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United States Government

Department of Energy

memorandum

DATE: December 20, 2005 Audit Report Number: OAS-L-06-03

REPLY TO
ATTN OF: IG-36 (A05SR025)

SUBJECT: Audit of "Defense Waste Processing Facility Operations at the Savannah River Site"

TO: Jeffrey M. Allison, Manager, Savannah River Operations Office

INTRODUCTION AND OBJECTIVE

The Department of Energy's (Department) Savannah River Site stores approximately 36 million gallons of liquid, high-level radioactive waste in 49 underground waste storage tanks. The contents of the waste tanks are broadly characterized as either "sludge waste" or "salt waste". Sludge waste is insoluble and settles to the bottom of a waste tank, beneath a layer of liquid supernate. Salt waste is soluble and is dissolved in the liquid.

The Defense Waste Processing Facility (DWPF) is designed to treat both forms of waste and package them for permanent disposition. Through a complex sequence of carefully controlled chemical reactions in the DWPF, the waste is blended with glass frit and vitrified into a borosilicate glass form. The resulting molten glass is poured into stainless steel canisters where it solidifies, immobilizing the radioactive waste within the glass structure. The canisters are then ready to be stored pending shipment to a Federal Repository for permanent storage. The DWPF, which began radioactive operations in March 1996, has an annual operating cost of about $100 million, and is presently treating only the sludge waste stored in the tanks. Due to the significant cost associated with operating the DWPF, we conducted this audit to determine whether the Department is maximizing the amount of sludge waste encapsulated in each canister produced in the DWPF.

CONCLUSIONS AND OBSERVATIONS

We determined that the Department has made progress towards maximizing the amount of sludge waste encapsulated in each canister produced in the DWPF. Since beginning operations in March 1996, the sludge waste loading per canister has increased from 25 percent to approximately 38 percent. Further, the fill level for each canister has increased from 96 inches to 100 inches. Also, the Department is taking additional measures to optimize the amount of sludge waste loading per canister. For example:

- Prior to processing each new batch of sludge feed in the DWPF, the Savannah River National Laboratory conducts an independent study to identify the frit composition that should be used in order to obtain the optimum waste loading for the new batch; and,

- The Department has a contractual incentive for Westinghouse Savannah River Company (Westinghouse) to increase the amount of actual sludge waste encapsulated in the canisters produced in the DWPF.

While the Department is making progress in maximizing the amount of sludge waste encapsulated in each canister, there is uncertainty associated with the amount of sludge waste that still requires treatment. In fact, since March 2002, the Department has revised its estimate of the total number of canisters expected to be completed in the DWPF three times. For example, in March 2002, the Department estimated that it would produce a total of about 6,000 DWPF canisters and complete operations no later than 2027. In December of the same year, the Department estimated that it would produce a total of about 5,000 canisters and complete operations by 2018. In September 2005, the Department's estimate increased to about 5,800 total canisters with a 2022 completion date. While some of the fluctuation was attributable to waste loading addressed above, there is uncertainty regarding the amount of sludge that remains to be treated at the Savannah River Site. This information is critical in order to establish a viable production and operation schedule for the DWPF and to understand the impact on future budgets.

The Department has acknowledged that differences exist in sludge estimates and has initiated efforts to determine the quantity of sludge treated, as well as the amount of sludge remaining. However, these efforts were put on hold until recently to support higher priority work. While we do not anticipate that the uncertainty of updated sludge amounts discussed above will have an immediate impact on DWPF operations, we suggest that the Department task Westinghouse to update the current sludge estimate and establish expected deliverable and completion dates for this task.

SCOPE AND METHODOLOGY

The audit was performed from May through November 2005, at the Department's Savannah River Site in Aiken, South Carolina. The scope of the audit included a review of actual and planned waste loading for sludge waste encapsulated in each canister produced in the DWPF from 1996 through the end of the project, which is currently planned for 2022. To accomplish the audit objective, we:

- Obtained and reviewed documents relating to actual and planned waste loadings for sludge waste encapsulated in each canister produced in the DWPF;

- Reviewed the Department's current contract with Westinghouse to determine whether performance measures were included to increase the amount of actual sludge waste encapsulated in the canisters produced in the DWPF; and

- Interviewed key Savannah River Operations Office and Westinghouse personnel regarding the amount of sludge waste that still requires treatment in the DWPF.

The audit was performed in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Accordingly, we assessed performance measures established under the *Government Performance and Results Act of 1993* and found that the Department established performance measures related to maximizing the amount of sludge waste encapsulated in each canister produced in the DWPF. 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. In performing this audit, we did not rely on computer-processed data to accomplish the audit objective. Therefore, it was not necessary to conduct an assessment of the reliability of this data. The Savannah River Operations Office waived the exit conference.

We appreciate the cooperation of your staff during our review. Because no formal recommendations are being made in this report, a formal response is not required.

Fredrick G. Pieper, Division Director
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cc: Chief of Staff
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