DOE/IG-0542

AUDIT REPORT

SOIL WASHING AT THE ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT

JANUARY 2002

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

U. S. DEPARTMENT OF ENERGY
Washington, DC 20585

January 28, 2002

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)
Inspector General

SUBJECT: INFORMATION: Audit Report on "Soil Washing at the Ashtabula Environmental Management Project"

BACKGROUND

The RMI Titanium Company's Earthline Technology Division (RMI) is the Department of Energy's (Department) environmental restoration contractor at the Ashtabula Environmental Management Project (AEMP) in Ashtabula, Ohio. RMI owns the Ashtabula property, formerly known as the RMI Extrusion Plant, where the firm processed uranium for the Department and its predecessor agencies. In March 1993, the Department awarded RMI a sole-source, cost-reimbursable contract to clean the extrusion plant and adjacent grounds to a level that permits release of the site for unrestricted use. The contract requires that RMI complete the project on or about March 31, 2003. The Department estimated the project would cost about $237 million to complete.

As part of the original decommissioning plan, RMI was required to excavate and ship about 40,000 tons of contaminated soil offsite for disposal. However, in January 1997, RMI began testing a soil washing process designed to chemically extract uranium from contaminated soils. Based on the test results, the Department expected that soil washing would reduce the volume of soil requiring disposal by 95 percent, generate minimal amounts of radioactive wastewater, and reduce cleanup costs by about $40 million. With the Department's approval, RMI spent over $6 million of Department funds to design and build the soil washing complex. In May 2000, RMI completed its first operating campaign in which it had hoped to process about 14,200 tons of soil. Since the campaign ended, RMI has been evaporating radioactive wastewater generated by the soil washing facility and researching alternatives to improve the performance and cost effectiveness of the plant. No additional soil has been processed.

The objective of the audit was to determine whether the AEMP's soil washing project has met the Department's performance and cost expectations.

RESULTS OF AUDIT

Despite investing over $6 million on a soil washing facility, the Department has not realized the expected performance improvements or reductions in site remediation costs. In fact, in its first campaign, the facility treated only 9,840 tons of soil, less than 70 percent of the soil prepared for treatment. Further, the process generated over 240,000 gallons of radioactive wastewater, far more than anticipated. We found that the soil treatment process had a number of known technical problems which were not resolved by RMI prior to this costly effort. Further, until recently, the Department did not adequately monitor RMI's activities to ensure that the facility was operating as planned. As a result, the facility has provided little or no value-added benefit.

As important, washing the remaining soil could cost the Department between $6.1 million and $13.3 million more than shipping the soil offsite for disposal. While we recognize that disposal offsite has its own set of challenges, we concluded that the cost differential and remaining technical problems associated with soil washing at RMI suggested that this process be terminated.

MANAGEMENT REACTION

Management partially concurred with the audit finding and recommendations but disagreed with some of our conclusions. A summary of management's comments, along with our response, is included on page 5 of this report. We have also attached management's comments in their entirety beginning on page 7.

Attachment

cc: Deputy Secretary
Under Secretary for Energy, Science and Environment
Assistant Secretary for Environmental Management
Manager, Ohio Field Office

SOIL WASHING AT THE ASHTABULA ENVIRONMENTAL MANAGEMENT PROJECT

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OVERVIEW

INTRODUCTION AND OBJECTIVE

The RMI Titanium Company's Earthline Technologies Division (RMI) is the Department of Energy's (Department) environmental restoration contractor at the Ashtabula Environmental Management Project (AEMP) in Ashtabula, Ohio. RMI owns the property formerly known as the RMI Extrusion Plant, where RMI processed uranium for the Department and its predecessor agencies for the production of nuclear fuel elements between 1962 and 1988. The Department awarded RMI a sole-source, cost-reimbursable contract in March 1993 to clean the extrusion plant and adjacent grounds to a level that permits release of the site for unrestricted use. The contract requires that RMI complete the project on or about March 31, 2003. The Department estimated the project would cost about $237 million to complete. As of September 2001, the Department had spent about $103 million on the contract.

