DEPARTMENT OF ENERGY OAK RIDGE FIELD OFFICE (OR) LESSONS LEARNED FROM CLEANUP PROJECTS AT OAK RIDGE

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ABSTRACT

The U. S. Department of Energy (DOE) Oak Ridge Field Office (OR) is carrying out Environmental Restoration activities at 40 + different sites containing multiple solid waste management units. These cleanup activities have been and are currently being executed under the various environmental requirements of the Environmental Protection Agency and the thirteen states in which the sites are located. This paper discusses the lessons learned or reinforced from successes and failures of selected cleanup activities at the OR facilities and describes opportunities for improvements in project planning, implementation, quality assurance, training and regulatory interactions.

LESSONS LEARNED FROM CLEANUP PROJECTS AT OAK RIDGE

The U. S. Department of Energy (DOE) Oak Ridge Field Office Oak Ridge (OR) has responsibility for carrying out environmental restoration activities at 40+ different sites located in seven Environmental Protection Agency (EPA) regions in thirteen different states. Most of these sites contain multiple solid waste management units or other environmental legacies resulting from 45+ years operation of research, production, and defense related facilities. These sites include 5 listed on the EPA National Priorities List (NPL), 5 are currently operating facilities, and 32 are former Manhattan Engineering District/Atomic Energy Commission sites. Cleanup activities are being implemented under the applicable regulations of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Recovery and Compensation Liability Act (CERCLA), the National Environmental Policy Act (NEPA), and include various stages of characterization, design, and remedial actions.

This paper discusses lessons learned from successes and failures of selected cleanup activities at the various OR facilities and describes opportunities for improvement in project planning, implementation, quality assurance, training, and regulatory interaction. This very candid discussion of OR experience is presented in the spirit of helping to achieve DOE's goal of managing environmental cleanup activities in a technically sound, cost effective, and compliant manner. In each of OR's cleanup experiences to date, lessons have been learned or reinforced from either the successful application or absence of the following desired characteristics of cleanup projects:

Utilize Experience of Others

While planning and executing projects, we should take advantage of information exchange with technical experts doing similar activities at other locations. This lesson was learned at significant cost to the OR facility in the Sludge Fixation Project which entailed an attempt at solidifying sludge from a RCRA closure. In this project, the sludge was solidified in a mixture of flyash and cement without taking advantage of the experiences with similar activities at other DOE facilities such as Rocky Flats and West Valley. This resulted in numerous "solidified" waste drums containing free liquids and an incompatibility between the waste form and containers. Had the project managers utilized the experiences on the same general geographical site, it could have taken advantage of capping which had been applied successfully at other facilities on the Oak Ridge Reservation. A reinforcement of this lesson was obtained from the Melton Valley Storage Tank Solidification Project in which project management took advantage of experiences of private vendors and utilities who had experienced similar problems. This project utilized available commercial, proven technology for a successful solidification campaign thereby reinforcing the lesson learned: utilize experience of others.

Project Documentation Thoroughness

Projects should incorporate rigor in documenting engineering design, change controls, and operating procedures. Technical decisions should be documented and not based on the informal discussions or understandings. This lesson was a bitter one in Oak Ridge experience in that the same solidification campaign for the sludges referred to earlier included minimal documentation prior to initiating the work. There were internal process changes with a significant amount of the guidance to the work teams being verbal. Additionally, there were informal agreements between the project team and the regulators thereby resulting in subsequent confusion, lack of memory on the part of some of the regulators, therefore, resulting in noncompliance in the management of the resulting solidified products. The resulting action plan for achieving compliance incorporated all the desired rigor and discipline in project planning and documentation. As a result, the project is currently on schedule and within estimated cost. The project plan received designation as a "notable practice" by a recent Tiger Team Review at Oak Ridge.

Characterize Adequately Before Technical Decisions

Problem solutions or technical fixes must be based on complete characterization of the problem waste in order to assure compatibility with applicable regulations. An example of this lesson was a particular Portsmouth pond closure at which there had been inadequate PCB analysis of the sludge.

These sludges were placed in boxes and, due to inadequate characterization, PCB contaminated soils were co-mingled, therefore, resulting in a much greater volume which required treatment under the TSCA regulations. A positive reaffirmation or confirmation of this lesson is the instrumentation at the Y-12 solid landfill facility which characterizes the bulk containers of solid waste to determine rad vs. non-rad compounds. This has enabled the reduction in the volumes of low-level rad wastes requiring further treatment and disposal being reduced by over a factor of two (2).

