

THE OFFICE OF SITE CLOSURE: PROGRESS IN THE FACE OF CHALLENGES

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ABSTRACT

The Office of Site Closure (OSC) was formed in November 1999 when the Department of Energy's (DOE's) Office of Environmental Management (EM) reorganized to focus specifically on site cleanup and closure. OSC's objective is to achieve safe and cost-effective cleanups and closures that are protective of our workers, the public, and the environment, now and in the future.

Since its inception, OSC has focused on implementing a culture of safe closure, with emphasis in three primary areas:

- Complete our responsibility for the Closure Sites Rocky Flats, Mound, Fernald, Ashtabula, and Weldon Spring;
- Complete our responsibility for cleanup at sites where the DOE mission has been completed (examples include Battelle King Avenue and Battelle West Jefferson in Columbus, and General Atomics) or where other Departmental organizations have an ongoing mission (examples include the Brookhaven, Livermore, or Los Alamos National Laboratories, and the Nevada Test Site); and
- Create a framework and develop specific business closure tools that will help sites close, such as guidance for and decisions on post-contract benefit liabilities, records retention, and Federal employee incentives for site closure.

This paper discusses OSC's 2001 progress in achieving site cleanups, moving towards site closure, and developing specific business closure tools to support site closure. It describes the tools used to achieve progress towards cleanup and closure, such as the application of new technologies, changes in contracting approaches, and the development of agreements between sites and with host states.

The paper also identifies upcoming challenges and explores options for how Headquarters and the sites can work together to address these challenges. Finally, it articulates OSC's new focus on oversight of Field Offices to ensure they have the systems in place to oversee contractor activities resulting in site cleanups and closures.

INTRODUCTION

The Department of Energy's (DOE's) Office of Environmental Management (EM) is responsible for addressing the legacy of the Cold War - remediating sites and disposing of the wastes

resulting from the Nation's 50 years of nuclear weapons research, development, and production. These activities include: storing, treating, and disposing of waste; characterizing, assessing, and remediating or stabilizing contaminated soil or groundwater; and decommissioning facilities used during the Cold War or during EM's remediation activities.

In late 1999, EM reorganized to better focus on the completion of its mission on a site level and to enable closer coordination between Headquarters and the Field activities. The Office of Site Closure (OSC) was established to focus specifically on site cleanup and closure. OSC's objective is to achieve safe and cost-effective cleanups and closures that are protective of our workers, the public, and the environment, now and in the future by addressing the entire missions of waste management, environmental restoration, and nuclear materials stabilization at the following Operations Offices: Albuquerque, Chicago, Nevada, Oakland, Oak Ridge, Rocky Flats, and Ohio. These responsibilities encompass work at more than 100 of EM's sites. These sites include everything from legacy waste storage, treatment, and disposal to managing nuclear materials processing facilities and inactive nuclear reactors, to remediating large tracts of land with soil or groundwater contamination.

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PROGRESS AT THE CLOSURE SITES

We continue to make progress towards closure of the Rocky Flats Environmental Technology Site by the end of 2006. During FY 2001, more than 200 shipments of transuranic (TRU) waste were shipped from the site to the Waste Isolation Pilot Plant (WIPP), near Carlsbad, New Mexico, for permanent disposal. Also during 2001, more than 14,500 kg of plutonium residue salts were processed and/or packaged for disposition, as well as more than 3,000 kg of sand, slag, and crucibles residue waste. And in July, the Rocky Flats Site Protected Area was reconfigured, reducing the size of the site area requiring safeguards and security measures by 80%. More information on progress at Rocky Flats is included in the paper on that topic later in this session.

Significant progress was also achieved at the Fernald Environmental Management Project, where a new contract for final cleanup was awarded in November 2000. This new closure contract is a cost-plus-incentive-fee arrangement which provides significant financial incentives to Fluor Fernald to complete work at the site ahead of schedule and for less than the baseline cost. Specific achievements under this contract during 2001 include placement of the permanent cap on Disposal Cell 1, beginning construction of the Silo Remediation Facility, and completing decontamination and decommissioning (D&D) of the Plant 5 Complex.

