U.S. Department of Energy
Washington, D.C.

NOTICE

DOE N 435.1

Approved: 8-9-2011
Expires: 8-9-2012

SUBJECT: CONTACT-HANDLED AND REMOTE-HANDLED TRANSURANIC WASTE PACKAGING

1. PURPOSE. This Notice provides specific instructions for packaging and/or repackaging contact-handled transuranic (CH-TRU) and remote-handled transuranic (RH-TRU) waste in a manner consistent with DOE O 435.1, *Radioactive Waste Management*, DOE M 435.1-1 Chg 1, *Radioactive Waste Management Manual*, CH-TRU and RH-TRU waste transportation requirements, and Waste Isolation Pilot Plant (WIPP) programmatic requirements.

2. CANCELLATION. None.

3. APPLICABILITY.

   a. Departmental Applicability. This Notice applies to all Departmental elements when packaging and/or repackaging CH-TRU and RH-TRU waste. This Notice does not apply when CH-TRU and RH-TRU waste are packaged and/or repackaged at a site where the following conditions apply:

      (1) A WIPP certified program is actively performing CH-TRU and/or RH-TRU waste characterization and certification at that site; **and**

      (2) Site personnel responsible for the packaging and/or repackaging operation are receiving feedback on the effectiveness of the packaging and/or repackaging operation from the WIPP certified program.

      Questions regarding the applicability or implementation of these packaging instructions should be directed to DOE-EM Office of Disposal Operations.

      The Administrator of the National Nuclear Security Administration will assure that NNSA employees comply with their respective responsibilities under this Notice. Nothing in this Notice will be construed to interfere with the NNSA Administrator's authority under section 3212(d) of Public Law (P.L.) 106-65 to establish Administration-specific policies, unless disapproved by the Secretary.

   b. DOE Contractors. Except for the equivalencies/exemptions in paragraph 3.c., the Contractor Requirements Document (CRD), Attachment 1, sets forth requirements of this Notice that will apply to contracts that include the CRD.

   c. Equivalencies/Exemptions for DOE N 435.1. Equivalencies and exemptions to this Notice are processed in accordance with DOE O 251.1C, Departmental Directives Program. Central Technical Authority (or designee) concurrence is

required for both equivalencies and exemptions to this Notice for nuclear facilities.

Exemption. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at 50 USC sections 2406 and 2511, and to ensure consistency throughout the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) will implement and oversee requirements and practices pertaining to this directive for activities under the Director's cognizance, as deemed appropriate.

4. REQUIREMENTS. General.

(1) Detailed contact-handled transuranic waste requirements are listed in Attachment 2.

(2) Detailed remote-handled transuranic waste requirements are listed in Attachment 3.

a. Implementation. Full implementation of this Notice must be accomplished within 90 days of its issuance, unless a different implementation schedule is approved by the Program Secretarial Officer.

5. RESPONSIBILITIES.

a. Director, Office of the National TRU Program, Carlsbad Field Office, provides specific written direction or packaging instructions and/or container limits as applicable. When an NNSA element is involved, site-specific direction is developed in coordination with NNSA.

b. Site Managers ensure that the packaging and/or repackaging of CH TRU and RH TRU waste is properly planned and executed.

c. Director, Office of Disposal Operations (or its successor office), Office of Environmental Management, approves all equivalencies and exemptions from the requirements of this Notice. When an NNSA element is involved, additional approval by NNSA is required.[1]

d. Contracting Officers, once notified by the appropriate program official, incorporate the CRD into affected site/facility management contracts in accordance with laws, regulations and DOE directives clause of the contracts.

1 NNSA elements must submit all requests for equivalencies and exemptions to the Director, Office of Disposal Operations, EM-43, and the Director, Office of Environment, Safety and Health, NA-SH-20, which will review the request (on behalf of the NNSA Chief Technical Authority) and work with EM to get approval.

6. REFERENCES.

   a. DOE O 435.1, Radioactive Waste Management (Change 1: August 28, 2001).

   b. DOE M 435.1-1, Radioactive Waste Management Manual (Change 1, June 16, 2001).

   c. DOE G 435.1-1, Implementation Guide for Use with DOE M 435.1-1, Chapter 3 Transuranic Waste Requirements (July 9, 1999).

7. DEFINITIONS.

   a. Contact-handled Transuranic (CH-TRU) Waste. Waste containing more than 100 nanocuries of alpha emitting transuranic isotopes per gram of waste with half-lives greater than 20 years and a payload surface dose rate not greater than 200 millirem per hour.

   b. Remote-handled Transuranic (RH-TRU) Waste. Waste containing more than 100 nanocuries of alpha emitting transuranic isotopes per gram of waste with half-lives greater than 20 years and a payload surface dose rate of 200 millirem per hour or greater.

8. CONTACT. Questions concerning this Notice should be addressed to the Office of Technical and Regulatory Support at (202) 586-0730.

BY ORDER OF THE SECRETARY OF ENERGY:

DANIEL B. PONEMAN
Deputy Secretary

CONTRACTOR REQUIREMENTS DOCUMENT
DOE N 435.1, *CONTACT-HANDLED AND REMOTE-HANDLED TRANSURANIC WASTE PACKAGING*

Regardless of the performer of the work, the contractor is responsible for complying with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

Contractors must implement the requirements set forth in Attachments 2 and 3 to DOE N 435.1 referenced in and made a part of this CRD, which provide program requirements applicable to contracts in which this CRD is inserted.

CONTACT-HANDLED TRANSURANIC WASTE PACKAGING INSTRUCTIONS

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CONTACT-HANDLED TRANSURANIC WASTE PACKAGING INSTRUCTIONS

1. PURPOSE.

This document provides DOE elements and DOE contractors with specific instructions for packaging and/or repackaging contact-handled transuranic (CH TRU) waste in a manner that is consistent with DOE O 435.1-1, *Radioactive Waste Management*, DOE M 435.1-1, *Radioactive Waste Management Manual* (Change 1), CH TRU transportation requirements, and Waste Isolation Pilot Plant (WIPP) programmatic requirements.

2. SCOPE.

This instruction addresses the packaging and repackaging of CH TRU waste resulting from activities and operations at new and existing DOE radioactive waste management facilities where the planned path for disposition is the WIPP.

3. APPLICABILITY.

The instructions provided in this document apply to DOE elements and DOE contractors as set forth in DOE M 435.1-1, *Radioactive Waste Management Manual*, when packaging and/or repackaging CH TRU waste. These instructions do not apply when CH TRU is packaged and/or repackaged at a site where the following conditions apply:

a. A WIPP certified program is actively performing CH TRU waste characterization and certification at that site; **and**

b. Site personnel responsible for the packaging and/or repackaging operation are receiving feedback on the effectiveness of the packaging and/or repackaging operation from the WIPP certified program.

Questions regarding the applicability or implementation of these packaging instructions should be directed to DOE-EM Office of Disposal Operations.

4. PREREQUISITES.

Public Law 102-579, Waste Isolation Pilot Plant Land Withdrawal Act, 1992, specifies that WIPP is "to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities." The following activities are considered atomic energy defense activities for purposes of these instructions and disposal at WIPP:

- Naval reactors development
- Weapons activities, including defense inertial confinement fusion
- Verification and control technology
- Defense nuclear materials production

- Defense nuclear waste and materials by-products management
- Defense nuclear materials security and safeguards and security investigations
- Defense research and development.

In order to establish the defense pedigree of the waste, a "defense determination" is required for all waste destined for WIPP disposal. The determination may be established as a part of the documentation of process knowledge that demonstrates the origin of the waste; or, for waste with a less direct tie to one of the defense activities, by a formal process initiated by the generator site and approved by the Carlsbad Field Office (CBFO) Manager or DOE Headquarters General Counsel.

CH TRU waste is defined as waste containing more than 100 nCi of alpha emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years and a surface dose rate ≤ 200 mrem/hr. To meet this prerequisite, each 55-gallon drum or Standard Waste Box (SWB) shall comply with this definition.

The WIPP Hazardous Waste Facility Permit specifies the hazardous waste numbers that are allowed at WIPP. These hazardous waste numbers are listed below; all other hazardous waste numbers are prohibited:

- F001, F002, F003, F004, F005, F006, F007, F009
- D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D021, D022, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D043
- P015, P030, P098, P099, P106, P120
- U002*, U003*, U019*, U037, U043, U044, U052, U070, U072, U078, U079, U103, U105, U108, U122, U133*, U134*, U151, U154*, U159*, U196, U209, U210, U220, U226, U228, U239*

  * Hazardous waste listed in part or wholly for ignitability, corrosivity, or reactivity characteristics shall not be packaged unless there is documented evidence that the waste no longer exhibits the characteristics of ignitability, corrosivity, or reactivity.

5. GROUPING WASTE FOR PACKAGING AND/OR REPACKAGING.

Categorize and package CH TRU waste by waste stream based on the following definition of a waste stream. A waste stream name shall be assigned by the site for each CH TRU waste stream.

Waste Stream.

A waste stream is defined as waste that is similar in material, physical form, radiological properties and hazardous constituents and that is generated from a single process or similar types of processes.

There are three broad category groups that are related to the physical form of packaged and/or repackaged TRU waste. Each of the three category groups is defined as follows:

a. Homogeneous Solids. Homogeneous solids are defined as solid materials, excluding soil and gravel, that do not meet the criteria for classification as debris as defined below. Examples of this category include, but are not limited, to process residues, sludges, sorbed liquid waste, and salt waste.

b. Soil and Gravel. This category consists of contaminated soil and/or gravel.

c. Debris. This category includes waste that consists of solid material exceeding a 60 mm particle size (2.36 inches) that is intended for disposal and that is:

(1) A manufactured object, or

(2) Plant or animal matter, or

(3) Natural geologic material.

Particles smaller than 60 mm in size may be considered debris if the debris is a manufactured object and if it is not a particle of homogeneous solid or soil and gravel.

6. WASTE CONTAINERS.

There are two container types that are allowable when packaging and/or repackaging CH TRU waste. These are 55-gallon open head drums with bung lids for homogeneous solids, soil and gravel, and debris, or direct-loaded SWBs for debris waste only.

Each 55-gallon drum and SWB used to package CH TRU waste shall meet DOT Specification 7A, Type A, packaging requirements. These containers shall be made of steel (including stainless or galvanized steel), and be in good and unimpaired condition as determined by using the container examination criteria listed on Annex 1, Payload Container Integrity Checklist, at a minimum. Acceptable 55-gallon drum dimensions are 34.5” to 35” tall including the locking ring and a diameter not exceeding 24” including the locking ring but not including the locking bolt.

Label each 55-gallon drum or SWB with a unique container identification number not exceeding 16 alpha-numeric characters. When the 55-gallon drum or SWB is the receiving container for repackaged waste, include in the unique container identification number “R” as the last character. The unique container identification number shall include a site identifier as a prefix.

7. PACKAGING CONFIGURATION.

a. 55-Gallon Drum. Package CH TRU waste into a 55-gallon drum using as few confinement layers as possible, but no more than two confinement layers. A confinement layer is any boundary that restricts, but does not prohibit, the release of hydrogen gas across the boundary. Allowable confinement layers are as follows:

- The two closed bag layers may consist of one closed inner bag and one closed 55-gallon drum liner bag, two closed inner bags, or two closed 55-gallon drum liner bags. A 55-gallon drum liner bag may be used when the two closed bag layers consist of two closed inner bags if the 55-gallon drum liner bag is not closed. Drum liner bags are of a size sufficient to line a 55-gallon drum. Inner bags are smaller in size and may be used to package individual waste items.

- Each bag, if closed, shall be closed by the twist-and-tape method and fitted with a filter with a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction.

- Closed metal cans fitted with a filter vent having a minimum hydrogen diffusivity value of 1.85E-5 mol/s/mol fraction.

Place the waste into a DOT Specification 7A, Type A, 55-gallon drum. When packaging or repackaging homogeneous solids that are in internal containers (i.e., container without lid), use a 55-gallon drum liner bag. When directly packaging homogeneous solids or soil and gravel, use a 90 mil polyethylene drum liner inside the 55-gallon drum. Do not use a rigid polyethylene drum liner when packaging or repackaging debris. A fiberboard rigid drum liner may be used in 55-gallon drums when packaging or repackaging debris. When using either polyethylene or fiberboard rigid drum liners, use the rigid drum liners without the lids. The 55-gallon drum lid shall be fitted with a container filter vent with an integral sample port septum.

b. Standard Waste Box. Package CH TRU waste in an SWB using as few confinement layers as possible, but no more than two confinement layers. A confinement layer is any boundary that restricts, but does not prohibit, the release of hydrogen gas across the boundary. Allowable confinement layers are as follows:

- The two closed bag layers may consist of one closed inner bag and one closed SWB liner bag, two closed inner bags, or two closed SWB liner bags. A SWB liner bag may be used when the two closed bag layers consist of two closed inner bags if the SWB liner bag is not closed. SWB liner bags are of a size sufficient to line an SWB. Inner bags are smaller in size and may be used to package individual waste items.

- Each inner bag, if closed, shall be closed by the twist-and-tape method and fitted with a filter with a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction.

- Closed metal cans fitted with a filter vent having a minimum hydrogen diffusivity value of 1.85E-5 mol/s/mol fraction.

- Each SWB liner bag, if closed, shall be closed by folding and taping (twist and tape is allowed when using a sleeve as the liner). Each SWB liner bag or sleeve shall be fitted with a filter with a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction.

Place the waste into a DOT Specification 7A, Type A, SWB. A fiberboard liner may be used in SWBs when packaging or repackaging debris. When a fiberboard liner is used, use it without the lid. Fit the SWB with two container filter vents. Ensure that one of the filters has an integral sample port septum.

c. Container Filter Vent Specifications. Ensure that container filter vent(s) to be installed on 55-gallon drums and/or SWBs have a minimum hydrogen diffusivity value of 1.85E-05 mol/s/mol fraction. Ensure that the filter selected for all 55-gallon drums and one of the filters selected for each SWB has an integral sample port septum. Container filter vents shall be legibly marked to ensure each of the following:

- Identification of the manufacturer

- Date of manufacture, or lot number, or unique serial number.

Ensure that the container filter vent housing and elements have an operating temperature range between -40 degrees Celsius to +70 degrees Celsius (-40 to +158 degrees Fahrenheit).

8. PROHIBITED ITEMS.

The following items are prohibited in packaged CH TRU waste:

- Internal shielding or deliberate waste placement to provide shielding for high radiation items

  This prohibition includes waste packaged in any manner that would shield items that could be >200 mrem/hr to reduce the surface dose rate of the payload container to ≤200 mrem/hr.

- Machine compacted waste

  Machine compacted waste is waste whose volume has been reduced by compaction using a mechanical compaction process.

- Liquids
- Unvented containers larger than 4 liters
- Nonradioactive pyrophorics

  Pyrophorics are materials that may ignite spontaneously in air or that emit sparks when scratched or struck, especially with materials such as steel. A flammable solid that, under transport conditions, might cause fires through friction or retained heat or can be ignited readily and, when ignited, burns vigorously and persistently so as to create a serious transportation hazard. Included in the pyrophorics definition are spontaneously combustible materials, water reactive materials, and oxidizers. Examples of nonradioactive pyrophorics are organic peroxides, sodium metal, and chlorates.

- Radioactive pyrophorics greater than 1% by weight

  Examples of radioactive pyrophorics are metallic plutonium, uranium or americium.

- Non-mixed hazardous waste

  Hazardous wastes not occurring as co-contaminants with TRU waste.

- Waste exhibiting the Resource Conservation and Recovery Act (RCRA) characteristics of ignitability, corrosivity, or reactivity
- Explosives
- Compressed gases
- Waste that has ever been managed as high-level waste, and waste from tanks specified in Table 1
- Classified shapes and/or classified composition (without prior approval of the CBFO Manager).

9. WASTE REQUIRING WRITTEN NOTICE TO THE DIRECTOR, OFFICE OF THE NATIONAL TRU PROGRAM, CARLSBAD FIELD OFFICE.

Sites shall request their cognizant DOE contact to provide formal written notice to the Director, Office of the National TRU Program, CBFO prior to packaging any of the following:

- Polychlorinated Biphenyls (PCBs) in any concentration
- Discrete Radiological Sources (calibration or sealed sources)

- Be or BeO > 1% by weight

- Solidified organics (e.g., solvents, acids, halogenated organics, etc.).

Packaging of any of these materials shall not proceed until the Director of the Office of the National TRU Program provides specific written direction or packaging instructions and/or container limits as applicable.

10. PACKAGING ACTIVITIES REQUIRING PRIOR WRITTEN APPROVAL FROM THE DIRECTOR, OFFICE OF DISPOSAL OPERATIONS, EM HEADQUARTERS OFFICE OF TECHNICAL AND REGULATORY SUPPORT.

Prior to performing packaging and/or repackaging activities that will deviate from these packaging instructions, sites shall request their cognizant DOE contact to obtain written approval for the deviation from the Director, Office of Disposal Operations, EM Headquarters Office of Technical and Regulatory Support. A request for deviation would be considered appropriate when remediating an old landfill, removing waste from an earthen berm, or conducting other waste retrieval operations where waste containers have degraded and it is impractical to separate debris and/or homogenous solids from soil and gravel.

11. CONDITIONS AND LIMITATIONS FOR ALL PACKAGED AND REPACKAGED CH TRU WASTE.

- Only waste that is similar in material, physical form, radiological properties and hazardous constituents and that is generated from a single process or similar types of processes shall be packaged together.

- Waste with different radiological properties (e.g., isotopic distributions) shall not be mixed in the same container.

- If isotopic data is collected by sampling, a sampling plan that defines data quality objectives and quality assurance objectives must be developed and documented.

- Each 55-gallon drum shall have ≤ 200 ^{239}Pu fissile gram equivalents (FGEs) of radioactive materials. Standard waste boxes shall have ≤ 325 ^{239}Pu FGEs of radioactive materials. The calculation for FGE (Annex 2, Fissile Gram Equivalent) shall include two times the measurement error (i.e., uncertainty) at a 1 sigma. Sites shall document the data and measurement error for any assay done. Results of the FGE calculation shall be documented on Annex 4, the Waste Container Packaging Form.

- Plutonium Equivalent Curies (PE-Ci) quantities shall be calculated for each 55-gallon drum or SWB and shall not exceed 80 PE-Ci per 55-gallon drum or 560 PE-Ci per SWB. Results of the PE-Ci calculation (Annex 3, ^{239}Pu Equivalent Activity) shall be documented on the Waste Container Packaging Form.

- Each 55-gallon drum or SWB shall have a measured surface dose rate of ≤ 200 mrem/hr (sum of gamma and neutron dose rates). Measured surface dose rate after packaging shall be documented on the Waste Container Packaging Form.

- Sites shall identify 95% of the radiological hazard for each container pursuant to 49 CFR §173.433(g). (49 CFR (10-1-07 edition)) The activities and masses of the isotopes contributing to 95% of the radiological hazard shall be documented on the Waste Container Packaging Form.

- Chemical compatibility shall be ensured for the waste repackaged into each individual 55-gallon drum and/or SWB. A guide for determining potentially incompatible waste can be found in 40 CFR Part 264 Appendix V.

12. REPACKAGING CH TRU WASTE.

a. Repackaging Waste into 55-gallon Drums and SWBs.

Video record all 55-gallon drum and SWB loading with an audio narration that will provide indisputable evidence of packaging configuration, all waste contents, and absence of prohibited items. Document a written record of waste packaging for each receiving container on a Waste Container Packaging Form. Good quality video images with thorough narrative descriptions of the waste and well written Waste Container Packaging Forms are the best insurance that waste containers will not need to be repackaged again at a future date.

When repackaging CH TRU waste each of the following actions shall be performed:

- Ensure that the original (feed) container(s) identification number(s) are clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

- Describe for the audio narration the repackaging activity that is to be performed (e.g., repackaging of feed 55-gallon drum # xyz into receiving 55-gallon drum # LL123R; repackaging of feed 55-gallon drums (state all container identification numbers) into receiving SWB # LL345R).

- Ensure that the receiving 55-gallon drum(s) or SWB unique container identification number(s) is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form(s).

- Ensure that the receiving 55-gallon drum(s) or SWB is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).

- Clearly state the date(s) of loading waste into the receiving 55-gallon drum(s) or SWB for the audio narration and document on the Waste Container Packaging Form(s).

- Ensure that all personnel loading waste into the receiving 55-gallon drum(s) or SWB are identified by name for the audio narration and documented on the Waste Container Packaging Form(s).

- Precede each interruption of the video by audio narration explaining the reason for the interruption.

- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.

- Ensure that each individual item placed into the receiving 55-gallon drum(s) or SWB is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.

- Ensure that the description of each item of waste placed into the receiving container includes estimated weight percent composition of the following waste constituents:

    - Iron-based metals/alloys
    - Aluminum-based metals/alloys
    - Other metals
    - Cellulosics
    - Rubber
    - Plastics
    - Inorganic materials
    - Soil/gravel

Note: All waste items shall be described for the audio narration and documented on the Waste Container Packaging Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number assignment

and/or subject the waste to other environmental regulations such as those implementing the Toxic Substances Control Act (TSCA).

When a feed container that has mixed contents of CH TRU homogeneous solids and debris is repackaged, perform the following actions:

- Remove the lids from all inner containers, describe contents and material composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.

- Separate debris items and package into a debris receiving 55-gallon drum or SWB using the debris waste repackaging instructions. Continue with these instructions to repackage the homogeneous solids portion of the waste.

- Open all inner containers of homogeneous solids and determine the absence of liquid prior to packaging into a receiving 55-gallon drum.

- When liquid is present in the opened inner containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidify so that liquid is no longer observed prior to packaging into a receiving 55-gallon drum.

- Completely empty all inner containers determined to contain only liquids, and handle as follows:

    - When the liquid is unused product (e.g., Windex® remaining in a container), and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.

    - If suspected or known to be TRU, treat the liquid.

    - Following treatment and prior to packaging, determine that the waste does not contain free liquid (whether or not absorbents have been added), by using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).

    - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio narration, and documenting the container # and Paint Filter Liquids Test result on the Waste Container Packaging Form.

- When waste is treated for any reason prior to packaging, describe the waste that was treated and the treatment method(s) used on the Waste Container Packaging Form.

When feed 55-gallon drums contain direct-loaded homogeneous solid CH TRU waste, perform the following actions, as applicable:

- When the feed 55-gallon drum is not a DOT Specification 7A, Type A, container and the homogeneous solid waste is in a rigid polyethylene liner, lift the liner and waste to a compliant 55-gallon drum. This action shall be completed as follows:
  - If the rigid liner lid is present, remove the lid. Ensure that this action is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
  - Verify the absence of liquid by thoroughly looking (with the aid of a flashlight) at the waste surface and down the annulus between the waste and liner and between the liner and container. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
  - When liquid is determined to be present, add a non-biodegradable absorbent, added in a quantity sufficient to absorb all liquid. Ensure that this activity is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
  - Do not reinstall rigid liner lid.
- When the feed 55-gallon drum is not a DOT Specification 7A, Type A, container and the homogeneous solid waste is not in a rigid polyethylene liner; notify the Director, Office of the National TRU Program, CBFO, for packaging instruction.
- When the feed 55-gallon drum is a DOT Specification 7A, Type A, container in good and unimpaired condition and the homogeneous solid waste either is or is not in a rigid polyethylene liner, perform the following:
  - Verify the absence of liquid by removing the rigid liner lid (if present) and thoroughly looking (with the aid of a flashlight) at the waste surface and down the annulus between the waste and liner, and between liner and container. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
  - When liquid is determined to be present, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid. Ensure that this

activity is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.

- Do not reinstall the rigid liner lid.

When repackaging CH TRU soil and gravel into receiving 55-gallon drums, perform the following:

- Empty the feed container.
- Verify the absence of liquid by visual observation. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
- When liquid is observed, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid.
- Following treatment and prior to packaging, determine that the waste does not contain free liquid using EPA Publication SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Method 9095B (Paint Filter Liquids Test).
- When a Paint Filter Liquids Test is performed, document the result on the Waste Container Packaging Form.
- When packaging soil and gravel into the receiving 55-gallon drum, ensure that the activity is clearly visible to the camera. Describe material composition and confirm the absence of liquid for the audio narration.
- After packaging and prior to closing the receiving 55-gallon drum, add approximately three to four inches of absorbent to the top surface of the waste.
- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:
  - The waste that was treated
  - The treatment method(s) used
  - Type of absorbent used
  - Product name and manufacturer of all material(s) added to the waste.

When repackaging CH TRU debris into receiving 55-gallon drums or SWBs, perform the following actions:

- Demonstrate the absence of liquid in empty containers by turning the open container upside down. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.

- Empty aerosol cans and cut in half. Do not just puncture.

- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable) and describe for the audio narration**.**

- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration.

- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.), have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures), the lubricant does not have to be removed but acknowledge its presence for the audio narration and document on the Waste Container Packaging Form.

- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.

- Place individual items with dose rates approaching 200 mrem/hr against the wall of the receiving container in a manner that ensures the item will remain where it was placed until the container is closed and the surface dose rate measurement is performed. Describe the placement location of these items for the audio narration.

- Block, brace, or suitably package sharp or heavy objects in the waste as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

b. Installation of Tamper-Indicating Devices.

Once the receiving 55-gallon drum or SWB has been closed in accordance with the manufacturer's specifications, perform the following actions:

- Affix a tamper-indicating device (TID) with a unique identification number to the 55-gallon drum or SWB.

- Install TIDs such that the container cannot be opened without breaking one or more seals.

- Ensure that TID placement locations do not interfere with filter vent diffusivity or accessibility to the sample port septum.

- Ensure that TID placement locations do not interfere with the operation of the 55-gallon drum closure bolt and lock nut, or the SWB closure bolts.

- Ensure that the unique TID identification number(s) are clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

c. Removable Surface Contamination.

- Monitor the container for surface contamination. Removable surface contamination that exceeds 20 dpm/100 cm^2 alpha and/or 200 dpm/100 cm^2 beta-gamma is not permitted. Fixing of surface contamination is not allowed.

13. PACKAGING CH TRU WASTE.

a. Waste into 55-gallon Drums and SWBs.

Video record all 55-gallon drum and SWB loading with an audio narration that will provide indisputable evidence of packaging configuration, all waste contents, and absence of prohibited items. Document a written record of waste packaging on a Waste Container Packaging Form. Good quality video images with thorough narrative descriptions of the waste and well written Waste Container Packaging Forms are the best insurance that waste containers will not need to be repackaged again at a future date.

When packaging CH TRU waste, perform each of the following actions:

- Ensure that the 55-gallon drum or SWB unique container identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure that the receiving 55-gallon drum(s) or SWB is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).

- State the date(s) of loading waste into the 55-gallon drum or SWB for the audio narration and document on the Waste Container Packaging Form.

- Identify all personnel loading waste into the 55-gallon drum or SWB by name for the audio narration and document on the Waste Container Packaging Form.

- Precede each interruption of the video by audio narration explaining the reason for the interruption.

- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.

- Ensure that each individual item placed into the waste container is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.

- Ensure that the description of each item of waste includes estimated weight percent composition of the following waste constituents:

    - Iron-based metals/alloys
    - Aluminum-based metals/alloys
    - Other metals
    - Cellulosics
    - Rubber
    - Plastics
    - Inorganic materials
    - Soil/gravel.

Note: All waste items shall be described for the audio narration and documented on the Waste Container Packaging Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number assignment and/or subject the waste to other environmental regulations such as those implementing the TSCA.

