# The Ohio Field Office Closure Experience

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## ABSTRACT

This paper explores the history and lessons learned related to the United States Department of Energy (DOE) Ohio Field Office Closure Projects – from the completion of the mission of the sites to the implementation of the Records of Decision or other regulatory documents defining the cleanup standards and the remedies that were achieved. Remediation of these sites was a collective $6 billion dollar mega environmental-remediation project and three of the sites were completed in CY 2006.

## INTRODUCTION

The DOE Ohio Field Office was established in October of 1994. Originally, the Ohio Field Office was composed of the four closure sites in the State of Ohio and the West Valley Demonstration Project in New York. In October 2004, former Secretary of Energy, Spencer Abraham, and Ohio Congressman Rob Portman announced the creation of the DOE Environmental Management Consolidated Business Center (EMCBC), located in Cincinnati, Ohio. The EMCBC was established to consolidate support functions of the DOE Environmental Management (EM) closure sites and other designated sites in the areas of human resources, financial management, contracting/procurement, information management, logistics, legal services, and technical support. The initial sites that made up the EMCBC were the Ohio Field Office (Ashtabula, Columbus, Fernald, and Miamisburg sites in Ohio, and West Valley Demonstration Project in New York); the Rocky Flats Project Office (Golden, Colorado); the Carlsbad Field Office (Carlsbad, New Mexico); and the Portsmouth/Paducah Project Office (Portsmouth site in Ohio and Paducah site in Kentucky).

With the physical completion of the cleanup work at three Ohio sites (Ashtabula, Columbus, Fernald), and the stand-up of the EMCBC in 2004, the Ohio Field Office was officially disbanded and completely absorbed into the EMCBC on December 31, 2006.

The Ashtabula, Columbus and Fernald closure sites are still in the process of final contract close-out (administrative actions, including final DCAA audits, payment of final invoices, etc.). The Miamisburg Closure Project is undergoing final project completion and will achieve physical completion in 2010. Cleanup at all four of the Ohio closure sites was executed using a Cost Plus Incentive Fee (CPIF) contract process. Critical

Decision 4 (*Approve Project Completion*) documentation under DOE Order 413.3A (Program and Project Management for the Acquisition of Capital Assets) has been submitted and approved for the Ashtabula, Columbus and Fernald sites. All four closure site contracts are in various stages of the contract closeout process.

As a result of the experiences gained through the administration and implementation of the four closure site contracts, the Ohio Field Office and the EMCBC were able to recognize various lessons learned and have attempted to share those lessons learned with other sites and have employed the lessons learned in the development and procurement of other DOE environmental restoration contracts.

## ASHTABULA CLOSURE PROJECT (ACP)

The ACP was a DOE-EM decontamination and decommissioning (D&D) and Resource Conservation & Recovery Act (RCRA) project on a privately owned site in Ashtabula, Ohio. The site was owned by the Reactive Metals, Inc., (RMI) Titanium Company, which operated a commercial extrusion plant under a U. S. Nuclear Regulatory Commission (NRC) radioactive materials license. The site was operated by RMI and RMI held all licenses and permits governing cleanup of the site and storage and disposal of all wastes generated as a result of the DOE-funded D&D work. These licenses and permits were issued to RMI by the Ohio Department of Health (ODH) and the Ohio Environmental Protection Agency (OEPA). Radiological cleanup activities were conducted in accordance with a Decommissioning Plan approved by the ODH, and remediation of hazardous materials was regulated by the OEPA in accordance with RCRA requirements.

The DOE operations at the ACP site began in 1962 and ended in 2000. Beginning in 1962, the primary function of RMI was to extrude depleted, natural, and slightly enriched uranium metal and experimental quantities of thorium for DOE. The uranium was extruded into rods, tubes, or other shapes as an intermediate step in the production of nuclear fuel elements at other DOE sites. RMI also extruded depleted uranium under an NRC license and extruded non-radioactive metals, primarily copper-based, for the commercial sector. At DOE direction, uranium extrusion work ceased in September 1988, and all extrusion operations at RMI ceased on October 31, 1990.

Uranium, technetium (Tc-99), and trichloroethylene (TCE) are the primary contaminants associated with the past extrusion activities. Because recycled uranium was extruded for DOE at the site and since Tc-99 is a contaminant in recycled uranium, the site was contaminated with both Tc-99 and uranium. TCE was used at the site as a degreasing agent in the DOE uranium extrusion process from 1962 to 1966, and for degreasing tools until 1972.

The areas remediated have been grouped into two Hazard Areas:

- Hazard Area 1 is the Contaminated/Buildings and non-waste management unit (WMU) soils, which is approximately 12 acres and was primarily contaminated with uranium and Tc-99. Ground water contaminants in this area were minimal. This area required removal of remaining contaminated in situ soils, existing soil piles, structures, concrete infrastructure, and utility lines.
- Hazard Area 2 is the WMU, which is the one-acre area that was the location of the evaporation pond. This area was the only location where ground water contamination had been confirmed. Ground water contaminants included TCE, uranium, Tc-99, nitrates, and degradation products of TCE. The WMU is regulated under the RCRA Permit by OEPA.

