

## **EFCOG Best Practice #102**

06/13/2011

**Best Practice Title:** Waste Characterization/Classification

**Facility:** Savannah River Site, South Carolina

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### **Brief Description of Best Practice:**

SRNS developed a process to allow generators to use the legacy contaminated waste containers as a part of the waste form. The weight of the entire waste stream including the container could be used to calculate radionuclide concentrations and can, in some cases, help classify a waste stream as LLW versus transuranic (TRU) waste.

### **Why the best practice was used:**

The process was developed to provide generators a practical, risk informed and cost effective method of disposing legacy contaminated containers.

### **What are the benefits of the best practice?**

- significantly reducing risk and worker exposure by not repackaging waste
- reducing the total cost of waste disposition by avoiding the unnecessary creation of a TRU waste stream.

### **What problems/issues were associated with the best practice?**

There were some problems in getting DOE and the generators to fully understand the concept and process.

### **How the success of the best practice was measured:**

Success of this process is measured by the fact that many legacy containers have been disposed of as LLW and worker exposure has been avoided by eliminating the need to repackage waste unnecessarily. Cost savings have also been realized by reducing the amount of waste that would have been characterized as transuranic waste, re-packaged and transported to WIPP for disposal.

### **Description of process experience using the best practice:**

Boxes, casks, intermodal containers, concrete containers, and other containers including 30, 55 and 85 gallon drums, containing radioactive waste have been stored in DOE Complex facility storage areas as TRU and LLW for many years. As the TRU and LLW program has matured, the boxes and other containers have been used as storage containers of radioactive waste and stored, once empty, for reuse if appropriate. Many of the boxes and other containers are contaminated on the inside, and upon evaluation will not be decontaminated and reused. For example at Savannah River Site, boxes that have been used for TRU waste storage as part of the F-Canyon or E-Area program to repackage TRU

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waste have not been able to be cleared for free release and, therefore, have been determined to be waste and must be discarded. Some of the boxes have been found to be contaminated on the inside after repackaging activities in F-Canyon. The boxes involved in E-Area repackaging have not been able to be cleared for free release even though there is no evidence that the inside of the containers were contaminated before repackaging activities. Drums and boxes that have stored radioactive waste managed as TRU and LLW have been found to be contaminated and unable to be released.

If the boxes or other containers, and their contents will not be reused and will no longer be needed as storage containers, they will be discarded as waste. At that time they must be characterized as waste to determine the appropriate classification and disposal path.

The discarded waste form subject to classification (as LLW vs. TRU) will then be the container and the container contents. The waste form consisting of the discarded contaminated container and contents must then be characterized to determine if the waste form is above 100 nCi/g. If the contaminated, discarded container and contents are below 100 nCi/g, then the waste form would be classified as LLW or mixed LLW and be disposed in a LLW/MLLW disposal unit based on the unit's Waste Acceptance Criteria.

**It is recognized in the DOE Order 435.1 Guidance on III. A, page III-3, that actions taken to process a waste stream for safety or technological reasons that are justified, may result in the waste being reclassified after processing as LLW.**

This is the case with the contaminated box waste form used in the example above. If a box is emptied of its contents as part of the TRU repackaging campaign and then the contaminated box is determined to be discarded as waste, the box must be classified in accordance with DOE 435.1 and if it cannot be released as sanitary waste, it will be a radioactive waste. At that point it must be classified as LLW or TRU. The box (if determined to be no longer of use and is to be discarded) was then an integral part of the waste form before its contents are removed. There are a number of boxes which when using the entire weight of the waste form (the box and its contents are the waste form since the box is determined to be discarded as waste), may be classified as LLW instead of TRU once the weight calculation takes into account the entire waste form. Therefore, emptying the box and generating a separate TRU waste stream does not reduce the volume of box waste to be disposed and the repackaging processing will generate both radiological and industrial risk that would be avoided by not repackaging. Rather, risk would be significantly reduced if the waste form were not repackaged and was disposed as LLW if it can be demonstrated that the waste form is below 100 nCi/g and it meets the LLW disposal waste acceptance criteria as derived from the DOE Order 435.1 Performance Assessment for LLW disposal. Avoiding the segregation not only reduces the risk of handling the waste form, it also reduces the total cost of waste disposition by avoiding the unnecessary creation of a TRU waste stream. The same logic is correctly applied to 55 and 85 gallon drum containers. If the drum is contaminated and determined to be discarded to waste then the entire waste matrix including the drum must be characterized to determine if the waste matrix is LLW or TRU. This is especially important if the 85 gallon drum is an overpack for a 55 gallon drum with suspect integrity. In addition 55 gallon drums that were emptied as a result of TRU drum remediation are contaminated and in some cases are determined to need over packing in boxes to reduce the contamination potential during handling for characterization

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and disposal. Contaminated large boxes and intermodals at DOE facilities have been determined to be waste (no longer needed) and are to be discarded as radioactive waste. It is appropriate and consistent with DOE Order 435.1 requirements and guidance for these waste boxes to be combined with the empty contaminated 55 gallon drums for characterization, classification, and disposal. As with the boxes discussed above, the contaminated box used to overpack the contaminated drums is an integral part of the waste form and the entire weight of the waste form can be used to determine if the waste is LLW or TRU. These are specific examples of combining wastes including waste containers as a processing step for safety or technical reasons in accordance with **DOE Order 435.1 Guidance on III. A, page III-3, that actions taken to process a waste stream for safety or technological reasons that are justified, may result in the waste being reclassified after processing as LLW.**

### **ISM Core Function 3: Develop and Implement Hazard Controls**