When homogeneous solids are packaged into 55-gallon drums, perform the following actions:

- Ensure that all containers of homogeneous solids are opened and determined to be free of liquid prior to packaging into a 55-gallon drum.

- When liquid is present in the opened containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidified so that liquid is no longer observed prior to packaging into a 55-gallon drum.

- Completely empty all containers determined to contain only liquids, and handle as follows:

    - When the liquid is unused product (e.g., Windex® remaining in a container) and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.

    - If suspected or known to be TRU, treat the liquid.

    - Following treatment and prior to packaging, determine that the waste does not contain free liquid (whether or not absorbents have been added) using EPA Publication SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Method 9095B (Paint Filter Liquids Test).

    - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio narration, and documenting the container # and Paint Filter Liquids Test result on the Waste Container Packaging Form.

- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:

    - The waste that was treated

    - The treatment method(s) used

    - Type of absorbent used (when applicable)

    - Solidification agent used (when applicable)

    - Product name and manufacturer of all material(s) added to the waste.

When soil and gravel are packaged into 55-gallon drums, perform the following actions:

- Prior to packaging, determine that soil and gravel does not contain free liquid using EPA Publication SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Method 9095B (Paint Filter Liquids Test).

- When liquid is determined to be present, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid.

- Following treatment and prior to packaging, determine that the waste no longer contains free liquid by repeating the Method 9095B Paint Filter Liquids Test.

- If liquid is determined to be present, add additional non-biodegradable absorbent until the soil and gravel is determined not to contain free liquid using the Method 9095B Paint Filter Liquids Test.

- Document the result of the final Method 9095B Paint Filter Liquids Test performed on the Waste Container Packaging Form.

- When packaging soil and gravel into the 55-gallon drum, ensure that the activity is clearly visible to the camera. Describe material composition and the absence of liquid confirmed for the audio narration.

- After packaging and prior to closing the 55-gallon drum, add approximately three to four inches of absorbent to the top surface of the waste.

- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:

    - The waste that was treated

    - The treatment method(s) used

    - Type of absorbent used

    - Product name and manufacturer of all material(s) added to the waste.

When debris is packaged into 55-gallon drums or SWBs, perform the following actions:

- Remove the lids from all containers, describe contents and material composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.

- Demonstrate the absence of liquid in empty containers by turning the open container upside down.

- If waste was treated at any time and for any reason prior to packaging, describe the waste that was treated and the treatment method(s) used on the Waste Container Packaging Form.

- Show that all aerosol cans have been emptied and cut in half. Do not just puncture.

- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**

- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**

- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.) have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures) the lubricant does not have to be removed but its presence shall be acknowledged for the audio narration and documented on the Waste Container Packaging Form.

- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.

- Place individual items with dose rates approaching 200 mrem/hr against the wall of the container in a manner that ensures the item will remain where it was placed until the container is closed and the surface dose measurement is performed. Describe the placement location of these items for the audio narration.

- Block, brace, or suitably package sharp or heavy objects in the waste as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

b. Bagging, Wrapping, or Canning Before Packaging.

When bagging, wrapping, or canning waste in one location and transferring the bagged, wrapped, or canned waste to another location for packaging or when bagging, wrapping, or canning waste and packaging the bagged, wrapped, or canned waste at a later time, video record the bagging, wrapping, and/or canning with an audio narration that will provide indisputable evidence of all waste contents, waste constituent composition, and absence of prohibited items in each bag, wrap, or can.

When bagging, wrapping, and/or canning CH TRU waste, comply with the following instructions:

- Mark each bag, wrap, or can with a unique identification number. Ensure that the number is clearly visible to the camera, read for the audio narration

and documented on the Waste Bag, Wrap, or Can Inventory Form (Annex 5).

- State the date(s) of placing waste into each bag, wrap, or can for the audio narration and document on the Waste Bag, Wrap, or Can Inventory Form.
- Identify personnel bagging, wrapping, or canning each waste item by name for the audio narration and document on the Waste Bag, Wrap, or Can Inventory Form.
- Precede each interruption of the video during a bagging, wrapping, or canning action by audio narration explaining the reason for the interruption.
- Identify each bag, wrap, or can with dose rates approaching 200 mrem/hr on the Waste Bag, Wrap, or Can Inventory Form.
- Ensure that recordings of waste bagging, wrapping, and/or canning activities are traceable to each bag, wrap, or can by the labeling of each recording with the unique bag, wrap, or can identification number(s).
- Remove the lids from all containers, describe contents and waste constituent composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.
- Ensure that the description of each item of waste includes estimated weight percent composition of the following waste constituents:
    - Iron-based metals/alloys
    - Aluminum-based metals/alloys
    - Other metals
    - Cellulosics
    - Rubber
    - Plastics
    - Inorganic materials
    - Soil/gravel.

Note: All waste items shall be described for the audio narration and documented on the Waste Bag, Wrap, or Can Inventory Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number

assignment and/or subject the waste to other environmental regulations such as those implementing the TSCA.

- Bag, wrap, or can debris items separately from homogeneous solids.
- Document the corresponding waste category group for each bag, wrap, or can on the Waste Bag, Wrap, or Can Inventory Form.
- Determine all containers of homogeneous solids to be free of liquid prior to bagging, wrapping, or canning.
- When liquid is present in the opened containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidify so that liquid is no longer observed prior to bagging, wrapping, or canning.
- Completely empty all containers determined to contain only liquids and handle as follows:
    - When the liquid is unused product (e.g., Windex® remaining in a container), and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.
    - If suspected or known to be TRU, treat the liquid.
    - Following treatment and prior to bagging, wrapping, or canning, determine that the waste does not contain free liquid (whether or not absorbents have been added) using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).
    - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio narration, and documenting the container #, the bag, wrap, or can unique identification number and the result of the Paint Filter Liquids Test on the Waste Bag, Wrap, or Can Inventory Form.
- When waste is treated for any reason prior to bagging, wrapping, or canning, describe the following on the Waste Bag, Wrap, or Can Inventory Form:
    - The waste that was treated
    - The treatment method(s) used
    - Type of absorbent used (when applicable)
    - Solidification agent used (when applicable)

- Product name and manufacturer of all material(s) added to the waste.

- Demonstrate the absence of liquid in empty containers by turning the open container upside down.

- Show that all aerosol cans have been emptied and cut in half. Do not just puncture.

- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable) and describe for the audio narration**.**

- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**

- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.) have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures) the lubricant does not have to be removed, but acknowledge its presence for the audio narration and document on a Waste Bag, Wrap, or Can Inventory Form.

- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.

c. Packaging Bagged, Wrapped, or Canned Waste

Video record all 55-gallon drum and SWB loading of waste bags and/or wraps with an audio narration that will provide indisputable evidence of packaging configuration and the bags and/or wraps packaged. Ensure compliance with the following:

- Package bagged and/or wrapped debris items into a debris-receiving 55-gallon drum or SWB.

- Package bagged and/or wrapped homogeneous solids into a homogeneous solids receiving 55-gallon drum.

- Ensure that the 55-gallon drum or SWB unique container identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure that the receiving 55-gallon drum(s) or SWB is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).

- State the date(s) of loading waste into the 55-gallon drum or SWB for the audio narration and document on the Waste Container Packaging Form.

- Identify all personnel loading waste into the 55-gallon drum or SWB by name for the audio narration and document on the Waste Container Packaging Form.

- Precede each interruption of the video by audio narration explaining the reason for the interruption.

- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.

- For each individual waste bag, wrap, or can placed into 55-gallon drums or SWBs, ensure that the unique bag, wrap, or can identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.

- Attach Waste Bag, Wrap, or Can Inventory Forms correlating to each waste bag and/or wrap packaged to the Waste Container Packaging Form, and record the total number of pages on the Waste Container Packaging Form.

- Place bagged, wrapped, or canned items with dose rates approaching 200 mrem/hr against the wall of the container in a manner that ensures the item will remain where it was placed until the container is closed and the surface dose rate measurement is performed. Describe the placement location of these items for the audio narration.

- Block, brace, or suitably package sharp or heavy objects that have been bagged, wrapped, or canned as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

d. Installation of Tamper-Indicating Devices.

Once the waste container has been closed in accordance with the manufacturer's specifications, perform the following actions:

- Affix a tamper-indicating device (TID) with a unique identification number to the 55-gallon drum or SWB.

- Install TIDs such that the container cannot be opened without breaking one or more seals.

- Ensure that TID placement locations do not interfere with filter vent diffusivity or accessibility to the sample port septum.
- Ensure that TID placement locations do not interfere with the operation of the 55-gallon drum closure bolt and lock nut, or the SWB closure bolts.

- Ensure that the unique TID identification number(s) is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

e. Removable Surface Contamination.

- Monitor the container for surface contamination. Removable surface contamination that exceeds 20 dpm/100 cm^2 alpha and/or 200 dpm/100 cm^2 beta-gamma is not permitted. Fixing of surface contamination is not allowed.

14. REQUIRED DOCUMENTATION.

Ensure that the following documentation for each container is available.

a. 55-gallon Drum and Standard Waste Box.

- Documentation for the procurement and receipt inspection, or certification of the 55-gallon drum or SWB to the DOT Specification 7A, Type A, requirements.
- For 55-gallon drums:
  - Documentation that the gross weight of the 55-gallon drum is no more than the maximum tested weight and no more than 1000 pounds
  - Documentation of the presence/absence of rigid drum liner
  - Documentation of the absence of rigid drum liner lid.
- For standard waste boxes:
  - Documentation that the gross weight of the standard waste box is no more than the maximum tested weight and no more than 4000 pounds.

b. Container Filter Vent.

- Documentation for the procurement and receipt inspection or certification of container filter vents to the container filter vent specifications.

c. Packaging.

Ensure that recordings and Waste Container Packaging Forms are traceable to each 55-gallon drum or SWB by the labeling of each recording and Waste Container Packaging Form with the unique container identification number(s).

- Ensure that waste packaging documentation includes:
  - Good quality video recordings with thorough narrative descriptions for all waste packaged into each 55-gallon drum and/or SWB
  - Good quality video recordings with thorough narrative descriptions for all waste bagged, wrapped, or canned (when applicable)
  - Well written and complete Waste Container Packaging Forms with any associated Waste Bag, Wrap, or Can Inventory Forms attached.
- Ensure that at a minimum, the following information is included on Waste Container Packaging Forms.
  - DOE or DOE contract site name
  - Unique container identification number
  - The date(s) of loading waste into the container
  - The unique identification number of each waste bag, wrap or can packaged (when applicable)
  - The container identification number(s) of feed container(s)
  - Video with audio recorded media number
  - Number of pages (Waste Container Packaging Form and attachments)
  - Site procedure number including revision number used to perform work
  - Waste stream name
  - Waste category group
  - Verification of empty container
  - Detailed description of each waste item and percent composition of iron-based metals/alloys, aluminum-based metals/alloys, other

metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel

- Description of any treatment done prior to packaging the waste
- Presence or absence of inner bag(s) and/or liner bag(s) and number of bag layers
- Statement that each inner bag and/or liner bag was fitted with a filter having a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction
- Statement of bag closure method
- Presence or absence of metal cans and number of metal can layers
- Statement that each metal can was fitted with a filter with a minimum hydrogen diffusivity value of 1.85E-05 mol/s/mol fraction
- Presence or absence of rigid drum liner
- Type of liner (e.g., plastic, fiberboard) and liner thickness
- Absence of rigid drum liner lid
- Container fill percentage (how full of waste the container is at time of closure, expressed in percent)
- Container filter vent(s) information
- Final closure date of the container
- Unique TID identification number
- Printed names and signatures of two persons who packaged waste into the container
- Weight of loaded container
- ^{239}Pu FGEs
- PE-Ci
- Highest measured surface dose rate of the loaded container
- 95% of the radiological hazard

When attaching Waste Bag, Wrap, or Can Inventory Forms it is not necessary to duplicate all documented information on the Waste Container Packaging Forms.

Entries of "see attached" will suffice as long as the Waste Container Packaging Forms with attachments provide the information specified in this instruction.

- At a minimum, the following information shall be included on Waste Bag, Wrap, or Can Inventory Forms.
    - Unique bag, wrap, or can identification number
    - The date of placing waste into the bag, wrap, or can
    - Video with audio recorded media number and location on the media (i.e., time-of-day stamp reading or recording time counter reading).
    - Number of pages
    - Site procedure number including revision number used to perform work
    - Waste stream name
    - Waste bagging, wrapping, and/or canning location (e.g., building, room number, and process)
    - Detailed description of each waste item and percent composition of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel
    - Description of the waste and any treatment method used prior to bagging, wrapping, or canning the waste
    - Identification of heavy, sharp objects that will require additional packaging protection (e.g., electric motor with exposed shaft)
    - Identification of items with dose rates approaching 200 mrem/hr
    - Statement that the bag was fitted with a filter having a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction
    - Bag closure method
    - Statement that each metal can was fitted with a filter having a minimum hydrogen diffusivity value of 1.85E-5 mol/s/mol fraction
    - Printed names and signatures of two persons who bagged, wrapped, or canned the waste

d. Hazardous Waste Determination.

Ensure that the hazardous waste determination required by the generator site's State-administered hazardous waste management program is documented and available for all packaged and/or repackaged CH TRU waste.

