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DOE/IG-0327

U.S. Department of Energy
Office of Inspector General

October 1993



Report on

**The Remedial
Investigation / Feasibility
Study Process at
Oak Ridge National Laboratory**

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This report can be obtained from the
U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, Tennessee 37831



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PREFACE

On April 27, 1993, the Office of Inspector General issued Audit Report DOE/IG-0327, on the Remedial Investigation and Feasibility Study Process at Oak Ridge National Laboratory. In responding to the findings in the audit report, the Oak Ridge Operations Office recognized that data quality problems existed at its site and suggested that similar problems existed throughout the Department of Energy. In addition, a Departmental "Data Quality Investigation" raised many of the same points disclosed in the audit. For example, this investigation found significant data quality problems including questionable field sampling and analytical services for the Oak Ridge National Laboratory Waste Area Grouping 6 Remedial Investigation.

Subsequent to the publication of the audit report, a major contract participant in this process issued a detailed analysis of the report and its contents. Although the contractor did not take issue with the recommendations contained in the report, its analysis included extensive material that questioned the first finding, entitled, "Management Controls."

Upon learning of the contractor's analysis, a review of the workpapers was initiated to determine if the issues raised by the contractor had been fully addressed during the audit. It was found that not all of the matters relating to the first finding had been completely documented. Because of the absence of requisite documentation, we have decided to reopen the subject audit with reference to the issue of "Management Controls."

Consequently, Audit Report DOE/IG-0327 is hereby reissued with the first finding deleted.

MASTER

United States Government

Department of Energy

memorandum

DATE: October 1, 1993

REPLY TO

ATTN OF: IG-1

SUBJECT: INFORMATION: Report on "The Remedial Investigation and Feasibility Study Process at Oak Ridge National Laboratory"

TO:

The Secretary


BACKGROUND:

Martin Marietta Energy Systems, Inc., manages and operates the Oak Ridge National Laboratory, under a cost-plus-award-fee contract administered by the Department of Energy's Oak Ridge Operations Office. The laboratory's environmental restoration program is responsible for eliminating or reducing the risks posed by inactive and surplus sites and facilities that have been contaminated with radioactive, hazardous, or mixed wastes. The objective of the audit was to determine if a proposed interim remedial action at the laboratory, designed to facilitate the clean-up of Waste Area 6, had been adequately justified.

DISCUSSION:

The audit disclosed that the proposed remedial action, estimated to cost \$140 million, was not adequately justified. The report includes recommendations for justifying the proposed interim action and for being firm in regulatory negotiations to assure that effective remedial actions are performed. Management generally concurred with the recommendations in the report.

Our finding is the subject of part II of the report. Management and auditor comments are in part III.


John C. Layton
Inspector General

Attachment

cc: Office of Environmental Restoration and Waste Management
Office of Energy Research
Office of Chief Financial Officer,
Audit Liaison Division
Oak Ridge Operations Office

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY PROCESS

AT OAK RIDGE NATIONAL LABORATORY

Report Number: DOE/IG-0327
Date of Issue: October 1, 1993

Eastern Regional Audit Office
Oak Ridge, Tennessee 37830

THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY PROCESS
AT OAK RIDGE NATIONAL LABORATORY

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U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL
OFFICE OF AUDITS

THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY PROCESS
AT OAK RIDGE NATIONAL LABORATORY

Audit Report No.: DOE/IG-0327

SUMMARY

Martin Marietta Energy Systems, Inc. (Energy Systems), manages and operates the Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee, under a cost-plus-award-fee contract administered by the Department of Energy's (DOE) Oak Ridge Operations Office (Operations Office). Energy Systems' environmental restoration program is responsible for eliminating or reducing the risk posed by inactive and surplus sites and facilities that have been contaminated with radioactive, hazardous, or mixed wastes. The remedial investigation and feasibility study (RI/FS) is being conducted as part of Energy Systems' environmental restoration program. The objective of the audit was to determine if the proposed interim source control action identified in the "Proposed Plan for the Oak Ridge National Laboratory Waste Area Grouping 6 Interim Remedial Action" had been adequately justified.

The audit disclosed that the proposed source control interim remedial action, three flexible membrane caps estimated to cost \$140 million for waste area grouping 6, was not adequately justified. We recommended that DOE justify the proposed action before agreeing to proceed.

The Manager, Oak Ridge Operations Office, generally concurred with the audit recommendations.


Office of Inspector General

PART I

APPROACH AND OVERVIEW

PURPOSE AND OBJECTIVE

The purpose of the audit was to review the RI/FS process at ORNL in Oak Ridge, Tennessee, operated by Energy Systems. The audit objective was to determine if the proposed interim source control action identified in the "Proposed Plan for the Oak Ridge National Laboratory Waste Area Grouping 6 Interim Remedial Action" had been adequately justified.