Primary stakeholders in the ACP End State Vision include DOE, RMI, ODH, and OEPA. These parties have worked to achieve the regulatory End State that allows for unrestricted use of the site after closure.

In September 2005, DOE contracted with LATA-Sharp Remediation Services, LLC to plan and complete the cleanup. Physical completion of all DOE-funded environmental remediation activities at the ACP was achieved on November 1, 2006, and independent verification performed by the Oak Ridge Institute for Science and Education (ORISE) determined that all cleanup criteria had been met. The ODH and OEPA regulators formally notified RMI that the site had been cleaned up in accordance with all RMI license and permit requirements. RMI subsequently sold the property.

EM completed the ACP with a life-cycle cost of $147M; this represents costs incurred from Fiscal Year (FY) 1997 through 2006. A Site Transition Plan (STP) was jointly authored by the DOE offices of Environmental Management (EM) and Legacy Management (LM), and approved by EM-1 and LM-1 on January 30, 2007. The Critical Decision 4 package was approved by the Under Secretary of Energy on November 29, 2007. [1] DOE's post-closure responsibility is limited to custodianship of Government-owned records; this work is performed by LM.

## COLUMBUS CLOSURE PROJECT (CCP)

In April 1943, the Battelle Memorial Institute (BMI) entered into a contract with the Manhattan District of the U. S. Army Corps of Engineers to perform atomic energy research and development. From that time through 1988, BMI carried out research with nuclear material for the Department of Energy (DOE), its predecessor agencies, and defense components of the Federal government. This work was also conducted under a nuclear materials license (SMN-7) overseen by the U. S. Nuclear Regulatory Commission (NRC). In 1986, DOE accepted the liability for the bulk of the cleanup of the retired nuclear research facilities owned by Battelle, and cleanup began in 1988. Radiological cleanup activities were conducted in accordance with a Decommissioning

Plan approved by the NRC, and remediation of hazardous materials was regulated by the Ohio Environmental Protection Agency (OEPA) in accordance with RCRA requirements

Over the years, Battelle performed contract work related to reactor and fuel design, fuel fabrication, and irradiation studies of reactor components and other materials. Isotopes of concern resulting from this research included mixed fission products (e.g. cesium, strontium, iodine), activation products (e.g. cobalt -60), transuranics (e.g. plutonium, americium, neptunium), and isotopes of uranium and thorium. Clean-up of the King Avenue facilities generated approximately 200,000 ft3 of LLW and MLLW. The West Jefferson remediation generated 1.5M ft3 of LLW and MLLW. In addition, 37M3 of TRU waste was packaged and shipped. Other noteworthy items include the first remote handled TRU (RH TRU) shipment utilizing the RH-72B canister, and Battelle project was the first EM site to use a commercial disposal facility (Envirocare, 1992).

A total of 15 buildings and surrounding land areas comprised the initial decommissioning project, located at two sites in central Ohio. Nine buildings at Battelle's main campus (King Avenue site) near downtown Columbus were successfully remediated between 1990 and 2000. At Battelle's West Jefferson site, three buildings, comprising the original West Jefferson North Nuclear Sciences Area, became the project focus in 1998. Removal of most building internal systems and packaging of the on-site inventory of transuranic (TRU) waste was completed in mid-2003. In November 2003, DOE contracted with Environmental Chemical Corporation (ECC&E2) Closure Services, LLC (Closure Services) to plan and complete the remaining tasks under the closure project. These included: demolition of the major buildings and their support structures; removal of contaminated underground utilities and contaminated components of the site's sanitary system (filter beds); and remediation of contaminated soils. Physical completion of these actions was achieved in June 2006.

EM completed the project with a Life-Cycle Cost of $163.4M. This represents the total costs for remediation from October 1997 through June 2006.

A Site Transition Plan (STP) was approved in January 2006, forming an agreement between EM and LM for actions required to transition post-closure responsibilities to LM. The Critical Decision 4 package was approved by the Under Secretary of Energy on July 17, 2007. [2] on the CCP (principally contract close-out and records transfer). Because Battelle's facilities were remediated to levels allowing future use without radiological restrictions, DOE-LM's post-closure role is limited to custodianship of Government-owned records.

**FERNALD CLOSURE PROJECT (FCP)**

The FCP was a DOE-owned and operated environmental remediation project, conducted in accordance with the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA). The end-state for the FCP was a federally-owned, undeveloped park with an emphasis on wildlife. On November 20, 2000, DOE-EM awarded a contract to Fluor Fernald, Inc. (FFI) to complete the remaining scope of the environmental

remediation project and to prepare the site for long-term surveillance and maintenance (LTS&M) of all CERCLA remedies. On October 29, 2006, FFI declared physical completion, and on January 18, 2007, the EM-1 approved acceptance of the physical completion of work required from FFI. On January 22, 2007, EM transferred operational responsibility for the entire FCP site to the Office of Legacy Management (LM). The site continues to be owned by DOE, and DOE-LM is responsible for all LTS&M activities..

A Site Transition Plan (STP) for the FCP was approved by EM-1 and LM-1 on March 29, 2005. The Critical Decision 4 package was approved by the Under Secretary of Energy on November 29, 2007. [3] Regulatory completion of the FCP will be a post-CD-4 activity. LM will be responsible for components of regulatory completion associated with Operable Unit 5 (the Aquifer Restoration Project), since final groundwater remediation is not expected to be complete until the year 2025.

EM completed the FCP with a life-cycle cost of $4.4B; this represents cost incurred from Fiscal Year1992 through 2006.

**MIAMISBURG CLOSURE PROJECT (MCP)**

Construction of the Mound Plant facility in Miamisburg, Ohio began in 1947 to support the early atomic weapons programs. Early work at the site involved production of polonium-beryllium initiators used in atomic weapons, and research related to radionuclides and detonators. In the 1950s, the facility manufactured a variety of nuclear weapons parts, including cable assemblies, explosive detonators, and electronic fire sets that activated them. The Mound Plant evolved into an integrated research, development and production facility. Non-weapons work ceased in 1972 and production of weapons components ceased in 1995.

In 1998, a sales contract was established between the Miamisburg Mound Community Improvement Corporation (MMCIC), a community reuse organization, and DOE that allowed conveyance of the Mound property by discrete parcels to the MMCIC, subject to the CERCLA 120(h) process. The first parcel of land was transferred to MMCIC in August 1999.

The DOE-EM awarded a closure contract to CH2M Hill Mound, Inc. to clean up the Mound site in accordance with the regulator-approved, stakeholder-endorsed, end-state project under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CH2M Hill, Inc. achieved physical completion in 2006, and subsequently exited the site.

Because surface soils within Operable Unit 1 (a historic “sanitary” waste landfill) did not pose an unacceptable risk, and excavation and treatment of residual subsurface contaminants was not considered practicable, the 1995 Record of Decision (ROD) did not establish any explicit source removal requirements. However, in response to community concerns over the potential impact of OU-1 on future development of the site, in FY 2006

the Congress appropriated additional funding for DOE to further-remediate OU-1 such that the end state would be acceptable, to the extent practicable, to the MMCIC. DOE-EM subsequently awarded the OU-1 cleanup contract to the Accelerated Remediation Co., Inc. (aRc), and aRc will complete all remaining physical work in OU-1 in 2010 (some of the aRc contract scope is funded by the American Reinvestment and Recovery Act [ARRA]).. The remainder of the former Mound Plant site was remediated by CH2M Hill, Mound, Inc. and predecessor cleanup contractors, and the majority of those land parcels have already been transferred (via real estate deed) to the MMCIC. A CERCLA Record of Decision (ROD) was recently approved for the remaining areas (Parcels 6, 7 and 8) and those land parcels are now being prepared for transfer to the MMCIC.
A Site Transition Plan (STP) for the MCP was approved by EM-1 and LM-1 in 2005. A revised ROD for OU-1 will be prepared after aRc completes physical work in 2010. A Critical Decision 4 package for the MCP site will not be prepared until aRc completes all physical work in OU-1. The CD-4 package will include work performed by both CH2m Hill Mound, Inc. and aRc. Responsibility for LTS&M activities at the MCP site is expected to transfer to the DOE Office of Legacy Management (LM) in FY 2011, and those activities will include operation and maintenance of remedial action systems, routine inspection and maintenance, records-related activities, and stakeholder support.

## LESSONS LEARNED

The following represents a summary level of collective lessons learned at the four Closure sites in the State of Ohio. The lessons learned are in eight (8) areas that represent common themes found throughout the four closure projects.

## SAFETY

Background

- Many facilities/systems shutdown or abandoned for several years
- Many of the facilities were 50+ years old
- Some data/drawings were not updated (waste disposal systems, underground piping, utilities, etc).

Industrial Safety Lessons Learned

- Anticipate hazards associated with changing site conditions
- Emphasize quick practical solutions with worker buy-in
- Do not let accelerated schedule cause workers to take shortcuts

Radiological/Nuclear Safety Lessons Learned

- Emphasize constant adherence to radiation protection and contamination control processes
- Use a graded approach: match the controls to the hazards

The Smartest Things We Did

- Measured and reported on safety issues at the first aid and near miss level
- Kept workforce engaged in understanding overall work scope hazards

- Rotated Facility Representatives on a weekly basis between sites

Things We Would Do Better
- Anticipate hazards associated with "everyday" industrial hazards
- