

CERTIFYING TRANSURANIC DEBRIS WASTE GENERATED AT TECHNICAL AREA-55

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ABSTRACT

This presentation is a series of viewgraphs that provides an overview of the two-stage process by which transuranic (TRU) debris waste is certified by Los Alamos National Laboratory (LANL) for shipment to the Waste Isolation Pilot Plant. The first stage of the process is conducted by the Waste Management and Environmental Compliance Group at Technical Area-55 (TA-55). The second stage is conducted by LANL's Environmental Technologies Group. TRU waste characterization and packaging information is documented, reviewed, and verified electronically on the Waste Management System. Both stages of TRU waste operations and certification collectively fulfill program requirements.

INTRODUCTION

An integrated management program has been developed at Los Alamos National Laboratory's (LANL's) Technical Area-55 (TA-55) for certifying transuranic (TRU) waste for shipment to the Waste Isolation Pilot Plant (WIPP). LANL Waste Management and Environmental Compliance Group (NMT-7) personnel manage TRU waste in compliance with a Transuranic Waste Interface Document (TWID) (2), which is approved by LANL's Environmental Technologies Group (E-ET). E-ET serves as the TRU waste project office and maintains LANL's TRU waste certification authority. The TWID incorporates the requirements of LANL's TRU Waste Certification Plan. The U.S. Department of Energy's (DOE's) Carlsbad Area Office (CAO) approved LANL's TRU Waste Certification Plan, which was developed by E-ET to implement requirements of the *Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (WIPP WAC). This program also integrates NMT-7's standard operating procedures (SOPs) (3,4,5), which were prepared in compliance with the TWID. These SOPs implement requirements for inspection, segregation, and packaging of TRU waste for shipment to the WIPP, as well as the preparation of associated data packages for certifying that drums and containers of TRU waste meet WIPP requirements.

Data are electronically recorded, maintained, and reviewed in the Waste Management System (WMS), which has access, signature, and change controls. In the second stage of the process, E-ET reviews and validates WMS data and ensures compliance with the remaining requirements of the *TRU Waste Certification Plan*.

WASTE CHARACTERIZATION AND CERTIFICATION PROCESS

Waste generators first identify and characterize a waste item based on acceptable knowledge (AK). If there is any question regarding the waste item, and it is determined that the waste is suitable for sampling, the waste may be sampled and analyzed for characterization. During the certification process, each waste item is inspected for prohibited items (i.e., corrosives, pyrophorics, ignitables, explosives, polychlorinated biphenyls, pressurized vessels, sealed containers greater than four liters, oils, and free liquids). Prohibited items are not accepted unless they are first remediated to meet the WIPP or LANL WAC. Oils must be sampled prior to their drainage from a reservoir. Items are packaged in bagout bags. Metals and hard plastic edges are taped to prevent damage to the bagout bag. Metal cans are used for the same purpose if there are too many sharp edges, such as broken glass or sharp tools.

The waste generator identifies any Resource Conservation and Recovery Act (RCRA) hazardous waste constituents by AK; or, if suitable for sampling, the waste may be sampled and analyzed and

characterized based on analytical results. During waste inspection and packaging, information is entered into the WMS, which prompts the user to enter information into data fields on the following forms or screens:

- Drum certification
- Waste origination and disposition form
- Packaging
- Closing
- Approval

DRUM CERTIFICATION SCREEN

Before packaging TRU waste, NMT-7 personnel inspect the drums for dents, gouges, condition of paint, chime, and ring; presence and integrity of the bolt, nut, and lid gasket; and carbon composite filter installation. For purposes of this paper, the term “drum” is used for a standard waste box (SWB) or 55-gal. drum. The NMT-7 drum certification process indicates that the drum meets quality standards for container integrity, storage, and shipment of TRU waste in compliance with U.S. Department of Transportation and WIPP WAC requirements. A variety of information is entered into the drum certification screen (e.g., the date of manufacture, purchase order number, tare weight of an assembled drum that is ready to receive waste items, and serial number of carbon composite filters).

Packaging information is also entered into the drum certification screen. Standard drum packaging is used to determine the TRUCON Code and shipping category unless specified otherwise. The standard packaging differs for open drums or in-line drums. For example, waste items that have been placed in bagout bags may be packaged into an open drum lined with two 5-mil liners; whereas, waste items from a glove box are directly loaded into an in-line drum that is directly attached to a glove box port. The in-line drum has a rigid plastic liner, placed inside a long bagout bag, placed inside a 5-mil plastic bag.

WASTE ORIGINATION AND DISPOSITION FORM (WODF)

The waste generator (or waste originator) enters all the information regarding waste items on the WODF (pronounced as woe-duf) screen. The waste matrix is assigned by selecting a matrix from a pull-down menu. The item ID is formulated by the WMS based on the matrix, process status, and the sequential number available for the combined matrix and process status. The waste generator is qualified and trained through the waste generator training program. Only qualified and trained personnel are authorized to enter data into the WMS. The information entered into the WODF screen fields is described below:

- *Quantity* refers to a matrix (such as gloves) that has a discard limit dependent on a calculation.
- *Gross* refers to the total weight of a waste item including the can in which it is placed inside the glove box.
- *Tare* is the can weight inside the glove box.
- *Net* is the weight of the item being discarded outside the glove box.
- *Volume* refers to the volume of liquid, if any.
- *PS* refers to process status, the unique process the waste came from or the point of generation of the waste from a project.
- *Location* is to identify from where the waste item physically came.
- *Comments* include additional information regarding waste, its traceability, special packaging configuration information, and filter numbers if they are used for the cans or bagout bags.

