



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

Audit Report

Department of Energy Efforts to
Dispose of Hanford's Chemical
Separation Facilities




Department of Energy

Washington, DC 20585

February 3, 2005

MEMORANDUM FOR THE SECRETARY

FROM:


Gregory H. Friedman
Inspector General

SUBJECT:

INFORMATION: Audit Report on the "Department of Energy Efforts to Dispose of Hanford's Chemical Separation Facilities"

BACKGROUND

In 1996, the Department of Energy (Department) established the Canyon Disposition Initiative. The Initiative was to develop a disposition path for Hanford Site's five chemical separation facilities, commonly referred to as canyons. As part of the Initiative, management recognized that canyon facilities could also be used to dispose of mixed waste (radiological and hazardous) and low-activity waste from other Hanford waste streams, and that this option needed to be evaluated.

The canyon facilities are particularly suited as waste disposal facilities because they were constructed with three to five foot thick concrete walls and six to eight foot thick foundations. Appendix 1 to the report shows one of the facilities and the surrounding area. As conceptualized, contaminated soils and construction debris would be placed inside and around the outside of the canyons and then covered with an engineered protective surface barrier. The Department chose the U-Plant canyon as the pilot project because it was the least contaminated of the canyons. Preliminary estimates were that the use of the five canyon facilities as waste disposal sites could significantly reduce waste disposal costs and the need for additional disposal facility capacity at Hanford.

The Record of Decision for the closure of the U-Plant, as well as the supporting remedial investigation and feasibility study, was to rely on the cost and technical studies completed as part of the Initiative. The Department's Richland Operations Office tasked Bechtel Hanford Incorporated to perform these studies. Because of the potential beneficial impact of this decision on health and safety conditions at Hanford and the related cost savings implications, we initiated this audit to determine whether the Department, in fact, had adequately considered using the U-Plant as a waste disposal site.

RESULTS OF AUDIT

Our audit disclosed that the Department did not thoroughly evaluate the feasibility and potential cost savings associated with using the U-Plant to dispose of mixed and low-activity waste from other Hanford sites. Although the Department concluded that it could entomb legacy waste currently in the U-Plant, the Bechtel Hanford study did not identify and quantify other waste streams that could be disposed of at the facility, nor did it adequately analyze the economic



benefits of using the facility as a disposal site. Instead, the study focused on characterizing and performing technical analysis on the structural integrity of the facility. In studying the merits of the Initiative, the Department did not ensure that the cost study was sufficient in scope, and once completed, never reviewed the study to determine whether it was accurate and complete or adequately supported the preferred alternative. As a result of not thoroughly evaluating the feasibility of using canyon facilities for waste disposal, the Department may not realize savings ranging up to \$500 million.

This report highlights the importance of the Department's oversight of its contractors' activities to ensure that decisions are based on reasonable and accurate assumptions and provide cost effective solutions to environmental, health and safety problems. As such, we have recommended that the Department take action to ensure that the study of the U-Plant is based on complete and accurate data and that the results are adequately considered and reflected in the Department's Record of Decision.

MANAGEMENT REACTION

The Acting Assistant Secretary for Environmental Management (EM) generally concurred with the recommendations in the report. In its initial comments and subsequent addendum, EM recognized that there were weaknesses in the early cost estimates. To ensure that the use of canyons are maximized in the future, management committed to identify waste disposal possibilities in current and near-term feasibility studies and modify the approved Record of Decision as appropriate. In addition, EM committed to assure that the appropriate level of oversight and review will be provided to ensure that decisions are based on sound technical, safety, and programmatic evaluations. We consider management's comments responsive to our recommendations.

Attachment

cc: Under Secretary for Energy, Science and Environment
Acting Assistant Secretary for Environmental Management

REPORT ON THE DEPARTMENT OF ENERGY EFFORTS TO DISPOSE OF HANFORD'S CHEMICAL SEPARATION FACILITIES

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Evaluation of Disposal Alternatives

Background

The Hanford Site is home to five large canyon facilities that were part of the Department's chemical separations process for many years. Four of the five canyon facilities are no longer operational and are awaiting disposition. Because of the nature of work performed in these facilities, they are contaminated with mixed wastes. A common method of dispositioning contaminated facilities is to decontaminate them and either close them in place or demolish them for disposal in a licensed disposal facility. The ultimate disposal method is determined by completing a Remedial Investigation/Feasibility Study (RI/FS) to identify the advantages and risks for each alternative, selecting a preferred alternative, and issuing a Record of Decision on the selected alternative.

Based on a 1995 concept paper, the Department decided to develop a disposition path for the five canyon buildings and, study the feasibility and potential cost savings available by using its canyon facilities for waste disposal sites. The unique structure of the canyons, three to five foot thick concrete walls and six to eight foot thick foundations, made them particularly suited to being used as disposal facilities. Preliminary estimates indicated that the use of the five canyon facilities for disposal of on-site mixed and low-activity waste could save the Department as much as \$17 million to \$500 million in waste disposal costs at Hanford and could reduce the need for additional disposal facility capacity. In 1996, the Department formalized the concept through the Canyon Disposition Initiative (Initiative) and tasked Bechtel Hanford Inc. (Bechtel) with evaluating the disposition path for the U Plant canyon building (see Appendix 1) and the potential feasibility and cost savings of using the canyon for waste disposal. Because the U-Plant had the lowest contamination level and gave engineers the best opportunity to test equipment and procedures in a relatively benign environment, it was selected as the pilot for the Initiative.

Waste Disposal Site Evaluation Methods

Bechtel did not conduct a thorough evaluation of the U-Plant to determine whether it could be used as a cost-effective waste disposal site. While characterization efforts and structural studies under the Initiative demonstrated that the U-Plant could meet land disposal requirements, Bechtel did not identify and quantify potential waste streams nor adequately study the economic benefits of using the facility as a disposal site. When the Department began considering the concept of disposing of waste in the canyon, mixed waste and immobilized low-activity waste were seen as potential waste streams for disposal at the U-Plant. However, when Bechtel began performing the feasibility study, they neither pursued these earlier waste streams nor identified additional potential waste streams.

Instead of studying potential streams, Bechtel simply inquired of program managers as to whether they had any waste they would like to dispose of in the U-Plant. When waste stream managers responded that they had planned to use existing or newly constructed land disposal facilities, Bechtel took no further action to identify candidate waste streams. Instead, Bechtel chose to establish an undefined or generic waste upon which to base its determination as to whether disposal in the canyons was economically feasible. As such, the cost comparison was general in nature and did not factor in treatment costs that are specific to mixed waste or higher classifications of low-level waste. Bechtel's cost study also did not include the cost of constructing new or expanding existing disposal facilities, both of which would have to occur should the canyons not be utilized for waste disposal.

We further observed that Bechtel's cost study did not consider incremental costs for specific types of waste. Depending on the waste stream, disposal costs can vary significantly. When Bechtel performed the cost comparison it did not account for such variances even though cost and waste inventory data was available. Specifically, Richland maintains a database that describes the nature and type of waste streams at the Hanford reservation. Bechtel, however, did not take advantage of such information and did not fully consider the economic impact of storing differing types and quantities of waste in the U-Plant.

In addition, Bechtel did not adequately consider the cost of building new or expanding existing land disposal facilities and other incremental expenses – costs that could have significantly impacted the economic viability of U-Plant storage. Currently, the Department operates three low-level waste disposal facilities at the Hanford Site and, according to the *Hanford Solid Waste Environmental Impact Statement Record of Decision*, has recommended that a new \$212 million disposal facility be constructed to dispose of immobilized low-activity waste. In addition to this facility, Hanford also plans to construct as many as four new disposal cells at the Environmental Restoration Disposal Facility to accommodate its low-level waste inventory. Based on prior years' operating costs, each new disposal cell costs approximately \$14 million to construct. However, these costs were not factored into Bechtel's cost study. We also noted that Bechtel had not considered or calculated the additional costs required for long-term surveillance and maintenance of the to-be-constructed disposal facilities.

Project Focus and Oversight

The U-Plant was not adequately considered as a waste disposal site because Bechtel focused its efforts on technical aspects and did not adequately consider economic benefits. While the technical work was necessary and important, its completion provided only a baseline determination as to whether the U-Plant was a viable disposal site and did not provide insight as to whether the Department could achieve overall cost savings. Rather than begin to study the economical benefits of disposing of waste in the canyons early on in the Initiative, Bechtel waited for five years to begin the study. Because of time constraints, Bechtel determined that it would perform only a limited review of waste streams and disposal costs as part of the RI/FS.

In addition to timeliness and completeness issues, the Department did not provide sufficient oversight to ensure that the cost study was accurate and complete. In reviewing the Department's involvement in the Initiative, we noted that it participated in occasional meetings to discuss the more technical issues associated with the U-Plant being used and permitted as a disposal facility. However, the Department did not provide the oversight necessary to ensure that the cost study was accurate and complete. For example, when Bechtel informed the Department that it had not found a waste stream and proposed using an undefined waste, the Department accepted the proposal without considering the effect it would have on the cost study.

We also learned that the Department did not review the cost study completed by Bechtel in 2001. During the audit, we requested a copy of the cost study from the Department to evaluate its accuracy and the assumptions used. Project managers responsible for oversight of the Initiative told us that they did not have a copy of the study and had not reviewed it prior to deciding to accept Bechtel's approach. Had the Department obtained and reviewed key assumptions contained in the cost study, it may have noted that the key project assumptions, such as use of an undefined waste form, unnecessarily limited the potential cost savings of using the U-Plant as a waste disposal site.

