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

Audit Report

Well Decommissioning Activities at the Hanford Site

DOE/IG-0670

January 2005

Department of Energy
Washington, DC 20585

January 3, 2005

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "Well Decommissioning Activities at the Hanford Site"

BACKGROUND

The Hanford Site, located in Richland, Washington, is the largest of the three original defense production sites within the Department of Energy complex and is currently the world's largest environmental cleanup project. As a result of fifty years of nuclear weapons production, 1.7 trillion liters of radioactive and hazardous waste have been released into the ground at Hanford. Some of this waste has contaminated the groundwater through various migration paths. The Department, through its Richland Operations Office (Richland), has initiated a *Hanford's Groundwater Management Plan* (Groundwater Plan) which includes, among other activities, decommissioning wells at the Hanford Site in order to prevent additional contaminants from reaching the groundwater.

Over the years, a number of wells have been drilled at Hanford to monitor the release of contaminants to groundwater. Many of these wells were drilled through or directly adjacent to waste sites. A large percentage of these wells were also completed prior to the institution of requirements designed to limit the possible migration of water down the well casing to the groundwater. While their original purpose was to detect releases of contaminants, many of these wells have now been abandoned and have become potential pathways for contaminants. Richland estimates that as many as 3,500 of the approximately 7,000 wells at the Hanford Site are unused and must be decommissioned as promptly as possible to prevent additional contamination pathways and to satisfy Washington State environmental requirements. Because of the importance of this issue, we initiated this audit to determine whether Hanford site wells are being decommissioned in a timely manner.

RESULTS OF AUDIT

Our audit disclosed that Richland's well decommissioning program was not as robust as it could or should have been. Although Richland officials estimate that the site has the capability to decommission between 104 and 150 wells per year, only 146 wells were decommissioned in the three year period from Fiscal Year 2002 to 2004. Further, despite

plans to accelerate the decommissioning of the wells in Fiscal Year 2004, performance in this area has not significantly improved. Specifically, of the 133 wells planned for decommissioning in the accelerated Fiscal Year 2004 schedule, 44 had not been completed by fiscal year end. Richland's progress in this area was impeded by the lack of a comprehensive well decommissioning plan. In particular, the shortcoming of Richland's existing plan was that it was not based on:

- A comprehensive inventory that described the type, age, condition, and location of all wells at the site;
- Risk-based scheduling and prioritization; and,
- An accurate estimate of funding and resources necessary to complete decommissioning activities.

We found that there is a direct link between prompt treatment of the wells and efforts to reduce or eliminate the risk that contaminants could migrate directly into the groundwater. Richland could also face potential enforcement actions by the State of Washington Department of Ecology should it not make adequate progress in decommissioning activities.

The Office of Inspector General has previously reported on problems with the Department's groundwater management programs. For example, in our report on *Groundwater Remediation Activities at Hanford* (DOE/IG-0655, July 2004), we found that the Department had not made significant progress in its efforts to remediate Hanford's groundwater and that pump-and-treat systems installed for this purpose had been largely ineffective. While Richland has made progress in coordinating those groundwater issues with regulators, additional action is needed to reduce the risk associated with potential contamination associated with unused wells. In that connection, we have made several recommendations designed to improve well decommissioning activities at Richland.

MANAGEMENT REACTION

The Assistant Secretary for Environmental Management (EM) generally concurred with the recommendations in the report, but did not fully agree with certain conclusions contained in the report. EM's comments and our response are summarized beginning on page 3 of the report and are included in Appendix 3.

Attachment

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

REPORT ON WELL DECOMMISSIONING ACTIVITIES AT THE HANFORD SITE

TABLE OF CONTENTS

Well Decommissioning

Details of Finding 1

Recommendations 3

Comments 4

Appendices

1. Objective, Scope, and Methodology 6
2. Prior Audit Reports 7
3. Management Comments 8

WELL DECOMMISSIONING

Well Decommissioning Activities

Abandoned and unused wells have not been decommissioned in a timely manner at the Hanford Site. According to the Washington Administrative Code (WAC), any well which is unusable, abandoned, permanently discontinued, an environmental, safety or public health hazard, or in such disrepair that its continued use is impractical, must be decommissioned. Hanford has approximately 7,000 wells, of which almost 3,500 meet the WAC criteria for required decommissioning. Based on prior decommissioning activities and discussions with contractor personnel, site officials told us that an average of two to three wells can be decommissioned per week. At this rate, between 104 and 156 wells could be decommissioned in a given year. However, in the past three years, Fiscal Years (FY) 2002 through 2004, a total of only 146 wells were decommissioned.

Even though Richland had planned to increase the decommissioning of wells from FY 2004 through 2006, it has yet to significantly improve its rate of decommissioning. We noted that Richland had planned to decommission 520 wells by the end of FY 2006, a considerable increase over past decommissioning rates. However, of the 133 wells identified for decommissioning in its FY 2004 accelerated schedule, 44 of the wells, or about 33 percent, had not been completed by the end of the fiscal year.

Decommissioning Plans and Priorities

Wells have not been decommissioned promptly at Hanford primarily because Richland had not developed a comprehensive well decommissioning plan. Specifically, we noted that the existing well decommissioning plan did not outline the total inventory of WAC wells and did not include a risk-based prioritization schedule or a complete resource and cost estimate. In addition, the database used for well decommissioning contains inaccurate data and was not easily accessed.

While Richland has issued the *Hanford Site Well Management Plan* (Well Plan), which includes roles and requirements to manage the drilling, completion, maintenance, remediation, and decommissioning of all wells supporting Richland, it is not comprehensive enough to allow for effective management of the decommissioning process. Specifically, the Well Plan does not include the number of wells that have been decommissioned or identify the number that still require action. In addition, it lacks a risk-based prioritized schedule – taking into account the age, condition, and potential for contamination of groundwater – of wells to be decommissioned and the estimated cost estimates of

such activities. As of July 2004, Richland also had not completed an inventory or verified the status of onsite wells, nor had it performed a comprehensive risk assessment and prioritized Hanford Site wells for decommissioning.

Further, while Richland maintains a database containing specific information on the wells located at Hanford, the information is not incorporated into the Well Plan. Additionally, information in the database is not easily accessed and can be misleading. For example, when we requested a comprehensive list of onsite wells, the information we were provided contained over 12,000 well identification numbers, suggesting that there were 12,000 wells onsite. However, upon further examination we determined that many of the well identification numbers were listed multiple times under different categories. Further, the information in the database has been passed down from contractor to contractor and had never been verified. Specifically, despite earlier assumptions to the contrary, the current contractor did not know whether the wells listed in the database as "abandoned" have ever been decommissioned. During the course of our audit, the contractor recognized deficiencies in the database and had already taken some corrective actions to improve reliability of the information.

Richland officials informed us that a lack of resources had limited their ability to increase decommissioning rates. While we do not dispute this assertion, we note that the lack of a defined risk-based schedule that outlined the potential hazards of not making adequate progress likely contributed to funding shortfalls. Without complete information, officials charged with allocating funds apparently chose to devote resources to projects they perceived to carry higher risks.

Public Health Risks and Costs

The continued existence of these abandoned and unused wells poses a risk to the environment – creating potential pathways for contaminants to migrate directly to the groundwater and eventually into the Columbia River. For example, in 1985, Richland discovered that at least one high-risk well, possibly multiple wells, had allowed uranium to migrate to the groundwater. Despite the passage of almost two decades, action was not taken to decommission these dangerous wells. Without accurate and up-to-date information regarding the condition of Site wells, it is likely that the Department will continue to experience delays and may be unable to improve its performance. Further, Richland may also be subject to potential enforcement action by the State of Washington

Department of Ecology for wells that have not yet been decommissioned. Finally, Richland officials may be unable to sustain or justify funds needed to accelerate the decommissioning without a risk-based assessment of the site's needs.

The development of a sound risk-based approach, based on a complete inventory of site wells, is also critical to the success of the decommissioning program. Incomplete information regarding the age, condition, location, and design of certain wells can delay or impede decommissioning efforts. For example, without adequate planning, the decommissioning of 70 "Webster-type" wells by FY 2006 could be delayed. These types of wells are more costly and difficult to decommission and may require the use of special techniques to perforate the well casings. According to discussions with Richland, contractor, and security personnel, increased security conditions may require curtailing the use of certain procedures, resulting in a possible delay in the contractor's schedule. To avoid or mitigate such delays, officials need to incorporate these factors into the overall risk assessment and develop contingency plans as appropriate.

RECOMMENDATIONS

We recommend that the Assistant Secretary for Environmental Management direct the Manager, Richland Operations Office to:

1. Conduct a complete inventory and verify the status of all onsite wells;

2. Perform a comprehensive risk assessment of all wells at the Hanford Site;

3. Develop and implement a comprehensive Well Plan to decommission required wells using data obtained from completing recommendations 1 and 2;

4. Update the database to ensure that information on wells is current, accurate, and complete; and,

5. Allocate funding to implement the Well Plan.

MANAGEMENT REACTION

The Assistant Secretary for Environmental Management (EM) generally concurred with the recommendations in the audit report.

