U.S. Department of Energy
Office of Inspector General
Office of Audits and Inspections

Audit Report

The Department of Energy's K Basins Sludge Treatment Project at the Hanford Site

DOE/IG-0848 February 2011

Department of Energy
Washington, DC 20585

February 17, 2011

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "The Department of Energy's K Basins Sludge Treatment Project at the Hanford Site"

BACKGROUND

In 1999, the Department of Energy's Richland Operations Office (Richland), the U.S. Environmental Protection Agency, and Washington State Department of Ecology signed an agreement for the remediation of two spent nuclear fuel storage basins located in the 100 K-Area of the Hanford Site. This agreement required the Department to retrieve and package for disposal over 2,100 metric tons of spent nuclear fuel and to remove the estimated 28.5 cubic meters of radioactive sludge and place it in interim storage pending future treatment. After the fuel was removed in 2004, the agreement was amended to treat the sludge prior to interim storage and ship it to a national repository for disposal. The sludge is classified as remote-handled transuranic waste and will need to be packaged in a configuration that will meet the acceptance criteria for the Department's Waste Isolation Pilot Plant (WIPP).

The Department's former prime contractor for the K Basins Sludge Treatment Project, Fluor Hanford, Inc. (Fluor), projected that the total lifecycle cost to treat and package the sludge in the basins would be approximately $104 million. In November 2004, Fluor subcontracted with British Nuclear Group America (BNGA), to design and fabricate a modular system known as the Contractor's Stabilization and Packaging System (CSAPS). This system was to retrieve, oxidize, and assay the sludge and then grout it in 55-gallon drums.

In September 2005, the Office of Inspector General issued a report on *Sludge Removal Operations at the Hanford Site's K Basins* (DOE/IG-0698), which determined that sludge removal operations had slipped in schedule and experienced significant cost overruns. This audit is a follow-up to our prior review; we sought, as well, to evaluate the Department's management of the sludge treatment phase of the Spent Nuclear Fuel project.

RESULTS OF AUDIT

Our review disclosed that the sludge treatment phase of the Spent Nuclear Fuel project had not been effectively managed. Specifically, Fluor and its subcontractor failed to apply key project management principles as the project progressed. The Department's administration of the

Fluor contract was also ineffective in ensuring that the project was adequately managed. Ultimately, due in large part to these issues, the CSAPS project was abandoned after 3 years of effort and the expenditure of about $43 million for the CSAPS module. We found that:

- Richland had not required an alternative analysis of potential solutions to determine which would best meet mission goals and mitigate related risk, including cost, schedule, environmental, safety, or health concerns. Notably, Richland and contractor officials selected a technology for the project – a key component of the CSAPS which was the Mobile Solidification System (MOSS), a system previously used in Europe to process low-activity waste – without performing a feasibility study or conducting timely bench or demonstration scale tests to determine whether the system could safely contain radiation;

- Richland permitted contractors to proceed with design, long-lead procurements, and construction of MOSS before approving the preliminary safety and hazard analyses and despite specific concerns raised by the Defense Nuclear Facilities Safety Board. Even after internal management concerns surfaced related to the failure to complete the safety analyses, Richland ultimately permitted the subcontractor to continue long-lead acquisitions; and,

- After completion and during acceptance testing of the MOSS module, Richland determined that the system had, in fact, been designed without important safety features necessary to protect workers from radiation contamination. Because of the significance of the safety issues and the high cost associated with resolving the design deficiencies, Richland directed Fluor to abandon the CSAPS.

We found that Fluor paid a $1 million fee to BNGA that was not tied to any performance objectives but appeared to be for contract closeout. Fluor took this action without authorization. Richland management asserted that it had been unaware that this fee had been paid, until we brought the matter to its attention. Federal officials told us, as well, that the Richland Contracting Officer's approval had not been obtained, as required by the Federal Acquisition Regulations. After we informed Department officials of the payment, they told us that they had preliminarily determined that the payment amounted to a "constructive termination fee" and were evaluating it to determine allowability. Since the costs were not approved, as required, we question the allowability of the entire $1 million payment.