Table 1. Waste Tanks Subject To Exclusion

Hanford Site - 177 Tanks	
A-101 through A-106	C-201 through C-204
AN-101 through AN-107	S-101 through S-112
AP-101 through AP-108	SX-101 through SX-115
AW-101 through AW-106	SY-101 through SY-103
AX-101 through AX-104	T-101 through T-112
AY-101 through AY-102	T-201 through T-204
B-101 through B-112	TX-101 through TX-118
B-201 through B-204	TY-101 through TY-106
BX-101 through BX-112	U-101 through U-112
BY-101 through BY-112	U-201 through U-204
C-101 through C-112	
Savannah River Site - 51 Tanks	
Tank 1 through 51	
Idaho National Engineering and Environmental Laboratory - 15 Tanks	
WM-103 through WM-106	WM-180 through 190

ANNEX 1. PAYLOAD CONTAINER INTEGRITY CHECKLIST

CONTAINER EXAMINATION		DISCUSSION OF CRITERIA
1.	Is the payload container obviously degraded?	Obviously degraded means clearly visible and potentially significant defects in the payload container or payload container surface.
2.	Is there evidence that the payload container is, or has been, pressurized?	Pressurization can be indicated by a fairly uniform expansion of the sidewalls, bottom or top. Past pressurization can be indicated by a notable outward deflection of the bottom or top. Verify that the payload container is not warped.
3.	Is there any potentially significant rust or corrosion such that wall thinning, pin holes, or breaches are likely or the load bearing capacity is suspect?	Rust shall be assessed in terms of its type, extent, and location. Pitting, pocking, flaking, or dark coloration characterizes potentially significant rust or corrosion. This includes the extent of the payload container surface area covered, thickness, and if it occurs in large flakes or built-up (caked) areas. Rusted payload containers may not be accepted if: 1. Rust is present in caked layers or deposits 2. Rust is present in the form of deep metal flaking, or built-up areas of corrosion products In addition, the location of rust should be noted; for example on a drum: top lid; filter region; locking chine; top one-third, above the second rolling hoop; middle one-third, between the first and second rolling hoops; bottom one-third, below the second rolling hoop; and on the bottom. Payload containers may still be considered acceptable if the signs of rust show up as: • Some discoloration on the payload container • If rubbed would produce fine grit or dust or minor flaking (such that wall thinning does not occur)
4.	Are any of the following apparent? • Wall thinning • Pin holes • Breaches	Wall thinning, pin holes, and breaches can be a result of rust/corrosion (see discussion for #3).
5.	Are there any split seams, tears, obvious holes, punctures (of any size), creases, broken welds, or cracks?	Payload containers with obvious leaks, holes or openings, cracks, deep crevices, creases, tears, broken welds, sharp edges or pits, are either breached or on the verge of being breached. Verify that there is no warping that could cause the container to be unstable or prevent it from fitting properly in the applicable package.

CONTAINER EXAMINATION		DISCUSSION OF CRITERIA
6.	Is the load-bearing capacity suspect?	The load-bearing capacity could be reduced for excessive rust (see discussion for #3), wall thinning (see discussion for #4), breaches, cracks, creases, broken welds, etc. (see discussion for #5).
7.	Is the payload container improperly closed?	Inspect the fastener and fastener ring (chine) if applicable for damage or excessive corrosion. Check the alignment of the fastener to ensure that it is in firm contact around the entire lid and the payload container will not open during transportation.
8.	Are there any dents, scrapes, or scratches that make the payload container's structural integrity questionable or prevent the top and bottom surfaces from being parallel?	Deep gouges, scratches, or abrasions over wide areas are not acceptable. If top and bottom surfaces are not parallel, this would indicate that the container is warped. Dents should be less than ¼ inch deep by 3 inches long and between ½ inch to 6 inches wide. All other dents must be examined to determine impact of structural integrity.
9.	Is there discoloration which would indicate leakage or other evidence of leakage of material from the payload container?	Examine the payload container regions near vents, top lid fittings, bottom fittings, welds, seams and intersections of one or more metal sheets or plates. Payload containers must be rejected if evidence of leakage is present.
10.	Is the payload container bulged?	For the purposes of this examination, bulging is indicated by: • A fairly uniform expansion of the sidewalls, bottom, or top (e.g., in the case of a drum, either the top or bottom surface protrudes beyond the planar surface of the top or bottom ring), • A protrusion of the side wall (e.g., in the case of a drum, beyond a line connecting the peaks of the surrounding rolling hoops or a line between a surrounding rolling hoop and the bottom or top ring), or • Expansion of the sidewall (e.g., in the case of a drum, such that it deforms any portion of a rolling hoop).

ANNEX 2. FISSILE GRAM EQUIVALENT

Determination of FGE requires the following information:

- The isotopic composition of the waste in a 30-gallon drum
- The quantity of each isotope contained in a 30-gallon drum
- The measurement error for each isotope contained in the 30-gallon drum

Calculation of the FGE and Compliance Evaluation

Only the isotopes listed below contribute to the FGE calculation:

Isotope	Equivalent Factor (EF)		
U-233	9.00E-01	Am-242m	3.46E+01
U-235	6.43E-01	Am-243	1.29E-02
Np-237	1.50E-02	Cm-243	5.00E+00
Pu-238	1.13E-01	Cm-244	9.00E-02
Pu-239	1.00E+00	Cm-245	1.50E+01
Pu-240	2.25E-02	Cm-247	5.00E-01
Pu-241	2.25E+00	Cf-249	4.50E+01
Pu-242	7.50E-03	Cf-251	9.00E+01
Am-241	1.87E-02		

The FGE of each 30-gallon drum shall be calculated from the isotopic composition and quantity of isotopes using the following equation:

$$\sum_{i=1}^{n}\left(G_{isotope}\cdot EF_{isotope}\right)+2\sqrt{\sum_{i=1}^{n}\left(TMU_{isotope}\cdot EF_{isotope}\right)^{2}}$$

Where:

n is the number of isotopes from the list above, contained in the waste

$G_{isotope}$ is the value in grams for each isotope listed above

$TMU_{isotope}$ is the total measurement uncertainty for each isotope and

$EF_{isotope}$ is the Equivalent Factor for each isotope listed above.

The FGE value (including two times the error) shall be less than or equal to the applicable limit for each 30-gallon drum.

Example:

A 30-gallon drum is assayed and found to contain:

Isotope	Grams	TMU
Pu-239	10.00	15%
Am-241	0.012	7%
Cs-137	0.001	3%

The FGE is calculated by:

$$FGE = (\{G_{Pu\text{-}239} \cdot EF_{Pu\text{-}239}\} + \{G_{Am\text{-}241} \cdot EF_{Am\text{-}241}\}) + 2\sqrt{\{TMU_{Pu-239} \cdot EF_{Pu-239}\}^2 + \{TMU_{Am-241} \cdot EF_{Am-241}\}^2}$$

$$FGE = 10.00 \cdot 1.00 + 0.012 \cdot 1.87E\text{-}02 + 2\sqrt{\{10.00 \cdot 0.15 \cdot 1.00\}^2 + \{0.012 \cdot 0.07 \cdot 1.87E-2\}^2}$$
$$= 10.0002244 + 3.0$$
$$= 13.00 \text{ g}$$

Cs-137 is ignored for the calculation of FGE because it does not appear in the list above.

ANNEX 3. ^{239}PU EQUIVALENT ACTIVITY

For a known radioactivity quantity and isotopic distribution, the ^{239}Pu equivalent activity is determined using isotope-specific weighting factors. The ^{239}Pu equivalent activity (EA) can be characterized by

$$EA = \sum_{i=1}^{K} Ai / WFi$$

where *K* is the number of TRU[1] isotopes, *Ai* is the activity of isotope *i*, and *WFi* is the PE-Ci weighting factor for isotope *i*.

WFi is further defined as the ratio

$$WFi = Eo / Ei$$

where *Eo* (rem/μCi) is the 50-year effective whole-body dose commitment due to the inhalation of ^{239}Pu particulates with a 1.0 μm activity median aerodynamic diameter (AMAD) and a weekly pulmonary clearance class, and *Ei* (rem/μCi) is the 50-year effective whole-body dose commitment due to the inhalation of isotope (*i*) particulates with a 1.0 μm AMAD and the pulmonary clearance class resulting in the highest 50-year effective whole-body dose commitment. Weighting factors calculated in this manner are presented below for isotopes typically present in CH TRU waste. If other TRU isotopes are determined to be present in the payload container, their weighting factors can be obtained from the values of Eo and Ei contained in DOE/EH-0071.[2]

[1] TRU as designated in this equation refers to any radionuclide with an atomic number greater than 92, as well as U-233.

[2] U.S. Department of Energy. Internal Dose Conversion Factors for Calculation of DOSE to the Public. DOE/EH-0071, July 1988.

PE-Ci Weighting Factors for Selected Isotopes[3]		
Isotope	**Pulmonary**	**Weighting Factor**
Clearance Class[4]		
U -233	Y	3.9
Np-237	W	1.0
Pu-236	W	3.2
Pu-238	W	1.1
Pu-239	W	1.0
Pu-240	W	1.0
Pu-241	W	51.0
Pu-242	W	1.1
Am-241	W	1.0
Am-243	W	1.0
Cm-242	W	30.0
Cm-244	W	1.9
Cf-252	Y	3.9

Example:

A 55-gallon drum is assayed and found to contain:

Nuclide	Mass (g)	Activity (Ci)
Pu-239	10.0	0.629
Am-241	0.012	0.042
Cs-137	0.001	0.088
Cm-243	0.01	0.522

[3] PE-Ci must be calculated using all radionuclides, not just these selected radionuclides.
[4] (W) Weekly, (Y) Yearly

By the definition, only the Pu-239, Am-241, and Cm-243 are transuranic; the Cs-137 is not and is therefore not included in the calculation of Plutonium-239 Equivalent Activity (PE-Ci).

From the table above the Weighting Factors for Pu-239 and Am-241 are 1.0 and 1.0, respectively. For Cm-243, the Dose Equivalent Factor, E_i, is obtained from DOE/EH-0071 and is shown to be 350 rem. The Dose Equivalent Factor for Pu-239, E_o, is shown to be 510 rem in the same document. The Weighting Factor for Cm-243, WF_{Cm-243}, is then calculated as

$$WF_{Cm-243} = E_i/E_o = 510/350 = 1.5$$

The PE-Ci is calculated by

$$PE\text{-}Ci = A_{Pu-239}/WF_{Pu-239} + A_{Am-241}/WF_{Am-241} + A_{Cm-243}/WF_{Cm-243}$$

$$PE\text{-}Ci = 0.629/1.0 + 0.042/1.0 + 0.522/1.5$$

$$PE\text{-}Ci = 1.019 \text{ PE-Ci}$$

ANNEX 4. WASTE CONTAINER PACKAGING FORM

Section 1: General Information
Unique Container Identification Number:
DOE or DOE Contract Site Name:
☐ Initial Waste Packaging ☐ Repackaging
Date(s) of Packaging or Repackaging:
Audio-Video Recording Number:
Site Procedure Number and Revision Used:

Section 2: Waste Container Information	
Container Type: ☐ 55-gallon drum ☐ SWB	
☐ Container Verified Empty Prior to Packaging	
Rigid Liner Used? ☐ Yes ☐ No If rigid liner was used, list the type of rigid liner and affirm that the lid was not installed: _____	
Container Filter Vent #1 with sample port septum: • Minimum H_2 Diffusivity 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No • Identification of the filter manufacturer: _____ • Date of manufacture, or lot number, or unique serial number: _____	
Container Filter Vent #2: (required for SWB only) • Minimum H_2 Diffusivity 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No • Identification of the filter manufacturer: _____ • Date of manufacture, or lot number, or unique serial number: _____	
Number layers of confinement: ☐ one ☐ two	
Closure Method used for 55-gallon drum or SWB liner bag: Closure Method used for inner bags:	
All Bag Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.075E-05 mol/s/mol fraction? ☐ Yes ☐ No	
Waste Container Weight	Container gross wt: kg. Container tare wt: kg. Waste net wt: kg.
Container Fill Percentage: %	
Waste Category Group: ☐ Homogeneous Solids ☐ Soil/gravel ☐ Debris	
Waste Stream Name:	
TID Identification Number(s):	

Unique Container ID #: _____ Page 2 of ___(incl. attachments)

Section 3: Feed Container Information (Repackaging Only)
Feed Container Type:
Feed Container ID Number:

Section 4: Container Inventory If loading bagged, wrapped, or canned waste, the unique identification number for each bag, wrap, or can shall be entered in the "waste item" column. "See attached" may be entered in the "waste description" column if the completed Waste Bag, Wrap, or Can Inventory Form contains the waste description and is attached to this form.	
Are "Bag and/or Wrap Inventory Forms" attached for items listed below? ☐ Yes ☐ No	
Waste Item or Bag/Wrap/Can ID#	Waste Description (including weight % of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel)

Unique Container ID #: _____ Page 3 of ___(incl. attachments)

Section 5: Packaging Summary	Yes	No
Does this waste contain any treated liquids? If waste contains treated liquid, describe in the Comments section: • The waste that was treated • Treatment method used • The type of absorbent used, • Solidification agent used, • Product name and manufacturer of any material added to the waste • Results of a Method 9095B Paint Filter Liquids Test for each container tested (including container #).		
Was any other treatment performed prior to packaging? If yes, describe the treatment in the Comments section.		
Was this waste packaged in accordance with the "CH TRU Waste Packaging Instructions"? If not, attach the letter from the Director, Office of Disposal Operations, EM Headquarters Office of Regulatory Compliance that approves the variance.		
Comments:		

Section 6: Operator Information	
List all personnel loading waste into container:	
Printed names and signatures of two site personnel who are approving this form and attesting that all items in the container are listed in this form (Section 7: Radiological Properties completion occurs after signature.)	
Printed Name:	Printed Name:
Signature:	Signature:
Date:	Date:

Unique Container ID #: _____ Page 4 of ___(incl. attachments)

Section 7: Radiological Properties
List the isotopes that contribute to 95% of the radiological hazard including their associated activities and masses:
Fissile gram equivalents (FGEs) in the container: FGEs
Plutonium equivalent curies (PE-Ci) in the container: PE-Ci
Highest measured surface dose rate of the loaded container: mrem/hr
TRU alpha activity of waste in container: _____ nCi/gram
Printed or typed name and phone number of point of contact for radiological characterization information:

ANNEX 5. WASTE BAG, WRAP, OR CAN INVENTORY FORM

Section 1: General Information
Unique Bag, Wrap, or Can ID Number:
Location/Point of Waste Generation (where bagging, wrapping, or canning was done, building, room number, process):
Date of Bagging, Wrapping, or Canning:
Audio-Video Recording Number:
Time-of-day Stamp Reading: _____ Or Recording Time Counter Reading: _____
Site Procedure Number and Revision Used:

Section 2: Bag, Wrap, or Can Information
☐ Bag ☐ Wrap ☐ Can
Number of bag layers: ☐ one ☐ two
Closure Method used for bags: _____
All Bag Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.075E-05 mol/s/mol fraction? ☐ Yes ☐ No
All Can Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Can Filters 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No
Waste Category Group: ☐ Homogeneous Solids ☐ Soil/gravel ☐ Debris
Waste Stream Name:

Section 3: Inventory of Bag, Wrap, or Can	
Waste Item	Waste Description (including weight % of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel)

Bag, Wrap, or Can Number: _____

Section 4: Bagging, Wrapping, or Canning Summary	Yes	No
Does this bag, wrap, or can include any high dose rate items, approaching 200 mrem/hr, that require placement against the wall of the 55-gallon drum or SWB?		
Does this waste contain any treated liquids? If waste contains treated liquid, describe in the Comments section: • The waste that was treated • Treatment method used • The type of absorbent used • Solidification agent used • Product name and manufacturer of any material added to the waste, and • results of a Method 9095B Paint Filter Liquids Test for each container treated (including container ID#).		
Was any other treatment performed prior to bagging, wrapping, or canning? If yes, describe the treatment in the Comments section.		
Was this waste bagged, wrapped, or canned in accordance with the "CH TRU Waste Packaging Instructions"? If not, attach the letter from the Director, Office of Disposal Operations, EM Headquarters Office of Regulatory Compliance that approves the variance.		
Comments:		

Section 5: Printed names and signatures of two site personnel who are approving this form attesting to the contents of the bag, wrap, or can	
This completed Waste Bag, Wrap, or Can Inventory Form consists of _____ pages	
Printed Name:	Printed Name:
Signature:	Signature:
Date:	Date:

REMOTE-HANDLED TRANSURANIC WASTE
PACKAGING INSTRUCTIONS

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REMOTE-HANDLED TRANSURANIC WASTE PACKAGING INSTRUCTIONS

1. PURPOSE.

This document provides DOE elements and DOE contractors with specific instructions for packaging and/or repackaging remote-handled transuranic (RH TRU) waste in a manner that is consistent with DOE O 435.1, *Radioactive Waste Management* (Change 1), DOE M 435.1-1, *Radioactive Waste Management Manual*, RH TRU transportation requirements, and Waste Isolation Pilot Plant (WIPP) programmatic requirements.

2. SCOPE.

This instruction addresses the packaging and repackaging of RH TRU waste resulting from activities and operations at new and existing DOE radioactive waste management facilities where the planned path for disposition is the WIPP.

3. APPLICABILITY.

The instructions provided in this document apply to DOE elements and DOE contractors as set forth in DOE M 435.1-1, *Radioactive Waste Management Manual* when packaging and/or repackaging RH TRU waste. These instructions do not apply when RH TRU waste is packaged and/or repackaged at a site where the following conditions apply:

a. A WIPP certified program is actively performing RH TRU waste characterization and certification at that site; **and**

b. Site personnel responsible for the packaging and/or repackaging operation are receiving feedback on the effectiveness of the packaging and/or repackaging operation from the WIPP certified program.

Questions regarding the applicability or implementation of these packaging instructions should be directed to DOE-EM Office of Disposal Operations

4. PREREQUISITES.

Public Law 102-579, Waste Isolation Pilot Plant Land Withdrawal Act, 1992, specifies that WIPP is “to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities.” The following activities are considered atomic energy defense activities for purposes of these instructions and disposal at WIPP:

- Naval reactors development
- Weapons activities, including defense inertial confinement fusion
- Verification and control technology
- Defense nuclear materials production

- Defense nuclear waste and materials by-products management
- Defense nuclear materials security and safeguards and security investigations
- Defense research and development.

In order to establish the defense pedigree of the waste, a "defense determination" is required for all waste destined for WIPP disposal. The determination may be established as a part of the documentation of process knowledge that demonstrates the origin of the waste; or, for waste with a less direct tie to one of the defense activities, by a formal process initiated by the generator site and approved by the Carlsbad Field Office (CBFO) Manager or DOE Headquarters General Counsel.

RH TRU waste is defined as waste containing more than 100 nCi of alpha emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years and a surface dose rate ≥ 200 mrem/hr, except for high-level radioactive waste. RH TRU waste shall not exceed 23 curies per liter maximum activity level (averaged over the volume of a 30-gallon drum). To meet this prerequisite, all waste shall be packaged into 30-gallon drums and shall comply with this definition.

The WIPP Hazardous Waste Facility Permit specifies the hazardous waste numbers that are allowed at WIPP. These hazardous waste numbers are listed below; all other hazardous waste numbers are prohibited:

- F001, F002, F003, F004, F005, F006, F007, F009
- D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D021, D022, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D043
- P015, P030, P098, P099, P106, P120
- U002*, U003*, U019*, U037, U043, U044, U052, U070, U072, U078, U079, U103, U105, U108, U122, U133*, U134*, U151, U154*, U159*, U196, U209, U210, U220, U226, U228, U239*

  *Hazardous waste listed in part or wholly for ignitability, corrosivity, or reactivity characteristics shall not be packaged unless there is documented evidence that the waste no longer exhibits the characteristics of ignitability, corrosivity, or reactivity.

5. GROUPING WASTE FOR PACKAGING AND/OR REPACKAGING.

Categorize and package RH TRU waste by waste stream based on the following definition of a waste stream. A waste stream name shall be assigned by the site for each RH TRU waste stream.

Waste Stream.

A waste stream is defined as waste that is similar in material, physical form, radiological properties and hazardous constituents and that is generated from a single process or similar types of processes.

There are three broad category groups that are related to the physical form of packaged and/or repackaged TRU waste. Each of the three category groups is defined as follows:

a. Homogeneous Solids. Homogeneous solids are defined as solid materials, excluding soil and gravel, that do not meet the criteria for classification as debris as defined below. Examples of this category include, but are not limited to, process residues, sludges, sorbed liquid waste, and salt waste.

b. Soil and Gravel. This category consists of contaminated soil and/or gravel.

c. Debris. This category includes waste that consists of solid material exceeding a 60 mm particle size (2.36 inches) that is intended for disposal and that is

(1) A manufactured object, or

(2) Plant or animal matter, or

(3) Natural geologic material.

Particles smaller than 60 mm in size may be considered debris if the debris is a manufactured object and if it is not a particle of homogeneous solid or soil and gravel.

6. WASTE CONTAINERS.

Only 30-gallon open head steel drums with bung lids are allowable when packaging and/or repackaging RH TRU waste.

Each 30-gallon drum shall have external dimensions not exceeding 29.5 inches height including the filter vent and 20.0 inches diameter at the widest point. Each 30-gallon drum shall be closed with an inside lever lock closure mechanism.

Label each 30-gallon drum with a unique container identification number not exceeding 16 alpha-numeric characters. When the 30-gallon drum is the receiving container for repackaged waste, include in the unique container identification number “R” as the last character. The unique container identification number shall include a site identifier as a prefix.

7. PACKAGING CONFIGURATION.

a. 30-Gallon Drum. RH TRU waste shall be packaged into 30-gallon drums using as few confinement layers as possible but no more than three confinement layers

excluding the 30-gallon drum. A confinement layer is any boundary that restricts, but does not prohibit, the release of hydrogen gas across the boundary. Allowable confinement layers are as follows:

- Plastic bags closed by any closure method and fitted with a filter vent having a minimum hydrogen diffusivity value of 1.075E-5 mol/s/mol fraction.

- Closed metal cans fitted with a filter vent having a minimum hydrogen diffusivity value of 1.85E-5 mol/s/mol fraction.

When directly packaging homogeneous solids or soil and gravel, use a polyethylene drum liner inside the 30-gallon drum. When using either polyethylene or fiberboard rigid drum liners, use the rigid drum liners without the lids. The 30-gallon drum lid shall be fitted with a container filter vent with an integral sample port septum.

b. Container Filter Vent Specifications. Ensure that container filter vent(s) to be installed on 30-gallon drums have a minimum hydrogen diffusivity value of 1.85E-05 mol/s/mol fraction. Ensure that the filter selected for all 30-gallon drums has an integral sample port septum. Container filter vents shall be legibly marked to ensure each of the following:

- Identification of the manufacturer

- Date of manufacture, or lot number, or unique serial number.

Ensure that the container filter vent housing and elements have an operating temperature range between -40 degrees Celsius to +70 degrees Celsius (-40 to +158 degrees Fahrenheit).

8. PROHIBITED ITEMS.

The following items are prohibited in packaged RH TRU waste:

- Internal shielding or deliberate waste placement to provide shielding for high radiation items

- Machine compacted waste

  Machine compacted waste is waste whose volume has been reduced by compaction using a mechanical compaction process.

- Liquids

- Unvented containers larger than 4 liters

- Nonradioactive pyrophorics

  Pyrophorics are materials that may ignite spontaneously in air or that emit sparks when scratched or struck, especially with materials such as steel. A flammable solid, under transport conditions, might cause fires through friction or retained heat or can be ignited readily and, when ignited, burns vigorously and persistently so as to create a serious transportation hazard. Included in the pyrophorics definition are spontaneously combustible materials, water reactive materials, and oxidizers. Examples of nonradioactive pyrophorics are organic peroxides, sodium metal, and chlorates.

- Radioactive pyrophorics greater than 1% by weight

  Examples of possible radioactive pyrophorics are metallic plutonium, uranium or americium.

- Non-mixed hazardous waste

  Hazardous wastes not occurring as co-contaminants with TRU waste.

- Waste exhibiting the Resource Conservation and Recovery Act (RCRA) characteristics of ignitability, corrosivity, or reactivity

- Explosives

- Compressed gases

- Waste that has ever been managed as high-level waste, and waste from tanks specified in Table 1

- Classified shapes and/or classified composition (without prior approval of the CBFO Manager).

9. <u>WASTE REQUIRING WRITTEN NOTICE TO THE DIRECTOR, OFFICE OF THE NATIONAL TRU PROGRAM, CARLSBAD FIELD OFFICE</u>.

Sites shall request their cognizant DOE contact provide formal written notice to the Director, Office of the National TRU Program, CBFO prior to packaging any of the following:

- Polychlorinated Biphenyls (PCBs) in any concentration

- Discrete Radiological Sources (calibration or sealed sources)

- Be or BeO > 1% by weight

- RH-TRU waste that will result in a 30-gallon drum surface dose rate in excess of 100 rems per hour

- Solidified organics (e.g., solvents, acids, halogenated organics, etc.).

Packaging of any of these materials shall not proceed until the Director of the Office of the National TRU Program provides specific written direction or packaging instructions and/or container limits as applicable.

10. PACKAGING ACTIVITIES REQUIRING PRIOR WRITTEN APPROVAL FROM THE DIRECTOR, OFFICE OF DISPOSAL OPERATIONS, EM HEADQUARTERS OFFICE OF TECHNICAL AND REGULATORY SUPPORT.

Prior to performing packaging and/or repackaging activities that will deviate from these packaging instructions, sites shall request their cognizant DOE contact to obtain written approval for the deviation from the Director, Office of Disposal Operations, EM Headquarters Office of Technical and Regulatory Support. A request for deviation would be considered appropriate when remediating an old landfill, removing waste from an earthen berm, or conducting other waste retrieval operations where waste containers have degraded and it is impractical to separate debris and/or homogenous solids from soil and gravel.

11. CONDITIONS AND LIMITATIONS FOR ALL PACKAGED AND REPACKAGED RH TRU WASTE.

- Only waste that is similar in material, physical form, radiological properties and hazardous constituents and that is generated from a single process or similar types of processes shall be packaged together.

- Waste with different radiological properties (e.g., isotopic distributions) shall not be mixed in the same container.

- If isotopic data is collected by sampling, a sampling plan that defines data quality objectives and quality assurance objectives must be developed and documented.

- Each 30-gallon drum shall have ≤ 200 ^{239}Pu fissile gram equivalents (FGEs) of radioactive materials. The calculation for FGE (Annex 1, Fissile Gram Equivalent) shall include two times the measurement error (i.e., uncertainty) at a 1 sigma. Results of the FGE calculation shall be documented on Annex 5, the Waste Container Packaging Form.

- Plutonium Equivalent Curies (PE-Ci) quantities shall be calculated for each 30-gallon drum and shall not exceed 80 PE-Ci per 30-gallon drum. Results of the PE-Ci calculation (Annex 2, ^{239}Pu Equivalent Activity) shall be documented on the Waste Container Packaging Form.

- Decay heat shall be calculated for each 30-gallon drum and shall not exceed the applicable limit specified in Annex 3, Decay Heat. The calculation for decay heat (Annex 3, Decay Heat) shall include the measurement error (i.e., uncertainty). Results of the decay heat calculation shall be documented on the Waste Container Packaging Form.

- Each 30-gallon drum shall have measured gamma and neutron surface dose rates satisfying the equation and using the limits identified in Annex 4, Surface Dose Rates. Measured surface dose rates after packaging shall be documented on the Waste Container Packaging Form.

- Sites shall identify 95% of the radiological hazard for each container pursuant to 49 CFR §173.433(g). (49 CFR (10-1-07 edition)) The activities and masses of the isotopes contributing to 95% of the radiological hazard shall be documented on the Waste Container Packaging Form.

- Chemical compatibility shall be ensured for the waste repackaged into each individual 30-gallon drum. A guide for determining potentially incompatible waste can be found in 40 CFR Part 264 Appendix V.

12. REPACKAGING RH TRU WASTE.

Repackaging Waste into 30-gallon Drums.

