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Management Challenges in Remediating a Mixed Waste Site at the Oak Ridge National Laboratory

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MANAGEMENT CHALLENGES IN REMEDIATING A MIXED WASTE SITE AT THE OAK RIDGE NATIONAL LABORATORY

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ABSTRACT

Martin Marietta Energy Systems, Inc., manages the Oak Ridge National Laboratory (ORNL) for the U.S. Department of Energy (DOE). Since ORNL's beginning in the 1940's, a variety of solid and liquid low-level radioactive waste (LLW), hazardous waste, and mixed waste has been generated. The solid wastes have been disposed of on site, primarily in shallow trenches called solid waste storage areas (SWSAs).

SWSA 6, opened in 1969, is the only operational disposal site at ORNL for solid LLW. In 1984, SWSA 6 was closed for three months when it was discovered that wastes regulated by the Resource Conservation and Recovery Act (RCRA) were being inadvertently disposed of there. SWSA 6 was then added to ORNL's Part A RCRA permit, administrative controls were modified to exclude RCRA-regulated wastes from being disposed of at SWSA 6, and a RCRA closure plan was prepared. This paper describes the regulatory challenges of integrating RCRA; the Comprehensive Environmental Response, Compensation, and Liability Act; and the National Environmental Policy Act into a cohesive remediation strategy while managing the project with multiple DOE contractors and integrating the regulatory approval cycle with the DOE budget cycle. The paper does not dwell on the recommended alternative but presents instead a case study of how some difficult challenges, unique to DOE and other federal facilities, were handled.

KEYWORDS

Low-level Radioactive Waste, Remediation, Federal Facility, Project Management.

INTRODUCTION

Martin Marietta Energy Systems, Inc., manages the Oak Ridge National Laboratory (ORNL) for the U.S. Department of Energy (DOE). Since the Laboratory's beginning in the 1940's, a variety of solid and liquid low-level radioactive waste (LLLW), hazardous waste, and mixed waste has been generated. The solid wastes have been disposed of on site, primarily in shallow trenches called solid waste storage areas (SWSAs).

SWSA 6, opened in 1969, is the only operational disposal site at the ORNL for solid low-level waste. In 1984, SWSA 6 was closed for three months when it was discovered that wastes regulated by the

Resource Conservation and Recovery Act (RCRA) were being inadvertently disposed of there. SWSA 6 was then added to the Laboratory's Part A permit; administrative controls were modified to exclude RCRA-regulated wastes from being disposed at SWSA 6, and a RCRA closure plan was prepared.

A Record of Decision (ROD) for SWSA 6 is planned to be approved in December, 1992. The action being proposed emphasizes source control and includes (1) capping with a synthetic membrane, (2) diverting upgradient groundwater and surface water, and (3) excavating and consolidating selected buried wastes.

This paper describes the regulatory challenges of integrating RCRA; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the National Environmental Policy Act (NEPA) while managing the project with multiple DOE contractors and integrating the regulatory approval cycle with the DOE budget cycle. The paper does not dwell on the recommended alternatives but presents instead a case study of how some difficult management challenges, unique to DOE and other federal facilities, were handled.

REGULATORY ISSUES

The RCRA closure plan for SWSA 6 was unique in that trenches containing the RCRA-regulated wastes were interspersed with similar trenches containing non-RCRA-regulated wastes, and SWSA 6 was still an operational waste disposal site for LLLW. Therefore, only a small fraction of the total waste inventory posing a relatively small risk was driving the RCRA closure of the site. The closure plan was approved in September 1987, and required that an interim cap be placed over only the RCRA-regulated trenches. The interim cap was planned for the following reasons.

1. RCRA-regulated trenches were interspersed with trenches not regulated by RCRA, and it made no sense to close only part of the site.
2. It was technically difficult to design a cap only for the RCRA-regulated trenches.
3. The trenches contained significant void spaces that would adversely affect the integrity of a RCRA cap.

The interim cap satisfied the immediate RCRA requirements to initiate closure by November 8, 1988, so that sufficient time could be spent preparing a RCRA facilities investigation (RFI), a corrective measures study (CMS), and a ROD to define a comprehensive closure of the entire site, not just the RCRA-regulated units. The interim closure was completed in May 1989, by covering ten acres of trenches with a high density polyethylene cap.

In December 1989, the Oak Ridge Reservation (ORR), of which the ORNL is a part, was placed on the National Priorities List, making it necessary to meet the requirements of CERCLA as well as those of RCRA in the closure of SWSA 6. As required by CERCLA, a federal facility agreement was negotiated by the DOE Oak Ridge Field Office, the U.S. Environmental Protection Agency-Region IV (EPA), and the Tennessee Department of Environment and Conservation (TDEC). This agreement defines roles and responsibilities for implementation of CERCLA on the ORR and requires integration with ongoing RCRA actions. In addition, DOE Orders mandate that the substantive requirements of NEPA be met and integrated with the CERCLA process. Since the EPA considers the CERCLA process to be equivalent to the NEPA process, it was necessary to integrate DOE's NEPA requirements with CERCLA in such a way as not to impede the project or to add work.

While RCRA, CERCLA, and NEPA have similar decision-making processes, each has unique procedural requirements that had to be met. The approach taken was to combine the requirements of all three statutes into one set of documents to avoid repetitive reviews and approvals and possible

inconsistent decisions. The RCRA Facility Investigation was expanded to include the Baseline Risk Assessment required by CERCLA. The CMS was changed to a corrective measures study/feasibility study/environmental assessment (CMS/FS/EA), and the nine criteria against which the CERCLA process requires alternatives to be evaluated were expanded to eleven to include NEPA considerations such as cumulative environmental impacts. The Proposed Plan required by CERCLA was modified so that the NEPA Finding of No Significant Impact was attached to it.