SCOPE AND METHODOLOGY

The audit was performed from January 31, 1992, to March 4, 1993, at the following locations: Energy Systems and its subcontractors, and the Oak Ridge Operations Office, which are in Oak Ridge, Tennessee; and the Assistant Secretary for Environmental Restoration and Waste Management in Washington, D.C. We audited the proposed interim source control action for waste area grouping 6 at ORNL.

The audit was done in accordance with generally accepted Government auditing standards for performance audits, and it included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. With respect to compliance testing, we used as criteria DOE and U.S. Environmental Protection Agency (EPA) regulations.

We used the following methodologies:

- o Reviewed laws and regulations addressing environmental restoration;
- o Interviewed personnel of DOE, Energy Systems, EPA, and the Tennessee Department of Environment and Conservation management; and
- o Evaluated environmental restoration information as to its accuracy, validity, completeness, and compliance with applicable laws and regulations.

We assessed the significant internal controls with regard to the proposed interim source control action. Internal control weaknesses identified by this audit are discussed in part II of this report. Because our audit was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed.

BACKGROUND

Environmental restoration involves the assessment and cleanup of sites contaminated with radioactive, hazardous, and mixed wastes as a result of past operations. Past ORNL research, development, and waste management activities have resulted in a significant number of areas being contaminated with low level radioactive, hazardous chemical, and mixed wastes. Because of the presence of this contamination, environmental restoration at ORNL is governed by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Further, all Oak Ridge sites, including ORNL, were placed on the National Priorities List in 1989 (sites requiring environmental restoration) because of historical operations at all three Oak Ridge sites.

Oak Ridge Operations Office entered into a Federal Facilities Agreement with the EPA and the Tennessee Department of Environment and Conservation. The Agreement addresses environmental restoration under RCRA and CERCLA. The Agreement calls for sites to be divided into operable units that provide incremental steps toward comprehensively addressing cleanup of the site. Waste area groupings are used by ORNL to define operable units that are discrete parts of the entire restoration project. ORNL has identified 20 waste area groupings to facilitate environmental restoration of the site. Waste area grouping 6 is one geographic location on the ORNL site.

In 1986, DOE learned that some of the waste being disposed in waste area grouping 6 was regulated by RCRA and that the site required closure. In 1989, DOE finished an interim closure that involved covering 10.4 acres with a thick, plastic cover. As stated by Oak Ridge Operations Office personnel, the cover helps minimize the contamination of surface water and ground water by minimizing the infiltration of surface water into the contaminated area. The plastic cover will remain in place until final remediation can be performed.

Waste area grouping 6 is a controlled area to which access is restricted. Therefore, further risk to health and the environment would principally occur through off-site migration of contamination.

In September 1991, Oak Ridge Operations Office issued the "Draft RCRA Facility Investigation Report for Waste Area Grouping 6 at Oak Ridge National Laboratory, Oak Ridge, Tennessee." It submitted the report to EPA Region IV and the Tennessee Department of Environment and Conservation for review, comment, and approval. It also made the report available to the public for review. On December 2, 1992, EPA Region IV approved the "RCRA Facility Investigation Report" for "purpose of screening feasible alternatives for an interim remedial action." Key information obtained from the RI/FS is highlighted in the "Proposed Plan for the Oak Ridge National Laboratory Waste Area Grouping 6 Interim Remedial Action."

The "Proposed Plan for the Oak Ridge National Laboratory Waste Area Grouping 6 Interim Remedial Action" described the interim actions being considered by DOE for remediation of ORNL waste area grouping 6 under CERCLA. Included in the plan as the preferred interim source control action for waste area grouping 6 was the proposal of three flexible membrane caps.

A public information and comment session for the "Proposed Waste Area Grouping 6 Interim Remedial Plan Action" was held February 9, 1993, and public comments were due on February 18, 1993. At the request of the Oak Ridge Environmental Peace Alliance, the Oak Ridge Operations Office extended the date to March 4, 1993. No date had been set to make the interim decision.

OBSERVATIONS AND CONCLUSIONS

RCRA, CERCLA, and implementing regulations state that remedial actions, including interim remedial actions, should eliminate, reduce, or control risk to health and the environment. DOE recommended a proposed interim source control action for waste area grouping 6 that does not meet the requirements of RCRA and CERCLA to protect health and the environment. Although DOE was attempting to show progress toward environmental restoration at the ORNL site, expenditures should be directed toward those projects most likely to reduce risk to health and the environment. The proposed source control interim remedial action (three flexible membrane caps) was not adequately justified. Accordingly, we are recommending that DOE determine the need for

the three flexible membrane caps (estimated to cost \$140 million including support facilities) before agreeing to proceed.

Part II contains details of these observations, along with appropriate recommendations.