The original decommissioning plan required RMI to excavate and ship about 40,000 tons of contaminated soil offsite for disposal. However, in January 1997, RMI began testing a soil washing process at the AEMP, which was designed to chemically extract uranium from contaminated soils. Upon completion of the testing, RMI reported to the Department that soil washing was a viable alternative to shipping and disposal. This was based on a preliminary analysis that washing the soil would be less expensive than offsite disposal. The Department approved the construction of a soil washing plant at the AEMP and determined that soil washing would save about $40 million.

RMI spent about $6.3 million of Department funds to design and build the soil washing complex. Between June 1999 and May 2000, RMI washed about 10,000 tons of soil in its first operating run (campaign). Since the end of the first campaign, RMI has been evaporating radioactive wastewater generated by the soil washing facility and researching alternatives to improve the performance and cost effectiveness of the plant.

The Office of Inspector General (OIG) recently issued two reports concerning management of the AEMP. Audit Report DOE/IG-0541, *Remediation and Closure of the Ashtabula Environmental Management Project* (January 2002), determined that the remediation of the AEMP was not on schedule to be completed by March 2003. Additionally, Inspection Report DOE/IG-0530, *Management of Personal Property at the Ashtabula Environmental Management Project* (November 2001), concluded that RMI was not managing Government-owned personal property in accordance with Departmental and other Federal property management requirements.

The objective of this audit was to determine whether the AEMP's soil washing project has met the Department's performance and cost expectations.

CONCLUSIONS AND OBSERVATIONS

The AEMP's soil washing project has not met the Department's performance and cost expectations. About 30 percent of the soil could not be treated and about 246,000 gallons of radioactive wastewater were generated during the first campaign. This occurred because RMI did not solve known technical problems and, until recently, the Department did not adequately monitor RMI's activities to ensure that the facility was operating as planned. As a result, the Department invested $6.3 million in a facility that provided little or no value-added benefit, and washing the remaining soil could cost the Department between $6.1 million and $13.3 million more than shipping the soil offsite for disposal.

This audit identified issues that management should consider when preparing its yearend assurance memorandum on internal controls.

(Signed)
Office of Inspector General

Department Expected Soil Washing to Minimize Waste and Reduce Costs

The Department's goal at the AEMP is to clean the AEMP and adjacent grounds to a level that permits release of the site for unrestricted use. The initial decommissioning plan required RMI to excavate and ship contaminated soil offsite for burial. However, the Department later approved RMI's proposal to wash contaminated soil onsite to minimize disposal costs. The Department's *Accelerating Cleanup: Paths to Closure Strategy* stated that the goal of soil washing at the AEMP was to minimize waste and reduce the cost of remediation at the AEMP. The Department expected that soil washing would reduce the volume of soil requiring disposal by 95 percent, generate minimal amounts of radioactive wastewater, and reduce cleanup costs by about $40 million.

Soil Washing Has Not Met the Department's Expectations

The soil washing project has not met the Department's performance and cost expectations. After the first production campaign, RMI determined that (1) about 30 percent of the soil could not be treated due to its clay content, (2) soil washing generated about 246,000 gallons of radioactive wastewater, and (3) soil washing would not reduce cleanup costs by $40 million as originally estimated.

During the first production campaign, about 30 percent of the soil at the AEMP could not be treated due to its high clay content. Of the 14,240 tons of soil excavated and prepared for treatment, about 4,400 tons could not be treated. Thus, instead of reducing the volume of soil requiring disposal by 95 percent, as originally expected, soil washing reduced the volume requiring disposal by only 70 percent.

Also, contrary to the Department's expectations, the first campaign generated about 246,000 gallons of radioactive wastewater. RMI installed a uranium recovery system to prevent generating large amounts of radioactive wastewater before the campaign began. However, the system did not work as designed, and large amounts of radioactive wastewater were generated. RMI has been evaporating the wastewater, but 16 months after the end of the first campaign, about 4,000 gallons of radioactive wastewater remained to be treated.

Further, the Department will not realize the cost savings originally estimated for soil washing at the AEMP. The cost savings have not materialized because soil washing costs have increased and the cost of offsite disposal has decreased since the estimate was prepared. In 1998, RMI estimated that soil washing would cost about $325 per ton. Since 1998, soil washing costs have increased to about $440 per ton. During the same period, the Department and RMI have reduced the cost of offsite disposal by about 60 percent, from about $900 per ton in 1998 to

$340 per ton in October 2001. As a result, the cost of offsite disposal is about $100 per ton less than the cost of soil washing.

