



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

Audit Report

Major Clean-Up Projects at the Idaho
National Engineering and
Environmental Laboratory




Department of Energy
Washington, DC 20585

May 25, 2004

MEMORANDUM FOR THE SECRETARY

FROM:


Gregory H. Friedman
Inspector General

SUBJECT:

INFORMATION: Audit Report on "Major Clean-Up Projects at the Idaho National Engineering and Environmental Laboratory"

BACKGROUND

Over the last 50 years, the Idaho National Engineering and Environmental Laboratory (INEEL) became the temporary storage site for large amounts of the Department of Energy's (Department) spent nuclear fuel, transuranic waste, and high-level waste. In order to appropriately treat, store, and ultimately ship this waste, the Department undertook several major cleanup projects. Among these projects were the Advanced Mixed Waste Treatment Project (AMWTP), the Dry Storage Project for Spent Nuclear Fuel (SNF), and the Three Mile Island Project. Certain expectations for these and other projects were formalized in October 1995.

- The AMWTP involved characterizing, treating, and preparing transuranic waste and mixed low-level waste for disposal. It was anticipated that the associated facility would be operational by March 31, 2003.
- The Dry Storage Project for SNF included construction and operation of a facility to treat and store 45 tons of SNF to support the Department's effort to remove stored fuel from the State of Idaho by 2035. The new facility was expected to be operational by July 1, 2003.
- The Three Mile Island Project was designed to remove spent fuel from an old wet storage facility and place it into 30 horizontal modules for interim storage until the fuel could be shipped to another state. All modules, along with the necessary storage canisters, were to be in place by December 31, 1998.

Given the significance of these projects and their impact on the Department's overall cleanup goals, we conducted this audit to determine whether Idaho achieved its original performance expectations for these major clean-up projects at the INEEL.

RESULTS OF AUDIT

Our audit disclosed that the Department faced significant challenges in completing its major projects in accordance with its original expectations. For example, the audit disclosed that as of its originally scheduled start date of March 31, 2003, the AMWTP facility was unable to characterize, treat, or certify waste; and, full operation is not anticipated until July 2004. We also noted that construction of the dry storage facility for SNF was not anticipated to begin until



well after its scheduled July 1, 2003, completion date – in fact, it is currently estimated to be sometime in 2005 or 2006. The Department also did not meet its original completion goal for the Three Mile Island Project and later reduced the scope of the project to compensate for schedule slippages.

Although events outside of the Department's control contributed to these schedule delays, enhancements to contract and project management practices could improve the way the Department and its contractors react to these events and ultimately the projects' outcomes. Because of the identified delays, the Department will be forced to deal with additional costs and long-term operational impacts to other environmental management projects. We recommended that the Department improve contract oversight and project management controls over key projects. This includes clearly defining project expectations and implementing effective performance accountability.

The Office of Inspector General has issued numerous reports on difficulties encountered by the Department with project management and contract administration. As such, both of these areas have been identified in our *Special Report on Management Challenges at the Department of Energy* (DOE/IG-0626, November 2003), as among the most serious challenges facing the Department of Energy.

MANAGEMENT REACTION

The Assistant Secretary for Environmental Management agreed with the report's conclusions and stated that, in recognition of problems across the complex, the Office of Environmental Management has taken a number of significant steps to improve project management. Additionally, at the Idaho Operations Office, actions have been initiated to improve project rigor and discipline. Management's comments are included in Appendix 3.

Attachment

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

REPORT ON MAJOR CLEAN-UP PROJECTS AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

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COMPLETION OF CLEAN-UP ACTIVITIES

Performance Expectations

The Department of Energy (Department) experienced difficulty in meeting its initial performance expectations for at least three of its major clean-up projects at the Idaho National Engineering and Environmental Laboratory (INEEL). Specifically, these three projects did not complete the initially prescribed scope of work in accordance with their anticipated schedule. These projects included the Advanced Mixed Waste Treatment Project, the Dry Storage Project for Spent Nuclear Fuel, and the Three Mile Island Project.