Video record all 30-gallon drum loading with an audio narration that will provide indisputable evidence of packaging configuration, all waste contents, and absence of prohibited items. Document a written record of waste packaging for each receiving container on a Waste Container Packaging Form. Good quality video images with thorough narrative descriptions of the waste and well written Waste Container Packaging Forms are the best insurance that waste containers will not need to be repackaged again at a future date.

When repackaging RH TRU waste each of the following actions shall be performed:

- Ensure that the original (feed) container(s) identification number(s) are clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.

- Describe for the audio narration the repackaging activity that is to be performed (e.g., repackaging of feed 30-gallon drum # xyz into receiving 30-gallon drum # LL123R).

- Ensure that the receiving 30-gallon drum(s) unique container identification number(s) is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form(s).

- Ensure that the receiving 30-gallon drum(s) is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).

- Clearly state the date(s) of loading waste into the receiving 30-gallon drum(s) for the audio narration and document on the Waste Container Packaging Form(s).

- Ensure that all personnel loading waste into the receiving 30-gallon drum(s) are identified by name for the audio narration and documented on the Waste Container Packaging Form(s).

- Precede each interruption of the video by audio narration explaining the reason for the interruption.

- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.

- Ensure that each individual item placed into the receiving 30-gallon drum(s) is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.

- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.

- Ensure that the description of each item of waste placed into the receiving container includes estimated weight percent composition of the following waste constituents:

    - Iron-based metals/alloys
    - Aluminum-based metals/alloys
    - Other metals
    - Cellulosics
    - Rubber
    - Plastics
    - Inorganic materials
    - Soil/gravel

Note: All waste items shall be described for the audio narration and documented on the Waste Container Packaging Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number assignment and/or subject the waste to other environmental regulations such as those implementing the Toxic Substances Control Act (TSCA).

When a feed container that has mixed contents of RH TRU homogeneous solids and debris is repackaged, perform the following actions:

- Remove the lids from all inner containers, describe contents and material composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.

- Separate debris items and package into a debris receiving 30-gallon drum using the debris waste repackaging instructions. Continue with these instructions to repackage the homogeneous solids portion of the waste.

- Open all inner containers of homogeneous solids and determine the absence of liquid prior to packaging into a receiving 30-gallon drum.

- When liquid is present in the opened inner containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidify so that liquid is no longer observed prior to packaging into a receiving 30-gallon drum.

- Completely empty all inner containers determined to contain only liquids, and handle as follows:

    - When the liquid is unused product (e.g., Windex® remaining in a container), and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.

    - If suspected or known to be TRU, treat the liquid.

    - Following treatment and prior to packaging, determine that the waste does not contain free liquid (whether or not absorbents have been added), by using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).

    - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio

narration, and documenting the container # and Paint Filter Liquids Test result on the Waste Container Packaging Form.

- When waste is treated for any reason prior to packaging, describe the waste that was treated and the treatment method(s) used on the Waste Container Packaging Form.

When feed 30-gallon drums contain direct-loaded homogeneous solid RH TRU waste, perform the following actions, as applicable:

- When the feed 30-gallon drum is not in a good and unimpaired condition, and the homogeneous solid waste is in a rigid polyethylene liner, lift the liner and waste to a compliant 30-gallon drum. This action shall be completed as follows:
  - If the rigid liner lid is present, remove the lid. Ensure that this action is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
  - Verify the absence of liquid by thoroughly looking at the waste. In spaces that are difficult to observe, use remote observation methods to reduce exposure (fiber optic camera system, lighted mirrors, etc.) when necessary. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
  - When liquid is determined to be present, add a non-biodegradable absorbent, added in a quantity sufficient to absorb all liquid. Ensure that this activity is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
  - Do not reinstall rigid liner lid.
- When the feed 30-gallon drum is not in a good and unimpaired condition, and the homogeneous solid waste is not in a rigid polyethylene liner; notify the Director, Office of the National TRU Program, CBFO, for packaging instruction.
- When the feed 30-gallon drum is in good and unimpaired condition and the homogeneous solid waste either is or is not in a rigid polyethylene liner, perform the following:
  - Verify the absence of liquid by removing the rigid liner lid (if present) and thoroughly looking at the waste. In spaces that are difficult to observe, use remote observation methods to reduce

exposure (fiber optic camera system, lighted mirrors, etc.) when necessary. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.

- When liquid is determined to be present, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid. Ensure that this activity is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
- Do not reinstall the rigid liner lid.

When repackaging RH TRU soil and gravel into receiving 30-gallon drums, perform the following:

- Empty the feed container.
- Verify the absence of liquid by visual observation. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
- When liquid is observed, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid.
- Following treatment and prior to packaging, determine that the waste does not contain free liquid using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).
- When a Paint Filter Liquids Test is performed, document the result on the Waste Container Packaging Form.
- When packaging soil and gravel into the receiving 30-gallon drum, ensure that the activity is clearly visible to the camera. Describe material composition and confirm the absence of liquid for the audio narration.
- After packaging and prior to closing the receiving 30-gallon drum, add approximately three to four inches of absorbent to the top surface of the waste.
- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:
  - The waste that was treated
  - The treatment method(s) used

- Type of absorbent used
- Product name and manufacturer of all material(s) added to the waste.

When repackaging RH TRU debris into receiving 30-gallon drums, perform the following actions:

- Demonstrate the absence of liquid in empty containers by turning the open container upside down. Ensure that this activity is clearly visible to the camera and described in detail for the audio narration.
- Empty aerosol cans and cut in half. Do not just puncture.
- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable) and describe for the audio narration**.**
- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration.
- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.), have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures), the lubricant does not have to be removed but acknowledge its presence for the audio narration and document on the Waste Container Packaging Form.
- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.
- Block, brace, or suitably package sharp or heavy objects in the waste as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

13. PACKAGING RH TRU WASTE.

a. Waste into 30-gallon Drums.

Video record all 30-gallon drum loading with an audio narration that will provide indisputable evidence of packaging configuration, all waste contents, and absence of prohibited items. Document a written record of waste packaging on a Waste Container Packaging Form. Good quality video images with thorough narrative descriptions of the waste and well written Waste Container Packaging Forms are

the best insurance that waste containers will not need to be repackaged at a future date.

When packaging RH TRU waste, perform each of the following actions:

- Ensure that the 30-gallon drum unique container identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.
- Ensure that the receiving 30-gallon drum(s) is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).
- State the date(s) of loading waste into the 30-gallon drum for the audio narration and document on the Waste Container Packaging Form.
- Identify all personnel loading waste into the 30-gallon drum by name for the audio narration and document on the Waste Container Packaging Form.
- Precede each interruption of the video by audio narration explaining the reason for the interruption.
- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.
- Ensure that each individual item placed into the waste container is clearly visible to the camera, described in detail for the audio narration, and documented on the Waste Container Packaging Form.
- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.
- Ensure that the description of each item of waste includes estimated weight percent composition of the following waste constituents:
    - Iron-based metals/alloys
    - Aluminum-based metals/alloys
    - Other metals
    - Cellulosics
    - Rubber

- Plastics
- Inorganic materials
- Soil/gravel.

Note: All waste items shall be described for the audio narration and documented on the Waste Container Packaging Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number assignment and/or subject the waste to other environmental regulations such as those implementing the TSCA.

When homogeneous solids are packaged into 30-gallon drums, perform the following actions:

- Ensure that all containers of homogeneous solids are opened and determined to be free of liquid prior to packaging into a 30-gallon drum.
- When liquid is present in the opened containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidify so that liquid is no longer observed prior to packaging into a 30-gallon drum.
- Completely empty all containers determined to contain only liquids, and handle as follows:
  - When the liquid is unused product (e.g., Windex® remaining in a container) and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.
  - If suspected or known to be TRU, treat the liquid.
  - Following treatment and prior to packaging, determine that the waste does not contain free liquid (whether or not absorbents have been added) using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).
  - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio narration, and documenting the container # and Paint Filter Liquids Test result on the Waste Container Packaging Form.
- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:

- The waste that was treated
- The treatment method(s) used
- Type of absorbent used (when applicable)
- Solidification agent used (when applicable)
- Product name and manufacturer of all material(s) added to the waste.

When soil and gravel are packaged into 30-gallon drums, perform the following actions:

- Prior to packaging, determine that soil and gravel does not contain free liquid using EPA Publication SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Method 9095B (Paint Filter Liquids Test).
- When liquid is determined to be present, add a non-biodegradable absorbent in a quantity sufficient to absorb all liquid.
- Following treatment and prior to packaging, determine that the waste no longer contains free liquid by repeating the Method 9095B Paint Filter Liquids Test.
- If liquid is determined to be present, add additional non-biodegradable absorbent until the soil and gravel is determined not to contain free liquid using the Method 9095B Paint Filter Liquids Test.
- Document the result of the final Method 9095B Paint Filter Liquids Test performed on the Waste Container Packaging Form.
- When packaging soil and gravel into the 30-gallon drum, ensure that the activity is clearly visible to the camera. Describe material composition and the absence of liquid confirmed for the audio narration.
- After packaging and prior to closing the 30-gallon drum, add approximately three to four inches of absorbent to the top surface of the waste.
- When waste is treated for any reason prior to packaging, describe the following on the Waste Container Packaging Form:
  - The waste that was treated
  - The treatment method(s) used

- Type of absorbent used
- Product name and manufacturer of all material(s) added to the waste.

When debris is packaged into 30-gallon drums, perform the following actions:

- Remove the lids from all containers, describe contents and material composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.
- Demonstrate the absence of liquid in empty containers by turning the open container upside down.
- If waste was treated at any time and for any reason prior to packaging, describe the waste that was treated and the treatment method(s) used on the Waste Container Packaging Form.
- Show that all aerosol cans have been emptied and cut in half. Do not just puncture.
- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**
- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**
- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.) have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures) the lubricant does not have to be removed but its presence shall be acknowledged for the audio narration and documented on the Waste Container Packaging Form.
- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.
- Block, brace, or suitably package sharp or heavy objects in the waste as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

b. Bagging, Wrapping or Canning before Packaging.

When bagging, wrapping, or canning waste in one location and transferring the bagged, wrapped, or canned waste to another location for packaging or when bagging, wrapping, or canning waste and packaging the bagged, wrapped, or canned waste at a later time, video record the bagging, wrapping and/or canning with an audio narration that will provide indisputable evidence of all waste contents, waste constituent composition, and absence of prohibited items in each bag, wrap, or can.

When bagging, wrapping, and/or canning RH TRU waste, comply with the following instructions:

- Mark each bag, wrap, or can with a unique identification number. Ensure that the number is clearly visible to the camera, read for the audio narration and documented on the Waste Bag, Wrap, or Can Inventory Form (Annex 6).

- State the date(s) of placing waste into each bag, wrap, or can for the audio narration and document on the Waste Bag, Wrap or Can Inventory Form.

- Identify personnel bagging, wrapping, or canning each waste item by name for the audio narration and document on the Waste Bag, Wrap, or Can Inventory Form.

- Precede each interruption of the video during a bagging, wrapping, or canning action by audio narration explaining the reason for the interruption.

- Ensure that recordings of waste bagging, wrapping and/or canning activities are traceable to each bag, wrap, or can by the labeling of each recording with the unique bag, wrap, or can identification number(s).

- Remove the lids from all containers, describe contents and waste constituent composition, and display to the camera. If all contents are not clearly visible to the camera, remove the contents such that each waste item is described in detail and displayed to the camera.

- Ensure that the description of each item of waste includes estimated weight percent composition of the following waste constituents:

    - Iron-based metals/alloys

    - Aluminum-based metals/alloys

    - Other metals

    - Cellulosics

- Rubber
- Plastics
- Inorganic materials
- Soil/gravel.

Note: All waste items shall be described for the audio narration and documented on the Waste Bag, Wrap, or Can Inventory Form in sufficient detail to address regulated constituents (e.g., lead or silver solder, mercury containing items or components, PCB ballasts and capacitors, etc.) that affect hazardous waste number assignment and/or subject the waste to other environmental regulations such as those implementing the TSCA.

- Bag, wrap, or can debris items separately from homogeneous solids.
- Document the corresponding waste category group for each bag, wrap, or can on the Waste Bag, Wrap, or Can Inventory Form.
- Determine all containers of homogeneous solids to be free of liquid prior to bagging, wrapping, or canning.
- When liquid is present in the opened containers of homogeneous solids, mix the liquid with a non-biodegradable absorbent or solidify so that liquid is no longer observed prior to bagging, wrapping, or canning.
- Completely empty all containers determined to contain only liquids and handle as follows:
    - When the liquid is unused product (e.g., Windex® remaining in a container), and not TRU, segregate the liquid to a LLW or MLLW waste stream as appropriate.
    - If suspected or known to be TRU, treat the liquid.
    - Following treatment and prior to bagging, wrapping, or canning, determine that the waste does not contain free liquid (whether or not absorbents have been added) using EPA Publication SW-846 “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” Method 9095B (Paint Filter Liquids Test).
    - When a Paint Filter Liquids Test is performed, establish traceability by labeling the waste that was tested (e.g., container 1), displaying the tested waste to the camera, stating that the waste was tested and determined not to contain liquid for the audio

narration, and documenting the container #, the bag, wrap, or can unique identification number and the result of the Paint Filter Liquids Test on the Waste Bag, Wrap, or Can Inventory Form.