Unrealized Benefits

The Department may not realize savings varying from \$17 million to \$500 million in waste disposal costs if it does not thoroughly evaluate the feasibility of using the canyon facilities to dispose of additional waste. Further, the Department may unnecessarily expand or construct additional disposal sites at Hanford, thereby increasing its footprint for long-term monitoring once cleanup sites are closed.

RECOMMENDATIONS

We recommend that the Acting Assistant Secretary for Environmental Management:

1. Require the Manager, Richland Operations Office, to continue to pursue the Canyon Disposition Initiative by:
 - a. Having the contractor:
 - i. Consider all potential waste types at the Hanford Site as part of the cost study; and,
 - ii. Perform a more detailed cost study which takes into consideration the disposal cost for candidate waste types, the cost of expanding existing or constructing new disposal facilities, and the long term monitoring costs.
 - b. Providing adequate oversight and review of the study to ensure that assumptions are reasonable and costs are complete and accurate; and,
 - c. Ensuring that the results of the study are adequately considered and reflected in the Department's Record of Decision.
2. Consider the viability of disposing of waste in canyon and similar facilities at Idaho and Savannah River sites based on the results of the Richland study.

MANAGEMENT REACTION

In responding to the draft report, the Acting Assistant Secretary for Environmental Management (EM) stated that, in general, the Department agreed with the report's recommendations. However, some of EM's comments on the report were not completely consistent with the recommendations. EM provided an addendum to clarify its position on these issues. In its response, EM recognized that there were weaknesses in the early cost estimates. To ensure that the use of canyons are maximized in the future, management committed to identify waste disposal possibilities in current and near term feasibility studies and modify the approved Record of Decision as appropriate. In addition, EM committed to providing an appropriate level of oversight and review to ensure

that decisions are based on sound technical, safety, and programmatic evaluations.

Although management concurred with the recommendations, it had some concerns with the content and overall tone of the report. Specifically, management stated that:

1. Work was performed with frequent and open communication with all regulatory parties to ensure it was consistent with the objectives for the Initiative and that the effort resulted in an overall positive impact;
2. The primary objective of the Initiative was to develop a viable disposition path for the five canyon buildings at the Hanford Site and not to determine the feasibility and benefit of using the canyons as disposal sites. The disposal of waste in the canyons was seen as a significant potential benefit; and,
3. The decision to eliminate immobilized low-activity waste as a viable waste stream for the canyons was the result of an informed decision to avoid jeopardizing compliance with Tri-Party Agreement milestones.