RMI Did not Solve Technical Problems, and the Department Did Not Monitor RMI Activities

The Department's expectations were not met because RMI did not solve known technical challenges to soil washing at the AEMP, and the Department did not adequately monitor RMI activities. RMI reported in April 1995 that AEMP's soil was oversized and not suitable for washing because it contained large volumes of clay. The problem was not solved before the first campaign, and as a result, about 30 percent of the soil could not be treated. After the first campaign, RMI reported that "resolution of the oversize problem is crucial to the financial success of the soil washing operation." As of September 2001, RMI had developed a possible solution, but had not demonstrated its effectiveness. Likewise, RMI was still reviewing alternative solutions to its contaminated wastewater problem. If the wastewater problem is not resolved, RMI could generate between 890,000 and 1.8 million gallons of radioactive wastewater in processing the remaining AEMP soil.

Until recently, the Department did not adequately monitor RMI's activities to ensure that the facility was operating as planned. Despite cost increases, the Department continued to fund the soil washing project without requiring solutions for technical problems. In fact, the Department spent about $100,000 in FY 2001, and RMI requested an additional $715,000 in FY 2002 to test solutions for the oversize materials problem and research alternatives for the contaminated wastewater problem. Prior to RMI's FY 2002 budget request, the Department had not required RMI to fix known technical problems with the soil washing project. However, as of October 30, 2001, the Ohio Field Office was evaluating RMI's request for additional funds, and reevaluating the merits of soil washing at the AEMP.

Facility Provided Little or No Benefit, and Offsite Disposal Would Cost Less

As a result, the Department has invested $6.3 million in a facility that has provided little or no value-added benefit. Also, the Department could save between $6.1 million and $13.3 million by disposing of its remaining contaminated soil offsite rather than using the soil washing facility. These savings are dependent on the volume of contaminated soil needing treatment at the AEMP.

RECOMMENDATIONS

We recommend that the Manager, Ohio Field Office:

1. Discontinue funding for soil washing at the AEMP; and,

2. Direct RMI to follow the original plan, which was to ship contaminated soil offsite.

MANAGEMENT REACTION

Management concurred with the audit finding and recommendation 1. It agreed to discontinue funding for soil washing and did not approve funding for FY 2002. With reference to recommendation 2, management did not agree to require RMI to ship contaminated soil offsite for treatment. Management has deferred action on this recommendation pending completion of an internal evaluation to establish the most economical method for completing the entire cleanup and closure of the AEMP by FY 2006.

Management also disagreed with our conclusion that until recently the Department did not adequately monitor RMI's activities to ensure the facility was operating as planned. Management stated that at the time soil washing was selected as a remediation approach, it appeared to be the most cost-effective option available. In addition, soil washing may have triggered reductions in commercial soil disposal costs. Further, management stated that it was well aware of the unexpected problems encountered during the first campaign and sought corrective action well before the OIG became involved.

AUDITOR COMMENTS

Management's action to recommendation 1 is responsive. With reference to recommendation 2, while we are disappointed that management chose not to immediately direct RMI to ship contaminated soil offsite, we recognize management's desire to conduct an internal review. We are confident, based on our own analysis, that this review will show that the most cost-effective method for remediating soils at the AEMP is to ship contaminated soils offsite. We also recognize that soil washing may have been the most cost-effective alternative at the time it was selected as a remediation approach, and may have contributed to reductions in commercial soil disposal costs. However, management did not adequately monitor RMI's activities to ensure the facility was operating as planned. If they had, the technical challenges that were identified in April 1995 would have been resolved, 95 percent of the soils would have been treated during the first campaign, and RMI would not have generated 246,000 gallons of contaminated wastewater during the first campaign.