The RCRA postclosure permit became the most difficult regulatory action to integrate with CERCLA. The approach recommended by DOE and initially accepted by the EPA and the TDEC was to combine the CERCLA Proposed Plan and the RCRA postclosure permit application into one document that would receive a combined regulatory and public review and a single consistent decision. However, in the fall of 1991 the TDEC informed DOE that a postclosure permit application for SWSA 6 was required by December 1991. If the postclosure permit application were submitted then, it would be subject to reviews prior to that for the CERCLA Proposed Plan and might require an action inconsistent with the Proposed Plan because the alternatives assessment was not complete. In particular there was concern about groundwater cleanup because the RCRA postclosure permit application is expected to contain groundwater cleanup goals, whereas, the CERCLA process was leading toward no groundwater cleanup based on the complex, fractured formation and the findings of the risk assessment.

DOE decided that a RCRA postclosure permit application would not be submitted for CERCLA sites and that RCRA would be an Applicable, Relevant, or Appropriate Regulation rather than a primary regulatory requirement. Consequently, the CMS/FS/EA was changed to a feasibility study/environmental assessment (FS/EA).

Another regulatory issue that ultimately had to be resolved was how to deal with the onsite risk to the inadvertent intruder. Since exhumation of the waste was not considered feasible due to high costs, unacceptable health risks to remediation workers, and lack of alternate disposal sites, the proposed remediation alternative is hydrologic isolation. While this action eliminates offsite risk, it does not affect onsite risk. Institutional control with fences and guards is acceptable for the short-term but has not been accepted by the regulatory community for the long-term. This issue was dealt with by considering this project an interim action for source control with the intent that DOE would continue to evaluate long-term alternatives and develop technologies for a final solution.

PROJECT MANAGEMENT

Each phase of the CERCLA process at SWSA 6 is managed by a different prime contractor to DOE. Martin Marietta Energy Systems, Inc., maintains and operates the ORNL and conducts the remedial investigations. Responsibility for preparing the FS/EA, the Proposed Plan, and the ROD is given to Radian Corporation, DOE's technical support contractor. Ebasco is responsible for remedial design, and the responsibility for remediation belongs to DOE's construction management contractor, MK-Ferguson of Oak Ridge Company. Martin Marietta Energy Systems, Inc., also has the additional role of integrating contractor for DOE to ensure that the project is properly coordinated among all participants, schedules are maintained, and budgets are met. Progress reports, budgets, and schedules are prepared and maintained by Martin Marietta Energy Systems, Inc., with input from the other contractors. As the integrating contractor, Martin Marietta Energy Systems, Inc., acts as a typical project manager with the exception that none of the other participants actually work for or are contractually accountable to them. This project management approach requires considerable coordination and cooperation from the various participants because sole accountability is difficult to assess. While this project structure complicates management, it is a tribute to the participants that all regulatory commitments are being met through a cooperative, team attitude.

REGULATORY/FUNDING CYCLES

The RCRA Corrective Action Program and CERCLA project phases are similar in that they proceed in the order of a site investigation phase, an alternatives assessment phase, a decision phase, a design phase, and a remediation phase. The duration and cost of each phase can be estimated at the beginning of the project, but they often change drastically as the project progresses. Site characterization can require much more time and money than expected if additional contaminant sources or releases are found. By the same token, the remedial action is not precisely defined until approval of the ROD. During prior phases, assumptions must be made about the technologies to be employed, their cost, and the time to design and construct them. As the project progresses, these variables are refined; therefore, unanticipated changes in assumptions regarding schedule and costs can result from the refinements obtained during each phase of the remediation process.

The federal funding cycle, however, does not readily accommodate the uncertainty of the remediation process. Formal budget requests are submitted two years in advance and forecast five years in advance. Even though a particular project's budget is not absolutely fixed until the funds are received, the program's budget 1, of which the project is a part, may be fixed, so large deviations in the costs of a particular project may cause problems to the overall program. Certain tasks may be delayed into another fiscal year or eliminated, and requested funds may no longer actually reflect the work to be performed due to changing program priorities and costs. Additionally, funding is received on an annual basis even though the projects span multiple years. This often creates a problem when contracts need to be awarded that cover work to be performed in more than one year. All of the funds to be committed must be available in the year the contract is awarded.

For the SWSA 6 project this uncertainty has been minimized and controlled by preparing a Baseline Design Report (BDR) early in the project that (1) describes the assumed remediation scenario; (2) contains a schedule and cost estimate for that assumed remediation scenario; and (3) documents all assumptions made in developing the remediation scenario, schedule, and cost estimate. The BDR was prepared initially during the investigation phase, updated during the evaluation of alternatives, refined following completion of the Proposed Plan, and will be updated during design. The cost estimate considers when funds will be required for contract commitments so that budget requests are properly made.

The project team also was able to minimize the incompatibility of the regulatory and budget cycles by identifying those portions of the project that need to be implemented regardless of the remediation alternative contained in the ROD and proceeding with them on an expedited basis. This will allow the entire project to be accelerated and will also reduce uncertainty because these project tasks were identified and will be designed and completed early. These identified tasks for SWSA 6 were the construction of lay-down areas, offices, showers, and decontamination facilities; plugging and abandonment of wells and boreholes; and capping of a demonstration LLW disposal facility.

CONCLUSIONS

Environmental restoration projects conducted for and by DOE and other federal facilities often pose management challenges not always found in the private sector. At SWSA 6 the primary management challenges are the integration of RCRA, CERCLA, and NEPA; the issue of institutional control; the fragmented project organization; and the incompatibility of the federal budget process with the regulatory process. Each of these management challenges is being dealt with successfully at SWSA 6 and many of the approaches are being and can be applied elsewhere.