At the Mound Environmental Management Project, an additional 38 hectares were deeded to the City of Miamisburg for economic development in April 2001, bringing the total amount of property transferred to 40% of the Site. In addition, an agreement was reached with the State of South Carolina to allow TRU waste from the Mound Site to be stored at the Savannah River Site (SRS) pending shipment to WIPP. This waste must be moved off the Mound site before the buildings in which it is stored can be decontaminated and either turned over to the City of Miamisburg for reuse or demolished. Shipment of the TRU wastes to the SRS was initiated in September 2001.

At the Weldon Spring Site Remedial Action Project, the final placement of all waste into the 1.1 million m³ disposal facility was completed in June, completing site disposal operations. Activities at the site are now focused on preparing for post-closure activities and completing the site interpretive center (a museum and visitors center). More information on closing the Weldon Spring Site is included in the paper on that topic later in this session.

PROGRESS AT OTHER OSC SITES

The other OSC sites also continued to make progress towards cleanup completion during 2001, including:

- Completing offsite disposal of approximately 12 million kg of soil from the Former Sodium Disposal Facility at the Energy Technology Engineering Center in California;
- Construction of the Environmental Management Waste Management Facility at Oak Ridge. This onsite disposal facility will safely isolate soil and debris contaminated with low-level radioactive waste, hazardous waste, and mixed waste from the cleanup of the Oak Ridge Reservation. Disposal operations are expected to begin in Spring 2002;
- Completing removal of the above-grade ducts, below-ground piping, and soils at the Brookhaven Graphite Research Reactor, as well as the Canal and Water House associated with the reactor at the Brookhaven National Laboratory;
- Beginning a full-scale shipping campaign using soft-sided containers to ship low-level waste from the Laboratory for Energy Related Health Research to the Nevada Test Site (NTS) for disposal. The use of the soft-sided containers in place of the metal B-25 boxes previously used to store, transport, and dispose of the low-level waste from the site saved more than \$200K over the life of the project;
- Completing stabilization of the eight Gunite Tanks at the Oak Ridge National Laboratory, marking the final step in their remediation. This project, originally scheduled to begin during FY 2002, was accelerated into FY 2001 when waste removal activities were completed a year ahead of schedule. The entire stabilization project was completed in less than six months and was completed more than \$500K under budget, which concluded all activities associated with the Gunite Tanks;

- Removing the uranium deposit from the Molten Salt Reactor Experiment (MSRE) at Oak Ridge, a high-visibility activity recommended by the National Academy of Sciences during its review of the MSRE remediation program in 1997;
- Retrieving nearly 6,000 drums of TRU waste nearly two years ahead of schedule and \$10M under budget at the Los Alamos National Laboratory;
- Completing several technology enhancements and deployments to accelerate cleanup at Lawrence Livermore National Laboratory sites. Installation of smaller, less costly portable treatment units with the coupling of new technologies such as electro-osmosis, Catalytic Reductive Dehalogenation, and Iron Filings/GeoSiphon have been successful in reducing costs over conventional pump and treat remedies;
- Decontaminating and decommissioning the 150-cm Cyclotron Facility at Argonne National Laboratory-East; and
- Completing the surface cleanup activities at Amchitka Island, Alaska, during the summer of 2001. The cleanup was performed at this remote location under harsh conditions without any significant health or safety problems.

Also, cleanup activities at 12 industrial sites on the NTS were complete during 2001, as were remediation activities at more than 100 other release sites across the OSC complex. These accomplishments help reduce the mortgage for the EM program and continue to show progress towards completing the legacy of contamination that caused the formation of EM in 1989.

And, in an effort to reduce OSC's future mortgage, we transferred responsibility for waste management at the National Laboratories at Ames, Argonne-East, Brookhaven, Berkeley, and Princeton from EM to DOE's Office of Science.

We also had several geographic site completions during FY 2001:

- In September 2001, decontamination, decommissioning, and demolition activities at the General Atomics Hot Cell Facility and clean up of the associated yard in La Jolla, California, begun in 1993, were completed.
- The transfer of the Grand Junction Office (GJO) to the Riverview Technology Corporation (RTC, a non-profit local economic development organization) became effective on October 1, 2001, marking the completion of cleanup activities at the GJO.

We are also continuing our emphasis on worker safety, and have substantial accomplishments in this area, such as:

- Fluor Fernald has worked more than 10 M hours without a lost work time accident;
- Mound has worked more than 5.7 M hours without a lost work time accident;

- NTS has worked more than 6.5 years without a lost work time accident; and
- The Weldon Spring Direct Hire Organization has amassed more than 1M safe work hours.