The Department did not properly mitigate project risk in the selection of a treatment technology. Ultimately, when the CSAPS was abandoned, Richland had already permitted the procurement and fabrication of equipment that could not, as a direct result, be used for its intended purpose. As a consequence, the Department spent $43 million for the engineering and procurement of the CSAPS modules for which it received no useful mission performance; funds that could have been put to better use. While we could not establish a direct cause and effect relationship with the CSAPS failures, we also noted that the estimated costs are expected to significantly increase due to the need to remove the K Basins sludge to comply with regulatory milestones. Fluor estimated that it would cost approximately $104 million to retrieve, process, package and ship all of the sludge to WIPP. The Department's new contractor, CH2M Hill Plateau Remediation

Company, estimates that it will cost nearly $175 million to move the sludge from the K Basins to another facility. This does not include the cost to store the sludge at the interim facility, nor to treat and package the sludge for disposal.

It is important to note that we have not examined in detail this latest K Basins cost estimate. We also recognize that this project addresses a complicated, one-of-a-kind waste form with uniquely challenging nuclear chemistry, and that managing a project of this magnitude and complexity, as is the case with many environmental management efforts at Department facilities, is no easy matter. Yet, in our judgment, had existing project management principles been employed by the contractors involved and if the Department's contract administration had been more robust, the problems noted may have been avoided. Nonetheless, given the Department's extensive environmental remediation portfolio, the project and its outcome provide valuable lessons for the future. In that context, we made several recommendations designed to help prevent similar contract management issues in future projects.

MANAGEMENT REACTION

The Office of Environmental Management (EM) generally concurred with the report's recommendations. Management expressed concern that the report does not clearly define the timeframe of the audit as the period of 2004 through 2007, and does not discuss improvements in project performance since 2007. Management's comments, included as Appendix 3, outlined a number of these improvement initiatives, some of which were taken in response to our 2005 report on the K Basins Project. EM asserted that corrective actions have been initiated to address each major area that was addressed in the recommendations. Specifically, they told us that actions are underway to: improve project management practices; improve compliance with Quality Assurance requirements; and, strengthen the role of the Federal Project Director, as well as other improvements. EM considers these management reforms complete.

Management's reactions to our recommendations are responsive to the finding. In response to management's comments, we modified Appendix 1 to clarify the timeframe of the activities under audit. Also, we acknowledge the many process improvement initiatives EM has underway that are designed to improve project management. These reforms, once fully implemented, should increase the likelihood of successful project execution. Since the time of our audit, the Department changed its strategy for sludge remediation; however, the revised project was in the preliminary design phase and thus was not mature enough for us to evaluate.

Attachment

cc: Deputy Secretary
Acting Under Secretary of Energy
Chief of Staff
Assistant Secretary for Environmental Management

REPORT ON THE DEPARTMENT OF ENERGY'S K BASINS SLUDGE TREATMENT PROJECT AT THE HANFORD SITE

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K Basins Sludge Treatment Project

The Department of Energy (Department) did not effectively manage the K Basins Sludge Treatment Project. The Department's contract was designed to place project and mission performance expectations on the contractor to treat and package the sludge in a configuration that would meet the acceptance criteria for the Department's Waste Isolation Pilot Plant (WIPP). However, the Department allowed its contractor to design and fabricate the Contractor Stabilization and Packaging System (CSAPS) without first verifying the adequacy of the equipment's performance for the intended application. Ultimately, the Department was forced to abandon the CSAPS after spending approximately $43 million and three years of development efforts.

Project History

In November 2004, the Department's prime contractor for the K Basins Sludge Treatment Project, Fluor Hanford, Inc. (Fluor), issued a cost reimbursable contract to British Nuclear Group America (BNGA). This subcontract required BNGA to provide a system that could deliver 55 gallon drums of grouted, remote-handled transuranic waste that met the Department's WIPP acceptance criteria by January 2007. Under the terms of its contract, BNGA was to design and fabricate a sludge treatment and packaging system utilizing existing commercial technology to retrieve, oxidize, and assay the K Basins sludge. Fluor asserted to the Richland Operations Office (Richland) that its subcontract with BNGA "…imposed the full liability on BNGA to construct and operate a technically viable sludge treatment system." Specifically, BNGA's profit (fee) was directly associated with milestones related to the delivery of treated and packaged sludge to the Department.

