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OFFICE OF INSPECTOR GENERAL

AUDIT OF
THE USE OF HANFORD SITE RAILROAD SYSTEM

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

AUDIT OF
THE USE OF HANFORD SITE RAILROAD SYSTEM

Audit Report Number: WR-B-97-04
March 20, 1997

SUMMARY

One goal of the Department of Energy (DOE) is to manage its physical assets as valuable national resources. As outlined in a DOE Order, O 430.1, the Richland Operations Office (Richland) is responsible for the stewardship of the DOE's physical assets at the Hanford Site (Hanford). One such asset is the railroad system, which provides sitewide transportation services. Although Hanford's railroad system was established in the 1940s, it is still maintained in usable condition. The purpose of the audit was to determine whether Richland ensured that Hanford contractors were fully utilizing the railroad system.

The audit determined that Hanford's \$58 million railroad system was not fully used to support Richland's environmental programs. The asset was not integrated into Hanford's activities because Richland did not ensure that its contractor fully evaluated transportation alternatives for moving large quantities of material. The audit showed that if Richland incorporated the rail system into the transportation segment of one ongoing project, DOE could save about \$29 million over the life of that project.

We recommended that the Manager, Richland Operations Office, ensure that Hanford contractors fully implement the project management principles outlined in the DOE Order and take every effort to cost-effectively use the railroad system and other Hanford physical assets.

OFFICE OF INSPECTOR GENERAL

PART I

APPROACH AND OVERVIEW

INTRODUCTION

The DOE, in partnership with its contractors, strives to operate, maintain, and use existing physical assets to meet mission needs. Field offices have first line responsibility to ensure stewardship of the assets. Part of stewardship responsibility involves ensuring assets are fully evaluated for use in meeting the DOE's mission.

One of Richland's oldest, yet well-maintained multi-million dollar physical assets, is the Hanford railroad system. This system, constructed in the 1940s, includes tracks, railcars, and locomotives and provides sitewide transportation. Because of the availability of this asset, the objective of the audit was to determine if Richland ensured that Hanford contractors were fully utilizing the railroad system.

SCOPE AND METHODOLOGY

The audit was performed from July 16, 1996 through October 31, 1996, at Richland and its prime contractors: Bechtel Hanford Inc. and Westinghouse Hanford Company (Westinghouse was replaced by Fluor Daniel Hanford Inc. on October 1, 1996), as well as at Hanford.

We accomplished the audit objective by:

- o reviewing laws and regulations;
- o interviewing Richland and contractor personnel;
- o examining procurement and accounting procedures;
- o reviewing utilization of Hanford railroad system equipment;
- o comparing the cost of transportation by rail to the cost for trucking;
- o observing transportation by railroad and paved road; and,
- o reviewing and comparing transportation safety reports.

In addition, we interviewed officials from commercial firms engaged in transporting large volumes of contaminated material and suppliers of related heavy equipment required to load material onto railcars. We also spoke with Department of Transportation officials to determine the safety advantages of transporting material by railroad rather than by truck.

The audit, conducted in accordance to generally accepted Government Auditing Standards for economy and efficiency audits, included tests of internal controls, laws, and regulations to the extent necessary to satisfy the audit objective. We did not rely extensively on computer-generated data; therefore, we did not fully examine the reliability of that data. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed.

The findings in this report were discussed with Richland management and staff as well as contractor personnel responsible for transportation infrastructure and project management at Hanford. An exit conference was held on February 21, 1997, with the Assistant Manager, Environmental Restoration.

BACKGROUND

DOE's goal is to manage its physical assets as "valuable national resources." As outlined in the DOE Order, Richland is responsible for the stewardship of the DOE's assets at Hanford. The Order provides guidance for management to ensure a process for formal, comprehensive, integrated, and documented planning methods for the acquisition and use of the DOE's assets. One of the DOE's valuable national resources is the Hanford railroad system.

Although the railroad system was established in the early 1940s, it is still a valuable asset that has a current estimated replacement cost of almost \$58 million. Since Fiscal Year 1994, Richland has spent about \$8.8 million for upgrading switches and rail tracks, \$1.2 million for two new double shell tank railcars, and about \$100,000 for upgrading 43 flatcars.

At the time of the audit, the railroad system included 119 miles of track. As shown in the map on page 4, the track extends from the northern part of Hanford to commercial rail tracks south of Richland.