Our commitment to safe operations is also demonstrated by our achievements in DOE's Office of Environment, Safety, and Health Voluntary Protection Program. This program promotes safety and health excellence through cooperative efforts among labor, management, and government at DOE sites and consists of three categories: STAR, MERIT, and DEMONSTRATION. STAR is the highest safety performance and program honor that can be achieved.

- The Weldon Spring Site has received the STAR Award every year since 1998;
- The West Valley Demonstration Project received the STAR Award in February 2000; and
- The Fernald Site achieved STAR Award status in January 2001.

PROGRESS IN DEVELOPING BUSINESS CLOSURE TOOLS

We are also continuing to develop standardized processes sites can follow to achieve closure. For example, one challenge to the timely closure of a site is the ability to retain experienced and skilled Federal staff at the site until the job is done. Some employees, fearing the end of their jobs, will move on to other jobs at other sites unless incentives are provided to keep them at the closure site. Legislation developed by OSC allows DOE to offer enhanced retention allowances to encourage employees to stay at the Rocky Flats and Ohio Field Offices. The legislation provides for enhanced retention bonuses, increased annual leave ceilings, and the continuation of medical coverage after leaving employment. The closure sites have developed transition plans and are now entering into agreements with qualified employees to increase annual accumulation from existing ceilings of 240 hours to 720 annually. This initiative affords DOE the maximum availability of employees to perform the needed closure efforts while creating additional resources that can be used later by the employees to transition to another job for retirement. Other enhanced incentives such as retention bonuses are likely to be reserved for use in the last few years before a site closes.

We are also working to ensure continuity for post-closure benefits at EM defense closure sites. In September 2001, the Secretary of Energy submitted to the Congressional Defense Committees a report on the funding and administration of these benefits. The report provides plans for the transfer and post-closure administration of pension and retiree medical benefits for the approximately 14,000 contractor employees and retirees at the defense closure facilities at Fernald, Mound, and Rocky Flats. The Department is presently considering options to provide for the continued sponsorship, administration and funding of contractor employee benefits post-closure. It is likely that a Department level organization will be given responsibility to oversee this important activity.

EM has convened a joint HQ/Field working group to address the issues associated with the management of records in preparation for closure. The expected report will address such issues as:

- Post-closure records requirements
- Successor management
- Maintaining intellectual control
- Transfer of custody of TRU waste records to the Carlsbad Field Office.

Recommendations should be provided to the Assistant Secretary in the next few months.

An important ongoing initiative is the continuing self-assessment by the sites of their progress in addressing the business closure activities needed for closure (property disposal, real estate, pensions and medical, records, etc.). This process provides an important tool to monitor the adequacy of the business closure activities which must be accomplished to close the sites on time.

Additionally, we are developing processes for priority selection for federal personnel who are surplus at closure sites. Also, in 2001 we launched a training course in business management and regulatory requirements for closure. More than 300 Field and Headquarters personnel took this training class during FY 2001.

TOOLS FOR PROGRESS

Changes in Contracting Approaches

One of the tools that has contributed significantly to progress at OSC sites is our approach to contracting. Both the Rocky Flats and Fernald contracts have been highly successful, in that they provide incentives for contractors to accelerate work and to be creative. In addition, these contracts also provide for the proactive evaluation of impacts of new requirements and changes in technical direction before implementing these changes. This proactive approach enables us to save both time and money in site closure and cleanup.

We also have successful contracts in place at the NTS, where specific incentives are included for accelerating work or reducing costs, and at Oak Ridge, where the Management and Integration contractor reduces costs by maintaining smaller prime contractor staff and specifically tailoring subcontracts.

In FY 2001, we issued the solicitation to build two facilities for processing depleted uranium hexafluoride. These facilities will address the legacy of fifty years of uranium enrichment for national defense and civilian purposes. We recently awarded a contract which includes a combination of fixed-price, incentive fee and performance-based award fee requirements.

Technologies

Another tool contributing to our progress is technology. Whether we are applying something brand new, modifying a technology from another field to be applicable to our challenges, or just sharing information between our sites so everyone benefits from all of our complex-wide experience, technology continues to improve our operations. The following are some specific examples of accomplishments within OSC enabled by technologies provided, or enhanced, by DOE's Office of Science and Technology (OST).