Instead of using one of the five mature technologies outlined in a Pacific Northwest National Laboratory (PNNL) Study that evaluated treatment alternatives for the sludge, BNGA instead chose to construct a module system that would heat the sludge under high temperature and pressure, thus oxidizing the uranium – a process that would permit shipment and disposal. The oxidized sludge would then be assayed and measured prior to packaging utilizing the Mobile Solidification System (MOSS) module. The MOSS was a modified low-activity radioactive waste grouting and packaging process patterned after a system that had been previously utilized in Sweden to remediate low-activity waste. BNGA intended to apply MOSS to a much more radioactive remote-handled transuranic waste environment at Hanford than it had been used for before. Both Richland and Fluor management concluded, based on the evaluation of BNGA's proposal, that the selected

treatment process could be successfully applied to the K Basins sludge. Subsequently, Richland approved Fluor's contract with BNGA and a request to begin certain procurements.

To meet the project schedule, Fluor requested and Richland granted "long-lead" procurement authority when the subcontract was awarded to BNGA. That is, since the treatment system was composed of complex treatment equipment that required a long time to procure and manufacture, Fluor believed the project had to begin the acquisition process before the design process had been completed. Accordingly, in November 2004, Fluor requested permission from the Department to procure these "long-lead" items. Thirteen days later, in a letter to Fluor, Richland management approved this request without first determining the impact of this action. Specifically, Richland approved the early procurement of equipment before the approval of the Preliminary Documented Safety Analysis, a process designed to ensure the safety of the Department's nuclear facilities. According to the approval letter, the Department stated that long-lead procurements were approved provided Fluor accepts "project risk." This approval of long-lead items essentially permitted BNGA to procure the entire treatment system, not just a few items. Richland officials later told us that the meaning they attached to "project risk" was that Fluor's fee would be at risk should the process prove to be ineffective.

It is important to note that the *Nuclear Safety Management Safety Basis Requirements* (10 CFR 830 Subpart B) allows the Department to authorize the contractor to perform *limited* procurements without the approval of a safety analysis, if the Department determines that the activities are not detrimental to public health and safety, and are in the best interest of the Department. However, Richland's 2004 authorization to Fluor did not limit the procurement authority, but instead allowed them to move forward with all procurements. Furthermore, Richland had not documented any determination it had made that concluded that this authorization would not be detrimental to public health and safety.

Within the first year after BNGA was awarded the contract, the Defense Nuclear Facilities Safety Board (DNFSB) identified issues with the flow down of requirements and defined work scope in the BNGA contract. Specifically, Fluor's contract with BNGA was to deliver packaged and treated sludge to the Department. However, the contract did not specify how to achieve this, nor did it flow down important requirements, including project management and

nuclear safety regulation. In August 2005, the DNFSB also raised concerns to the Department about the appropriateness of conducting design reviews before the preliminary documented safety analysis and associated hazard analysis had been completed.

In late November 2005, BNGA commissioned an independent review panel to identify areas of concern for the project to address. The panel voiced a concern about the chemistry of the sludge and the use of high temperature and pressure to oxidize the uranium in the corrosion vessel given that such a process had not been demonstrated on a small scale. Thus the panel recommended bench scale testing. Subsequently, BNGA coordinated with the PNNL to study the physical properties of the sludge under these conditions. A bench scale test performed by PNNL found that the hydrothermal treatment did adversely affect the chemical and physical properties of the sludge. PNNL formally reported these findings in March 2007, but by that time the MOSS had already been constructed.

Project Termination

The CSAPS was ultimately deemed to be ineffective, and as such, was abandoned by the Department. By April 2007, the MOSS had been fabricated and was ready for Fluor to begin acceptance testing to determine whether the system would operate as intended. During the testing, it was determined that the MOSS could not confine radioactive materials during normal operations and that it would expose workers to unnecessary safety risk. Thus, in September 2007, after performing an assessment to determine the maturity of the CSAPS, Richland abandoned the system. Specifically, Richland determined:

- The corrosion vessel, a module for oxidizing the sludge, was designed to operate under high temperatures and high pressure. However, in the event of an accident, there could be unacceptable radiation containment risk, with potential significant exposure risk to the public;

- The MOSS could not confine radioactive materials during normal operations and would expose workers to unnecessary risk; and,

- It would be cost prohibitive to make the necessary modifications to the BNGA sludge treatment system for use in its intended purpose.