MAP OF THE HANFORD SITE

(MAP not included)

In addition to nearly 119 miles of track, the railroad system has four locomotives, 24 tank cars, 98 flatcars, and maintenance equipment. The cost to operate and maintain the track and related equipment was \$1,363,700 in Fiscal Year 1996. The railroad system has a budget of \$999,700 for Fiscal Year 1997.

PART II

FINDING AND RECOMMENDATIONS

Use Of Hanford Site Railroad System

FINDING

As part of its stewardship responsibilities, Richland must ensure that all available physical assets are integrated into the

project management process and used in a cost-effective manner to accomplish the DOE's missions. This audit determined, however, that the \$58 million railroad system was not used to support Richland's environmental programs. This asset was not integrated into Hanford's activities because Richland, contrary to the DOE Order, did not ensure its contractor, Bechtel Hanford Inc., fully evaluated transportation alternatives for moving large quantities of material within Hanford. Additionally, Richland planned to excess and dispose of the system; this discouraged potential system users from considering it for use in their cleanup plans. Our audit showed that if Richland incorporated the rail system into the transportation segment of one ongoing project, the DOE could save about \$29 million over the life of that project. In addition, by using the railroad to transport the material, the risk of accidents is significantly reduced.

RECOMMENDATIONS

We recommend that the Manager, Richland Operations Office, ensure that Hanford contractors:

1. Fully implement the project management principles outlined in DOE O 430.1.
2. Take every effort to cost-effectively use the railroad system and other Hanford physical assets.

MANAGEMENT REACTION

The Manager, Richland Operations Office, partially concurred with recommendation 1 and concurred with recommendation 2. The Manager's comments and auditor responses are presented in Part III.

DETAILS OF FINDING

The DOE's goal is to manage its physical assets as a "national resource." The Order outlines a process to ensure that resources, such as the railroad system, are used to accomplish DOE missions in the most cost-effective method. The Order requires field offices, such as Richland, to ensure that formal, comprehensive, integrated, and documented planning methods are used to manage the DOE's physical assets. In addition, this guidance requires project planning to ensure that physical assets are integrated with other projects and activities, and that asset design alternatives are considered.

The Order has assigned certain responsibilities for project management to the field offices. Under the Order, Richland is responsible for overseeing Hanford projects and verifying that contractors meet project management requirements, including consideration of alternatives. In addition, the Order establishes Richland as the lead for verifying that Hanford contractors use an economic approach to physical asset management when planning for the DOE's cleanup mission.

INTEGRATION OF PHYSICAL ASSETS FOR MISSION NEEDS

However, Richland had not ensured that the railroad system was used in ongoing projects or integrated into the planning process for future projects. During the audit, we noted several projects that could have effectively used the railroad system to accomplish the cleanup mission. One ongoing restoration project operated by Bechtel, for example, involves the movement by truck and disposal of over 4.6 million cubic yards of low-level radioactive contaminated soil. Over the life of this project, the estimated cost to use trucks to transport the soil is almost \$128 million.

Bechtel, however, when planning the restoration project, recommended the use of trucks without fully evaluating the use of the railroad system. When the Office of Inspector General (OIG) inquired about the possibility of using the railroad system, Bechtel officials stated that they did not want to use the railroad because they would have to share the railroad resources with another project in Hanford's 200 West Area. However, our review showed that sharing transportation resources was not an issue because waste from the 200 West Area was being moved by pipeline. Bechtel also raised concerns about the cost for special equipment to load and unload the trains. Even with additional equipment, however, the cost of transporting by railroad averages over \$1.4 million per year less than the cost of transporting by truck.

In addition to the ongoing project, we also determined that future projects could use Hanford's railroad system. For example, contractors at Hanford could use the railroad system to:

- o transfer radioactive waste from 300 Area laboratories in 1998;
- o move 2.4 million gallons of contaminated liquids from the 100 Area K-Basins starting in 2001;
- o move transuranic waste from other DOE sites to Hanford's new Waste Receiving and Processing facility;
- o eventually move excess and/or contaminated railroad equipment; and,
- o transport nearly 2,500 cubic yards of low-level radioactive contaminated rubble from the decommissioning of seven production reactors.

CONSIDERATION OF ALTERNATIVES

The Order gives Richland the lead for verification that Hanford's contractors have a cost-effective approach to physical asset management. However, despite several completed reports suggesting that the railroad system was cost effective, Richland did not ensure that Bechtel fully evaluated the most economical transportation alternatives. In fact, Hanford contractors produced seven reports since 1992 that advocated the use of the

railroad system for cost-effective movement of material. In one such report, "Site Transportation System Evaluation" (August 8, 1995), the railroad system was selected as the most cost-effective mode of transport for bulk and hazardous material. In addition to the Hanford reports, a May 1992 OIG report "Packaging, Transporting, and Burying Low-Level Waste," showed that railroads were the most cost-effective method to transport bulk shipments.

Not fully evaluating alternatives was also the topic of a March 1995 OIG Report, "Audit of Richland Operations Office Site Characterization Program." The OIG reported that Richland had not evaluated alternatives before deciding on more costly methods to complete characterization objectives and recommended that Richland develop procedures to ensure economic analyses of all alternatives are completed before making decisions as to how a program objective will be accomplished.

Project managers also did not consider using trains on future projects. This happened because project managers believed Richland's senior management considered the railroad nonessential. This view is supported by a number of actions taken by Richland. On January 23, 1996, for example, Richland approved the Hanford railroad system's degradation from Class 3 to Class 1. This action, if continued, will eventually decrease the effectiveness of the railroad because it reduces the safe operating speed of the train from 40 miles per hour to 10 miles per hour as the system degrades. Another example occurred just after the start of our audit when Richland's Director of Site Infrastructure directed a Hanford contractor to excess all the flatbed railcars and one locomotive. During this period, another Hanford contractor completed a draft study for the ultimate disposal of all railroad assets. Finally, Richland has continued to support Bechtel's plans to remove usable railroad tracks in the 100 B/C and 100 D/DR Areas of Hanford so that Bechtel can more effectively use its trucks to move contaminated soil.

Richland, by not ensuring its contractors fully evaluate alternatives and allowing the railroad system to degrade, is eliminating a valuable alternative for movement of large quantities of bulk material. The railroad system, currently maintained as Class 3, provides the safest and least costly method to move bulk material. In addition, with proper maintenance, the system will last until the end of the Richland environmental mission.

COST-EFFECTIVE USE OF RAILROAD SYSTEM

As noted, a previous OIG report showed that the use of trains to haul bulk material is less costly than the use of trucks. The OIG recommended using rail for bulk shipments and to evaluate the feasibility of using a combination of rail and other shipment methods, including trucks. Richland could also realize savings if Bechtel used the Hanford railroad system to transport bulk shipments of contaminated material. Richland, for example, would save over \$29 million over the life of the project to remove 4.6 million cubic yards of contaminated soil. These

savings could be realized even though Richland would have to purchase equipment, build additional rail spurs, and pay contract termination costs to a trucking firm for the current transportation contract.

Additional monetary savings will also occur due to decreased use of Hanford's road system. For example, Bechtel estimates that using trucks to transport the 4.6 million cubic yards of soil will completely degrade the haul roads after 5 years. Consequently, Bechtel plans to gravel the roads once the asphalt has deteriorated. The change to gravel roads will not only impact road maintenance costs but will also impact operations by reducing haul speeds. The combination of these factors will, therefore, increase the cost to haul contaminated soil to Hanford's disposal facility.

Effectively using trains on current projects will also provide a valuable asset for future projects. For example, although the future projects discussed earlier cannot by themselves support the cost of the railroad system, each could use the system to reduce project costs. In addition, DOE has projects that could use trains which will not even start until early in the next century. One such project is the movement of transuranic waste from the Idaho National Engineering and Environmental Laboratory to a waste handling and packaging facility at Hanford.

Finally, using trains rather than trucks will also result in nonmonetary safety benefits. According to Department of Transportation statistics, trains were 72 times safer per ton-mile than trucks in Calendar Year 1994. At Hanford, in fact, employees have operated the railroad system for over 48 years without lost time from injury.

PART III

MANAGEMENT AND AUDITOR COMMENTS

The Manager, Richland Operations Office, partially concurred with recommendation 1 and concurred with recommendation 2. He also commented on the report's observations and conclusions, finding, and reasonableness.

Management Comments. The Manager only partially concurred with recommendation 1, to fully implement project management principles outlined in the DOE Order, because he stated that every effort had already been made to ensure that Hanford contractors fully implement them. Likewise, the Manager disagreed with the report's finding that project management principles had not been fully implemented by pointing out that Richland completed a value engineering study on various waste transportation modes, including the railroad system, in February 1997.

Auditor Comments. Despite his use of the term "partial" concurrence, the Manager's response addresses the OIG's concern about the absence of evaluating alternatives before making

decisions. A value engineering study that fully documents fair analyses of all alternatives is appropriate and consistent with DOE policy. Further, the value engineering study was finished after the audit verification work was completed.