Site-Wide Integration of Project Planning

Decisions should not be made in a vacuum. Project plans should be coordinated site-wide for consistency, compatibility, and acceptability to all stake-holders. This lesson was positively confirmed in the activities at the Y-12 plant which consisted of seven RCRA closures utilizing the same technology. Decisions were integrated relative to these seven closures site-wide. Experience was gained due to the repetitive nature of the closures. The results of this site-wide integration resulted in completion of the seven projects on schedule and below the total estimated project cost. Another positive example of site-wide integration of project planning involves groundwater strategy on the Oak Ridge Reservation. OR has integrated the groundwater strategy, and implemented change control procedures for the installation, utilization, maintenance, and closure of all groundwater monitoring wells. There is coordination between the research, compliance, and RI/FS utilization of all groundwater monitoring wells. This has enabled good control over the cost and utilization of all wells on the reservation.

A Strong and Effective Project Management System

Any cleanup project management system should include a structured, clear line of authority, clear communications, and formal review and approval by line management with authority and accountability clearly assigned. Once again, the sludge fixation project at Oak Ridge is a good example of how not to do it. In this particular example there was no clear project organization with the clear line of authority and communications established. Responsibility for implementing the project was carried out by the maintenance (a matrix) function. There was inadequate communication with the line authorities where responsibility and accountability resided. There were inadequate project reviews as progress developed. Alternatively, there was a success story in the closure of the Solid Waste Storage Area No. 6. There was a clear project structure with designated leadership, weekly project team meetings with a clear understanding by all who had authority for decisions and actions. This project came in under TEC and on schedule.

Provide Proper Training

Personnel must be provided with adequate training in operating procedures, sampling/analysis protocols, Q.A./Q.C., and applicable regulations and safety procedures. This lesson also was driven home by the Sludge Fixation Project at Oak Ridge. In this project there was inadequate training, inadequate characterization of the products and the raw materials to be solidified, resulting in RCRA violations. On the other hand, subsequent to this, there has been adequate training supplied to employees, stiffened or improved sampling analysis protocols, and much improved Q.A./Q.C., resulting in recent RCRA inspections result by the regulatory body with no violations.

Performance based on Technical Adequacy---Not Schedule Driven

Milestone negotiations and project implementation should be based on technical compliance and not arbitrary deadlines. Keep technical realism and resource limitations clearly in mind during milestone negotiations. This again was driven home in the Sludge Fixation Project in that the schedule was self-imposed with no clear regulatory driver, and milestones became unrealistic and not consistent with available resources. On the positive side, the White Oak Creek Embayment Sediment Retention Structure was a project with milestones based on technical compliance and reasonable timetables. The schedule was based on documented agreements between all the affected parties. The project was successfully completed consistent with the technical requirements.

Sound Quality Assurance Program

This program should include operational readiness reviews, change control procedures, quality control criteria, and unusual occurrence reporting with the associated corrective actions. This lesson was learned in the closure of a surface impoundment, which consisted of a placement of a clay cap over the stabilized waste. In this the permeability limits of the clay were determined to be outside specifications. This had resulted from incorrect sampling procedures, inadequate attention to the specifications, or inadequate quality control criteria. This resulted in a costly recovery to prove to the regulators that the particular clay was adequate for the permeability requirements.

On the positive side, a good experience was obtained from the readiness reviews and quality control procedures at the TSCA incinerator. At this facility, the sampling protocol was developed and approved and applied during the burn trial test, resulting in achieving the 99.9999 percent destruction of PCBs. This resulted in the receipt of the TSCA permit.

Good Communications With Regulators

Project decisions should be reached after all issues are clearly communicated to regulators; discussions held and agreements appropriately documented. This lesson was learned again with the pond cleanup at K-25, where informal discussions were held with the regulators and decisions and actions taken based on informal agreements which later resulted in non- compliant storage of a significant number of drums. Discussions and agreements at all times should be clearly documented.

Affirmation of this lesson involved the Weldon Spring Quarry and the Oak Ridge Elza Gate sites where all issues were clearly communicated and agreements documented leading up to Records of Decision being signed in a timely manner.

The above discussed "Lessons Learned" have resulted from specific OR cleanup actions. However, the results are equally applicable to Environmental Restoration and Waste Management activities throughout the Department of Energy.