Management Oversight

The unsuccessful attempt to dispose of the K Basins sludge was due to inadequate management oversight of the project by the Department. Because of its focus on meeting schedule, Richland did not ensure that contractors followed best business practices that would have mitigated project risk and helped ensure that substantial cost and time were not wasted in constructing an unacceptable nuclear facility. Project management, quality assurance, and contract management weaknesses directly contributed to the failed design and fabrication efforts.

Project Management

Richland did not apply the Department's project management order (DOE Order 413.3) that would have required Fluor to implement key project management principles and best practices designed to mitigate project risk. Effective risk management relies on the owner of the project, the Department, to identify the risk in executing the project and then decide to either accept the risk or terminate the project due to unacceptable risk. Project management principles call for a risk management analysis to first identify the problem to be resolved and then select the best solution. In a 2005 report, the National Research Council (Council) also identified similar issues related to the Department's problems with adhering to project management principles. Specifically, according to the Council's report, even though contractors play major roles in identifying, analyzing, mitigating, and controlling project risks, project risk management is a function of the Department and should not be fully delegated to the contractor.

However, Richland never ensured that a number of key project management steps were implemented in the early stages of the project to mitigate project risk. Specifically,

- An alternative analysis of potential solutions for packaging the radioactive waste, a key process of CSAPS, was not performed. This would have enabled Richland to evaluate various potential solutions to determine which solution would best meet mission goals and mitigate related risk, including cost, schedule, environmental, safety, and health risks. Instead, Richland settled solely on a commercially available European system that, unlike the intended use of the MOSS, had only previously been used to grout and package low-activity waste.

- When Richland selected the European system for its waste packaging solution, the MOSS, it did not perform a feasibility study to determine if its use on the CSAPS was viable. The European waste packaging system was being used to treat low-activity waste. A feasibility study of that system would have afforded Richland the opportunity to determine if its application at the Hanford Site for packaging radioactive remote-handled transuranic sludge was practical and would also have identified potential performance issues. Nonetheless, Richland selected the commercially available system and moved forward with procurements to modify the system for CSAPS without first determining that it was a viable solution and the best alternative.

- Timely bench scale testing was not performed to prove the viability of the CSAPS before procuring equipment to support the mission. According to BNGA's January 2006 internal study of the CSAPS, it stated that "in the chemical industry, it would be extremely unusual to design and build a full-scale reaction vessel, without having first carried out the reaction on the small-scale." Eleven months later, PNNL was contracted to conduct bench scale testing to determine how the sludge would react in the corrosion vessel. In March 2007, PNNL issued a report that stated there were significant adverse changes in the chemical and physical properties of the sludge. However, by that time, Richland had already procured and fabricated equipment for the MOSS; and 6 months later the CSAPS project was abandoned.

Quality Assurance

Richland did not ensure that Fluor adhered to policies and procedures that reduced safety risk and ensure that equipment met technical specifications. Furthermore, its Quality Assurance Plan did not contain these requirements. When the MOSS was fabricated, it lacked important safety controls in its design to protect workers from possible radiation contamination. Notably, during the design of the MOSS, in August 2005, the DNFSB expressed concern that the design reviews of the MOSS were advancing even though the preliminary safety analysis and associated hazard analysis had not been completed. The purposes of those analyses are to identify the safety controls in design.

Richland also permitted Fluor to procure equipment for the K Basins Sludge Treatment Project without first determining whether the safety performance of the equipment was technically feasible or in the best interest to the Department. The *Nuclear Safety Management Safety Basis Requirements* (10 CFR 830 Subpart B) calls for contractors to perform a safety analysis to ensure the safe design of a nuclear facility, to include its equipment and operations. These regulations require that the contractors thoroughly document their understanding of the nuclear facility, the work to be performed, the associated hazards, and the needed hazard controls. Once these controls are established and approved by the Department, the contractor may begin the procurement and fabrication of the equipment. This process not only helps ensure the safety of nuclear facilities, but also ensures that substantial cost and time are not wasted in constructing a nuclear facility that will not be acceptable to the Department.