- When waste is treated for any reason prior to bagging, wrapping, or canning, describe the following on the Waste Bag, Wrap, or Can Inventory Form:
  - The waste that was treated
  - The treatment method(s) used
  - Type of absorbent used (when applicable)
  - Solidification agent used (when applicable)
  - Product name and manufacturer of all material(s) added to the waste.
- Demonstrate the absence of liquid in empty containers by turning the open container upside down.
- Show that all aerosol cans have been emptied and cut in half. Do not just puncture.
- Demonstrate for the video the absence of liquid in pipe by holding in an inclined position (prior to capping or taping ends if applicable) and describe for the audio narration**.**
- Demonstrate for the video the absence of liquid in pipe with inline valve(s) by opening the valve(s), holding in an inclined position (prior to capping or taping ends if applicable), and describe for the audio narration**.**
- Demonstrate for the video and describe for the audio narration that lubricant reservoirs and other components of mechanical equipment that may contain liquid (e.g., pump housings, gear boxes, oil sumps, etc.) have been completely drained and the plugs removed. If the equipment contains non-flowing lubricant (at ambient temperatures) the lubricant does not have to be removed, but acknowledge its presence for the audio narration and document on a Waste Bag, Wrap, or Can Inventory Form.
- Cut hoses and tubing into approximate one foot sections to demonstrate the absence of liquids.

c. Packaging Bagged, Wrapped, or Canned Waste.

Video record all 30-gallon drum loading of waste bags, wraps, and/or cans with an audio narration that will provide indisputable evidence of packaging configuration and the bags, wraps, and/or cans packaged. Ensure compliance with the following:

- Package bagged, wrapped, and/or canned debris items into a debris receiving 30-gallon drum.
- Package bagged, wrapped, and/or canned homogeneous solids into a homogeneous solids receiving 30-gallon drum.
- Ensure that the 30-gallon drum unique container identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.
- Ensure that the receiving 30-gallon drum(s) is initially empty; state for the audio narration, make clearly visible to the camera, and document on the Waste Container Packaging Form(s).
- State the date(s) of loading waste into the 30-gallon drum for the audio narration and document on the Waste Container Packaging Form.
- Identify all personnel loading waste into the 30-gallon drum by name for the audio narration and document on the Waste Container Packaging Form.
- Precede each interruption of the video by audio narration explaining the reason for the interruption.
- Following each interruption of the video, verify and state for the audio narration that nothing was added to the bag, wrap, or can during the interruption.
- For each individual waste bag, wrap, or can placed into 30-gallon drums ensure that the unique bag, wrap, or can identification number is clearly visible to the camera, read for the audio narration, and documented on the Waste Container Packaging Form.
- Ensure and state for the audio narration that waste items within the packaging area that are not included in this waste stream, are not placed in the drum being packaged.
- Attach Waste Bag, Wrap, or Can Inventory Forms correlating to each waste bag, wrap, and/or can packaged to the Waste Container Packaging Form, and record the total number of pages on the Waste Container Packaging Form.

- Block, brace, or suitably package sharp or heavy objects that have been bagged, wrapped, or canned as necessary to provide puncture protection for the container. Describe protective measures for the audio narration.

14. REQUIRED DOCUMENTATION.

Ensure that the following documentation for each container is available.

a. 30-gallon Drum.

- Documentation that the gross weight of the 30-gallon drum is no more than 400 pounds
- Documentation of the presence/absence of rigid drum liner
- Documentation of the absence of rigid drum liner lid.

b. Container Filter Vent.

- Documentation for the procurement and receipt inspection or certification of container filter vents to the container filter vent specifications.

c. Packaging.

Ensure that recordings and Waste Container Packaging Forms are traceable to each 30-gallon drum by the labeling of each recording and Waste Container Packaging Form with the unique container identification number(s).

- Ensure that waste packaging documentation includes:
  - Good quality video recordings with thorough narrative descriptions for all waste packaged into each 30-gallon drum
  - Good quality video recordings with thorough narrative descriptions for all waste bagged, wrapped, and/or canned (when applicable)
  - Well written and complete Waste Container Packaging Forms with any associated Waste Bag, Wrap, or Can Inventory Forms attached.
- Ensure that at a minimum, the following information is included on Waste Container Packaging Forms.
  - DOE or DOE contract site name
  - Unique container identification number
  - The date(s) of loading waste into the container

- The unique identification number of each waste bag, wrap, and/or can packaged (when applicable)
- The container identification number(s) of feed container(s)
- Video with audio recorded media number
- Number of pages (Waste Container Packaging Form and attachments)
- Site procedure number including revision number used to perform work
- Waste stream name
- Waste category group
- Verification of empty container
- Detailed description of each waste item and percent composition of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel
- Description of any treatment done prior to packaging the waste
- Presence or absence of bag(s) and number of bag layers
- Statement of bag closure method that each bag was fitted with a filter having a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction
- Presence or absence of metal cans and number of metal can layers
- Statement that each metal can was fitted with a filter with a minimum hydrogen diffusivity value of 1.85E-05 mol/s/mol fraction
- Presence or absence of rigid drum liner
- Type of liner (e.g., plastic, fiberboard) and liner thickness
- Absence of rigid drum liner lid
- Container fill percentage (how full of waste the container is at time of closure, expressed in percent)
- Container filter vent(s) information
- Final closure date of the container
- Printed names and signatures of two persons who packaged waste into the container

- Weight of loaded container
- ^{239}Pu FGEs
- PE-Ci
- Decay heat
- Highest measured surface dose rate of the loaded container
- 95% of the radiological hazard

When attaching Waste Bag, Wrap, or Can Inventory Forms it is not necessary to duplicate all documented information on the Waste Container Packaging Forms. Entries of "see attached" will suffice as long as the Waste Container Packaging Forms with attachments provide the information specified in this instruction.

- At a minimum, the following information shall be included on Waste Bag, Wrap, or Can Inventory Forms.
  - Unique bag, wrap, or can identification number
  - The date of placing waste into the bag, wrap, or can
  - Video with audio recorded media number and location on the media (i.e., time-of-day stamp reading or recording time counter reading).
  - Number of pages
  - Site procedure number including revision number used to perform work
  - Waste stream name
  - Waste bagging, wrapping, and/or canning location (e.g., building, room number, and process)
  - Detailed description of each waste item and percent composition of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel
  - Description of the waste and any treatment method used prior to bagging, wrapping, or canning the waste
  - Identification of heavy, sharp objects that will require additional packaging protection (e.g., electric motor with exposed shaft)

- Statement of bag closure method that the bag was fitted with a filter having a minimum hydrogen diffusivity value of 1.075E-05 mol/s/mol fraction

- Statement that each metal can was fitted with a filter having a minimum hydrogen diffusivity value of 1.85E-05 mol/s/mol fraction

- Printed names and signatures of two persons who bagged, wrapped, or canned the waste

d. Hazardous Waste Determination.

Ensure that the hazardous waste determination required by the generator site's State-administered hazardous waste management program is documented and available for all packaged and/or repackaged RH TRU waste.

Table 1. Waste Tanks Subject to Exclusion

Hanford Site - 177 Tanks	
A-101 through A-106	C-201 through C-204
AN-101 through AN-107	S-101 through S-112
AP-101 through AP-108	SX-101 through SX-115
AW-101 through AW-106	SY-101 through SY-103
AX-101 through AX-104	T-101 through T-112
AY-101 through AY-102	T-201 through T-204
B-101 through B-112	TX-101 through TX-118
B-201 through B-204	TY-101 through TY-106
BX-101 through BX-112	U-101 through U-112
BY-101 through BY-112	U-201 through U-204
C-101 through C-112	
Savannah River Site - 51 Tanks	
Tank 1 through 51	
Idaho National Engineering and Environmental Laboratory - 15 Tanks	
WM-103 through WM-106	WM-180 through 190

ANNEX 1. FISSILE GRAM EQUIVALENT

Determination of FGE requires the following information:

- The isotopic composition of the waste in a 30-gallon drum
- The quantity of each isotope contained in a 30-gallon drum
- The measurement error for each isotope contained in the 30-gallon drum

Calculation of the FGE and Compliance Evaluation

Only the isotopes listed below contribute to the FGE calculation:

Isotope	Equivalent Factor (EF)		
U-233	9.00E-01	Am-242m	3.46E+01
U-235	6.43E-01	Am-243	1.29E-02
Np-237	1.50E-02	Cm-243	5.00E+00
Pu-238	1.13E-01	Cm-244	9.00E-02
Pu-239	1.00E+00	Cm-245	1.50E+01
Pu-240	2.25E-02	Cm-247	5.00E-01
Pu-241	2.25E+00	Cf-249	4.50E+01
Pu-242	7.50E-03	Cf-251	9.00E+01
Am-241	1.87E-02		

The FGE of each 30-gallon drum shall be calculated from the isotopic composition and quantity of isotopes using the following equation:

$$\sum_{i=1}^{n}\left(G_{isotope}\cdot EF_{isotope}\right)+2\sqrt{\sum_{i=1}^{n}\left(TMU_{isotope}\cdot EF_{isotope}\right)^{2}}$$

Where:

n is the number of isotopes from the list above, contained in the waste

$G_{isotope}$ is the value in grams for each isotope listed above

$TMU_{isotope}$ is the total measurement uncertainty for each isotope and

$EF_{isotope}$ is the Equivalent Factor for each isotope listed above.

The FGE value (including two times the error) shall be less than or equal to the applicable limit for each 30-gallon drum.

Example:

A 30-gallon drum is assayed and found to contain:

Isotope	Grams	TMU
Pu-239	10.00	15%
Am-241	0.012	7%
Cs-137[1]	0.001	3%

The FGE is calculated by:

$$FGE = (\{G_{Pu\text{-}239} \cdot EF_{Pu\text{-}239}\} + \{G_{Am\text{-}241} \cdot EF_{Am\text{-}241}\}) + 2\sqrt{\{TMU_{Pu-239} \cdot EF_{Pu-239}\}^2 + \{TMU_{Am-241} \cdot EF_{Am-241}\}^2}$$

$$FGE = 10.00 \cdot 1.00 + 0.012 \cdot 1.87E\text{-}02 + 2\sqrt{\{10.00 \cdot 0.15 \cdot 1.00\}^2 + \{0.012 \cdot 0.07 \cdot 1.87E-2\}^2}$$
$$= 10.0002244 + 3.0$$
$$= 13.00 \text{ g}$$

[1] Cs-137 is ignored for the calculation of FGE because it does not appear in the list above.

ANNEX 2. ^{239}PU EQUIVALENT ACTIVITY

For a known radioactivity quantity and isotopic distribution, the ^{239}Pu equivalent activity is determined using isotope-specific weighting factors. The ^{239}Pu equivalent activity (EA) can be characterized by

$$EA = \sum_{i=1}^{K} Ai / WFi$$

where *K* is the number of TRU[6] isotopes, *Ai* is the activity of isotope *i*, and *WFi* is the PE-Ci weighting factor for isotope *i*.

WFi is further defined as the ratio

$$WFi = Eo / Ei$$

where *Eo* (rem/μCi) is the 50-year effective whole-body dose commitment due to the inhalation of ^{239}Pu particulates with a 1.0 μm activity median aerodynamic diameter (AMAD) and a weekly pulmonary clearance class, and *Ei* (rem/μCi) is the 50-year effective whole-body dose commitment due to the inhalation of isotope (*i*) particulates with a 1.0 μm AMAD and the pulmonary clearance class resulting in the highest 50-year effective whole-body dose commitment. Weighting factors calculated in this manner are presented below for isotopes typically present in RH TRU waste. If other TRU isotopes are determined to be present in the 30-gallon drum, their weighting factors can be obtained from the values of Eo and Ei contained in DOE/EH-0071[7].

PE-Ci Weighting Factors for Selected Isotopes[8]

Isotope	Pulmonary	Weighting Factor
Clearance Class[9]		
U -233	Y	3.9
Np-237	W	1.0
Pu-236	W	3.2
Pu-238	W	1.1
Pu-239	W	1.0

[6] TRU as designated in this equation refers to any radionuclide with an atomic number greater than 92, as well as U-233.

[7] U.S. Department of Energy. Internal Dose Conversion Factors for Calculation of DOSE to the Public. DOE/EH-0071, July 1988.

[8] PE-Ci must be calculated using all radionuclides, not just these selected radionuclides.

[9] (W) Weekly, (Y) Yearly

Isotope	Pulmonary	Weighting Factor
Pu-240	W	1.0
Pu-241	W	51.0
Pu-242	W	1.1
Am-241	W	1.0
Am-243	W	1.0
Cm-242	W	30.0
Cm-244	W	1.9
Cf-252	Y	3.9

Example:

A 30-gallon drum is assayed and found to contain:

Nuclide	Mass (g)	Activity (Ci)
Pu-239	10.0	0.629
Am-241	0.012	0.042
Cs-137	0.001	0.088
Cm-243	0.01	0.522

By the definition, only the Pu-239, Am-241, and Cm-243 are transuranic; the Cs-137 is not and is therefore not included in the calculation of Plutonium-239 Equivalent Activity (PE-Ci).

From the table above the Weighting Factors for Pu-239 and Am-241 are 1.0 and 1.0, respectively. For Cm-243, the Dose Equivalent Factor, E_i, is obtained from DOE/EH-0071 and is shown to be 350 rem. The Dose Equivalent Factor for Pu-239, E_o, is shown to be 510 rem in the same document. The Weighting Factor for Cm-243, WF_{Cm-243}, is then calculated as

$$WF_{Cm-243} = E_i/E_o = 510/350 = 1.5$$

The PE-Ci is calculated by

$$PE\text{-}Ci = A_{Pu-239}/WF_{Pu-239} + A_{Am-241}/WF_{Am-241} + A_{Cm-243}/WF_{Cm-243}$$

$$PE\text{-}Ci = 0.629/1.0 + 0.042/1.0 + 0.522/1.5$$

$$PE\text{-}Ci = 1.019 \text{ PE-Ci}$$

ANNEX 3. DECAY HEAT

The determination of the decay heat per container requires the following information for each isotope:

- the mass ($m_{isotope}$) in grams,
- the total measurement uncertainty ($TMU_{isotope}$) of $m_{isotope}$ in grams, and
- the decay heat per gram ($h_{isotope}$, see Table 2).

