DOE/IG-0549

AUDIT REPORT

IDAHO OPERATIONS OFFICE PLANNED CONSTRUCTION OF A WASTE VITRIFICATION FACILITY

APRIL 2002

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL
OFFICE OF AUDIT SERVICES

U. S. DEPARTMENT OF ENERGY
Washington, DC 20585

April 1, 2002

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)
Inspector General

SUBJECT: INFORMATION: Audit Report on "Idaho Operations Office Planned Construction of a Waste Vitrification Facility"

BACKGROUND

In 1995, the Office of Inspector General evaluated planned construction projects at the Idaho National Engineering and Environmental Laboratory. In our resulting audit report, we questioned a number of the projects because they were not needed to support the Laboratory's mission, or because they were inappropriately sized. At the time, we found that the Department was not consistently verifying the need for projects, nor was it identifying and evaluating alternatives. As a result of the audit, the Department agreed to more aggressively manage construction by canceling unnecessary projects and thoroughly assessing alternatives at the Idaho site.

Currently, the Department's Idaho Operations Office has a five-year plan, covering Fiscal Years 2001 through 2005, which details construction activities and upgrades to existing facilities at the Laboratory. These activities are collectively valued at $3.3 billion. The largest single project in the five-year plan is a waste vitrification facility that, by itself, is expected to cost approximately $2.5 billion. The facility would treat two separate types of waste: sodium-bearing liquid waste; and, high-level radioactive calcine waste that is currently in a solid, granular form. A 1995 Settlement Agreement between the Department and the State of Idaho established milestones for removing both types of waste from the State over the next several decades.

In light of our earlier work and the considerable resources Idaho plans to spend on construction activities, we conducted an audit to determine whether alternatives to constructing the waste vitrification facility were given adequate consideration.

RESULTS OF AUDIT

Our review found that the Department had not adequately considered potentially less costly alternatives to constructing the vitrification facility, including several proposed by the National Research Council. These options would allow Idaho to treat the liquid waste by upgrading an existing facility for as little as $80 million and deferring action on solid waste until technical uncertainties are resolved. The Department chose not to fully consider other approaches because it interpreted the Settlement Agreement to require that Idaho's waste be "road ready" by the milestone date of 2035 and judged that vitrifying the waste was the only treatment process that would meet this milestone. Consequently, the Department may spend significant funds to construct a facility that may ultimately prove to be unnecessary.

To address this situation, we recommended that the Assistant Secretary for Environmental Management require Idaho to fully evaluate alternatives to constructing the waste vitrification facility and to negotiate approval for any alternatives deemed appropriate with the State.

At your direction, the Office of Environmental Management recently completed a "Top-to-Bottom" review of its program mission and activities. The resulting report, which was published subsequent to completion of our audit field work, included the conclusion that the Department should consider alternatives to vitrification – including steam reforming, calcination, saltstone, or other grouting techniques – where such methodologies are feasible. According to the review team, these approaches may be appropriate, and less costly than vitrification, for tank waste containing low-activity and transuranic constituents.

MANAGEMENT REACTION

The Assistant Secretary expressed fundamental agreement with the audit conclusions. She also noted that, consistent with the "Top-to-Bottom" review, the Office of Environmental Management recently made the decision to modify the current baseline and, potentially, the treatment alternative for Idaho high-level waste, pending the results of further study and acquisition activities.

Attachment

cc: Chief of Staff
Under Secretary for Energy, Science and Environment
Assistant Secretary for Environmental Management

IDAHO OPERATIONS OFFICE PLANNED CONSTRUCTION OF A WASTE VITRIFICATION FACILITY

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OVERVIEW

INTRODUCTION AND OBJECTIVE

The Department of Energy's (DOE) Idaho Operations Office (Idaho) has a five-year plan to construct or upgrade facilities at the Idaho National Engineering and Environmental Laboratory (INEEL). The plan covers Fiscal Years 2001 through 2005 construction projects, collectively valued at $3.3 billion.

The largest single project in the five-year plan is a waste vitrification facility that, by itself, is expected to cost $2.5 billion upon completion. The vitrification facility would treat two separate types of waste: sodium-bearing liquid waste (liquid waste) and high-level radioactive calcine waste (solid waste) that is currently in a solid, granular form. A 1995 Settlement Agreement between DOE and the State of Idaho established milestones for removing both types of waste from the State over the next several decades.

In 1995, the Office of Inspector General issued a report on the *Audit of Construction Management at the Idaho National Engineering Laboratory* (WR-B-96-03, October 1995), in which we questioned a number of planned construction projects because they were not needed to support INEEL's mission or because they were larger than necessary. At the time, we found that Idaho was not consistently verifying the need for projects, nor was it identifying and evaluating alternatives. Idaho concurred with our findings and recommendations and agreed to more aggressively manage construction by canceling unnecessary projects and thoroughly assessing alternatives. In light of our earlier work, we conducted this audit to determine whether alternatives to constructing the waste vitrification project were given adequate consideration.

CONCLUSION AND OBSERVATIONS

DOE officials did not adequately consider less costly alternatives to the preferred alternative of constructing the vitrification facility even though they were aware of them. These options would allow Idaho to treat the liquid waste by upgrading an existing facility for as little as $80 million (estimated project cost) and defer action on the solid waste until technical uncertainties involving solid waste are resolved. DOE chose not to consider alternative approaches because it interpreted the Settlement Agreement to require that Idaho's waste be "road ready" by the milestone date of 2035, and judged that vitrifying the waste was the only treatment process that would meet this milestone. As a result, the Department may spend significant funds to construct a facility that may ultimately prove to be unnecessary.

We recommended that the Assistant Secretary for Environmental Management require Idaho to fully evaluate alternatives to constructing the waste vitrification facility and to negotiate any such alternatives deemed appropriate with the State.

During the audit, we also noted that Idaho did not fully consider alternatives to two additional projects in its five-year construction plan. Because these projects were either on-going or recently completed, we have not made formal recommendations. Nevertheless, we are concerned that, taken together with the planned construction of the vitrification facility and our 1995 findings, indications are that Idaho has not yet adopted a rigorous process for full analysis on construction projects and feasible alternative approaches. These matters are briefly discussed in Appendix 3.

The audit identified issues that management should consider when preparing its year-end assurance memorandum on internal controls.

(Signed)
Office of Inspector General

ALTERNATIVES TO THE WASTE VITRIFICATION FACILITY

Alternatives to Waste Vitrification

DOE officials did not adequately consider alternatives to the preferred alternative of constructing the vitrification facility even though they were aware of them. The alternative approaches would allow Idaho to treat the liquid waste first by upgrading an existing calcining facility or building a new cesium ion exchange facility and defer action on the solid waste until technical uncertainties involving solid waste are resolved.

Current Plans

As currently envisioned, the proposed waste vitrification facility would consist of an 83,000 square foot processing building with basement levels extending 32 feet below grade. It would also include a 21,000 square foot calcine processing addition and a 12,000 square foot single-story administration building. The process for vitrification consists of mixing the waste with glass powders, melting the mixture at about 1150 degrees centigrade in a special melter lined with ceramic brick, and pouring the melt into waste containers. After cooling, the resulting nuclear waste glass products would be generally homogeneous, non-crystalline materials with high chemical durability. The glass products would then be shipped to a permanent high-level waste repository.

The vitrification facility would be constructed to convert both liquid and solid wastes into glass. However, because these waste streams differ significantly and cannot be treated concurrently, the proposed project plan calls for the facility to be designed to treat the liquid waste first. Once this is accomplished, the facility would undergo a major modification of its waste feed system in order to treat the solid waste. Initial design and construction would take place between 2003 and 2015, with vitrification of liquid waste commencing upon completion and taking about 2 years. Plant modification would take another 2 years, after which high-level waste vitrification would proceed until about 2035.

Liquid Waste Alternatives

In a December 1999 report commissioned by DOE, the National Research Council (Council) described six alternatives to the vitrification of liquid waste. Five of these options centered on evaporation techniques that would solidify the liquid waste. In these scenarios, the resulting materials would likely be categorized as transuranic (TRU) waste, packaged in drums or other containers, and stored onsite or shipped to a TRU waste repository. The sixth alternative was that Idaho's liquid waste be solidified using an existing

facility at the INEEL, the New Waste Calcine Facility. The Council's report implies that under this approach, Settlement Agreement criteria would be met cost effectively and with minimal risk to INEEL workers. The Council did not consider vitrification to be a reasonable treatment method for Idaho's liquid waste and focused its attention, instead, on the shorter-term, more cost-effective technologies described above.

An internal report completed by Bechtel in 2000 also concluded that the preferred treatment process for liquid waste would be to solidify the waste in the existing calcining facility or, alternatively, to solidify the waste using another treatment technology, such as cesium ion exchange. Like the Council, the contractor identified other treatment alternatives as well. The contractor specifically rejected the alternative of vitrification as it was deemed to be an uneconomical alternative.

Solid Waste Alternatives

The Council's 1999 report also recommended that processing the solid waste be deferred and the waste remain in its current storage facility. The Council cited several reasons for its preferred option, including the following:

- In its current state, high-level solid waste at INEEL does not pose a hazard to public health or the environment.
- The waste is in a storage facility designed to last 500 years.
- Selecting a treatment option, such as vitrification, is premature given the many uncertainties regarding disposition of this waste.

The report discussed several major uncertainties regarding the ultimate disposition of high-level waste, including the fact that the proposed repository (Yucca Mountain) does not have final waste acceptance criteria. The preliminary waste acceptance criteria is subject to change, and in fact, is currently in its third revision. The Council noted the possibility that the planned repository may even accept Idaho's solid waste in its current calcined form. Further, since it is uncertain whether the repository will have sufficient capacity to dispose of Idaho's solid waste, the Council reasoned that preparing Idaho's waste for permanent disposal at this time may not be the most prudent course of action. Finally, the Council concluded that the longer the solid waste remains in its current storage facility, the more the radioactive isotopes will decay. Accordingly, in a few decades, this waste could be processed with less technical risk and less potential radiological exposure. In

summary, the Council report concluded that if solid waste were vitrified associated risks and costs may far exceed the risks of continued storage, and there would be no certainty that the vitrified waste could be shipped out of the state.

Although the Council recommended DOE perform an environmental, safety and health analysis comparing the relative risks of processing solid waste in a vitrification plant against the alternative of leaving the waste in its current storage facility for a few decades prior to treatment, none was performed. Idaho officials told us that this analysis was not conducted because the alternative of deferring vitrification was not formally considered.

DOE Guidance

The 1995 Settlement Agreement between DOE and the State of Idaho requires that Idaho's solid waste calcine be treated in a form suitable for transport to a high-level waste repository, or interim storage facility outside of Idaho, by December 31, 2035. Additionally, the liquid waste shall be calcined by December 31, 2012. However, the Settlement Agreement allows for re-negotiation of this milestone if the decision made in the National Environmental Policy Act (NEPA) process selects a different path forward.

The NEPA provides the conceptual framework for choosing among alternatives. An Environmental Impact Statement (EIS) must "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." The primary objective of an EIS is to serve as an action-forcing device to insure that the policies and goals defined in the NEPA are infused into the ongoing programs and actions of the Federal Government. Council on Environmental Quality regulations direct all Federal agencies to use the NEPA process to identify and assess the reasonable alternatives to proposed actions that would minimize adverse effects of these actions upon the quality of the human environment. These regulations further state that "reasonable alternatives include those that are practical or feasible from a common sense, technical, or economic standpoint. The number of reasonable alternatives considered in detail should represent the full spectrum of alternatives meeting the agency's purpose and need."

Interpretation of the Settlement Agreement

DOE chose not to consider alternative approaches because it interpreted the Settlement Agreement to require that Idaho's waste be "road ready" by the milestone date of 2035, and judged that vitrifying the waste was the only treatment process that would meet this milestone. DOE chose not to exercise the provision in the Settlement Agreement that allowed

for re-negotiation of the 2035 milestone based on the preferred alternative identified in the NEPA process. Thus, DOE did not include reasonable alternatives in its formal NEPA analysis. In effect, DOE allowed the Settlement Agreement to dictate the parameters of the NEPA process, rather than allowing the NEPA process to run its course and modify the Settlement Agreement accordingly.

By interpreting the Settlement Agreement as it did, DOE limited alternatives to those that met the milestones in the Settlement Agreement and mitigated unknowns. DOE preferred vitrification because it is assumed that borosilicate glass, or vitrified waste, would be the only waste form acceptable in the high-level waste repository. Additionally, the choice of vitrification resolved a dispute between DOE and the State regarding the waste classification level of the liquid waste. The State contended that liquid waste was high-level waste, whereas DOE (and the Council) considered the liquid to be transuranic waste. The choice of vitrification results in a waste form that is assumed to be acceptable at either a high-level waste or at a transuranic waste repository.

Based on our analysis of the re-negotiation clause of the Settlement Agreement and of the Council's report, we concluded that DOE has both the authority and the obligation to follow the customary NEPA process requiring consideration of alternatives. NEPA specifically requires consideration of reasonable alternatives that are practical or feasible from a common sense, technical, or economic standpoint. The alternatives recommended by the Council and Bechtel appear reasonable and should have been formally considered in the EIS. In fact, DOE specifically tasked the Council to develop alternatives for consideration in the EIS.

More Cost Than Necessary

If DOE does not give serious consideration to alternatives to its plans to construct the waste vitrification facility, it may incur unnecessary costs and build a facility that is not needed. Risks of radiological exposure may also be greater than necessary.

The vitrification facility could cost $2.5 billion, with design and construction taking over a decade to complete. Cost data for alternative proposals have not been fully developed because DOE has not yet thoroughly reviewed the alternatives. However, some data is available indicating that options recommended by the Council and by Bechtel would be far less costly, at least in the near term. Both the Council and

Bechtel, for example, discussed upgrading INEEL's existing calcining facility to treat liquid waste. Bechtel estimated that the necessary upgrades could be completed by 2008 at a cost of as little as $80 million. Bechtel also estimated that a new cesium ion exchange facility, which would also effectively treat the liquid waste, could be built by 2008 and cost about $330 million.

Regarding the solid waste, deferring the decision to vitrify until technical and other uncertainties are resolved will help to ensure that DOE spends only those funds that are absolutely necessary. If DOE builds the vitrification facility now, it may not act in the most efficient manner to meet a permanent repository's waste acceptance criteria, other regulatory requirements, or its commitments to the State of Idaho.

Additionally, according to the Council report, vitrification has a great deal more technical risk and potential for radiological exposure than if the solid waste is left in its current storage containers. Thus, the most prudent approach with regard to safety and environmental concerns may be deferring action on the solid waste until a determination is made that vitrification is, in fact, required.

RECOMMENDATIONS

We recommended that the Assistant Secretary for Environmental Management require Idaho to:

1. Fully evaluate alternatives to constructing the waste vitrification facility; and,

2. Negotiate any such alternatives deemed appropriate with the State.

MANAGEMENT REACTION AND AUDITOR COMMENTS

In written comments on our draft report, the Assistant Secretary for Environmental Management expressed fundamental agreement with the audit conclusions. She noted that independent of the Office of Inspector General review, the Office of Environmental Management recently made the decision to modify the current baseline and preferred treatment alternative for the Idaho High-Level Waste Program, pending the results of further study and acquisition activities. The Assistant Secretary's comments, which are responsive to our recommendations, are included as Appendix 4.

The Office of Environmental Management also provided a number of comments intended to clarify various issues raised in our draft report. Those comments, along with our responses, are summarized on the following pages.

Management Comment

Environmental Management noted that a vitrification facility could be built to treat sodium-bearing waste for $600 million. In management's view, the $2.5 billion estimate we relied on was too high since it was based on a facility to vitrify both sodium bearing waste and high-level waste calcine.

Auditor Response

The $600 million estimate was for a facility to treat only the liquid waste. The $2.5 billion was for a facility to treat both waste streams and it was included as part of Environmental Management's final Environmental Impact Statement, dated September 2001. We used the higher figure because, in our judgment, it more fairly represented the potential costs of DOE's preferred alternative.

Management Comment

Environmental Management asserted that the preferred alternative selection process was rigorous and included consideration of less costly alternatives and options. Management suggested that it has in the past and continues to consider a wide range of treatment alternatives in the environmental impact statement.

Auditor Response

We agree that DOE considered a wide range of alternatives; however, based on our audit, we concluded that management did not adequately consider alternatives suggested by the National Research Council. In fact, DOE did not establish the Council's recommendations as alternatives for formal consideration in the Final Environmental Impact Statement. We found this troubling given that DOE specifically tasked the Council to review its planned approach and recommend alternatives for consideration in the impact statement process.

Management Comment

Environmental Management asserted that all of the treatment alternatives considered in the EIS, with the exception of taking no action on solid waste, are projected to complete treatment by 2035.

Auditor Response

We agree that in the EIS, several options were considered for treating liquid and solid waste by 2035. However, with regard to the treatment alternatives, vitrification was the only option deemed able to meet the 2035 milestone for all the waste to be "road ready." By limiting its options for treating the solid waste to only those that meet the milestone, DOE eliminated exploring ideas recommended by the National Research Council. For example, DOE did not consider the option of disposing of the solid waste at the proposed repository in its current calcined form, which would be far less expensive than constructing a vitrification capability.

Management Comment

Environmental Management stated that the Office of Inspector General may have improperly framed the National Research Council's six alternatives to vitrification. Management asserted that since the baseline treatment at the time of the issuance of the Council report was calcination, the Academy must have been describing six alternatives to calcination of the sodium bearing liquid waste.

Auditor Response

We strongly disagree. In its report section dealing with sodium-bearing liquid waste, the Council specifically states that "If the approach of this chapter is adopted, the final waste form for [sodium-bearing waste] need not be a vitrified one…." Clearly, the six suggested options were alternatives to vitrification, not calcination.

Management Comment

Environmental Management expressed concern about our representation of issues we raised regarding the Health Physics Instrumentation Laboratory project (Appendix 3 of this report). Specifically, management asserted that alternatives such as outsourcing were documented in the 1997 conceptual design report, and the Office of Inspector General did not consider them.

Auditor Response

We did review the 1997 analysis, but found that the underlying data was not current. In fact, this study was based upon dated, unduly optimistic projections that the Laboratory would calibrate twice the number of instruments than actual experience could support. We also found no evidence that outsourcing was seriously considered.

APPENDIX 1

SCOPE

The audit was performed from April 4, 2001, to January 17, 2002, at the Idaho and Bechtel offices in Idaho Falls, Idaho. The audit scope was limited to construction projects in Idaho's Fiscal Year 2001 Five-Year Plan. The Five-Year Plan covers planned line items and general plant projects for the years 2001 through 2006. We judgmentally selected a sample of five of a total of 24 planned/ongoing line item construction projects. Our judgmental sample of five projects examined $2.5 billion dollars or 75 percent of the $3.3 billion dollar universe of planned line item construction projects. Of the five projects examined, one was cancelled during our fieldwork and another was determined to be too early in the planning phase to determine if alternatives were considered.

METHODOLOGY

To accomplish the audit objective, we:

- Obtained and reviewed construction management planning and authorization documents;
- Reviewed applicable DOE regulations;
- Reviewed prior OIG audits;
- Selected a judgmental sample of five construction projects of the 24 line item projects in the Five-Year Plan for detailed review;
- Reviewed construction cost data and cost estimates;
- Interviewed key personnel in the DOE Idaho Operations Office;
- Relied on DOE EM-6 cost estimates for the proposed vitrification facility[1]; and,
- Reviewed NEPA documentation for the Waste Vitrification Facility.

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 Idaho's planning process for the construction of new facilities. Additionally, we assessed internal

[1]DOE EM-6 estimated $2.5 billion to construct the Waste Vitrification Plant. Idaho's estimate in its Five-Year Plan was $997 million. As a result, we adjusted the universe by $1.5 billion to $3.3 billion total.

controls and performance measures established under the *Government Performance and Results Act of 1993* and determined that there were specific performance goals or standards that pertained to this audit. However, the specific construction performance goals in the Idaho Performance Evaluation Measurement Plan were too new to assess their effectiveness. 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 information processed on automated data processing equipment to accomplish our audit objective.

We discussed this audit with the Idaho Operations Office and Office of Environmental Management during an exit conference on February 5, 2002.

APPENDIX 2

RELATED REPORTS

- *Audit of Construction Management at the Idaho National Engineering Laboratory*, (WR-B-96-03, October 1995). The audit identified five construction projects totaling about $4.3 million that were not needed and two others totaling $38 million that were oversized by a combined $22.1 million. If Idaho verifies and reassesses the need for all planned construction projects, it could potentially save and reprogram more than $26.4 million. One of the projects found to be oversized and justified on the basis of outdated results was the Health Physics Instrumentation Laboratory.

- *Audit of Renovation and New Construction Projects at Lawrence Livermore National Laboratory*, (WR-B-97-06, June 1997). Livermore had not demonstrated that it had selected the best alternatives for meeting DOE's needs while minimizing cost, for three projects. Livermore was able to pursue these projects because the Operations Office did not ensure that the laboratory had performed cost and benefit analyses of all alternatives. Further, the Operations Office did not establish benchmarks to assess the reasonableness of the total costs of designing, constructing, and managing these projects. As a result, it was likely that DOE was spending more than necessary on renovation and new construction projects.

- *Special Report on the Audit of the Management of Department of Energy Construction Projects*, (DOE/IG-0398, November 1996). Past OIG reports showed that (1) construction plans were not always updated when mission needs changed, and (2) projects were not needed or all alternatives were not fully evaluated prior to proceeding with construction of new facilities.

APPENDIX 3

OTHER MATTERS

Idaho did not fully consider alternatives to two additional projects in its five-year plan. Because the projects discussed below were either on-going or recently completed, we have not made formal recommendations.

Health Physics Instrumentation Laboratory

In 1991, Idaho proposed to construct a new Health Physics Instrumentation Laboratory. A report issued by the OIG in 1995 questioned the size of the proposed new laboratory and the studies done to justify its need. As a result of the report, management reduced the size of the facility, but continued to use the same questionable studies to support the need for the facility. The underlying assumptions used in the studies were never updated or validated. In June 2001, we issued a memorandum to Idaho expressing our concerns about the planned construction of this facility. We met with the Idaho Manager in August 2001, however, the proposed construction project proceeded.

In lieu of constructing a $13.6 million facility, a proposed alternative was to build a $5.6 million facility that would satisfy a requirement to maintain core capabilities on-site. With this alternative, the majority of calibration work would have been outsourced to another DOE field site or to a new private vendor in Idaho Falls, while the smaller facility could perform calibration work during emergencies. If outsourced, the calibration work would be less expensive. For instance, in 2001 calibration work was outsourced to a Hanford laboratory because the current Idaho laboratory was closed due to safety violations. The Hanford laboratory calibrated Idaho's instruments for $110 per instrument while Idaho's laboratory charged $300 per instrument. In addition, a new vendor in Idaho Falls now provides calibration service for radiation detection instruments at a cost of $150 per calibration. In fact, this local vendor has instrument calibration contracts with other DOE sites and commercial entities. Despite these available alternatives, Idaho chose to build a full-size facility that cost $8 million more than a facility that would maintain core capabilities. Likewise, Idaho did not consider an alternative construction proposal for the Records Storage Facility.

Records Storage Facility

According to a January 2001 cost estimate prepared by Bechtel, Idaho could have used standard construction practices to build this facility to meet its record storage needs at a cost of $2.7 million at the INEEL site. Instead, Idaho built its facility to higher Departmental standards at a cost of $4.5 million in Idaho Falls. Idaho's application of higher standards was particularly questionable since the facility was built in the city of Idaho Falls rather than on the INEEL site.

Idaho will spend at least $9.8 million more than necessary for both the Records Storage Facility ($1.8 million) and the Health Physics Instrumentation Laboratory ($8 million).

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United States Government **Department of Energy**

memorandum

DATE: February 20, 2002

REPLY TO
ATTN OF: EM-40

SUBJECT: Draft Office of Inspector General Report titled "Idaho Operations Office Planned Construction of a Waste Vitrification Facility"

TO: Frederick D. Doggett, Acting Director for Performance
Audits and Administration, Office of Inspector General, IG-30

This memorandum is in response to your subject memorandum of January 18, 2002, which forwarded the subject report and requested a review and written comments. The requested review was completed following meetings between our staffs to clarify some of the issues raised by the report. I am in fundamental agreement with your conclusions, but would like to clarify the actions and intention regarding Idaho Operations' high-level waste and sodium-bearing waste disposition.

Independent of your review, Environmental Management (EM) recently completed a Top-to-Bottom Review of the current EM program and its management systems with the intended goal of quickly and markedly improving performance. One of the recommendations of this review is to move EM to an accelerated, risk-based cleanup strategy. In support of this strategy, a programmatic decision has been made to modify the current baseline and preferred treatment alternative for the Idaho High-Level Waste Program waste streams so they are technology-neutral pending the results of further study and acquisition activities.

I appreciate the opportunity to review the draft report, have our staffs meet to clarify concerns, and provide you with comments. I look forward to receipt of your final report. If you have any questions, please contact Randy Scott at (202) 586-0370.

Jessie Hill Roberson
Assistant Secretary for
Environmental Management

Attachment

EM Comments on Office of Inspector General (OIG) Draft Report titled "Idaho Operations Office Planned Construction of a Waste Vitrification Facility"

Note: It was clarified at the meetings between our staffs that the issues and concerns raised in the report were focused on the preferred alternative selection process for the Idaho High-Level Waste (HLW) and Facilities Disposition Environmental Impact Statement (EIS) and not on the alternatives and options presented in the draft and final EIS. Thus, the following comments are provided in the context of this understanding:

Overview

Introduction and Objective

- 2nd paragraph, 2nd line: States that the cost estimate for the vitrification plant is $2.5 billion upon completion.

Comments: At the meetings between our staffs, it was clarified that this number was taken from the EM-6 Cost Report that evaluated the estimated cost for the Early Vitrification Option in the draft EIS. Early Vitrification is similar to but not the same as the initial preferred alternative that is the subject of the OIG report. Cost estimates developed for the EIS place the project cost for a vitrification plant to treat Sodium-Bearing Waste (SBW) at just under $600 million, with disposal cost potentially being $500 million more.

Conclusions and Observations

- 1st paragraph, 1st line and throughout the report: States that Idaho (clarified to mean DOE) officials did not adequately consider less costly alternatives to its initial preferred alternative of constructing a vitrification facility even though they were aware of them.

Comments: The preferred alternative selection process was rigorous and did include consideration of less costly alternatives and options. EM and Idaho officials (including the State of Idaho as a cooperating agency) agreed to a preferred alternative that would meet the Idaho Settlement Agreement (SA) court-ordered milestone of having HLW calcine "road ready" by 2035 because it is premature for the Department to consider missing milestones that are greater than 30 years away.

Idaho and EM officials have in the past and continue now to consider a wide range of treatment alternatives in the EIS. This effort was augmented by independent reviews of alternatives conducted by the National Academy of Sciences (NAS) as well as other internal and external experts, and the results of these reviews are factored into the final EIS. The October 2000 selection by my predecessor of vitrification as the EIS preferred treatment alternative was based on not only cost estimates but also on a variety of regulatory commitments, assumptions, and uncertainties. However, as stated in my forwarding memorandum, EM is evaluating regulatory commitments and previous programmatic and regulatory assumptions and, specifically,

reconsidering the options for treating and disposing the waste streams in question. No decisions have been made at this point, and no construction project for treating these waste streams has been authorized.

- 1st paragraph, 2nd - 4th line and throughout the report: States that an existing facility (the calciner) could be upgraded to treat liquid SBW for $80M.

Comments: It was clarified that this number was taken from an early estimate that did not include the same projects and requirements that were factored into the Early Vitrification Alternative cost estimate that is stated in the report as a basis of comparison. The calciner upgrade cost estimate is at the low end of a project cost estimate. Project cost for upgrading and operating the calciner are likely to exceed $200 million, and if full life-cycle costs are considered for the upgrade and operation of the calciner through 2016, estimates approach $1.5 billion. Although the cost estimates involved are highly speculative, it is understood that operating the calciner without additional upgrades would be significantly less expensive than conducting extensive calciner upgrades, but calciner upgrades would likely be less expensive than a vitrification plant if regulatory and stakeholder issues can be successfully resolved.

- 1st paragraph, 5th - 7th lines: States that Idaho (DOE) chose not to consider alternative approaches because only vitrification meets the SA date of 2035.

Comments: The range of reasonable alternatives was, in fact, considered in the draft EIS and after modification based on comments received by the public, the range of reasonable alternatives will be presented in the final EIS as well. All of the treatment alternatives considered in the EIS (e.g., calcination, vitrification, separations, grout, etc.) are projected to complete treatment by 2035. Only alternatives that evaluate taking no action for calcine fail to meet 2035 (No Action, Continued Current Operations). Meeting 2035 was not a factor in the original EM-1 selection of vitrification as the original preferred alternative for the EIS, nor was it a factor in my direction to modify the preferred alternative so that it is technology neutral.

- 2nd paragraph: Recommends that Idaho (DOE) fully evaluate alternatives to constructing the waste vitrification facility.

Comments: Agree, however, this is what the draft EIS did and what the final EIS will do. Also recommends that the Department propose alternatives to the State (clarified to mean negotiate with the State). This has been done during the EIS development process. However, the Department is the decision authority for treatment plants in Idaho, and it will make and document its decision in a Record of Decision.

- 3rd paragraph: States the conclusion that Idaho has not adopted a rigorous process for full analysis on construction projects.

Comments: The initial preferred alternative of vitrification is not a construction project and is only one of several alternatives or options addressed in the final EIS. However, as stated previously, the EM Top-to-Bottom review prompted a re-evaluation of the regulatory

commitments, assumptions, and uncertainties associated with the initial decision and, as a result, the decision has been made to revise the preferred alternative for the EIS to make it treatment technology neutral. When a decision is made for a project, the Department will follow the rigorous process mandated by DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*.

Alternatives to the Waste Vitrification Facility

Alternatives to Waste Vitrification

- 1st paragraph: States that Idaho (DOE) officials did not adequately consider alternatives to constructing the vitrification facility.

Comments: Alternatives to consider upgrades to the calciner or construction of a cesium ion exchange were considered and will still be viable treatment alternatives in the final EIS, as will other treatment alternatives such as grout, steam reforming, and vitrification.

- 1st paragraph: States that the alternative approaches would allow Idaho (DOE) to treat the liquid waste first and defer action on the solid waste.

Comments: When the Department issues its final EIS, it must indicate its preference for preparing calcine to have it "road ready" by 2035 to address the full purpose and need of the EIS. However, the Department's decision on calcine treatment and/or disposal can be deferred.

Current Plans

- 1st paragraph: Lists proposed waste vitrification facility specifications.

Comments: The listed treatment plant specifications were developed for environmental impacts analysis only, and they do not represent project quality estimates nor do they represent a basis for decision.

Liquid Waste Alternatives

- 1st paragraph, 2nd line: States that the NAS described six alternatives to vitrification.

Comments: This appears to be improper framing of the NAS action. Since the baseline treatment at the time of the issuance of the NAS report was calcination, if anything, the NAS described six alternatives to calcination of SBW with the calcine going to storage in a bin set.

- 1st paragraph, 8th-10th lines: States that the NAS implied in its report that calcination of SBW would meet the requirements of the SA quickly and cost effectively at minimal risk to workers.

Comments: There are some apparent inconsistencies in the NAS report, such as the recommendation in the executive summary of the NAS report, "In the committee's view,

solidification options other than calcination (which results in the counterproductive conversion of SBW to HLW when SBW calcine is mixed in storage with HLW calcine) should be identified and one of them selected." The NAS also did not consider regulatory commitments or stakeholder opposition to the calciner (which many consider to be an incinerator). Also, there is no apparent basis for the implication that calciner upgrades could be completed faster than other treatment options, as they are all projected in the draft EIS to complete in the same time frame (2012-2015). Finally, the OIG report states that the NAS did not consider vitrification to be a reasonable treatment method for liquid waste. It was clarified at the meetings between our staffs that interpretations may differ on this point. However, EM cannot determine where the OIG assertion is stated in the NAS evaluation of vitrification, nor does the NAS caution against pursuit of vitrification in its list of overall recommendations.

- 1st paragraph: States that the NAS focused its attention on the shorter-term technologies.

Comments: It is the intent of EM to focus on the shorter-term technologies in its decision-making. However, the preferred alternative for the EIS must address the full purpose and need (which in this case includes HLW calcine treatment) and thus cannot just focus on the near-term SBW treatment mission.

Solid Waste Alternatives

- 1st paragraph, lines 1-3: Agree that the NAS proposed deferral of calcine treatment decisions, but only until certain items are known, not unilateral deferral as implied.

- 2nd paragraph, 11th line: Report recommends waiting a few decades to treat calcine.

Comments: All of the EIS calcine alternatives do wait two decades. EM believes the NAS was discussing the merits of waiting significantly beyond 2035 to treat calcine. However, EM will continue to consider options that will place calcine in a form suitable for disposal without requiring vitrification, preferably without deferral beyond 2035.

- 2nd paragraph, last line:

Comments: Note that HLW does not have to be shipped out of the State of Idaho to satisfy the SA. It must be made "road ready."

- 3rd paragraph: States that no Environment, Safety & Health analysis was performed comparing risks of a vitrification plant against risk of leaving calcine in the bins with no further treatment.

Comments: The EIS provides this, as well as an analysis of numerous other treatment alternatives. We did not analyze leaving the calcine in the bin sets for over 100 years and then treating it because the period of institutional control for the Idaho National Engineering and Environmental Laboratory (INEEL) was assumed to be 2095 in accordance with the Comprehensive Land Use Plan. Therefore, assuming that calcine treatment could occur that far

in the future would be speculative. Also, it should be noted that vitrification was not the baseline when the NAS report was issued.

Interpretation of the SA

- 1st paragraph:

Comments: The EIS does consider a full range of alternatives which are described in both the draft and the final EIS. Therefore, we believe that the OIG statements are in the context of the preferred alternative selection process. For clarification, the EIS project evaluated over 100 technologies and then narrowed them to eight options for waste processing (treatment) alternatives for liquid SBW and calcine in addition to a No Action Alternative. The draft EIS waste-processing (treatment) alternatives included upgrades of the existing calciner as well separations (including CsIX), ceramics (HIP), direct cement, vitrification, and sending the calcine to Hanford for treatment. These alternatives were developed to be representative of the environmental impacts from any specific technology that may be subsequently pursued. In addition, the EIS alternatives were modularized so the Department could pick any one technology from an alternative or a combination of technologies from the alternatives. In the final EIS, an additional option will be added in response to public comment (Steam Reforming), which is similar to Calcination. Thus, both the draft and final EIS evaluate other alternatives besides vitrification. However, as stated previously, the final EIS will present a technology-neutral preferred alternative.

Appendix 3

Comments in regard to the Health Physics Instrumentation Laboratory (HPIL) and Records Storage facility projects:

EM recognizes that, historically, alternative analyses to construction projects have not been formally documented in a manner that provides a detailed historical record of the basis for decisions. EM also recognizes that the Department in general is subject to construction and project management requirements and standards that significantly exceed those of private industry. With the recent issuance of DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*, and the vision set forth in the recently completed Top-to-Bottom review, EM is confident that acquisition decisions will be better documented, and that requirements and standards which add little or no value will be eliminated.

The 1995 OIG report referred to in this appendix stated that DOE-Idaho Operations Office (DOE-ID) proposed to construct a laboratory larger than the laboratory it was to replace. Subsequent to that report, DOE-ID reduced the size of the replacement laboratory to that of the existing structure. OIG's current report questions the underlying assumptions and accuracy of studies used to evaluate alternatives for the laboratory. The alternative selected was based on numerous factors, on which the studies in question had little or no significant bearing and would not have changed the decision made.

The HPIL is a replacement laboratory for an existing facility in deteriorated condition following over 50 years of service. Alternatives to new construction were considered and documented in the conceptual design report; and an external independent review by the DOE Office of Engineering and Construction Management found that the alternatives analysis was adequate and recommended proceeding with the project. The IG did not take these reports into consideration when drawing their conclusion on the inadequacy of the alternatives analysis. No existing facilities were found on site that could be cost effectively retrofitted to meet the shielding and deepwell calibration source storage requirements for the mission of the lab. Outsourcing was considered and advertised in the Commerce Business Daily, but rejected when vendors would not guarantee calibration of instruments after shipment. Even with outsourcing, INEEL would still require an on-site facility for receiving, storing, calibration verification, and special needs requests.

Project cost for the HPIL is $13.8 million and construction is underway and within cost and schedule contingencies. DOE-ID is unfamiliar with the $5.6 million estimate OIG cites as their recommendation for this facility. Also, the report cites the cost to calibrate instruments at Hanford as one-third less than that of Idaho during a period when the HPIL facility was off-line. The reason for this difference is that only the lower cost and less complex instruments were sent to Hanford. The more expensive and more complex instruments were held at ID until the HPIL facility came back on line.

-- The Records Storage Facility is a replacement facility (General Plant Project) for current storage that does not meet fire and electric codes. It was also justified on the rising cost of sending and maintaining records at the Seattle archives facility and the inability to continue to send records to that facility. Project cost was $4.5 million, the facility was built to DOE Order requirements and standards, and it was completed on schedule and within budget. The report cites DOE-ID for not using "standard construction practices" to lower the cost of the facility. DOE-ID built the facility to DOE Order requirements and standards.

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