U.S. Department of Energy
Office of Inspector General
Office of Audit Services

Audit Report

Waste Reduction Plans for the Advanced Mixed Waste Treatment Project at the Idaho National Engineering and Environmental Laboratory

DOE/IG-0611

July 2003

Department of Energy

Washington, DC 20585

July 7, 2003

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "Waste Reduction Plans for the Advanced Mixed Waste Treatment Project at the Idaho National Engineering and Environmental Laboratory"

BACKGROUND

Since the early 1970s, the Department of Energy has stored about 65,000 cubic meters of transuranic (TRU) waste and mixed low-level waste at the Idaho National Engineering and Environmental Laboratory (INEEL), near Idaho Falls, Idaho. Most of the waste was generated at the Rocky Flats Plant near Denver, Colorado, and was shipped to the INEEL in drums and boxes. The preponderance of waste is stored on asphalt pads and covered with soil to form earthen-covered berms.

In 1996, the Idaho Operations Office entered into a contract with BNFL Inc., to construct the Advanced Mixed Waste Treatment Facility to characterize, treat, and package INEEL's waste. The waste will eventually be transported to the Waste Isolation Pilot Plant (WIPP), near Carlsbad, New Mexico, for final disposal. One of the primary goals of the BNFL contract was to significantly reduce the volume of waste during the treatment process so as to reduce the overall cost of transportation and disposal. To be specific, the contract required that the waste in its original volume (65,000 cubic meters) be reduced after treatment to about 22,750 cubic meters, or no more than 35 percent of the original volume. BNFL is to be penalized monetarily if the volume of post-treated waste does not meet this performance objective. The current contract value for this effort is $912 million.

The objective of this audit was to determine whether BNFL will achieve the Department's volume reduction goal.

RESULTS OF AUDIT

Based on current plans, the volume of Idaho's waste to be shipped to WIPP will only decrease by about six percent. Initially, BNFL is to employ a variety of sorting, repackaging, and compacting techniques to reduce the 65,000 cubic meters by more than half. However, the treated waste will then be placed in "over-pack" disposal

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containers, which will increase the volume to about 61,000 cubic meters. Thus, the overall volume reduction will be minimal, certainly far less than the Department's goal.

The Idaho Operations Office's planning and oversight for the waste reduction project, in our judgment, was inadequate. For example, Idaho officials were unaware that the amount of waste to be shipped had increased to 61,000 cubic meters until November 2002. This was nearly three years after decisions regarding the use of over-pack containers had been made. Additionally, the contract with BNFL was unclear as to exactly how waste reduction would be measured, and reduction goals and plans were not modified to reflect changing assumptions. As a result, absent a major change in program direction, WIPP will receive substantially more waste than originally planned, causing the Department to spend $205 million more than expected to dispose of Idaho's waste.

We recommended that the Assistant Secretary for Environmental Management develop a contingency plan reflecting the greater-than-anticipated volume of waste to be shipped to WIPP. We also recommended that the Manager, Idaho Operations Office seek to clarify the waste reduction goals and measures contained in the BNFL contract.

MANAGEMENT REACTION

Environmental Management agreed with the finding and recommendations and indicated that it had previously identified all of the issues in past reviews. Management's verbatim response is included as Appendix 3.

Attachment

cc: Deputy Secretary
Under Secretary for Energy, Science and Environment
Assistant Secretary for Environmental Management
Manager, Idaho Operations Office

WASTE REDUCTION PLANS FOR THE ADVANCED MIXED WASTE TREATMENT PROJECT AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

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WASTE REDUCTION GOAL

Waste Reduction Plans

Based on current plans, BNFL will not meet the Department of Energy's (Department) goal of reducing waste volume by 65 percent using the Advanced Mixed Waste Treatment Facility (AMWTF). Specifically, based on BNFL's most recent plan, INEEL would ship 61,000 cubic meters to WIPP for disposal, a reduction of only six percent.

The Department issued a Record of Decision for the AMWTF in 1999. At that time, the preferred alternative for treating the 65,000 cubic meters included repackaging, incineration, supercompaction, and encapsulation. By incinerating approximately 14,300 cubic meters and supercompacting approximately 48,000 cubic meters, BNFL estimated it could reduce the original waste volume by 65 percent, to 22,750 cubic meters, after encapsulation and before containerization. Containerization was estimated to increase the overall volume to about 30,000 cubic meters. Shortly after the Record of Decision was signed, a legal suit challenged the Department's plan to operate the incinerator. The Department chose to settle the lawsuit by eliminating the incinerator as a treatment option. Although this meant that 14,300 cubic meters would no longer be incinerated, other process improvements implemented at about the same time were largely offsetting, and significant waste reduction was still feasible.