Management Comments. The Manager concurred with recommendation 2 to take every effort to cost-effectively use the railroad system and other Hanford physical assets. He added that the railroad system is recognized as a sitewide asset and will continue to be evaluated as an alternative for transportation functions. For at least one project, transfer of waste from the 300 Area laboratories, the railroad has been selected as the preferred transportation method.

Auditor Comments. The Manager's comments are responsive to the recommendation.

Additional Comments

Management Comments. The Manager said the decision to utilize trucks to transport waste to the Environmental Restoration Disposal Facility was based on the need to reduce initial capital costs of the Disposal Facility. The value engineering study also supported this decision.

Auditor Comments. At the exit conference, a contractor representing Richland and Bechtel described the results of the 4 day value engineering study. He said that the study did not recommend either the current method of transport or trains, but suggested an alternative transportation method using trucks which may be best suited for the project. The study concluded that changing from the current trucking approach to a modified system could save DOE over \$16 million. The study also showed that a railroad with trucking option had the lowest total cost.

Although we did not fully review this study, it appeared responsive to our recommendation. However, there are some concerns. First, the study was staffed primarily with contractor personnel involved in the original decision to use trucks. Other key individuals, such as Hanford railroad experts, site infrastructure personnel, and Richland budgeting and safety personnel did not participate in the study. These individuals could have brought additional perspective and objectivity to the study. Additionally, the study's ranking factors included a number of intangible criteria such as "simplest system, safest operations and maintenance, best meets schedule, and most flexible to operate." The only criteria used for the original decision was capital cost. Finally, the brevity of this 4 day study may not have resulted in sufficient depth to support a major program decision.

Management Comments. The Manager stated that truck usage will be required in addition to the railroad system to service small and widely scattered remediation activities. The Manager further said that the OIG had not included these costs in its estimated monetary impact statement.

Auditor Comments. The railroad is adjacent to most remedial sites. Any additional trucking should therefore be minimal.

Management Comments. The Manager did not think there was sufficient basis to support a savings estimate of \$29 million. Although recently performed project estimates indicated that the railroad system could have lower life-cycle costs than trucks, the amount of such savings is highly dependent on key assumptions including funding, schedule, and waste volumes. Estimates indicate that reducing the amount of material to be remediated and transported to the Disposal Facility could decrease the advantages of the railroad system and may eliminate it as a viable alternative. The OIG report shows a break-even in year 2003. Due to uncertainty of volumes, remediation rates, and funding availability, it is possible that program may never reach the break-even point. The Manager also stated that a 10-year plan is being developed which will further impact savings.

Auditor Comments. Any estimate involves judgments about future events. Our analysis was based on the best data provided by Bechtel, including its multi-year work plan showing the remediation effort taking place over a 20-year schedule. Further, Richland and Bechtel officials and other Hanford contractors assisted in our savings analysis and fully reviewed our analysis. Based on these reviews, we adjusted our cost estimates downward to the \$29 million figure cited. During the audit, Richland did not present any evidence that data used to complete the 20-year schedule was not current and accurate.

We are still not aware of changes in budget, volumes, or schedule that would affect our estimates. In fact, Richland is committed by the Tri-Party Agreement to support the project as shown in our report. Reductions in the quantities of contaminated material to be moved will have to be agreed to by the Environmental Protection Agency and the Washington State Department of Ecology under the Tri-Party Agreement. We were not aware of any agreed upon changes to the Tri-Party Agreement.

Finally, without decreasing the waste volumes, a move to a 10-year schedule will require increases in funding levels. However, should Richland initiate a 10-year plan, our analysis showed trucks were still over \$15 million more costly than the Hanford railroad system.

Management Comments. The recommendation not to utilize existing tracks in the 200 West Area for transporting waste to the Disposal Facility was made by Bechtel's predecessor. A new 8-mile railroad spur outside the 200 West Area would have been required and the expense of constructing such a spur was considered excessive in light of project budget reductions.

Auditor Comments. Even with the new spur, which was estimated to cost \$13 million, a lifecycle analysis would have supported the use of trains.

Management Comments. The Manager did not agree with our assessment concerning the damage to Hanford highways. The

Manager stated that roads will have an expected service life of 5 years and may last longer. Remediation sites at 100-B/C will be completed in less than 4 years and burial ground remediation will take place later and may continue another 4 years.

Auditor Comments. Although work at any one site may take less than 4 years, Bechtel planning documents show a project life of 20 years. Common roads such as Route 4 North will therefore need extensive maintenance. In addition, roads such as Route 4 North will continue to be used after the 100 areas have been remediated.

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