Advanced Mixed Waste Treatment Project

As of March 31, 2003, the Department had not fully commenced operations of the Advanced Mixed Waste Treatment Project (AMWTP). Central to the project was a newly constructed facility designed to characterize, treat, and certify transuranic mixed waste for disposal at the Department's Waste Isolation Pilot Plant (WIPP). The facility was necessary to permit the removal of transuranic waste from the State of Idaho by 2018. The Idaho Operations Office (Idaho) contracted with BNFL, Inc. (BNFL) in 1996 to complete the project. According to BNFL's contract and the Department's *Accelerating Cleanup: Paths to Closure* plan, the facility was to be operational - capable of retrieving, characterizing, treating, and certifying waste for shipment - by March 31, 2003.

However, at that date, the AMWTP was only able to retrieve the waste from the earthen berms and load pre-certified waste onto trucks at its shipping dock. The facility's processes to characterize, treat, and certify the waste were not operational. Some of the equipment in the characterization line did not function properly and the characterization certification reviews were not performed until August 2003. The treatment capabilities were not expected to be ready for review until July 2004. In commenting on the draft report, management stated that the facility had to be operational before it could be certified to ship waste to WIPP. While we do not dispute that assertion, original expectations were that certifications would occur prior to the expected March 31, 2003, operation date.

Dry Storage Project for Spent Nuclear Fuel

The Department did not successfully commence loading spent fuel into a newly constructed dry storage facility by July 1, 2003. The Dry Storage Project included the construction and operation of a facility to treat and store 45 metric tons of spent nuclear fuel to support the Department's effort to remove the INEEL's stored fuel from the State by 2035. According to the Department's *Accelerating Cleanup: Paths to Closure* plan and other project documents, the Department intended the new facility to be operational by July 1, 2003. As of December 2003, construction on the dry storage facility had not begun. Construction is not to commence until sometime in 2005 or 2006.

Three Mile Island Project

The Department did not achieve its original plans to complete construction of the Three Mile Island dry storage facility by December 31, 1998. The project was designed to remove spent fuel from an old storage facility and place it into 30 horizontal modules for interim storage until the fuel could be removed from the State. The project was to have all 30 storage modules in place, along with the necessary storage canisters, by December 31, 1998. However, as of that date only three modules were on site and only one canister was available.

Further, Idaho removed scope from this project in order to meet a June 1, 2001, schedule goal. Originally, the project included the transfer of spent fuel from the Three Mile Island reactor, the Loss of Fluid Test reactor, and miscellaneous commercial reactors. However, to accomplish loading of the fuel by the scheduled date of June 1, 2001, the Idaho Operations Office removed all but the Three Mile Island fuel from the project's scope of work.

Contract Oversight and Project Management

Each of these projects experienced some delay due to unforeseen circumstances beyond the Department's control. Specifically, during the permitting phase of the AMWTP, a lawsuit from environmental groups delayed construction of the facility. The other projects were affected by protests made by losing bidders and by bankruptcy proceedings of a key subcontractor. Also, in commenting on the report, management pointed out that the clean up environment is always changing which creates challenges in managing Departmental expectations. For example, the AMWTP contract was awarded prior to WIPP beginning operations and

setting firm certification requirements. Despite these unavoidable circumstances, enhancements to contract and project management practices could improve the way the Department and its contractors react to these events and ultimately the project outcomes.

Contract Oversight

In our judgment, more active oversight of contractors could enhance schedule performance. The contracts to construct the AMWTP facility and the dry storage facility were issued as fixed-price privatization contracts. When issued, the Department favored privatization contracts because the contractor would be required to design and construct the facilities with no payment until the facilities were treating or packaging waste. Thus, Idaho was not as involved as it could have been when managing the contracts and enforcing the limited accountability features. For example, the contract and performance management plan required BNFL to make regular cost and schedule variance reports on the treatment project. While management indicated that BNFL continues to provide cost and schedule variance reports to the Department's contracting officer, a recent review by the Office of Environmental Management noted that the contractor stopped providing these reports when the variances began to grow and Idaho did not enforce the provisions requiring report submission. It should be noted that since this review, the Manager at Idaho has taken a number of steps to improve accountability over this project.