A secondary effect of the decision not to incinerate any of the waste, however, was that INEEL's waste would need to be transported and disposed of using over-pack containers. Use of the over-packs is related to the Department's 1995 decision to "blend-up" INEEL's mixed low-level waste – which, at that time was "orphan" waste with no defined disposal path – with transuranic (TRU) waste in a single shipping container. As originally conceived, the blend-up involved incinerated mixed low-level waste constituents, and over-packs were not necessary. Without incineration, however, the mixed low-level components of the waste must be transported and disposed of in the over-packs to meet WIPP waste acceptance criteria. INEEL's 65,000 cubic meters of waste includes 39,500 cubic meters of TRU waste and 25,400 cubic meters of mixed low-level waste.

Currently, BNFL estimates that sorting, repackaging, and compacting will reduce INEEL's waste volume from 65,000 to 30,560 cubic meters, or 53 percent, before the waste is containerized for shipment to WIPP. However, once the waste is placed in the over-packs, BNFL estimates that the volume will increase from 30,560 to 61,000 cubic meters.

In September 2001, we reported[1] that Idaho's blend-up strategy would needlessly add to the WIPP facility and cost the Department about $119 million more than other alternative strategies, such as disposing of the mixed low-level waste at the Hanford site near Richland, Washington. We recommended that the Department not blend-up the waste and, instead, dispose of the mixed low-level waste at Hanford. The Department did not concur with our finding and recommendation, indicating that our cost savings estimate was overstated. It should be noted, however, that our estimate at the time was based on Department data showing that the volume of mixed low-level waste would be reduced by 65 percent. As our current audit has shown, that degree of volume reduction will not occur. Therefore, our 2001 savings estimate may have been significantly understated.

Department Oversight

We found that the Idaho Operations Office's planning and oversight for the waste reduction project was inadequate. For example, Department officials were unaware that BNFL planned to ship 61,000 cubic meters of waste to WIPP until November 2002, nearly three years after the lawsuit was settled and the decision to use over-packs was made. Prior to November 2002, Idaho believed that BNFL planned to ship 30,560 cubic meters to WIPP, as shown in BNFL's process flow chart. Earlier involvement by Idaho could have led to a re-examination of waste reduction alternatives and costs.

Further, although volume reduction is a critical part of the BNFL contract, Idaho did not ensure that BNFL's contract terms were clear as to how the reduction should be measured. The contract states that the price paid for treatment of the 65,000 cubic meters will be reduced by one percent for every percentage point by which the actual volume reduction is less than the 65 percent volume reduction requirement, and an additional one percent for each percentage point by which the actual volume reduction is less than 50 percent. The contract does not state whether the volume reduction should be measured before or after the waste is packaged for shipment. According to BNFL and Idaho management, waste reduction should be measured after the initial sorting, repackaging, and compaction, but before packaging for shipment to WIPP. Based on our audit, we concluded that such an interpretation conflicts with the intent and purpose of the AMWTF contract and the Department's waste reduction goals. Moreover, it negates the benefits derived from repackaging and compaction, and provides no incentive for

[1] DOE/IG-0527, *Idaho Operations Office Mixed Low-Level Waste Disposal Plans*, September 2001.

BNFL to minimize the volume of waste actually shipped to WIPP. In our judgment, this lack of clarity makes holding the contractor accountable for performance nearly impossible.

Other aspects of Idaho's contract administration were also of concern. For example, Idaho modified BNFL's waste reduction clause in January 2000; however, the modification did not clarify the measurement process. The modification stated that the intent of the volume reduction requirement was to reduce the cost of transportation and disposal to the Government; however, an "escape" clause allows that no penalty will be assessed if the contractor can demonstrate that failure to meet the reduction will cause no harm to the Government. The purpose of this clause is not clear and it appears to further dilute the contractor's accountability for waste reduction.

We also noted that Idaho had not modified the contract to reflect current assumptions. For example, no modifications were made based on the elimination of the option to incinerate waste or the requirement that all the waste be encapsulated. In September 2002, BNFL formally requested such changes and that the 65 percent reduction requirement apply to only 45,500 cubic meters of waste, due to the loss of the incinerator option. BNFL's request may represent an opportunity for Idaho to revisit waste reduction alternatives.

Impact

Based on BNFL's current plans, WIPP will receive 61,000 cubic meters of waste from INEEL. However, WIPP's primary planning document, the July 2002 National TRU Waste Management Plan, identifies a total expected volume of 110,000 cubic meters of waste from all sources, including 36,000 cubic meters from the AMWTF project. If, instead, INEEL ships 61,000 cubic meters, WIPP will have to increase its expected contact-handled TRU waste receipts by 25,000 cubic meters. This would increase the total volume of waste to be disposed at WIPP by 23 percent and would almost certainly have profound impacts on the operational capabilities and assumptions at WIPP.

Furthermore, the additional volume could increase disposal costs by as much as $205 million. We made this estimate by multiplying the additional 25,000 cubic meters by the unit disposal cost of $8,177 per meter presented in the July 2002 National TRU Waste Management Plan. Environmental Management disagreed with this cost estimate, suggesting that the actual cost to dispose of 25,000 cubic meters of waste would be $57.5 million. However, we noted that Environmental Management's estimate was not based on the life cycle costs of TRU waste disposal operations. According to the TRU plan, the variable

waste component will fluctuate as different volumes of waste are received over the life cycle of operations. The National TRU Waste Management Plan incorporated this time-phasing of variable costs. Environmental Management's analysis did not. Accordingly, we relied upon the methodology prescribed in the National TRU Waste Management Plan.

RECOMMENDATIONS

We recommend that the Assistant Secretary, Office of Environmental Management:

1. Prepare a contingency plan for disposal that would enable WIPP to dispose of more waste from INEEL than currently planned; and,

2. Re-evaluate the costs and benefits of INEEL's mixed low-level waste blend-up strategy.

We recommend that the Manager, Idaho Operations Office:

3. Take steps to improve direct technical oversight of the BNFL contract; and,

4. Determine whether contract penalties against BNFL are appropriate.

MANAGEMENT REACTION

Management agreed with the findings and recommendations. Management's verbatim comments are included as Appendix 3.

PRIOR AUDIT REPORTS

- *Idaho Operations Office Mixed Low-Level Waste Disposal Plans* (DOE/IG-0527, September 2001), concluded that the Department could save about $119 million by not blending mixed low-level waste with transuranic waste at the INEEL. Specifically, the 65,000 cubic meters of waste at INEEL consists of about 39,500 cubic meters of transuranic waste that Idaho plans to blend with 25,400 cubic meters of mixed low-level waste in order to create a final waste product of transuranic waste. The audit recommended not blending the waste, and instead, disposing of the mixed low-level waste at Hanford.

- *Waste Treatment Plans at the Idaho National Engineering and Environmental Laboratory* (DOE/IG-0440, February 1999), concluded that waiting until the Advanced Mixed Waste Treatment Facility was available to process 3,100 cubic meters of waste would be more economical and reduce the environmental risks to Laboratory employees.

Appendix 2

OBJECTIVE

The objective of this audit was to determine whether BNFL will achieve the Department's volume reduction goal.

SCOPE

The audit was performed from October 31, 2002, to January 15, 2003, at the Idaho Operations Office and BNFL Inc., in Idaho Falls, Idaho. The audit scope was limited to the planned waste volume reduction in BNFL's Advanced Mixed Waste Treatment Facility since the inception of the contract in 1995.

METHODOLOGY

To accomplish the audit objective, we:

- Obtained and reviewed planning documents for the activities under audit, including the Record of Decision for the Advance Mixed Waste Treatment Project;
- Researched Federal and Departmental regulations;
- Reviewed findings from prior audit reports regarding the Advanced Mixed Waste Treatment Project;
- Reviewed the BNFL contract with the Department for the Advanced Mixed Waste Treatment Project (No. DE-AC07-97ID13481);
- Assessed internal controls and performance measures established under the Government Performance and Results Act of 1993; and,
- Interviewed key personnel in the Idaho Operations Office and the Office of Environmental Management.

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. Specifically, we tested controls with respect to the Department's planning process for waste management activities. 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. We did not rely on automated data processing equipment to accomplish our audit objective. We held and exit conference with Department management on June 30, 2003.

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United States Government **Department of Energy**

Memorandum

DATE: June 18, 2003

REPLY TO ATTN OF: EM-3 (Paul Golan, 202-586-0738)

SUBJECT: Draft Audit Report on *Waste Reduction Plans for the Advanced Mixed Waste Treatment Project at the Idaho National Engineering and Environmental Laboratory*

TO: Frederick D. Doggett, Deputy Assistant Inspector General for Audit Services

This is in response to your March 17, 2003, memorandum requesting the Office of Environmental Management (EM) to review and comment on the subject Office of Inspector General (OIG) draft audit report.

EM agrees with the findings of the OIG. EM had previously identified all of the issues in past reviews.

- Recommendation 1: *That the Assistant Secretary for Environmental Management prepare a contingency plan for disposal that would enable WIPP to dispose of more waste from INEEL than currently planned.* Accepted.

- Recommendation 2: *That the Assistant Secretary for Environmental Management re-evaluate the costs and benefits of INEEL's mixed low-level waste blend-up strategy.* Accepted.

- Recommendation 3: *That the Manager, Idaho Operations Office take steps to improve direct technical oversight of BNFL contract.* Accepted.

- Recommendation 4: *That the Manager, Idaho Operations Office determine whether contract penalties against BNFL are appropriate.* Accepted.

Thank you for the opportunity to review your draft report and to have our comments included in your final report. If you have any further questions, please call me at (202) 586-7709, or Mr. Mark W. Frei, Acting Deputy Assistant Secretary, Office of Project Completion, at (202) 586-0370.

Jessie Hill Roberson
Assistant Secretary for
Environmental Management

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