PART II

FINDING AND RECOMMENDATIONS

Source Control Interim Remedial Action.

FINDING

CERCLA, RCRA, and implementing regulations set forth criteria for interim remedial action. The regulations stipulate that interim measures are appropriate when actions are necessary (1) to quickly achieve significant risk reduction, (2) when phased actions are necessary and appropriate given the size or complexity of the site, or (3) to expedite the completion of the total site cleanup. DOE and the feasibility study contractor recommended a proposed source control interim remedial action of waste area grouping 6. However, the extent of contaminant migration risk from waste area grouping 6 is below EPA requirements. In addition, DOE has not proven that the proposed interim action is required under CERCLA. The work performed on the remedial investigation and used in the feasibility study does not demonstrate the extent of offsite contamination originating from waste area grouping 6 or that the proposed membranes would expedite completion of final site cleanup. Since the need for the proposed interim remedial action has not been justified, DOE may spend \$140 million unnecessarily.

RECOMMENDATIONS

We recommend that the Manager, Oak Ridge Operations Office:

1. Justify the need for the source control interim remedial action (estimated to cost \$140 million including support facilities) of waste area grouping 6 before agreeing to proceed, and
2. Be firm in regulatory negotiations to ensure that effective remedial action is performed and challenge regulatory interpretations that clearly are not in the best interest of the public.

MANAGEMENT REACTION

Management generally concurred with the recommendations. Management believes that the important issue is that the ORNL remedial action evaluation process has not effectively considered site-wide risk reduction as a key factor in setting priorities. Management stated that from a common sense standpoint, the proposed \$140 million expenditure at waste area grouping 6 could be put to better use in addressing other ORNL problems. However, the regulatory climate and RCRA/CERCLA-imposed restrictions led to the current position. Part III contains management comments.

DETAILS OF FINDING

REQUIREMENTS FOR REMEDIAL ACTION

Both CERCLA and RCRA contain requirements for cleaning up sites to protect human health and the environment. CERCLA implementing regulation [40 CFR Part 300.430(a)(1)] states that the remedial selection process "is to implement remedies that eliminate, reduce, or control risks to human health and the environment." It further requires remedial actions to be implemented as soon as site data and information make it possible to do so. Parts of sites, such as waste area grouping 6, should be remediated on an interim basis if the action will quickly achieve site stabilization, prevent further degradation, significantly reduce risk, or expedite the completion of the total site cleanup. To facilitate final remediation, interim actions should neither be inconsistent with nor preclude implementation of the expected final remediation.

When interim remedial actions are inconsistent with these requirements, they may serve to hinder and may delay final remediation as well as increase the total cost of cleanup.

RCRA requirements contained in 40 CFR Part 264.101(a) state:

The owner or operator of a facility seeking a permit for the treatment, storage or disposal of hazardous waste must institute corrective action as necessary to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in such unit.

REQUIREMENTS FOR INTERIM REMEDIAL ACTION WERE NOT MET

In September 1991, the Operations Office issued "Draft RCRA Facility Investigation Report for Waste Area Grouping 6 at Oak Ridge National Laboratory, Oak Ridge, Tennessee" and submitted it to EPA Region IV and the Tennessee Department of Environment and Conservation for review, comment, and approval. The report was also made available to the public for review. Included in the report and subsequent feasibility study was a proposal for a source control interim remedial action, consisting of three flexible membrane caps. This proposal was added to the report after initial review by EPA and the Tennessee Department of Environment and Conservation.

On December 2, 1992, EPA Region IV approved the RCRA Facility Investigation Report for purpose of screening feasible alternatives for an interim remedial action. Public hearings for the proposed interim remedial action were held on February 9, 1993, and public comments were due on February 18, 1993. At the request of the Oak Ridge Environmental Peace Alliance, the Operations Office extended the date to March 4, 1993. No date had been set to make the interim decision.

The proposed interim remedial action for waste area grouping 6 is based on the premise that the primary route for contaminant migration is shallow subsurface flow. Isolating the buried wastes in waste area grouping 6 should eliminate shallow subsurface flow as a transport medium.

However, our audit disclosed that the report presented to EPA and the Tennessee Department of Environment and Conservation did not support the need for an interim remedial action at waste area grouping 6, since the data did not demonstrate a significant offsite risk. The proposed interim remedial action (1) has not been proven to achieve significant risk reduction of offsite migration of contaminants (the intent of the proposed action), and (2) does not expedite completion of total site cleanup.

Responding to a draft of this report, the Operations Office stated that risk due to waste area grouping 6 releases is much smaller than that of other ORNL sites. Accordingly, resources should be applied to those areas with the higher risk. The Operations Office further stated that the offsite risk due to waste area grouping 6 releases is below the level of regulatory actions.

Significant Risk Reduction

The proposed interim remedial action was predicated on the remedial investigation performed by a subcontractor. However, Operations Office personnel confirmed that they do not have investigative data to demonstrate the source of migrating contamination. In addition, management stated that the offsite contamination risk is below the EPA threshold to perform remedial action, and the proposed action would not result in a significant reduction in risk.

Total Site Cleanup

In addition, ORNL has not proven that the proposed interim remedial action will facilitate final remediation. The Operations Office, EPA, and the Tennessee Department of Environment and Conservation agree that the proposed interim remedial action may not be a requirement and does not facilitate a final action. When final remediation is implemented, the proposed caps become additional waste that would require disposal. Thus, instead of augmenting final remediation, the interim remedial action increases the final remediation effort and related costs. More importantly, interim remedial action could adversely affect future sampling needed to determine a final remedial action. To obtain the required samples, the caps would have to be breached, thus compromising their integrity and purpose.

INTERIM REMEDIATION IS AN ATTEMPT TO SHOW CLEANUP PROGRESS

By proposing a source control interim remedial action, DOE was making a conscientious effort to show progress toward cleaning up the ORNL site. However, the Operations Office stated that: (1) the regulatory climate and RCRA/CERCLA-imposed restrictions have led it to the current position, and (2) the fact that the lower risk waste area grouping 6 at ORNL is receiving top priority is a problem shared by DOE, EPA, and the State of Tennessee. The RI/FS process was designed to determine a final remediation. However, based on the history of the site, it was recognized at the inception of the RI/FS process that current technology was insufficient to remediate the site. Since final remediation is not feasible, interim remediation appears to be the vehicle by which progress could be demonstrated.

The Operations Office stated that a "no action alternative" was part of the waste area grouping 6 feasibility study. However, it was unacceptable because the site could not be released for unrestricted use as it exceeded EPA risk criteria. The Operations Office further stated that controls to prevent or limit access to the site would support a "no action alternative" since the offsite risk was less than the EPA risk limit. Although such controls may be acceptable, the Operations Office stated that EPA Region IV will not permit this at present.

Controls to prevent or limit access are acceptable under certain conditions stated in 40 CFR 300.430 (a)(1). These controls may be used for long-term management to prevent or limit exposure to hazardous substances, pollutants, or contaminants. The use of such controls shall not substitute for active response measures for the sole remediation unless such measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remediation. As agreed by all parties, there are no active response measures currently available to permanently remediate waste area grouping 6. Thus, controls to prevent or limit access represent a significant savings with little risk until effective remediation technologies are developed.

INVESTMENT IS QUESTIONABLE

While we recognize and fully support the need for environmental remediation, DOE must base large expenditure commitments such as the source control interim remedial action on demonstrated need. Our analysis of the proposed interim remedial action indicates that it does not meet the requirements established by CERCLA for such actions. Specifically, the intent of the proposed interim remedial action was to reduce offsite migration of contaminants, which has not been demonstrated. Furthermore, the Operations Office recognized that the offsite risk was below the level of regulatory actions although the risk levels exceeded EPA levels for unrestricted access.

During the audit, ORNL initially estimated the cost of installing the three flexible membrane caps at \$13 million. However, at the public hearings, ORNL stated that total costs of the interim remedial action was \$140 million. The additional costs included project management, support activities, and

monitoring and assessment. In our opinion, DOE should make large expenditure commitments, such as this, based only on demonstrated need. Because the necessity for this proposed interim remedial action clearly has not been demonstrated, the expenditure of \$140 million may not be warranted. Further, because the membrane caps may come in contact with contamination, the interim remedial action may result in additional waste (the caps) requiring future disposal.

PART III

MANAGEMENT AND AUDITOR COMMENTS

In responding to a draft of this report, Oak Ridge Operations Office management generally concurred with the recommendations and provided comments. Management and auditor comments are presented below.

Source Control Interim Remedial Action.

Management Comments. Management agreed that DOE, in cooperation with EPA and the State of Tennessee, should justify the need for the source control interim remedial action and the \$140 million expenditure. Management also agreed that DOE (Operations Office and Headquarters elements) should aggressively negotiate with the regulators to implement effective remedial action projects. Human health risks and improved public participation should be driving factors in these interactions.

Management further stated:

The report states that the proposed interim action does not meet CERCLA requirements. We believe that CERCLA permits a phased approach to remediation when the site is considered complex. Since this is the case at ORNL, we believe that the proposed interim action meets the intent of CERCLA.

Auditor Comments. Management's intended actions are responsive to the findings.

We do agree that CERCLA permits a phased approach to remediation, and ORNL is a complex site. However, the proposed interim action neither quickly achieves significant risk reduction nor expedites completion of total site cleanup. Accordingly, the proposed interim action is not required in our opinion.

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