



Department of Energy  
 Carlsbad Field Office  
 P. O. Box 3090  
 Carlsbad, New Mexico 88221



OCT 18 2004

Ms. Elizabeth Forinash  
 Center for Federal Regulations  
 Office of Radiation and Indoor Air  
 U.S. Environmental Protection Agency  
 1310 L Street, NW  
 Washington, DC 20005



Dear Ms. Forinash:

The purpose of this letter is to follow up with you regarding our discussion on the audits of debris and homogenous solids at the Hanford Site. Specifically by this letter I hope to address issues between our agencies on Hanford's procedures for the characterization and certification of homogeneous solids and mixed oxides and provide you with additional information on these matters. Most importantly, I would like to assure you that I understand the EPA's concerns regarding the need for formal approval in these matters and steps we are taking to ensure that these formal approvals are obtained from your agency in future operations regarding the characterization of TRU waste for disposal at the Waste Isolation Pilot Plant (WIPP). My main objective is to ensure that a misunderstanding like this does not happen again. I have enclosed a chronology of events regarding the audit and procedures of the debris and homogeneous solids at the Hanford Site.

When I learned that EPA had not approved the procedures that were the focus of the follow-up audit, I instructed Hanford to suspend shipment of the remaining drums of homogeneous solids.<sup>1</sup> In addition, CBFO:

1. Imposed new procedures for the creation, review and approval of the letters sent to sites authorizing them to begin the shipment of new categories of waste to WIPP;
2. Is developing a database to track correspondence and decisions regarding site audits and approvals; and,
3. If EPA agrees, would submit certification letters to EPA for review and approval prior to sending them to the sites.

<sup>1</sup> There are no more containers of mixed oxides from waste stream RLHMOX.001 at Hanford.



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CBFO believes that the procedures used by Hanford to characterize and certify homogeneous solids comply with all applicable requirements. It also believes that the mixed oxide waste stream RLHMOX.001 is correctly classified as debris waste. The procedures used to characterize these wastes comply with all applicable requirements and, except for the procedures that originate from EPA's certification and apply to homogeneous solids, were approved by the respective regulatory agency (i.e., NMED, NRC, EPA, or DOE). Accordingly, DOE believes that WIPP's receipt of homogeneous solids and mixed oxides has no adverse impacts on the long-term performance of the repository, or on public health and the environment. As the acting manager, I am responsible for the approval of certification letters and therefore apologize to EPA for this situation. I look forward to working with you to strengthen the audit program to ensure that situations like this do not recur in the future. Much of the additional information you requested is in the enclosures; the acceptable knowledge information is being provided as we gather it.

If you have any questions, please do not hesitate to call me at (505) 234-7300.

Sincerely,



R. Paul Detwiler  
Acting Manager

Enclosure

**Enclosure****Location of containers of Hanford solids and mixed oxides:** Panel 2, Rooms 5, 4 & 3**Estimated closure date of Panel 2:** No sooner than March 19, 2005**Chronology of Events Related to Audit A-03-14 at the Hanford Site:**

During June 16-20, 2003, the Carlsbad Field Office (CBFO) performed an audit (A-03-14) of the procedures used to characterize and certify: (1) newly generated and retrievably stored debris waste streams (S5000) and homogeneous solids waste (S3000) at the Waste Receiving and Processing (WRAP) facility; (2) newly generated debris waste (S5000) and homogeneous solids waste (S3000) at the Plutonium Finishing Plant (PFP) and T-Plant. The audit also included the procedures used to assay and package waste at the PFP. Both EPA and the New Mexico Environment Department (NMED) participated in this audit, which was conducted with an explicit acknowledgment that a follow-up audit would be needed to verify some aspects of the procedures used to characterize homogeneous solids (S3000). The follow-up was necessary because some procedures used to characterize homogeneous solids are performed at DOE's Idaho National Engineering and Environmental Laboratory (INEEL), and INEEL had not completed these procedures and returned the data to Hanford in time for the June 2003 audit.

CBFO issued its interim report on audit A-03-14 on July 21, 2003. On August 7, 2003, EPA approved Hanford's procedures used to characterize and certify wastes it observed during this audit with the exception of the some procedures used to validate, verify and confirm data regarding acceptable knowledge for "TRU solids" because that information was not available during the audit. In light of this exception, EPA directed DOE not to send such wastes from Hanford to WIPP.

CBFO developed a plan for the followup audit (A-04-06) at Hanford, and submitted it to EPA. It conducted the followup audit on November 4-5, 2003, and submitted the interim report to EPA on December 1, 2003. This report indicted that all of the remaining procedures needed to characterize and certify homogeneous solids at Hanford were in place and appropriate. NMED participated in the followup audit; EPA was unable to attend.

NMED issued its approval of the original audit (A-03-14) on December 5, 2003, and its approval of the followup on July 2, 2004. On July 14, 2004, CBFO, believing the exception regarding TRU solids that EPA had included in its August 2003 approval had been addressed by the followup audit, erroneously expanded Hanford's authority to characterize and certify contact-handled waste to homogeneous solids. Hanford began shipment of homogeneous solids to WIPP on July 21, and has sent 602 drums of it to the repository.

As to the mixed oxide waste stream (WSPF No. RLHMOX.001), it is in the category of debris waste (S5000) and has been since September 2003.<sup>1</sup> These oxides are packaged in steel pipes "overpacked" into 55-gallon drums, and are similar to a mixed oxide waste stream (WSPF No. RF121.01) that the Rocky Flats site has sent to WIPP that is also categorized as debris waste (S5000) at Rocky Flats. EPA approved the procedures Hanford used to characterize debris waste on August 7, 2003, and again on August 19, 2004, after the recertification audit that took place at Hanford during June 15-18, 2004. Starting on December 2, 2003, Hanford began shipment of this mixed oxide waste stream to WIPP and sent 926 containers to the repository.

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<sup>1</sup> Debris waste is defined by the WIPP Hazardous Waste Facility Permit and the WIPP WAP as: solid material exceeding a 2.36 inch (in.) (60 millimeter) particle size 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 2.36 inches in size may be considered debris if the debris is a manufactured object and it is not a particle of S3000 (homogeneous solids) or S4000 (soils/gravel).

The mixed oxides in this waste stream are manufactured objects consisting of pellets in a ceramic matrix and powders; they are neither soil/gravel nor a homogeneous solid. This waste stream also contains sintered steel pellets and silica powders, which are also manufactured items.

**Use of Acceptable Knowledge in the Characterization of Homogeneous Solids:**

EPA certified WIPP in accordance with the certification criteria found at 40 C.F.R. Part 194.<sup>1,2</sup> In section 194.24(a), EPA requires that DOE produce chemical, physical, and radiological information regarding the waste as follows:

*(a) Any compliance application shall describe the chemical, radiological and physical composition of all existing waste proposed for disposal in the disposal system. To the extent practicable, any compliance application shall also describe the chemical, radiological and physical composition of to-be-generated waste proposed for disposal in the disposal system. These descriptions shall include a list of waste components and their approximate quantities in the waste. This list may be derived from process knowledge, current non-destructive examination/assay, or other information and methods.*

EPA's expectation in meeting this criterion is stated as follows:<sup>3</sup>

*EPA expected the compliance application to:*

- Provide a description (chemical, radiological, physical) of existing waste.*
- List approximate quantities of waste components in each description.*
- Provide similar descriptions for to-be-generated waste, to the extent practicable.*

*As stated in the Compliance Application Guidance for 40 CFR Part 194 (CAG) (p. 30), the physical description of waste may include: the types of items, articles, and materials present in the waste (including void space); a description of physical forms and initial liquids present in the category (both free and bound); and the types and properties of the containers to be used for disposal. The chemical description may include: process chemicals likely to be present in the waste; all added components (neutralizers, stabilizers, solidifies, etc.) and approximate total quantities; and the chemical properties of other items present that could affect performance. The radiological description may include: the species and quantities of the radioisotopes present in the waste; information on the expected distribution of curie loading by container; the surface radiation levels of containers, including types of radiation; and the classification of the waste material, such as CH or RH TRU waste.*

DOE met this and other waste characterization criteria in Chapter 4 of the Certification Compliance Application (CCA)<sup>4</sup> and associated appendices (WCA, WCL, WAP and BIR). Central to the demonstration of compliance with the disposal standards is the identification of waste components that must be quantified and tracked through the waste characterization process. These components are spelled out in the certification decision along with the imposed limits (maximum or minimum values) and the waste characterization methods that are to be employed in

<sup>1</sup> Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the Disposal Regulations: Certification Regulations Certification Decision; Final Rule, 63 Fed. Reg. 27354 (May 18, 1998).

<sup>2</sup> 40 C.F.R. Part 194, Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the 40 C.F.R. Part 191, *Disposal Regulations*.

<sup>3</sup> Compliance Application Review Document No. 24, Waste Characterization, Section 24.A.4.

<sup>4</sup> *Title 40 CFR 191 Compliance Certification Application*, DOE/CAO-1996-2184, October 1996, U. S. Department of Energy, Carlsbad, NM

"controlling" the components within the limits in the certification decision. According to EPA's review of DOE's application, DOE listed the following methods for controlling the waste components:<sup>5</sup>

*In Chapter 4.4 (p. 4-44), DOE proposed to use NDA methods (i.e., PANS & gamma spectroscopy), NDE (i.e., RTR), and VE, as the methods to quantify various waste components.*

- *RTR is a nondestructive, semi-quantitative technique that involves x-ray scanning of waste containers to identify and verify waste container contents (including cellulose, plastics, and rubbers).*
- *VE is a semi-quantitative method that confirms/determines the matrix parameter category and waste material parameter weights through visual examination of wastes. It is used to quantify waste components such as cellulose, plastics, and rubbers.*
- *NDA, a nonintrusive technology, employs radiation detection techniques to determine the waste's isotopic content and activity.*

These methods do not rely on either acceptable knowledge or solids sampling to satisfy the requirements of the certification. EPA provided a separate criterion for the use of acceptable knowledge (process knowledge) when such information is a basis for quantifying waste components. It states:

- (c) For each waste component identified and assessed pursuant to paragraph (b) of this section, the Department shall specify the limiting value (expressed as an upper or lower limit on mass, volume, curies, concentration, etc.), and the associated uncertainty (i.e., margin of error) for each limiting value, of the total inventory of such waste proposed for disposal in the disposal system. Any compliance application shall:*
- (3) Provide information which demonstrates that the use of process knowledge to quantify components in waste for disposal conforms with the quality assurance requirements found in § 194.22.*

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<sup>5</sup> Compliance Application Review Document No. 24, Waste Characterization, Section 24.F.4.

Typically, acceptable knowledge is not necessary as the basis for quantifying waste components. An Acceptable Knowledge Summary Report accompanies the Waste Stream Profile Form for each waste stream that is shipped to WIPP. This report for the Hanford RLHMOX.001 waste stream contains the following information in the Waste Description Section:

- **General Waste Stream Information:** a description of the waste stream including its management by the shipping site. This general description may include estimates of the number of containers of waste in the waste stream. There may also be a discussion that relates the waste stream to inventory information in the TRU Waste Baseline Inventory Report.
- **Waste Matrix Codes:** used to classify the waste on a physical and chemical basis.
- **Waste material parameters:** provides a listing of the types (but not quantities) of waste material parameters. Estimates of quantities are on a container basis using radiography or visual examination.
- **Waste packaging configuration:** type of packaging and number of layers of confinement
- **Prohibited items:** General assessment of how the acceptable knowledge record supports the conclusion that no prohibited items are present
- **Waste Generating Process:** Describes the general waste generation process and any subsequent treatment processes that resulted in the final waste form. The description may reference the specific defense-related activity that produced the waste.
- **Chemical properties:** This section will describe the chemical properties with emphasis on those that are regulated under hazardous waste regulations and the Toxic Substances Control Act.
- **Radionuclide properties:** This section will describe the specific radionuclides that are present. The description generally does not include container specific quantitative information. It may include isotopic scaling information available from the acceptable knowledge record. Quantification of radionuclides for tracking purposes is done using non-destructive assay and the scaling information found in the acceptable knowledge information.<sup>6</sup>
- **Defense waste determination:** Acceptable knowledge summary reports will provide an overview of the information available to support the determination that the waste is a defense-related waste stream.

It can be seen from this list, that while acceptable knowledge information is important to satisfying the hazardous waste regulations, the collection of acceptable knowledge does not provide information that must be available to quantify waste components regulated by EPA. Several aspects of the acceptable knowledge record could become important in the future for this purpose, however the current practice is to rely on the three methods listed above.

Acceptable knowledge provides important information for assigning containers into waste streams. This is less important for homogeneous solids because there is less of a chance that a container of debris will be identified as a container of solids during radiography or visual examination.

<sup>6</sup> *Calculation of Assay Results*, Plutonium Finishing Facility Analytical Laboratories Quality Control Procedure, ZA-400-302, Revision D, change 3, Effective 4-12-2004

In conclusion, the EPA certification requirements to quantify and track important waste components do not rely on the acceptable knowledge information collected about the waste stream as each container is required to be examined, with radiography or visual examination and with non-destructive assay equipment in order to provide the requisite component values.