The Large Scale Demonstration Project at Mound demonstrated the WaterWorks Crystals and the NoChar Absorbent Polymer, both of which give us a solidification technology for liquid waste that meets waste acceptance criteria and minimizes the volume of waste requiring disposal. Both of these technologies were also applied at other sites (the WaterWorks Crystals at Ashtabula, Pantex, and the Laboratory for Energy-Related Health Research; and the NoChar Polymer at Ashtabula, Rocky Flats, and Sandia). That means they helped us make progress towards closure at Mound, and helped us get closer to completing these other sites, too.

We have also had terrific results from the Accelerated Site Technology Deployment at Brookhaven, where we applied the In Situ Object Counting System, and the BetaScint Fiber Optic Sensor to provide near-real time radioactivity assay results in our decommissioning activities at the Brookhaven Graphite Research Reactor. And on that same project, we also applied the diamond wire saw, which enabled us to dismantle the above-grade ductwork into sections that could be shipped to the disposal site.

The In-situ Object Counting System was also deployed last summer at the NTS Reactor Maintenance Assembly and Disassembly complex. This system enabled the site to characterize the roof prior to demolition, to characterize bulky waste for free release, and to screen excavated soil. As a result, the site was able to save labor, time, and money.

A major benefit of some of the technologies we have deployed is the ability to improve protection for our workers. One way to protect them is to ensure they are not exposed unnecessarily to radioactive materials or radiation.

At Rocky Flats, technology is helping to protect our workers. Rocky Flats had more than 900 glove boxes contaminated with plutonium to be addressed before the site can close. To help enhance worker safety and reduce exposure risk during size reduction of these glove boxes, OST worked with the site to deploy the Inner Tent Chamber, which removes workers from unnecessary radiological exposures by separating them from direct contact with the materials being size reduced.

Another way to protect our workers from potential hazards is through the use of the Remote Excavator (deployed at the Los Alamos National Laboratory), which enables a worker to operate a full-sized excavator using a series of remote controls and computer view screens. The worker is safely housed within a building rather than out in the field exposed to the explosives and radiation hazards.

Then there is the Personal Ice Cooling System (otherwise known as “the cool suit”), a simple concept that continues to provide results. Workers in radiation zones wear multiple layers of clothing to protect them from the radioactivity in the materials they are handling. These multiple layers can lead to varying levels of heat stress, making the workers uncomfortable, and potentially endangering them. The cool suit provides a way to circulate cold water through a vest worn by workers to help them control their body temperatures during work activities. In addition to avoiding the hazards of heat stress, the cool suit enables workers to increase their productivity. First demonstrated at Fernald with support from OST, the cool suit has led to happier, more comfortable workers, and more rapid completion of our tasks at more than 15 EM sites. Some of the OSC sites where the cool suit has been used are Argonne, Ashtabula, Los Alamos, Mound, NTS, Pantex, Oak Ridge, Rocky Flats, and West Valley.

At the Kansas City Plant, phytoremediation was deployed by planting poplar trees to accelerate treatment of groundwater contaminated with volatile organic compounds. A reactive barrier was installed in 1998 to intercept and treat the contaminated groundwater, but sampling indicated some water circumvented the barrier, and that even after treatment, some contamination still remained. Serving as technical consultants, OST personnel determined that fast-growing poplar trees would absorb and break down the contamination and achieve hydraulic control of the plume. Deployed last June, the potential cost savings could be as much as \$500K.

At Los Alamos, approximately 20,000 m³ of soil was contaminated with uranium at the site Firing Range. The site used a sodium bicarbonate solution to leach the uranium from the soil. The uranium was then recovered through filtration. This Heap Leaching technology was demonstrated on 7,500 m³ of Firing Range soil last May.

The Pantex Plant composted 2,300 m³ of soil and debris contaminated with high explosives and low levels of other (non-radiological) contaminants. Even though composting is a “low-technology” concept (in this case, the composting was promoted using steer manure and rotted wood chips), the results can be significant because it eliminates the need to dispose of the soil off site. The Pantex Plant earned special recognition from the President’s Closing the Circle for Pollution Prevention for applying this technology.

These examples demonstrate that success comes in all shapes and sizes, and affects both the large and the small sites. And it is through the combination of all these successes that OSC will continue to make progress in site cleanup and closure.