AUDITOR RESPONSE

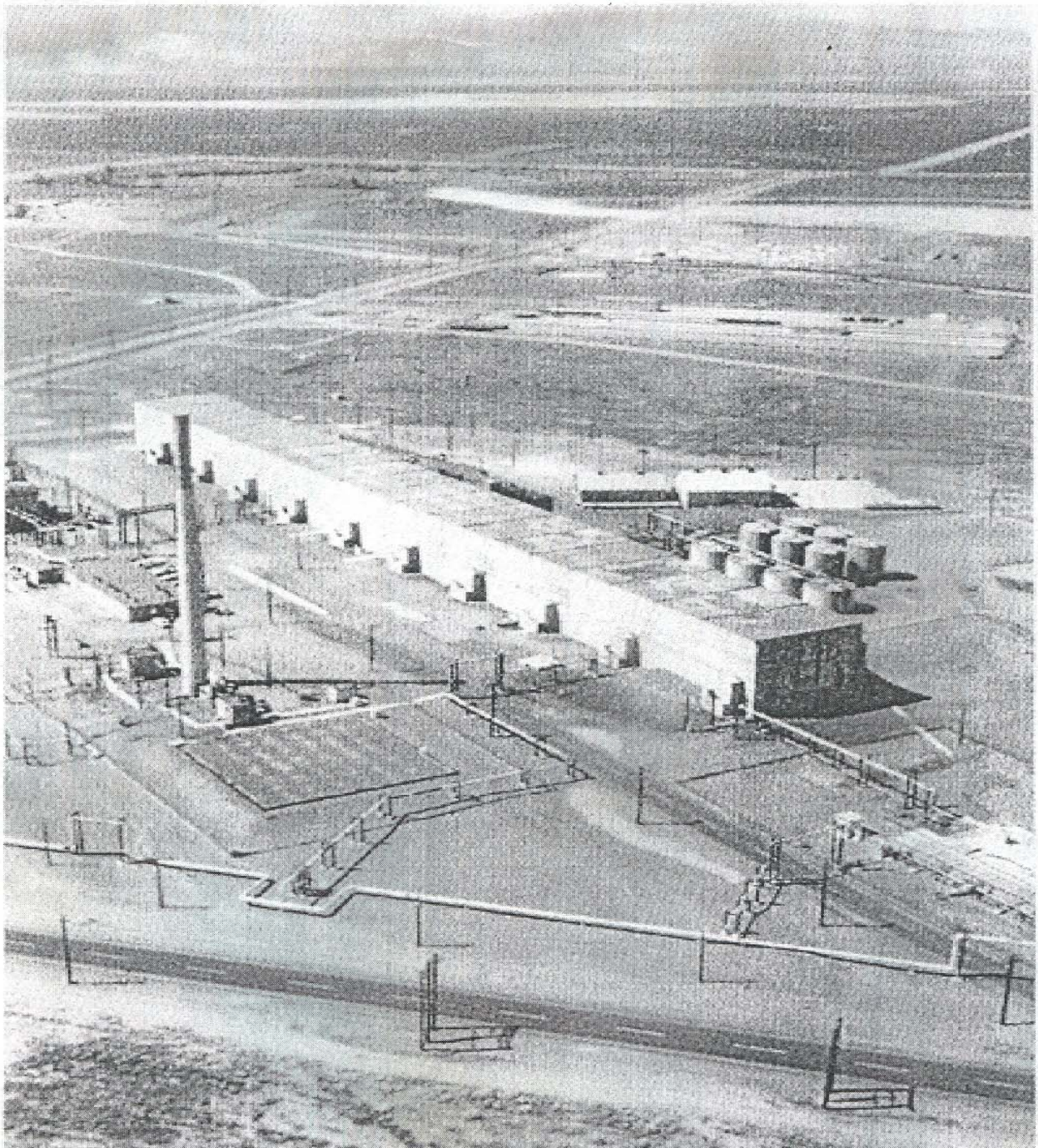
We consider management's comments to be responsive to the report's recommendations. However, we believe that the report content is accurate. We noted that there was communication with all regulatory parties during the course of the study. Nevertheless, this communication frequently dealt with permitting the facility as a disposal site and did not focus on the economic benefits addressed in the report.

Management also indicated that the primary objective of the Initiative was to develop a viable disposition path for the five canyons and not to determine the feasibility and benefit of using the canyons as disposal sites. While the Initiative does address the disposition of the five canyons at Hanford, determining if waste could be disposed of in the canyons was one of the primary drivers. In fact, had the focus not been the potential to dispose of waste inside the facility, the disposition path of the canyon would have followed the normal *Comprehensive Environmental Response and Compensation Liability Act* guidelines and would not have taken place until 2020. However, because the driver of the project was the disposal of waste inside and around the canyon, the Initiative's Agreement in Principle stressed that the decision to

dispose of wastes in the canyons was "time critical" to ensure that waste candidates for disposal were available in the planning time frame." If waste disposal was not a primary factor there would have been no "time critical" issues or concerns about waste availability for the canyons.

Management also stated that it made an informed decision to eliminate immobilized low-activity waste as a viable waste stream for disposal in the canyons to avoid jeopardizing milestones. Management anticipated that the Initiative would not be completed in time to accommodate the disposal of immobilized low-activity waste. While we do not disagree with management for making such an informed decision, such action corroborates our earlier statement that the intent of the Initiative was to determine the feasibility of disposing of waste in the canyon facilities and that the timing of the Initiative was critical to accomplish that objective.

Finally, Management asserts that a provision allows for the Record of Decision to be modified if an appropriate waste is identified. We agree that the Record of Decision can be modified; however, such modification should be based on a complete study of disposal alternatives. Management's plan to study alternative waste streams is a responsive step in achieving a meaningful Record of Decision.



Appendix 2

OBJECTIVE To determine whether the Department adequately considered using the U-Plant as a waste disposal site.

SCOPE We conducted the audit from March 2004 to July 2004, at the Hanford Site in Richland, Washington. The scope of the audit covered the Department's Canyon Disposition Initiative.

METHODOLOGY To accomplish the audit objective, we:

- Obtained and reviewed the original concept papers and the 1996 *Agreement in Principle* signed by the Tri-Parties supporting work done under the Initiative;
- Reviewed cost and technical data supporting the RI/FS;
- Researched Federal and Departmental regulations;
- Assessed internal controls and performance measures established under the *Government Performance and Results Act of 1993*; and,
- Interviewed key personnel in the Richland Operations Office, the Office of River Protection and Bechtel Hanford Incorporated.

The audit was conducted 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. We assessed internal controls established under the *Government Performance and Results Act of 1993* as they relate to the Initiative. 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 conduct a reliability assessment of computer-processed data because no computer-processed data was used during the audit.

We held an exit conference with management on December 6, 2004.

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