Management comments are included in their entirety in Appendix 3. Although management concurred with the report recommendations, they provided an attachment that discussed several issues in the audit report. Management stated that:

1. Only 2,150 wells are required to be decommissioned based on the 2002 *Performance Management Plan for Accelerated Cleanup at the Hanford Site* (Performance Management Plan);

2. EM planned to decommission 90 wells during Fiscal Year 2004, not the 133 stated in the report; and,

3. EM is not limited to decommissioning 104-150 wells per year and that more wells could be decommissioned per year if funding was deemed necessary since much of this work is contracted out.

AUDITOR RESPONSE

We consider management's comments are responsive to the report's recommendations. Management contends, however, that only 2,150 wells need to be decommissioned based on the 2002 Performance Management Plan. During the course of the audit we obtained more recent Departmental data from Fiscal Years 2003 and 2004 that indicate approximately 3,500 wells require decommissioning. Hanford's Groundwater Management Plan (March 2003) states less than half of the Site's 7,000 wells are in use, and according to the Washington Administrative Code, any well which is unused is to be decommissioned.

Management also indicated that EM planned to decommission 90 wells during Fiscal Year 2004, not the 133 stated in the report. We realize that the schedule for the 133 wells to be decommissioned in Fiscal Year 2004 was not the baseline, however, the Department and the contractor both agreed to an accelerated schedule to decommission 133 wells during Fiscal Year 2004. The schedule to decommission 133 wells would have aided management in meeting the goal of decommissioning 520 wells by the end of Fiscal Year 2006.

Finally, management explained they are not limited to decommissioning rates of 104-150 wells per year as stated in the report. We agree that more wells could be decommissioned per

year if funding for these activities increases, allowing management to hire more contractors to perform well decommissioning activities. The 104-150 is simply an average based on historical decommissioning rates.

Appendix 1

OBJECTIVE

We conducted the audit to determine whether Hanford Site wells are being decommissioned in a timely manner.

SCOPE

We conducted the audit from May to November 2004, at the Hanford Site in Richland, Washington. The scope of the audit covered Richland's well decommissioning activities.

METHODOLOGY

To accomplish our objective, we:

- Obtained and reviewed planning documents for well decommissioning activities;
- Researched Federal and Departmental regulations;
- Reviewed findings from prior audit reports regarding well decommissioning activities;
- Reviewed the Fluor Hanford, Inc. contract with the Richland Operations Office;
- 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 and the Office of Environmental Management.

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 related to Richland's well decommissioning activities at the Hanford Site. 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 reviewed the Hanford Well Information System and determined it was not reliable or accurate; therefore, we did not rely upon computer-processed data during the audit.

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

PRIOR AUDIT REPORTS

- *Groundwater Remediation Activities at Hanford* (DOE/IG-0655, July 2004). The audit disclosed that the Department had not made significant progress to remediate Hanford's groundwater. Pump-and-treat systems installed as remediation measures have been largely ineffective, and plans to install surface barriers as a final remediation action for groundwater in certain areas of the site may be inappropriate due to a yet undefined "end-state" for groundwater at Hanford. As a result, Richland risks the further contamination of groundwater and the continued expenditure of funds on a largely ineffective technology. In addition, more than $230 million is scheduled to be spent on surface barriers that may be inconsistent with the end-state developed for the Hanford Site.

- *Groundwater Monitoring Activities at Department of Energy Facilities* (DOE/IG-0461, February 2000). The audit disclosed that some Departmental sites had not adopted innovative technologies and approaches to groundwater monitoring. Groundwater monitoring activities were not being conducted as economically as possible. As a result, opportunities to reduce operating costs by about $3.6 million annually and to improve groundwater monitoring efficiencies were not realized.

- *Audit of Groundwater Monitoring at Hanford* (WR-B-97-03, November 1996). The audit showed that while Richland's groundwater monitoring program was mission essential, it was not performed at the least cost to the Department. Work performed by three contractors overlapped, resulting in duplicative groundwater monitoring activities. Because of duplicative efforts, the Department spent at least $700,000 in Fiscal Years 1995 and 1996 more than it should have and could save at least $500,000 annually by implementing action to ensure coordination of contractor's work for Hanford groundwater monitoring.

United States Government Department of Energy

memorandum

DATE: December 9, 2006

REPLY TO ATTN OF: EM-21 (P. Beam, 301-903-8133)

SUBJECT: Response to Office of Inspector General on Draft Audit Report Entitled "Well Decommissioning Activities at the Hanford Site"

TO: Rickey R. Hass, Assistant Inspector General for Audit Operations
Office of Inspector General, IG-32

Thank you for the opportunity to respond to your draft audit report on well decommissioning activities at Hanford. Attached are specific comments concerning the draft report detailed findings for consideration in development of the final report.

I offer the following comments regarding the draft report recommendations.

1. Conduct a complete inventory and verify the status of all onsite wells.

   The Office of Environmental Management (EM) agrees to publish a well inventory within a new well decommissioning document. To provide additional focus to this area, the Hanford Well Management Plan will be supplemented with a well decommissioning plan document. This new well decommissioning plan will consolidate and expand the existing well decommissioning plans. It will also include a field walkdown plan and schedule for open wells that have not been verified since the creation of the well inventory database. The risk-based approach used to date has been appropriate for the current work activities; however, this additional effort will be useful for future planning purposes beyond 2006.

2. Perform a comprehensive risk assessment of all wells at the Hanford Site.

   EM agrees that it would be beneficial to update and publish the current risk assessment strategy. This will be included in the new well decommissioning plan. EM is following a prudent risk-based approach to verify and decommission wells. EM has regulator and stakeholder acceptance of well decommissioning activities through 2006 as described in the Hanford Groundwater Management Plan and the Hanford Management Plan for Accelerated Cleanup of the Hanford Site.

   EM well decommissioning activities must be prioritized with respect to the remaining Hanford cleanup activities. Some monitoring wells that pose no risk to the environment will be not decommissioned until the priority cleanup activities are completed.

3. Develop and implement a comprehensive Well Plan to decommission required wells using data obtained from completing recommendations 1 and 2.

   EM agrees to create a new well decommissioning plan using information obtained from addressing recommendation 1 and 2. Well decommissioning activities through 2006 are planned in detail and accepted by the regulators and stakeholders. This new document will apply the current risk-based approach to create detailed planning for the remaining wells. As before, EM will then seek regulator and stakeholder input and acceptance of its well decommissioning strategy.

4. Update the database to ensure that information on wells is current, accurate, and complete.

   EM agrees to update the well database as new information becomes available from addressing recommendations 1, 2, and 3. The database is always kept up-to-date with the current well information. The well database was created through a consolidation of site records during the 1990s. Many field verifications were performed throughout the site as the database was being populated. Field verifications have continued in the areas where cleanup activities have been performed.

5. Allocate funding to implement the Well Plan.

   EM agrees to fund implementation of the new well decommissioning plan as cleanup priorities dictate. The new well decommissioning plan will provide a risk-based schedule for completing the well decommissioning activities. Well decommissioning activities planned through 2006 have already been identified and funded as priority actions. EM anticipates completing the fiscal year 2006 well decommissioning commitments for high-risk wells on schedule.

If you have any further questions, please call me at (202) 586-7709, or Ms. Sandra Waisley, Director, Office of Cleanup Technologies, at (202) 586-3087.

Paul M. Golan
Acting Assistant Secretary for
Environmental Management

Attachment

IG Report No. DOE/IG-0670

CUSTOMER RESPONSE FORM

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We wish to make our reports as responsive as possible to our customers' requirements, and, therefore, ask that you consider sharing your thoughts with us. On the back of this form, you may suggest improvements to enhance the effectiveness of future reports. Please include answers to the following questions if they are applicable to you:

1. What additional background information about the selection, scheduling, scope, or procedures of the inspection would have been helpful to the reader in understanding this report?

2. What additional information related to findings and recommendations could have been included in the report to assist management in implementing corrective actions?

3. What format, stylistic, or organizational changes might have made this report's overall message more clear to the reader?

4. What additional actions could the Office of Inspector General have taken on the issues discussed in this report which would have been helpful?

5. Please include your name and telephone number so that we may contact you should we have any questions about your comments.

Name _____ Date _____

Telephone _____ Organization _____

When you have completed this form, you may telefax it to the Office of Inspector General at (202) 586-0948, or you may mail it to:

Office of Inspector General (IG-1)
Department of Energy
Washington, DC 20585

ATTN: Customer Relations

If you wish to discuss this report or your comments with a staff member of the Office of Inspector General, please contact Wilma Slaughter at (202) 586-1924.

The Office of Inspector General wants to make the distribution of its reports as customer friendly and cost
effective as possible. Therefore, this report will be available electronically through the Internet at the following address:

U.S. Department of Energy Office of Inspector General Home Page
http://www.ig.doe.gov

Your comments would be appreciated and can be provided on the Customer Response Form