Also, incorporating performance accountability features in the contracts, such as penalties for not meeting established milestones, could enhance contractor performance. We noted that the Department's contract with BNFL did not include any penalties if the treatment facility did not become operational by the target date. Also, performance measures were inadequate to ensure that the dry storage facility was operational in time to support the Department's goals. Specifically, the Dry Storage Project contract did not include incentives or penalties tied to the July 1, 2003, milestone to commence loading of spent nuclear fuel. Instead, the original contract included a clause that invoked incentives and penalties tied to completion of the facility by December 31, 2004, or 18 months after the planned date. When it became evident the contractor would not meet this contract deadline, the contract was subsequently modified and the performance date delayed until December 31, 2005.

Regarding the Three Mile Island project, Department officials told us that many of the delays in meeting milestones were caused by inadequate performance by a subcontractor at the INEEL. However, we noted the same omission of accountability features, such as penalties for missed deadlines, with this fixed-price subcontract.

Project Definition

We found that project plans could be improved by more clearly defining expectations, end products, and performance metrics. For the three major projects we reviewed, specific definitions were lacking for many of the planned activities. For example "commencement of operation" was never specifically defined for the AMWTP. In many cases the original goals for the projects that we measured against during our review could only be reconstructed by drawing from a variety of sources. Clearly defined expectations are essential to an effective change control process, which is a key project management tool. Improved project management practices could enhance project outcomes.

Long-Term Effects

By not meeting its original expectations on these projects, the Department prematurely reimbursed the contractor on work performance, will be faced with additional costs, and will experience long-term operational impacts to other environmental management projects.

For the AMWTP, cost reimbursements were made before the contractor demonstrated facility capabilities and the Department's shipping schedule was negatively impacted. Specifically, Idaho transferred 197 cubic meters of pre-certified waste from its management and operating contractor to BNFL for shipment to WIPP. Even though the contractor had not retrieved, characterized, or packaged this waste, Idaho agreed to pay BNFL \$5 million to "process" this waste, \$4.4 million of which was to recover a portion of construction costs. Under the contract, recovery of these capital costs was not to take place until the facility was able to process waste. In commenting to the draft report, management stated that this had no effect on the life-cycle cost of the project – a fact with which we agree. In our opinion, however, prematurely reimbursing the contractor reduces the principal incentive for BNFL to begin full operations – that is, the contract is designed to not pay BNFL until the AMWTP is fully operational. Further, the Department's national transuranic waste shipping schedule was negatively affected. Because the AMWTP

facility was not fully operational, the repository's schedule of planned shipments from the INEEL was decreased by over 800 shipments. To its credit, the Department was able to minimize this loss by increasing shipments from other sites, such as Savannah River, Rocky Flats, and Hanford. However, about 590 planned shipments were not replaced. At the time of our review, the Department had incurred over \$1.8 million in stopped work costs for its transportation contractor because of this shortfall.

Because the Dry Storage Project is now projected to begin operations more than two years after originally expected, the Department will not have this facility available as early as planned to store fuels emptied from the spent fuel pools. Based on data contained in the justification for this project, the Department may be foregoing a potential cost savings of as much as \$47 million due to this two year delay. This potential savings is based on the Department's estimate that operating the spent fuel pools and other aging spent fuel facilities costs over \$23 million per year. In responding to our draft report, management stated that the estimated savings was not factual since operation of the Dry Storage Project is not necessary to empty the aging spent fuel pools and some pools have already been emptied. However, even though some have been emptied, the largest pool has yet to be emptied, and according to existing plans, the Dry Storage Project is necessary to complete the Department's goal of emptying all of the pools.

By not meeting the original objectives for the Three Mile Island project, a significant amount of work was postponed to future years. For instance, the Loss of Fluid Test Reactor spent fuel and other commercial spent fuel transfers still have not occurred. In addition, the operating costs for the Three Mile Island project increased by approximately \$6 million causing the Idaho Operations Office to shift work scope and reduce funding from other projects on Idaho's Environmental Management Integrated Priorities List.

RECOMMENDATIONS

To improve contract oversight and project management and to minimize remaining project costs, we recommend that the Manager, Idaho Operations Office, ensure that:

1. Contracts include performance accountability features, including meaningful penalties where appropriate, to accomplish the Department's project requirements;
2. Contract performance requirements are monitored and enforced in a timely manner;
3. Detailed project plans are prepared that clearly define the scope of work necessary to meet major project milestones, and the contract's scope of work is clearly tied to the major project activities; and,
4. The formal change control processes over project plans and contractor requirements include all changes in work scope, detailing how these changes affect meeting project milestones.