Calculation of the Decay Heat

The following equation is used to calculate the decay heat:

$$\text{Decay Heat} = , \sum_{isotope\,1}^{isotope\,n} \left(m_{isotope} * h_{isotope}\right) + \sqrt{\sum_{isotope\,1}^{isotope\,n} \left(TMU_{isotope} * h_{isotope}\right)^2}$$

where:

n is the number of isotopes contributing to the decay heat of the waste.

Compliance Evaluation

The decay heat calculated using the above equation shall be less than or equal to the decay heat limits specified in Table 1.

Table 1. Decay Heat Limits per 30-Gallon Drum for Debris and Solidified Inorganic RH-TRU Wastes to Ensure <5% Hydrogen in the Innermost Confinement Layer

Waste Form	30-Gallon Drum Decay Heat Limit (watts)
Debris Waste	≤0.20
Solidified Inorganic Waste	≤0.40

Table 2. Decay Heat

Nuclide	Decay Heat (watts/g)	Nuclide	Decay Heat (watts/g)	Nuclide	Decay Heat (watts/g)	Nuclide	Decay Heat (watts/g)	Nuclide	Decay Heat (watts/g)
H-3	3.28E-01	Nb-95m	6.11E+02	Ba-137	N/A	Po-210	1.45E+02	U-239	1.69E+05
Be-10	2.68E-05	Tc-99	8.49E-06	Ba-	2.12E+06	Po-211	4.58E+09	U-240	1.17E+03
C-14	1.32E-03	Tc-99m	4.31E+03	Ce-141	4.19E+01	Po-212	9.24E+15	Np-237	2.09E-05
Na-22	8.94E+01	Ru-103	1.05E+02	Ce-142	0.00E+00	Po-213	6.26E+14	Np-238	1.49E+03
P-32	1.19E+03	Ru-106	2.00E-01	Ce-144	2.14E+00	Po-214	1.46E+13	Np-239	5.87E+02
P-33	2.33E+02	Rh-	7.55E+03	Pr-143	1.26E+02	Po-215	1.29E+12	Np-240	8.52E+04
S-35	1.23E+01	Rh-106	6.74E+07	Pr-144	5.54E+05	Po-216	1.40E+10	Np-	9.98E+05
Ca-45	8.12E+00	Pd-107	2.83E-08	Pr-144m	6.22E+04	Po-218	9.90E+06	Pu-236	1.87E+01
Sc-46	4.25E+02	Ag-108	2.74E+06	Pm-146	2.22E+00	At-211	3.05E+04	Pu-238	5.73E-01
V-49	2.06E-01	Ag-	2.53E-01	Pm-147	3.44E-01	At-217	6.74E+10	Pu-239	1.95E-03
Cr-51	1.95E+01	Ag-	1.32E+06	Pm-148	1.26E+03	Rn-219	5.30E+08	Pu-240	7.16E-03
Mn-54	3.88E+01	Ag-110	3.01E+07	Pm-	2.73E+02	^{220}Rn	3.44E+07	Pu-241	3.31E-03
Fe-55	8.49E-02	Ag-	7.99E+01	Sm-146	3.47E-07	Rn-222	5.01E+03	Pu-242	1.17E-04
Fe-59	3.80E+02	Cd-109	1.68E+00	Sm-147	3.04E-10	Fr-221	6.71E+06	Pu-243	5.38E+03
Co-57	7.29E+00	Cd-	2.34E-01	Sm-151	3.10E-03	Fr-223	1.10E+05	Pu-244	5.22E-07
Co-58	1.91E+02	Cd-	9.59E+01	Eu-150	5.95E-01	Ra-223	1.83E+03	Am-241	1.16E-01
Co-60	1.76E+01	In-114	6.32E+06	Eu-152	1.35E+00	Ra-224	5.37E+03	Am-242	9.38E+02
Ni-59	3.22E-06	In-114m	3.23E+01	Eu-154	2.39E+00	Ra-225	2.78E+01	Am-	4.32E-03
Ni-63	6.05E-03	In-115m	1.26E+04	Eu-155	3.42E-01	Ra-226	2.88E-02	Am-243	6.49E-03
Cu-64	7.21E+03	Sn-	2.38E+00	Gd-152	2.77E-13	Ra-228	2.76E-02	Am-245	2.12E+04
Zn-65	2.89E+01	Sn-	1.44E-02	Gd-153	2.96E+00	Ac-225	1.99E+03	Cm-240	7.48E+02
As-73	1.02E+01	Sn-123	2.58E+01	Tb-160	9.24E+01	Ac-227	3.68E-02	Cm-242	1.23E+02
Se-79	2.18E-05	Sn-126	3.06E-05	Ho-	1.99E-02	Ac-228	1.80E+04	Cm-243	1.90E+00
Kr-85	5.94E-01	Sb-124	2.32E+02	Tm-168	8.39E+01	Th-227	1.11E+03	Cm-244	2.86E+00
Rb-86	3.71E+02	Sb-125	3.27E+00	Ta-182	5.60E+01	Th-228	2.71E+01	Cm-245	5.77E-03
Rb-87	7.32E-11	Sb-126	1.54E+03	Au-198	1.51E+03	Th-229	6.17E-03	Cm-246	1.02E-02
Sr-89	1.01E+02	Sb-	1.01E+06	Tl-207	5.58E+05	Th-230	5.75E-04	Cm-247	2.98E-06
Sr-90	1.60E-01	Te-123	6.50E-17	Tl-208	6.93E+06	Th-231	6.43E+02	Cm-248	5.53E-04
Y-88	2.24E+02	Te-123m	1.31E+01	Tl-209	8.58E+06	Th-232	2.68E-09	Cm-250	1.59E-01
Y-90	3.01E+03	Te-125m	1.57E+01	Pb-209	5.32E+03	Th-234	3.45E+00	Bk-247	3.69E-02
Y-90m	4.40E+04	Te-127	3.59E+03	Pb-210	1.96E-02	Pa-231	1.46E-03	Bk-249	3.24E-01
Y-91	8.83E+01	Te-127m	5.21E+00	Pb-211	7.61E+04	Pa-233	4.90E+01	Bk-250	3.34E+04
Zr-88	4.46E+01	Te-129	7.48E+04	Pb-212	2.64E+03	Pa-234	2.40E+04	Cf-249	1.54E-01
Zr-90	N/A	Te-129m	5.42E+01	Pb-214	1.49E+05	Pa-	3.40E+06	Cf-250	4.12E+00
Zr-90m	2.13E+09	I-125	6.38E+00	Bi-207	5.34E-01	^{232}U	6.93E-01	Cf-251	5.89E-02
Zr-93	7.29E-07	I-129	9.34E-08	Bi-210	2.86E+02	^{233}U	2.84E-04	Cf-252	4.06E+01
Zr-95	1.10E+02	I-131	4.23E+02	Bi-211	1.64E+07	U-234	1.82E-04	Cf-254	9.10E-01
Nb-93m	5.01E-02	Cs-134	1.33E+01	Bi-212	2.42E+05	^{235}U	6.04E-08	Es-252	4.37E+01
Nb-94	1.91E-03	Cs-135	3.82E-07	Bi-213	7.64E+04	U-236	1.78E-06	Es-253	9.91E+02
Nb-95	1.87E+02	Cs-137	9.74E-02	Bi-214	7.25E+05	U-237	1.64E+02	Es-254	7.35E+01
		Ba-133	6.82E-01	Po-209	4.94E+00	U-238	8.62E-09	Es-254m	1.69E+03

ANNEX 4. SURFACE DOSE RATES

Container Volume (gallons)	**L_{Gamma} Gamma Contact Dose Rate Limits (rem/h)**		**$L_{Neutron}$ Neutron Contact Dose Rate Limit (rem/h)[10]**
	^{208}Tl or ^{232}U	All Other Isotopes	
30	21	100	0.20

Containers should be packed so that:

$$\frac{D_{Gamma}}{L_{Gamma}} + \frac{D_{Neutron}}{L_{Neutron}} < 1 ,$$

where D_{Gamma} is the measured contact gamma dose rate in rem/h and $D_{Neutron}$ is the measured contact neutron dose rate in rem/h. L_{Gamma} and $L_{Neutron}$ are the limits from the above table. Unless AK indicates that ^{208}Tl dominates the external gamma radiation from the container, assume that L_{Gamma} = 100 rem/h.

10 Assumes a neutron radiation weighting factor of 20.

ANNEX 5. WASTE CONTAINER PACKAGING FORM

Section 1: General Information
Unique Container Identification Number:
DOE or DOE Contract Site Name:
☐ Initial Waste Packaging ☐ Repackaging
Date(s) of Packaging or Repackaging:
Audio-Video Recording Number:
Site Procedure Number and Revision Used:

Section 2: Waste Container Information	
Container Type: ☐ 30-gallon drum	
☐ Container Verified Empty Prior to Packaging	
Rigid Liner Used? ☐ Yes ☐ No If rigid liner was used, list the type of rigid liner and affirm that the lid was not installed: _____	
Container Filter Vent with sample port septum: Minimum H_2 Diffusivity 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No Identification of the filter manufacturer: _____ Date of manufacture, or lot number, or unique serial number: _____	
Number layers of confinement: ☐ one ☐ two ☐ three	
Closure Method used for inner bags:	
All Bag Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.075E-05 mol/s/mol fraction? ☐ Yes ☐ No	
All Metal Can Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No	
Waste Container Weight	Container gross wt: kg. Container tare wt: kg. Waste net wt: kg.
Container Fill Percentage: %	
Waste Category Group: ☐ Homogeneous Solids ☐ Soil/gravel ☐ Debris	
Waste Stream Name:	

Unique Container ID #: _____ Page 2 of ___(incl. attachments)

Section 3: Feed Container Information (Repackaging Only)
Feed Container Type:
Feed Container ID Number:

Section 4: Container Inventory If loading bagged, wrapped, or canned waste, the unique identification number for each bag, wrap, or can shall be entered in the "waste item" column. "See attached" may be entered in the "waste description" column if the completed Waste Bag, Wrap, or Can Inventory Form contains the waste description and is attached to this form.	
Are "Bag, Wrap, and/or Can Inventory Forms" attached for items listed below? ☐ Yes ☐ No	
Waste Item or Bag/Wrap/Can ID#	Waste Description (including weight % of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel)

Unique Container ID #: _____ Page 3 of ___(incl. attachments)

Section 5: Packaging Summary	Yes	No
Does this waste contain any treated liquids? If waste contains treated liquid, describe in the Comments section: • The waste that was treated • Treatment method used • The type of absorbent used, • Solidification agent used, • Product name and manufacturer of any material added to the waste • Results of a Method 9095B Paint Filter Liquids Test for each container tested (including container #).		
Was any other treatment performed prior to packaging? If yes, describe the treatment in the Comments section.		
Was this waste packaged in accordance with the "RH TRU Waste Packaging Instructions"? If not, attach the letter from the Director, Office of Disposal Operations, EM Headquarters Office of Regulatory Compliance that approves the variance.		
Comments:		

Section 6: Operator Information	
List all personnel loading waste into container:	
Printed names and signatures of two site personnel who are approving this form and attesting that all items in the container are listed in this form (Section 7: Radiological Properties completion occurs after signature)	
Printed Name:	Printed Name:
Signature:	Signature:
Date:	Date:

Unique Container ID #: _____ Page 4 of ___(incl. attachments)

Section 7: Radiological Properties
List the isotopes that contribute to 95% of the radiological hazard including their associated activities and masses:
Fissile gram equivalents (FGEs) in the container: FGEs
Plutonium equivalent curies (PE-Ci) in the container: PE-Ci
Highest measured surface dose rate of the loaded container: mrem/hr
TRU alpha activity of waste in container: _____ nCi/gram
Printed or typed name and phone number of point of contact for radiological characterization information:

ANNEX 6. WASTE BAG, WRAP OR CAN INVENTORY FORM

Section 1: General Information
Unique Bag, Wrap or Can ID Number:
Location/Point of Waste Generation (where bagging, wrapping, or canning was done, building, room number, process):
Date of Bagging, Wrapping, or Canning:
Audio-Video Recording Number:
Time-of-day Stamp Reading: _____ Or Recording Time Counter Reading: _____
Site Procedure Number and Revision Used:

Section 2: Bag, Wrap or Can Information
☐ Bag ☐ Wrap ☐ Can
Number of bag and/or can layers: ☐ one ☐ two ☐ three
Closure Method used for inner bags:
All Bag Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.075E-05 mol/s/mol fraction? ☐ Yes ☐ No
All Can Layers Vented? ☐ Yes ☐ No Minimum H_2 Diffusivity of Bag Filters 1.85E-05 mol/s/mol fraction? ☐ Yes ☐ No
Waste Category Group: ☐ Homogeneous Solids ☐ Soil/gravel ☐ Debris
Waste Stream Name:

Section 3: Inventory of Bag, Wrap or Can	
Waste Item	Waste Description (including weight % of iron-based metals/alloys, aluminum-based metals/alloys, other metals, cellulosics, rubber, plastics, inorganic materials, and soil/gravel)

Bag, Wrap, or Can Number: _____

Section 4: Bagging, Wrapping, or Canning Summary	Yes	No
Does this waste contain any treated liquids? If waste contains treated liquid, describe in the Comments section: • The waste that was treated • Treatment method used • The type of absorbent used • Solidification agent used • Product name and manufacturer of any material added to the waste, and • results of a Method 9095B Paint Filter Liquids Test for each container treated (including container ID#).		
Was any other treatment performed prior to bagging, wrapping, or canning? If yes, describe the treatment in the Comments section.		
Was this waste bagged, wrapped, or canning in accordance with the "RH TRU Waste Packaging Instructions"? If not, attach the letter from the Director, Office of Disposal Operations, EM Headquarters Office of Regulatory Compliance that approves the variance.		
Comments:		

Section 5: Printed names and signatures of two site personnel who are approving this form attesting to the contents of the bag, wrap, or can	
This completed Waste Bag, Wrap, or Can Inventory Form consists of _____ pages	
Printed Name:	Printed Name:
Signature:	Signature:
Date:	Date: