

# Audit Report

Waste Processing and Recovery Act Acceleration Efforts for Contact-Handled Transuranic Waste at the Hanford Site



OAS-RA-10-10

May 2010



## **Department of Energy**

Washington, DC 20585

May 25, 2010

#### MEMORANDUM FOR THE SECRETARY

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FROM: Gregory H. Friedman

Inspector General

SUBJECT: INFORMATION: Audit Report on "Waste Processing and Recovery

Act Acceleration Efforts for Contact-Handled Transuranic Waste at the

Hanford Site"

#### **BACKGROUND**

The Department of Energy's Office of Environmental Management's (EM), Richland Operations Office (Richland), is responsible for disposing of the Hanford Site's (Hanford) transuranic (TRU) waste, including nearly 12,000 cubic meters of radioactive contact-handled TRU wastes. Prior to disposing of this waste at the Department's Waste Isolation Pilot Plant (WIPP), Richland must certify that it meets WIPP's waste acceptance criteria. To be certified, the waste must be characterized, screened for prohibited items, treated (if necessary) and placed into a satisfactory disposal container.

In a February 2008 amendment to an existing Record of Decision (Decision), the Department announced its plan to ship up to 8,764 cubic meters of contact-handled TRU waste from Hanford and other waste generator sites to the Advanced Mixed Waste Treatment Project (AMWTP) at Idaho's National Laboratory (INL) for processing and certification prior to disposal at WIPP. The Department decided to maximize the use of the AMWTP's automated waste processing capabilities to compact and, thereby, reduce the volume of contact-handled TRU waste. Compaction reduces the number of shipments and permits WIPP to more efficiently use its limited TRU waste disposal capacity. The Decision noted that the use of AMWTP would avoid the time and expense of establishing a processing capability at other sites.

In May 2009, EM allocated \$229 million of American Recovery and Reinvestment Act of 2009 (Recovery Act) funds to support Hanford's Solid Waste Program, including Hanford's contact-handled TRU waste. Besides providing jobs, these funds were intended to accelerate cleanup in the short term. We initiated this audit to determine whether the Department was effectively using Recovery Act funds to accelerate processing of Hanford's contact-handled TRU waste.

## **RESULTS OF AUDIT**

Relying on the availability of Recovery Act funds, the Department changed course and approved an alternative plan that could increase costs by about \$25 million by processing Hanford TRU-waste on-site rather than at AMWTP. Further, under the newly adopted alternative approach, the Department would fail to achieve the previously anticipated reductions in volume associated with the use of existing AMWTP waste compaction capabilities.

Our concern with the current plan revolves around the fundamental question of efficient and effective use of Recovery Act funds and is discussed on page 4 of this report.

#### Change of Plans

Both EM Headquarters and Richland management informed us that the Department had approved a new plan that would significantly modify the disposal plan contained in the February 2008 Decision for the *Department of Energy's Waste Management Program: Treatment and Storage of Transuranic Waste*. In particular, the plan would accelerate shipping contact-handled TRU waste from Hanford to WIPP using Recovery Act funds. The *TRU Waste Acceleration Plan* (Revision 1, March 2010), calls for Hanford to transfer only a nominal amount of waste (about 208 cubic meters) to the AMWTP in Fiscal Year 2010, rather than the 6,500 cubic meters identified in the Decision. The overwhelming majority of Hanford's contact-handled TRU waste would, under the current plan, be processed and certified at Hanford then shipped directly to WIPP.

The Department's immediate plans are to address 850 cubic meters of waste in above-ground storage at Hanford. Hanford had taken action to execute the plan and started processing the 850 cubic meters of the contact-handled TRU waste in February 2009 using hand-sorting techniques. Also, the Department has plans to process approximately 1,600 cubic meters of its waste drum inventory yet to be retrieved; and, a considerable inventory of contact-handled TRU waste in small and large boxes. Richland is using Recovery Act funds to increase Hanford's repackaging capabilities and expand the contractor waste processing workforce to facilitate on-site processing of the waste.

Management officials asserted that the 6,500 cubic meters of TRU waste from Hanford identified in the Decision was used only as a bounding limit for the required National Environmental Policy Act analysis and that the Department had not planned to ship this volume of waste to the AMWTP. Although management correctly characterized the 6,500 cubic meters as a bounding limit, the statement is inconsistent with other plans outlined in the Decision. Specifically, the Decision noted that "DOE [Department of Energy] expects that most of the waste from these generator sites will be sent to INL for treatment and characterization."

## **Cost-Effective Waste Processing**

Processing the contact-handled TRU waste at Hanford as opposed to the AMWTP does not appear to be the most cost-effective approach. As shown in the following table, the Department will incur nearly \$25 million in additional costs to process the TRU waste at Hanford than it would at the AMWTP.

Additional Cost of Processing Contact-Handled Transuranic Waste at Hanford vs.  AMWTP				
	Treatment/Processing	Transportation	Disposal	Total
Hanford Cost	\$42,182,172	\$6,417,957	\$8,069,216	\$56,669,345
AMWTP Cost	\$20,041,505	\$9,319,541	\$2,444,042	\$31,805,088
Difference	\$22,140,667	(\$2,901,584)	\$5,625,174	\$24,864,257

The \$24.8 million in additional cost in processing results primarily from the fact that Hanford must hand-sort and repackage the waste before it can be characterized and loaded into containers for disposal. This is a costly, labor and resource-intensive procedure. In contrast, AMWTP is a highly automated process. We found, and Department officials confirmed, that an economic analysis of the proposed change in processing strategy had not yet been prepared to demonstrate the cost effectiveness of deviating from the original plan to process the waste at AMWTP.

In reviewing an earlier cost savings analysis that we prepared, management commented that our analysis incorrectly included waste in boxes. Accordingly, we revised the estimate to include only the volume of waste in drums at Hanford, or a total of 2,660 cubic meters. As a consequence, we did not include the inventory of small and large boxes in our cost comparison. Thus, there is a very real potential for significant additional cost savings in processing available candidate waste in boxes, as well.

Management asserted that its recent investigations have disclosed that almost 100 percent of the TRU waste drums in storage were suspected to contain items, such as various liquids, that are prohibited for disposal at WIPP, making it impossible to ship the waste to INL. We could not validate management's assertion. Hanford officials were unable to produce any studies suggesting that a high percentage of the TRU waste containers held prohibited items, let alone the nearly 100 percent as asserted by management. In subsequent discussions, Richland management acknowledged that there is no data to indicate that the prohibited items rate was nearly 100 percent; however, management stated that the prohibited items rate is not now a relevant factor since Richland is no longer looking for candidate waste to go to Idaho. The new project plan, according to Richland management, is to repackage all the waste, regardless of the prohibited items rate. Richland officials told us that Hanford will treat all the waste as containing prohibited items and will hand-sort and repackage the waste for shipment to WIPP.

#### Volume Reduction

Processing the waste at Hanford also will not allow WIPP to more efficiently use its disposal capacity, as envisioned by the Decision. Specifically, Richland does not have the capability to compact contact-handled TRU waste to reduce the volume of waste shipped to WIPP. According

to Richland officials, Hanford's compaction capabilities are limited to compacting mixed, low-level waste and empty waste drums. The AMWTP, on the other hand, has waste compaction capabilities that reduce the volume of TRU waste, a primary reason for the Department's decision in the amended Decision to ship the waste to AMWTP from waste generator sites. Because of uncertainties regarding contents of the waste drums, it is not possible to determine with certainty the exact amount of volume reduction available from compaction.

#### Workforce Concerns

Department officials told us that Richland initially had not implemented its plans to have the AMWTP process Hanford's contact-handled waste, at least in part, because of concerns about maintaining a stable Hanford workforce. For example, Richland planned to ship the 208 cubic meters of contact-handled TRU waste to the AMWTP in November 2008. According to Richland's manager, however, the shipment was postponed, in part, because of concerns about transferring jobs to Idaho, along with the waste. Specifically, in a September 30, 2008, letter, labor representatives voiced concerns with the Department's decision to transfer packaging and compaction work associated with TRU waste disposition to the AMWTP – work the labor representatives stated had been traditionally performed at the Hanford Site. Currently, however, it appears that there are no concerns about a decreasing workforce since Hanford contractors are hiring large numbers of employees to support several major Recovery Act projects.

## Possible Impact

As a result of Richland's decision to process the TRU contact-handled waste on-site, the Department is at risk of spending approximately \$25 million more than necessary. In our judgment, these funds could be better used for other high-priority, stimulus-related cleanup projects. We recognize the Department's responsibility to use Recovery Act funding to create jobs and to stimulate the economy. However, in our view, this does not obviate the need to achieve Departmental missions efficiently and effectively. The fact pattern here suggests that the current plan to process Hanford's waste on-site as opposed to processing the waste at the AMWTP is inconsistent with this objective. This conclusion is based on the finding that the alternative approach has not been sufficiently analyzed to reliably confirm that this course of action is better than the previous plan identified in the applicable Record of Decision.

#### RECOMMENDATIONS

Given the Department's responsibility to efficiently use Recovery Act funding, we recommend that the Assistant Secretary, Office of Environmental Management:

- 1. Determine the amount of Hanford contact-handled TRU waste that is suitable for processing at the AMWTP and ultimate disposal at WIPP; and,
- 2. Fully analyze the cost implications of processing Hanford's contact-handled TRU waste on-site as opposed to processing it at the AMWTP.

#### MANAGEMENT COMMENTS

Management concurred with the report's recommendations but disagreed with the estimated cost increase for Richland to prepare the waste for disposal as opposed to using AMWTP for the preparation.

Management's comments were responsive to our recommendations. Regarding management's comments concerning our cost analysis, the analysis was based on the actual costs incurred at Hanford in preparing waste for shipment, as well as the costs to process the waste at the AMWTP. The details of this cost analysis were fully vetted with Department management, and adjusted based on management input, prior to issuing the draft report.

A detailed discussion of management's comments and our response is included in Attachment 2 and management's verbatim comments are included in Attachment 3.

#### Attachments

cc: Deputy Secretary
Under Secretary of Energy
Assistant Secretary, Office of Environmental Management
Chief of Staff
Chief Financial Officer
Audit Liaison Specialist, Office of Risk Management, CF-80
Manager, Richland Operations Office
Audit Liaison, Richland Operations Office

## **OBJECTIVE, SCOPE, AND METHODOLOGY**

#### **OBJECTIVE**

The audit objective was to determine whether the Department was effectively using Recovery Act funds to accelerate processing of Hanford's contact-handled TRU waste.

#### **SCOPE**

We began the audit on October 8, 2008, to determine the Department's progress in implementing plans to process Hanford's contact-handled TRU waste at the Advanced Mixed Waste Treatment Project. On May 8, 2009, however, we re-focused the audit to assess the effectiveness of using Recovery Act funds to accelerate processing of Hanford's waste, which became the primary focus of the audit through the end of audit work in May 2010. The audit was conducted at the Richland Operations Office (Richland), and the Idaho National Laboratory (INL). Scope was limited to Solid Waste Processing activities at Hanford.

#### METHODOLOGY

To accomplish the audit objective, we:

- Researched Federal, Departmental and contractors regulations, policies and procedures;
- Interviewed key personnel in the Office of Environmental Management, Richland, INL, the Carlsbad Field Office, and the CH2M Hill Plateau Remediation Company;
- Obtained and reviewed plans for Solid Waste Processing activities;
- Obtained and reviewed contract requirements, and performance measures applicable to Solid Waste Processing activities;
- Conducted observations at T-Plant, the Waste Receiving and Processing Facility, and the Advanced Mixed Waste Treatment Facility; and,
- Obtained and reviewed Project Operating Plans for Solid Waste processing activities to be performed at Hanford, the Carlsbad Field Office, and INL using Recovery Act funds.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. The audit included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Because our review was limited, it would not necessarily have disclosed all

internal control deficiencies that may have existed at the time of our audit. Also, we considered the establishment of performance measures in accordance with the Government Performance and Results Act of 1993 as they related to the audit objective. Finally, we did not rely on computer-processed data to accomplish our audit objective.

An exit conference was held with Department officials on May 6, 2010.

## MANAGEMENT COMMENTS AND AUDITOR RESPONSE

#### Management Comment

Management disagreed with the Office of Inspector General's (OIG) estimate of a potential \$25 million increase in cost for Richland Operations Office (Richland) to prepare the transuranic (TRU) waste for disposal, as opposed to sending it to the Advanced Mixed Waste Treatment Project (AMWTP) for processing. Management stated that the \$25 million estimate did not adequately consider the technical requirements and new technical challenges and constraints that must be addressed for TRU shipments between sites, thus understating the total life-cycle costs for waste processed through the AMWTP. Also, management stated that several significant changes have occurred since the OIG evaluation began. For example, the Richland contractor proposed revised technical approaches for TRU waste. Also, with enactment of the American Recovery and Reinvestment Act of 2009 (Recovery Act), the Department of Energy (Department) decided to invest Recovery Act funds in Hanford Site (Hanford) TRU activities in order to save jobs and accelerate mission accomplishment, consistent with Recovery Act objectives.

In particular, management asserted that the OIG cost estimate did not include most of the required activities and associated costs that are needed even if the waste were to be shipped to the AMWTP. Management stated, for example, that retrieved drums must undergo full characterization that includes process knowledge, radiography, nondestructive assay, and, in some cases, headspace gas sampling to meet Nuclear Regulatory Commission shipping requirements. Additionally, management asserted that a drum found to contain prohibited items, such as liquids, must undergo essentially all the same steps required to repack a drum whether for shipment directly to the Waste Isolation Pilot Plant (WIPP) or to the AMWTP.

Management asserted that its revised approach for processing the waste at Hanford will result in processing efficiencies not considered in the OIG cost savings analysis. In particular, management pointed out that point-of-generation packaging at the trench face (waste retrieval site) by placing it directly into standard waste boxes for shipment to WIPP will result in significant life-cycle cost savings. Management also pointed out that the OIG analysis did not consider that the use of higher volume standard waste boxes at the point-of-generation is more cost effective than packing retrieved drums in overpack containers for shipment to WIPP.

#### **Auditor Response**

We acknowledge that significant technical requirements must be met prior to shipping Hanford's waste, and our report took these into account. Our cost analysis considered the technical requirements that must be met in shipping the waste to the AMWTP, as well as, the technical challenges and constraints associated with shipments between sites. In particular, our cost analysis was based on the actual costs incurred at Hanford in preparing waste for shipment, as well as the costs to process the waste at the AMWTP. The details of this cost analysis were fully vetted with Department management, and adjusted based on management input, prior to issuing the draft report.

The OIG's cost estimate does not include the costs associated with sorting out prohibited items and repacking the waste, because we accept management's assertion that waste containers with prohibited items should be processed at Richland, and are not good candidates to ship to the AMWTP. However, those waste containers without prohibited items are less expensive to process at the AMWTP due to its highly automated processes for characterizing, treating, and compacting the waste. Further, cost for removal of prohibited items were not included because Richland did not incur these costs for the 208 cubic meters of waste that it has retrieved and plans to ship to the AMWTP for full characterization, sorting, repacking, and shipping to WIPP. We noted that Richland had made the determination that the 208 cubic meters of waste was suitable for shipping and processing at the AMWTP without fully characterizing and sorting the waste. Management's comments that such costs will be incurred regardless of whether the waste is sent to the AMWTP is based on its assertion that a high percentage of retrieved drums contains prohibited items and cannot be shipped to the AMWTP without incurring the costs of fully characterizing the waste and sorting out the prohibited items. However, full characterization is not necessary to scan for prohibited items, rather, a process referred to as quick-scan or acceptable knowledge can be used to determine whether prohibited items are in the waste. Additionally, management officials were unable to produce any studies that determined a high percentage of TRU waste containers held prohibited items.