Appendix 1

SCOPE

The audit was performed from June 4, 2001, to November 8, 2001, at the Ashtabula Environmental Management Project (AEMP) in Ashtabula, Ohio, and the Ohio Field Office in Miamisburg, Ohio. The audit included a review of the Department's and RMI Titanium Company's (RMI) activities related to soil washing from FY 1995 to FY 2001.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed the Department's expectations for soil washing at the AEMP;
- Assessed the terms and conditions of the Department's contract with RMI;
- Reviewed RMI's cost estimates for soil washing at the AEMP;
- Evaluated RMI's baselines for project completion; and,
- Compared the life-cycle cost of soil washing to the cost of direct disposal.

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. Accordingly, the assessment included reviews of the Department's contract with RMI, the Department's *Accelerating Cleanup: Paths to Closure Strategy*, and RMI's Ohio Department of Health license for radioactive material. We determined that performance measures were established in accordance with the Government Performance and Results Act of 1993; however, as stated in the report, the Department did not hold RMI accountable for achieving those measures. We did not rely on computer-processed data to achieve our audit objective.

Management waived the exit conference.

United States Government | Department of Energy

memorandum

Ohio Field Office

DATE: JAN 11 2002

REPLY TO ATTN OF: OH: Saylor OH-0356-02

SUBJECT: **Management Response to IG-30 (A02EM022)**

TO: Terry Brendlinger, Manager, Eastern Regional Audit Office

This letter is in response to the Office of Inspector General's (OIG) draft report No. A02EM022 concerning "Soil Washing at the Ashtabula Environmental Management Project" dated November 14, 2001. The response incorporates comments from the Ashtabula Environmental Management Project as well as the Ohio Field Office (OH) and has the concurrence of Headquarters. We have attached the comments of the prime contractor, Earthline Technologies, a Division of RMI Titanium, Inc. Our general comments, your recommendation, and the DOE-OH position are as follows:

General Comments

The report asserts that soil washing is not the most cost-effective alternative for disposal. At the time soil washing was selected as a remediation approach at AEMP, it appeared to be more cost-effective than other available options (e.g., dig and haul). It appears that the reduction in soil disposal costs at commercial facilities which now makes soil washing appear uneconomic may have been triggered, in part, by the emergence of soil washing as a treatment alternative. DOE-OH is currently re-evaluating continuation of soil washing based on current market conditions and a technical assessment of proposed soil washing improvements.

DOE management was well aware of the unexpected problems encountered during the start-up and subsequent operation of the Soil Washing Plant during the first campaign. DOE sought corrective action in the form of an Accelerated Site Technology Deployment (ASTD) Proposal for technical assistance in early 2000, well before the IG became involved. The proposal was reviewed and funded by the Office of Science and Technology (EM-50). Prior to the release of these funds to the contractor, DOE-AEMP insisted on a cost performance analysis by outside experts. Based on this analysis, Earthline submitted a corrective action plan that is currently being subjected to a life cycle cost analysis. Therefore, we believe the conclusion that "the Department did not monitor RMI's activities to ensure that the facility was operating as planned" is inaccurate.

JAN 11 2002

Recommendation

"We recommend that the Manager, Ohio Field Office, discontinue funding for soil washing at the AEMP, and direct RMI to follow the original plan, which was to ship contaminated soil offsite."

DOE-OH Position

We concur that funding for the soil washing at the AEMP should be discontinued at this time. The Current Year Work Plan proposed by RMI included soil washing; however, the Department did not approve funding for soil washing for the current year.

The Ohio Field Office is in the process of establishing the most economical method to complete the remaining soil remediation at Ashtabula and complete the entire site cleanup/closure prior to 2006. We are evaluating all factors relevant to this decision including the total cost for excavation, shipment, and disposal of the soil; the current estimate for soil washing the remaining soils; and the estimate of total soil volume requiring treatment/disposal. This evaluation will be complete by the end of January 2002. Therefore, at this time, we non-concur with the recommendation to direct RMI to follow the original plan to ship contaminated soil offsite. The Ohio Field Office will be able to make a decision on the most economical method to complete the remaining soil remediation after the evaluation is complete.

Please contact Mr. Steven Casto, Senior Staff Accountant, at (937) 865-3549 or Mr. Ron Saylor, Staff Accountant, at (937) 865-4405, if you have any questions. Our faxsimile number is (937) 865-4063.

for Susan R. Brechbill
Manager

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