.O. Box 98518
Las Vegas, NV 89193-8518



Waste Management Project

Radioactive Waste Acceptance Program

Macroencapsulation Guidance For Classified Components and NNSWAC Compliance

Revision 0

May 2012

Approved by: James J. Cebe Date: 15 MAY 2012
James J. Cebe, NNSA/NSO, RWAP Program Manager

Reviewed by: R. Greg Gelsinger Date: 5/15/2012
R. Greg Gelsinger, NSTec, RWAP Manager

Prepared by: Jeanne Poling Date: 5/15/2012
Jeanne Poling, NSTec, EM Deputy Director

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or any agency thereof.

Summary

The U.S. Department of Energy (DOE) complex has a surplus of classified legacy weapon components generated over the years with no direct path for disposal. The majority of the components have been held for uncertainty of future use or no identified method of sanitization or disposal. As more weapons are retired there is an increasing need to reduce the amount of components currently in storage or on hold. A process is currently underway to disposition and dispose of the legacy/retired weapons components across the DOE complex.

Issue

The classified legacy weapon components are composed of hundreds of thousands of parts. Each part will not be characterized individually, but the components will be characterized based on process knowledge as a whole. Examples of this type of item include firing sets, trainers, radar assemblies, neutron generators and other similar components. In most cases, there are hazardous Resource Conservation and Recovery Act–regulated metals involved in the parts that make up the components. The typical regulated metals in the components would be lead and silver from circuit boards and wiring, cadmium or chromium plated parts. When the components are completely disassembled the regulated metals are relatively small amounts. However, the weapon components were designed and built to be very durable under extreme mechanical and environmental conditions and disassembly of the components is a labor intensive process.

The majority of classified legacy weapon components will have more than one hazardous constituent but it is estimated that over 95% of the components will meet the definition of hazardous debris. The appropriate Land Disposal Restriction treatment for the classified hazardous debris is macroencapsulation. During the week of March 12, 2012, the Nevada Division of Environmental Protection Federal Bureau Chief toured Kansas City and observed that there were numerous components that appeared to meet the regulatory macroencapsulation requirement as manufactured. These items are fully encased in stainless steel, resin potting material or other polymer coating and require no further treatment. Examples of the types of components that qualify as “inherently macroencapsulated as manufactured” are shown below.

Examples of “Inherently Macroencapsulated as Manufactured”



Electronic Components



Compression Molded Part



W83 Drop Test Unit

Requirements/Regulations

40 CFR 268.2(g) defines “debris” as:

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 the 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 268.45 Table 1 defines “macroencapsulation” as:

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 material into which it may come into contact after placement (leachate, other waste, microbes).

Conclusion

The intent of this guidance is to inform generators that even if a component contains a regulated hazardous waste, it may not require further treatment. Numerous classified legacy components that contain hazardous metal constituents when declared excess already meet the regulatory requirement for macroencapsulation as manufactured. These items are fully encased in stainless steel, aluminum, resin potting material or other polymer coating during manufacturing and require no further treatment. The justification of equivalency for macroencapsulation must be documented in the waste profile along with the backup documentation. Qualified waste inspector and certification officials will need to inspect the items to ensure that no further treatment is required for these intact components during packaging operations.