MANAGEMENT REACTION

The Assistant Secretary for Environmental Management (EM) concurred with the recommendations and stated that the Department is taking corrective actions to improve project management. These actions include incorporating accountability features into contracts, aligning initiatives to life-cycle baselines, and improving management over contractors' activities. The Assistant Secretary also indicated that one of the major goals of her office was to improve project management for all projects. Additionally, at the Idaho Operations Office, actions have been initiated to improve project rigor and discipline, and to align with EM initiatives that apply DOE Manual 413.3 project management principles to life-cycle baselines. Other management comments unrelated to the recommendations have been addressed within the report, as appropriate. Management's written comments can be found in Appendix 3 of this report.

AUDITOR COMMENTS

We consider management's comments and planned corrective actions to be responsive to the report's recommendations.

Appendix 1

OBJECTIVE

To determine whether the Idaho Operations Office achieved its original performance expectations for major clean-up projects at the Idaho National Engineering and Environmental Laboratory.

SCOPE

The audit was performed from July 2, 2003, to December 12, 2003, at the Idaho Operations Office and the INEEL, near Idaho Falls, Idaho. The audit reviewed selected projects that were related to the Idaho Settlement Agreement milestones from its inception in October 1995 through December 2003.

METHODOLOGY

To accomplish the audit objective, we:

- Obtained and reviewed planning documents for the activities audited;
- Researched Federal and Departmental regulations;
- Reviewed findings from prior audit reports regarding the Settlement Agreement and project management;
- Reviewed the BNFL contract with the Department for the design, construction, and operation of the Advanced Mixed Waste Treatment Project;
- Reviewed the Foster Wheeler contract with the Department for the design, construction, and operation of the Spent Nuclear Fuel Dry Storage Project;
- Reviewed project data from the Three Mile Island Line-Item Construction Project;
- 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.

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 computer-generated data to accomplish our audit objective. We held an exit conference with the Deputy Manager of the Idaho Operations Office on April 22, 2004.

PRIOR AUDIT REPORTS

- *Remote Treatment Facility* (DOE/IG-0573, November 2002), concluded that the conceptual design and schedule for building the facility did not provide the capability to treat all the remote handled solid waste at the INEEL. Since all mission needs were not incorporated into planning the facility, the Department may need to build a second treatment facility and could be vulnerable to fines and enforcement actions.
- *Idaho Settlement Agreement Activities* (DOE/IG-0571, October 2002), concluded that the transfer of Three Mile Island spent nuclear fuel to dry storage exceeded cost expectations by as much as \$18 million and that the shipment of 3,100 cubic meters of transuranic waste out of Idaho potentially could exceed cost expectations by as much as \$150 million. In addition to events outside the Department's control, project management control weaknesses contributed to cost overruns.
- *Remediation and Closure of the Ashtabula Environmental Management Project* (DOE/IG-0541, January 2002), concluded that clean-up efforts on the RMI Extrusion Plant and surrounding grounds would not be completed until nine years after the scheduled completion date and project costs could increase by \$60 million. In managing this project, the Department did not hold the contractor accountable for progress or require compliance with the contract. In addition, the contractor did not follow its decommissioning plan.

Memorandum

DATE: April 16, 2004

REPLY TO
ATTN OF: EM-3.2 (Kluk, 301-903-3744)

SUBJECT: Response to Report on "Major Clean-up Projects at the Idaho National Engineering and Environmental Laboratory" (A03IF038)

TO: Rickey R. Hass, IG-30

We have reviewed the subject report transmitted to me by your memorandum of March 11, 2004. The report identifies suggested improvements for managing cleanup projects at the Idaho National Engineering and Environmental Laboratory (INEEL) including the Advanced Mixed Waste Treatment Facility, the Dry Spent Fuel Storage Project, and the Three Mile Island Project. The report also recommends using enhanced contract and project management practices.

In general we agree with the reports conclusion; however, recently I have taken a number of significant steps to improve project management in the EM program across the complex. First, I have aligned the three critical performance elements: contract, budget, and project management. Second, our projects have been redefined to correlate with the accelerated completion schedule and budget structure in the Project Baseline Summaries. Third, project management principles outlined in the DOE Manual 413.3-1 are being applied to life-cycle baselines. In fact, one of the major goals of my office is to improve project management processes for all EM projects.