Despite the *Nuclear Safety Management Safety Basis Requirements* and Departmental guidance (DOE G 421.1-2), we could not determine if Richland adequately assessed the risk of allowing Fluor to move forward with procurements in advance of an approved safety analysis. Richland acknowledged that it had not documented its rationale for this authorization. Richland officials told us that it was in the best interest of the Department to authorize the early procurement of the CSAPS, since the project schedule was very aggressive. In order to meet regulatory milestones, Fluor was to deliver to the Department 50 drums of WIPP certifiable waste by March 2006. To meet this milestone, Fluor requested permission from the Department to procure "long lead" items prior to the approval of a safety analysis. The Department's blanket approval for procuring long-lead items essentially permitted Fluor to procure the entire treatment system, not just a few items. By permitting the contractors to begin the procurement process prior to completion of the safety analysis, Richland was unable to ensure that the needed safety features were designed into the waste processing equipment.

In March 2006, Richland recognized the problem of procuring the equipment prior to approval of a safety analysis, and rescinded Fluor's authority to procure the equipment. A Department review team appointed to review the project determined that Fluor's request and Richland's approval for early procurement were not consistent with the nuclear safety rule. Additionally, the review team's report concluded there was no documented justification for the early procurement of the sludge packaging system. Nonetheless, despite the review team's findings, in May 2006,

Richland granted Fluor authority to resume procurement of the MOSS, even though it had not documented its rationale for concluding that the authorization was consistent with the *Nuclear Safety Management Safety Basis Requirements* or Departmental guidance.

Contract Management

Richland did not adequately manage the contract for the K Basins Sludge Treatment Project. Richland approved Fluor's contract strategy to subcontract the entire sludge treatment phase to a subcontractor without requiring adequate oversight from either Fluor or Richland. Fluor's subcontract with BNGA required BNGA to deliver 50 fifty-five gallon drums of waste by March 2006, and complete all sludge treatment activities by January 2007. Although Fluor asserted that the full liability for constructing and operating the sludge treatment system rested with BNGA, once it was clear that BNGA would be unable to deliver a viable system, Richland did not take sufficient contractual action appropriate to the circumstances. Specifically, had Richland partially terminated Fluor's contract work scope related to the K Basins Sludge Treatment Project, Fluor would have been required to either return or sell the equipment and thus reduce the cost of the contract. Since the Department had spent approximately $5 million on the MOSS module, the MOSS had commercial value that may have resulted in a significant credit to the Department. In fact, BNGA's parent company expressed interest in the equipment. However, instead of partially terminating Fluor's contract, Richland abandoned the CSAPS and Fluor required BNGA to deliver the associated equipment to the Department, where it remains unused.

In addition, Fluor subsequently closed the BNGA contract and negotiated a $1 million payment to BNGA, even though BNGA's equipment did not meet contract specifications, terms, and conditions. Specifically, Fluor's $1 million payment was a settlement that should have required Richland's contracting officer's approval. Richland officials were unaware of the $1 million payment when it was brought to their attention, but stated the payment may have represented a constructive termination for convenience. However, the Federal Acquisition Regulations has no provision for a constructive termination for convenience and does not allow a settlement payment without a formal termination. In this instance, Fluor never terminated the subcontract with BNGA, but rather modified BNGA's scope of work to close out the contract and paid BNGA a fee that was not

reflective of its performance. Our review of supporting documentation submitted with the invoice revealed that it explicitly stated that the final payment by Fluor was "in lieu of all other unpaid fee amounts whether earned or unearned."

Project Cost, Contract Fees and Impact on Future Project Costs

As a result of the project management and quality assurance issues outlined in our report, the Department ultimately bore the entire cost of the K Basins Sludge Treatment Project, spending $43 million and investing 3 years of effort for the engineering and procurement of the CSAPS modules, while receiving no useful mission performance. Had Richland implemented critical project management practices in the early stages of the project, such as an alternative analysis and feasibility study of key components, and bench scale testing of the modules of the CSAPS, many of the technical problems may have been identified. Furthermore, had Richland ensured that the safety analysis and associated hazard analysis were performed before procuring key equipment for CSAPS, it may have been able to make certain that needed safety features were designed into the waste processing equipment.

We also noted that since the CSAPS project was abandoned, the estimated cost to remove the K Basins sludge to comply with regulatory milestones is now expected to significantly increase. At the time of our review, the Department's new contractor, CH2M Hill Plateau Remediation Company, was considering a project execution plan that estimated a total lifecycle cost of $174.8 million to move the sludge from the K Basins to another facility. This plan did not include the additional cost to store the sludge at the interim facility, or the cost to treat and package the sludge for disposal.

Furthermore, issues with Federal oversight of the contract resulted in $1 million in questionable payments, despite the failure of the CSAPS. Specifically, when CSAPS was abandoned, Fluor unilaterally paid $1 million to BNGA to close out the contract, a payment that should have required Richland's contracting officer's approval and which was not in compliance with Federal Acquisition Regulations. Since it was not approved as required, we question the entire $1 million payment.

RECOMMENDATIONS

We believe that the K Basins Sludge Treatment Project provides a number of valuable lessons learned. To correct the problems identified with the management of the K Basins Sludge Treatment Project and help ensure that lessons learned are applied to ongoing

and future projects, we recommend that the Assistant Secretary, Office of Environmental Management (EM) :

1. Ensure that project management requirements are appropriately applied to all major projects, to include the planning and early design phase;

2. Ensure that the site fully documents the analysis supporting key nuclear safety decisions;

3. Improve contract administration by ensuring adequate Federal involvement in the technical and procurement strategies proposed by the contractors; and,

4. Evaluate the costs questioned in this report, and take any necessary action to recover unallowable costs, as appropriate.

MANAGEMENT AND AUDITOR COMMENTS

The Office of Environmental Management generally concurred with the report's recommendations. However, management expressed concern that the report does not clearly define the timeframe of the audit as the period of 2004 through 2007, and does not discuss improvements in project performance since 2007. To this end, EM asserted that corrective actions have been initiated to address each major area that was addressed in the recommendations. Specifically, actions are underway to: improve project management practices; improve compliance with Quality Assurance requirements; and, strengthen the role of the Federal Project Director, as well as other improvements. EM considers these management reforms complete. As for the fourth recommendation, EM committed to fully evaluate the $1 million fee associated with contract closeout, and the issues associated with the disposition of excess equipment for allocability, allowability, reasonableness, and, based on the review, to recover the fee plus interest, as appropriate by January 31, 2012.

Management's reactions to our recommendations are responsive to the finding. We modified Appendix 1 to clarify the timeframe of the activities under audit. We acknowledge the many process improvement initiatives EM has underway to improve project management. These reforms, once fully implemented, should increase the likelihood of successful project execution. While the Department has changed its strategy for sludge remediation since 2007, the revised project was in the preliminary design phase and thus was not mature enough for us to evaluate.

Management's comments are included in their entirety in Appendix 3.

Appendix 1

OBJECTIVE

The objective of this audit was to determine whether the Department of Energy (Department) effectively managed the sludge treatment phase of the Spent Nuclear Fuel project.

SCOPE

The audit was performed from August 18, 2009, to December 18, 2010, at the Hanford Site in Richland, Washington. The scope of the audit primarily covered K Basins sludge treatment operations and planning activities during Fiscal Years 2004 through 2007, as well as certain follow-up actions in later fiscal years. This audit did not include detailed work on the present project strategy, which was reconfigured in 2007, but is currently only in the preliminary design phase.

METHODOLOGY

To accomplish the audit objective, we:

- Analyzed the Fluor Hanford, Inc., contract and their subcontract with British Nuclear Group America;
- Reviewed the contractor procurement files;
- Reviewed findings from prior audit reports regarding the K Basins Sludge Treatment Project;
- Researched Federal and Departmental regulations, policies, and procedures; and,
- Interviewed key personnel in the Office of Environmental Management; Office of Health, Safety and Security; Defense Nuclear Facilities Safety Board; Richland Operations Office; CH2M HILL Plateau Remediation Company; and, Fluor Hanford Close-out Office.

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 objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Accordingly, we assessed significant internal controls and compliance with laws and regulations necessary to satisfy the audit objective. We also assessed the Department's implementation of the *Government Performance and Results Act of 1993* and determined that it had established performance measures for project management. 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 upon computer processed data to accomplish our audit objective.

An exit conference was held with Department officials on February 10, 2011.

PRIOR AUDIT REPORT

- *Sludge Removal Operations at the Hanford Site's K Basins* (DOE/IG-0698, September 2005). The audit found that sludge removal operations had slipped in schedule and had experienced significant cost overruns. The project's actual costs had exceeded budgeted costs by $34 million between October 2002 and June 2005. The project management problems occurred because neither the Department of Energy nor Fluor Hanford, Inc., management had focused adequate attention on the critical planning phase of the sludge removal portion of the project, nor had they placed any emphasis on key project actions. The report recommended that the Richland Operations Office develop a complete risk assessment/mitigation plan, ensure long-term project planning was completed, and reevaluate the cost and schedule baseline.

Department of Energy
Washington, DC 20585

January 19, 2011

MEMORANDUM FOR RICKEY R. HASS
DEPUTY INSPECTOR GENERAL
FOR AUDITS AND INSPECTIONS
OFFICE OF INSPECTOR GENERAL

FROM: INÉS R. TRIAY
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

SUBJECT: Draft Inspector General Audit Report on "K Basins Sludge Treatment Project at the Hanford Site"

Thank you for the opportunity to review the Office of Inspector General (IG) draft audit report entitled *K Basins Sludge Treatment Project at the Hanford Site.* While the Office of Environmental Management (EM) generally agrees with the four recommendations, EM remains concerned with the IG's characterization of EM's management of the K Basins Sludge Treatment Project (STP) at the Hanford Site. Specifically, the report does not clearly define the timeframe of this IG audit being the period of 2004 through 2007 and does not discuss improvements in project performance of the STP since 2007. In addition, we would like to provide clarifications regarding some technical and management issues identified in the draft report. We are providing our comments on the draft report below and in Attachment 1, which includes factual corrections to certain information in the IG's draft report.

IG previously conducted an audit of the STP and documented its recommendations in the audit report entitled *Sludge Removal Operations at the Hanford Site's K Basins* (DOE/IG-0698) in 2005. EM initiated a series of corrective actions in response to the earlier IG recommendations, including conducting independent technical reviews, making contract and management changes, and re-baselining the STP in the summer of 2007. On the corporate level, EM also developed initiatives to improve acquisition and project management practices (see EM's *Report on Acquisition and Project Management Continuous Improvement*, October 2010[1]). These actions have led to significant improvements on the STP (see Attachment 2). We understand that the IG audit team has not identified any specific concern about the current project performance and management after 2007.

[1] Available at http://www.em.doe.gov/pdfs/FINAL%20REPORT%20on%20Acquisition%20and%20Project%20Management%20Continuous%20Improvement%20-%202%20Nov%2010.pdf

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The present IG audit has focused on historical performance issues for the period of 2004 through 2007. EM generally concurs with the IG's four recommendations in this draft audit report that:

1) Ensure that project management requirements are appropriately applied to all major projects, to include the planning and early design phase;

2) Ensure that quality assurance, to include nuclear safety analysis, is fully implemented in the design of nuclear facilities, equipment, and operations;

3) Improve contract administration by ensuring adequate Federal involvement in the technical and procurement strategies proposed by the contractors; and

4) Evaluate the costs questioned in this report, and take any necessary action to recover unallowable costs, as appropriate.

However, we would like to stress that EM initiated corrective actions in response to similar comments of the 2005 IG audit report (DOE/IG-0698) in the summer of 2007, and is continuing to implement the actions at the Hanford Site and across the EM complex. The following provides specific responses to the four IG recommendations:

1. With respect to the IG's first recommendation, EM has made improvements in project management practices. In 2010, EM has restructured projects into smaller, better defined capital asset projects and non-capital operations activities to reduce project risk and provide more focused management and oversight. EM has made many improvements in front-end planning, and is ensuring capital asset projects complete 70-90% design prior to establishing performance baselines. The performance baselines for capital asset projects are established with a minimum 80% confidence level, and the contingency is budgeted for in the baseline. EM has embraced the Office of Science model for peer review of major construction projects. A key strategy included in *Roadmap for EM's Journey to Excellence* (Rev 0 – December 16, 2010) is engaging regulators and stakeholders to ensure our project plans are consistent with their expectations.

   EM is also improving policies and procedures to gauge the quality of contractor cost estimates and independently validating these estimates. EM established a cost estimating Center of Excellence at the EM Consolidated Business Center to improve the quality of independent government estimates for construction and cleanup projects. EM is utilizing FAR Part 15 contracts that require offerers to develop cost proposals. We are using Technology Readiness Levels and Project Definition Rating Index approaches to better understand the project design/definition stage and to improve the quality of cost estimates. **Estimated completion date:** Complete.

2. With respect to the IG's second recommendation, in November 2008 EM issued the EM Corporate Quality Assurance Program (QAP) (EM-QA-001), that implements a graded approach for complying with 10 CFR 830.120, DOE Order 414.1C, and NQA-1 requirements, senior EM management expectations, other national and international standards, software QA, and sampling and analysis for design of nuclear facilities, equipment, and operations. EM nuclear projects have followed DOE-STD-1189, *Integration of Safety into the Design Process,* which provides guidance on project integration and planning, including Nuclear Safety Basis strategy and graded QA standards prior to CD-1. EM was the lead in the development and issuance of DOE-STD-1189, and prior to the issuance of DOE-STD-1189 in March 2008 had implemented an interim guidance to proactively incorporate safety considerations early in the design process. The EM corporate QAP has been flowed down to the field organizations and each field element is responsible for implementing QA requirements using its own QA Implementation Program (QIP). EM-HQ's Office of Standards and Quality Assurance provides ongoing oversight of the field implementation of site and prime contract QIPs. In addition, EM has worked closely with industry experts through the Energy Facility Contractors Group and the EM QA Corporate Board, to address issues concerning the graded approach. EM's principled approach continues to be that of a graded QA approach that incorporates nuclear safety analyses commensurate with the level of hazards and risks posed to the public, workers, and the environment. **Estimated completion date:** Complete.

3. With respect to the IG's third recommendation, *Roadmap for EM's Journey to Excellence* (December 2010) includes initiatives to further strengthen and clarify the role of Federal Project Directors (FPD). We are implementing an improved EM Business Model that shifts greater authority and accountability to the field, and strengthens Headquarters policy, planning and best practice dissemination functions (e.g., adopting an "Advise-Assist-Assess" Headquarters model). EM will examine the causes of FPD turnover to ensure continuity and consistency of Federal project oversight for critical projects, and has already placed a Deputy Manager for each of our major construction projects to address the potential turnover of the current FPDs.

   In addition, EM is continuously making improvements in acquisition practices and contract management. EM has expanded the use of FAR Part 15 contracts for capital asset projects and other non-capital work and awarded smaller, more-focused contracts (e.g., work previously performed by 3 prime contractors at the Hanford site is now performed by 5 prime contractors).

   Furthermore, EM is making improvements in contract management practices. EM is establishing partnering relationships for all major contracts

to create a transparent and collaborative working environment between the Federal and contractor staff in order to foster a better understanding of the rules of engagement and build better operating business relationships. EM is working with industry to discuss ways to improve the pre- and post-contract award process. A joint DOE-industry workshop was held in March 2010 to identify and prioritize improvement actions for implementation. EM is working to ensure that our Federal staff and contractors across the EM complex understand and appreciate the need to maintain alignment of project and contract baselines. A series of workshops have been or are being held with site Federal and contractor personnel to discuss procedures to be utilized to ensure contracts remain aligned with proposed project baseline revisions. **Estimated completion date:** Complete.

4. Finally, with respect to the IG's fourth recommendation, we agree with the statements shown on Page 5 of the IG draft audit report on the requirement for approval by the Contracting Officer (CO) of any "settlement" between the prime and subcontractor. Inasmuch as the FAR does not have any provision for constructive termination as clearly stated by the IG, the CO has a responsibility to recover the unallowable costs within a reasonable time period. EM understands IG's recommendation for EM to recover the $1 million (plus interest) and to recover any value remaining in the mobile solidification system module using government property disposition procedures. In response to these recommendations, the CO will fully evaluate the excess equipment disposition and the costs for allocability, allowability, reasonableness, and recovery or offset of the $1 million (plus interest) of the Project Hanford Management Contract. **Estimated completion date:** January 31, 2012.

In addition to these comments on the four recommendations, we are providing in Attachment 1 clarifications regarding some technical and management issues identified in the draft report.

We welcome additional direct dialogue with you on these issues prior to finalizing your report. We would also appreciate your including the attached comments in the final report.

If you have any further questions with regard to these comments, please contact me at (202) 586-7709 or Mr. Mark Gilbertson, Deputy Assistant Secretary for Program and Site Support, at (202) 586-0755.

Attachments

cc: C. Anderson, EM-3
M. Gilbertson, EM-50
M. McCormick, RL

IG Report No. DOE/IG-0848

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