In subsequent discussions, Richland management acknowledged that the historical rate of occurrence of prohibited items in waste containers has been much less than the high estimates management assumed in planning its current waste treatment process. However, management stated that the prohibited items rate is no longer a relevant factor since Richland is no longer looking for candidate waste to go to Idaho National Laboratory.

As previously mentioned, our cost analysis was based on actual costs incurred in processing TRU waste at Hanford as opposed to processing it at the AMWTP. It does not factor in recent changes in Richland's approach to point-of-generation packaging the waste into standard waste boxes. However, we were unable to evaluate management's assertion regarding cost savings because it had not yet completed detailed cost studies.

Finally, as discussed in the body of our report, management had not completed an economic analysis of changes in processing the waste at Hanford as opposed to processing it at the AMWTP. We concluded that the life-cycle cost savings estimate should have been prepared for both approaches prior to making a decision to scale back plans set forth in the Record of Decision.

## **Management Comment**

Management stated that the Department expects that its new approach to accelerating waste retrieval and packaging with Recovery Act funds will reduce life-cycle costs by a preliminary estimate of more than \$135 million.

## <u>Auditor Response</u>

Management's preliminary estimate of reduced life-cycle costs of \$135 million is currently under development. While details of the estimate are not complete, it appears that the estimated life-cycle savings result from elimination of out-year TRU waste program costs due to near term acceleration of waste removal. Applying the Recovery Act funds to accelerate implementation of the February 2008 Decision in the near term by maximizing TRU waste transfers to the AMWTP would also result in similar life-cycle cost reductions.

#### Management Comment

Management concurred with our recommendation to determine the amount of Hanford contact-handled TRU waste that is suitable for processing at the AMWTP.

## **Auditor Response**

Management's comments are responsive to our recommendation.

## **Management Comment**

Management concurred with our recommendation to fully analyze the cost implications of processing Hanford's contact-handled TRU waste on-site, as opposed to processing it at the AMWTP.

#### Auditor Response

Management's comments are responsive to our recommendation.

#### MEMORANDUM FOR RICKEY R. HASS

DEPUTY INSPECTOR GENERAL FOR AUDIT SERVICES

FROM: INÉS TRIAY (**NO SIGNATURE-508 VERSION**)

ASSISTANT SECRETARY FOR

ENVIRONMENTAL MANAGEMENT

SUBJECT: Draft Inspector General Audit Report on "Waste Processing and

Recovery Act Acceleration Efforts for Contact-Handled

Transuranic Waste at the Hanford Site"

My office has reviewed the draft Office of the Inspector General (IG) report entitled, "Waste Processing and Recovery Act Acceleration Efforts for Contact-Handled Transuranic (CH-TRU) Waste at the Hanford Site." The attachment provides the Department's comments on the report. These comments have been coordinated with staff at the Hanford Site, Idaho Operations Office, and the Carlsbad Field Office.

The Department concurs with the IG recommendation that the Office of Environmental Management (EM) should re-evaluate its plans, in light of changes that have occurred, to determine the amount of Hanford CH-TRU waste that may be suitable for processing at the Advanced Mixed Waste Treatment Plant (AMWTP). EM plans on completing the evaluation by June 30, 2010.

The Department shares the IG's commitment to ensuring the effective use of Recovery Act funds to accomplish key mission objectives, but does not agree with the IG estimate of potential \$25 million in increased cost to dispose of Hanford TRU waste. The Department is unable to validate the IG's \$25 million dollar impact as it appears required activities have been omitted, as explained further in the attachment. EM concurs that we should re-evaluate Hanford's lifecycle baseline in light of changes that have occurred, which will help ensure the life-cycle cost for the Hanford cleanup is optimized. This evaluation will be completed by September 30, 2010.

EM will realize significant savings by using Recovery Act funds to support transuranic waste activities. Recovery Act funds have allowed the continuation and acceleration of cleanup and waste disposal activities throughout the Department's complex. At Hanford alone, the ability to accelerate previously unfunded work related to the transuranic waste program will reduce life-cycle costs by a preliminary estimate of more than \$135 million (current year dollars), an outcome contrary to that described in the Monetary Impact Report.

In order to optimize worker safety, contamination control and life-cycle cost, the Department has discontinued the previous TRU waste retrieval strategy that placed significantly degraded drums into 85-gallon overpack drums prior to transfer to above ground storage and eventual processing. Field conditions for retrieval at Hanford are worse than anticipated, resulting in significantly more degraded drums. Processing efficiency will be improved by implementing point-of-generation packaging at the trench face by placing the waste directly into standard waste boxes. The revised Hanford waste processing approach and more efficient steps in retrieving and preparing waste for shipment and disposal will result in significant life-cycle cost savings for EM.

The plan that the IG is referencing in the report is a strategic plan entitled "TRU Waste Acceleration Plan" (originally entitled the 30/5 shipping plan) and approved on October 9, 2009. The need for the plan was recognized by EM-1 and developed by Washington TRU Solutions - the Carlsbad Field Office's prime contractor - following the decision to invest significant ARRA funding to accelerate the permanent disposition of legacy TRU waste throughout the complex as part of the effort to dramatically reduce the footprint of the EM program.

## **Background:**

The IG conducted an audit at Hanford to determine whether the Department had implemented its plan to accelerate CH-TRU Waste at Hanford by sending the waste to the Idaho AMWTP for compaction before final disposal at the Waste Isolation Pilot Plant (WIPP). The IG also evaluated whether the Department was effectively using American Recovery and Reinvestment Act funds to accomplish this acceleration.

As a result of the audit, the IG specifically recommended that my office determine the amount of Hanford CH-TRU waste that is suitable for processing at the AMWTP and ultimate disposal at WIPP. In addition, the IG suggested that EM fully analyze the cost implications of processing Hanford's CH-TRU waste on-site as opposed to processing it at the AMWTP. EM's planned actions to respond to these recommendations are detailed in the attached comments.

#### Attachment

cc:

Cynthia Anderson, EM-3.1 Joni Boone, EM-4.1 Audit Liaison, CF-1.2 David Brockman, RL David Langstaff, RL

## **PRIOR REPORTS**

## Office of Inspector General Reports

- Disposal of Remote-Handled Transuranic Waste at the Waste Isolation Pilot Plant (DOE/IG-0613, July 2003). The audit concluded that opportunities existed for the Department of Energy (Department) to improve the efficiency of its remote-handled transuranic (TRU) waste disposal program. Additionally, the report also noted that existing strategic performance goals and measures for use in managing the program could be enhanced. By maintaining a careful focus on full integration and coordination of the treatment, transportation, and disposal of remote-handled TRU waste across the complex, the Department can increase the likelihood that its accelerated cleanup goals will be achieved. The report recommended that the Office of Environmental Management maximize opportunities to fully integrate and coordinate the treatment, storage, transportation, and disposal of remote-handled TRU waste by conducting an analysis to determine the optimal mix of shipping container types for cost-effective, safe, and environmentally acceptable shipment of remote-handled TRU waste to the Department's Waste Isolation Pilot Plant.
- Transuranic Waste Retrieval and Processing at the Hanford Site (DOE/IG-0624, October 2003). The audit concluded that the Department faced significant challenges in its efforts to retrieve and process TRU waste at the Hanford Site. Specifically, as of July 2003, none of the nearly 10,000 containers had been retrieved. Further, the report found the Department's milestones were in jeopardy because Richland Operations Office (Richland) had not placed sufficient emphasis on retrieving and processing projects. Specifically, Richland had not established an achievable TRU waste retrieval plan. Additionally, the Department had not performed a comprehensive study to determine obtainable retrieval rates and optimal processing levels needed to meet, at minimal cost, regulatory milestones and cleanup goals.

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