Innovative Agreements

In order to close a site, the waste or other materials on that site must either be safely stabilized and disposed of on site, or moved off site. Offsite disposal of waste can be expensive, but both DOE and commercial disposal facilities have worked with our OSC sites to provide disposal capacity for both low-level waste and mixed low-level waste.

As discussed earlier in this paper, we were also able to negotiate an agreement with the Governor of South Carolina enabling Mound to ship TRU waste to SRS for repackaging and storage prior to shipment to WIPP. The innovative aspect to this agreement is that South Carolina is accepting

1 m³ into the state for every 2 m³ shipped out of the state. So even as SRS accepts TRU waste from Mound for storage, the total amount of TRU waste at the site decreases because it is working off its own inventory of TRU waste. In addition, this activity helps save money within the EM program, since building a facility to repackage and ship the waste directly to WIPP from Mound would cost more than using the facility already at SRS to perform that function.

Cost Measurement and Control Tools

Integrated baselines, agreed to by the Field and Headquarters, lay out our planned scope, cost and schedules and allow us to coordinate all the elements needed to achieve site closure. These baselines are also critical to our ability to measure day to day performance. In addition, they form the basis for us to compare technologies and alternatives, helping us to make sure we're heading down the path that is most cost effective. We continue to work with the other parts of EM to develop additional techniques and tools that will help us to more accurately determine and control our environmental cleanup and waste management costs.

A few examples of the tool development efforts we are leading or participating in include:

- Refining estimating tools and models such as expanding the capabilities of the Remedial Action Cost Engineering and Requirements estimating system;
- Developing an automated package for assessing project cost risks and determining contingency funds needed; and
- Maintaining a standardized list with definitions of environmental cost categories. This list known as the Environmental Cost Element Structure was recently adopted by the American Society of Testing and Materials as an international standard.

Another tool we are just starting to work on is an automated life cycle cost comparison tool that will speed up and simplify cost analyses of various life cycle alternatives. We completed and are now loading the Environmental Cost Analysis System database. Historical cost data for over 20 projects are now contained in this system and it enables us to generate more accurate cost estimates and to better understand the factors (regulatory, technical, geographical, etc) that drive our project costs. This improves our ability to pinpoint areas where cost savings can be achieved and allow us to plan future projects that are more and more efficient.

Continuous improvement in our project baselines and the tools we use to estimate, analyze and control costs are all key factors in the success of our individual projects. These tools are helping us reduce the time and cost required to complete closure at our sites.

WHERE DO WE GO FROM HERE?

To promote more rapid site cleanup and closure, OSC is shifting our focus to broad oversight of the Field. Specifically, we will be ensuring the Field Offices have the systems in place to oversee the following contractor activities:

- Program planning, budgeting, and execution systems
- Procurement systems
- Integrated safety management systems
- Project control systems
- Closure business systems
- Safeguards and security systems

In this context, systems include organizational processes, practices, and procedures, in addition to any formal management systems.

However, even with this shift in focus, OSC remains keenly interested in ensuring continued safe operations at all OSC sites, and to achieving site cleanups and closures by 2006.

We have a number of activities that are working well and are helping us make progress towards our 2006 commitments, such as the physical accomplishments at sites described previously in this paper. We have identified key interface issues so that we know what we must do to continue to achieve progress. Our contracts at Rocky Flats and Fernald provide the right framework, and create incentives for performance. And our closure business issues are receiving greater attention, which will help resolve issues associated with site closure.

But there are areas where we can improve, and every person involved in the OSC program needs to make these a priority. Specific examples of things that we could do better include developing and sharing more innovative approaches to meeting requirements and achieving cleanups, and ensuring the level of documentation and analysis is consistent with the needs.

How can OSC achieve these improvements? We all need to look at what we do and avoid being overly conservative; we need to develop and implement creative solutions to streamline our cleanup and closure processes (such as the innovative agreements described earlier in this paper), and we need to look at how other agencies are solving similar challenges and learn from them.

We believe this shift in focus will help OSC make these improvements. This new focus will help us improve our current approaches to our program that may now be holding us back.

CONCLUSION

OSC has made significant progress during FY 2001, as demonstrated by the progress towards closure at many sites and the three geographic site closures, the reduced costs and time saved, and our continued safe cleanup record discussed in this paper.

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OSC looks forward to continuing to work with all the members of the OSC family - DOE and contractors in the field as well as the HQ organization, to promote site cleanups and closures and to ensure we provide the best possible value to the people of the United States.