The WODF screen also includes information regarding prohibited items (e.g., pyrophorics, corrosives, explosives), special materials (e.g., particulates, beryllium), and acceptable hazardous constituents. Waste processing methods for debris waste is checked as solid. If waste requires cementation, the waste is sent

to the waste management cementation team. Presence of lead shielding is recorded when the waste item emits a contact dose rate above 75 mrem per hour. Information regarding the type of assay instrumentation used is also recorded.

The electronic WMS has a variety of icons or buttons to facilitate data entry. Pressing the *Isotope* button selects the radionuclides present in a waste item. The *Hazardous* button provides information on the quantity and nature of hazardous waste. The *Memos* button provides information on the letters for exceptions or clarifications on the waste. The *History* button shows the tracking of the waste item through various events. The *Non-Waste* button is used for items that are not going to waste, but that need future tracking. Solid TRU waste team members use the *Certify* button to approve and accept that the data provided by the generator meet various WAC.

After completing the WODF entries, a waste generator ensures that the waste is submitted to the Nondestructive Assay Laboratory (NMT-4), where the waste packages are assayed for radioisotopes and radioactivity. These measurements are recorded on the WMS for the respective isotopes and to determine whether the isotope meets the discard limit. Packages that meet the criteria for the discard limit are managed as waste and segregated according to the following criteria:

- Waste matrix (e.g., combustibles, metals, glass)
- Defense or nondefense waste
- RCRA classification

DRUM PACKAGING SCREEN

The process of determining how drums will be packaged is done electronically. Sorting waste items is simulated in this manner to minimize physical handling of the waste, thus reducing exposure. NMT-7 personnel determine how waste items will be segregated into drums by matrix type and radiological measurement (i.e., gamma or neutron assay); and whether the waste is defense or nondefense program waste, and routine or nonroutine waste. During this simulated drum packaging of each waste item, a running total of special nuclear material (SNM) is calculated. By clicking on the *drum* icon, all relevant fields are populated based on the information entered previously for each waste item. The final drum weight (in pounds) is recorded. The final drum weight must be within two pounds of the tare weight and the sum total of all the waste items in the drum. Any discrepancy exceeding two pounds must be resolved.

Larger waste items that do not fit into a 55-gal. drum are packaged into a SWB. Drums that contain waste are secured with a padlock to ensure that the material inside cannot be diverted. After the batch data reports have been approved, the drums are shipped to LANL's safe storage facility.

CLOSE DRUM SCREEN

After the drum is chosen for waste placement, the data are entered into all data fields of the Close Drum screen. The date a drum is closed is entered in the *Original Date Closed* field. If a tamper-indicating device (TID) is utilized, the TID identification number is also entered. The calculated gross weight is the sum of tare weight of the drum and the weights of the different waste items placed in the drum. The accumulation start date is entered for hazardous waste items and refers to the date the first hazardous waste item is placed in a drum. That start date follows the waste item if the item is repackaged in a different drum. Notes or comments are entered as needed.

DATA PACKAGE APPROVAL

The TRU waste functional supervisor reviews the data for compliance with the TWID and facility SOPs. If WIPP WAC cannot be met, the data are reviewed for compliance with the LANL WAC for safe storage. The data are reviewed on a variety of screens such as *Item Listing*, *Waste Origination and Disposition Form*, *Drum Information*, *RCT Survey*, and the approval screen. Waste profile numbers,

shipping categories, TRUCON codes, LANL waste stream numbers, defense or nondefense waste information, and cost codes are entered during the review and approval process. Some examples of the data review checks are as follows:

- The Pu-239 fissile-gram equivalent measurement with twice the uncertainty should not exceed 200.
- The Pu-239 equivalent activity should not exceed 80 Curies.
- The total number of nanocuries per gram of the waste should be greater than 100.
- The removable alpha contamination should be below 20 disintegrations per minute per cm².
- The removable beta/gamma contamination should be below 200 disintegrations per minute per cm².
- The dose rate should be less than or equal to 200 mrem per hour at surface or 10 mrem/ hour at 1 m.
- The decay heat in wattage should be in compliance with the TWID or the latest version of the TRUPACT-II Content Code Document (DOE/WIPP 89-004).

If the decay heat content of a waste drum is over the wattage limit per the TRUPACT-II Content Code Document, the waste can not be certified for shipment to the WIPP. In such a situation, the waste is stored at LANL safe storage, provided that the waste meets the LANL WAC. A note is added to the data package that the drum exceeds the wattage limit, the drum needs to be reassayed and, if the assay results indicate that the drum is still over the wattage limit, that a gas generation test should be performed.

SECOND STAGE OF THE PROCESS

After data are determined as acceptable, NMT-7 personnel make the data package available to E-ET for project-level data review and validation. In the second stage of the process, E-ET also ensures compliance with the remaining requirements of the *TRU Waste Certification Plan* before approval to ship the waste is requested from the CAO. Some of these requirements include the following:

- Radioassay of waste containers using the CAO-certified assay system
- Headspace gas sampling
- Identifying and confirming RCRA-listed hazardous wastes
- Based on acceptable knowledge, determining whether waste streams in the debris waste matrix category are hazardous according to RCRA

E-ET requirements are not described in detail in this paper.

CONCLUSION

Groups NMT-7 and E-ET at Los Alamos are processing TRU debris waste in compliance with the TWID and the LANL Certification Plan to certify TRU waste for shipment to the WIPP.

REFERENCES

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5. "Rejected Waste Package/Data Package Investigation," TRUWM-TA-55-DP-05, Los Alamos National Laboratory, Current Revision.