A key aspect of the Department's accelerated cleanup strategy is the application of the Department's project management principles and practices to our Project Baseline Summaries. Project management principles being applied to EM projects, with oversight from the Office of Management, Budget, and Evaluation (OMBE), include development of detailed life cycle baselines; risk assessment and mitigation strategies; independent reviews using outside OMBE experts; an earned value management system consistent with industry standards; performance metrics linked to the baseline; quarterly executive level performance reviews; and cost and schedule performance tracking in the Department's Project Assessment and Reporting System. My staff is now organized to better align with key performance activities and conducts internal baseline and performance assessment reviews periodically during the life of EM projects. Also a configuration control board is established to manage and control project changes.

We are also making a concerted effort to enhance our procurement and contract oversight functions by implementing improved scope definition and cost estimation and establishing risk-based end states, life cycle funding profiles, fixed price contracts where applicable, and


Appendix 3

performance based incentives. I have also established the Contract Management Advisory Council to review procurement activities, and we are in the process of awarding a new performance based contract for the Idaho Completion Project.

At the Idaho Operations Office, actions have been initiated to improve project management rigor and discipline, and to align with EM initiatives that apply DOE Manual 413.3 project management principles to life-cycle baselines. For example, the current management and operating contractor has in place tiered Project Execution Plans (PEPs) that cover the INEEL cleanup program, including facility area projects and key sub-projects. These PEPs are supported by detailed schedules and critical activity paths, are resource loaded and costed, and meet Critical Decision-2 standards (per DOE Order 413.3). They are scheduled for external review and approval during May 2004. In addition, the Idaho Operations Office is developing a baseline that identifies federal actions required to support the contractors' activities. Finally, the recently issued Request for Proposals for the new Idaho Completion Project includes a provision that the winning contractor develop a life cycle baseline within six months, which details the project scope, cost, and schedule through 2012.

We note many of our comments on the draft report submitted on February 9, 2004 were incorporated in the current draft. We have attached additional specific comments we believe are important to the factual accuracy of the report and recommend they be incorporated.

I believe the above actions address many of the issues raised in your report. Should you have my questions or comments, please call Patty Bubar, Deputy Assistant Secretary for ISM/Operations Oversight, at (202) 586-5151.


Jessie Hill Roberson
Assistant Secretary for
Environmental Management

Attachment

cc: Elizabeth Sellers, Manager, Idaho Operations Office (ID)

Appendix 3

Comments on Inspector General Report (A031F038) Submitted March 11, 2004

Page 1. Advanced Mixed Waste Treatment Project.

While it is true that commencement of AMWTP operations did not occur as originally envisioned, we believe there were extenuating circumstances that were critical to the delay. To improve the factual accuracy of the report, it should acknowledge that the Waste Isolation Pilot Plant (WIPP) certification was needed in order to ship waste to WIPP. The AMWTP had to pass a program evaluation conducted by Carlsbad Field Office, followed by a certification audit, which required that data packages be generated, reviewed, and approved by the auditors. These activities could only occur after the facility was "operational." Hence, shipping to WIPP had to occur after the facility was certified as "operational".

Page 2. Contract Oversight.

In the first paragraph, the statement is made that "BNFL stopped providing these [cost and schedule variance] reports when the variances began to grow, and Idaho did not enforce the provisions requiring these reports to be submitted." Actually, the contractor continues to provide monthly Cost Management Reports, which include cost and schedule variances, to the DOE contracting officer.

Page 3. Long Term Effects.

The discussion of 197 cubic meters of waste is irrelevant to the issue of long-term impacts because this waste was part of the BNFL contract and had to be processed whether in 2003 or later. Early processing had no effect on the lifecycle cost of the project.

Page 4. Paragraph on Dry Storage Project cost savings.

The paragraph is not factual because operation of the Dry Storage Project is not necessary to empty aging spent fuel pools. Spent fuel pools at Test Area North, Materials Test Reactor, Power Burst Facility, and Idaho Nuclear Technology Engineering Center have been emptied a decade ahead of plans made previously. Thus we are in the process of reducing the cost of maintaining the multiple spent fuel pools without the availability of the Dry Storage Project.

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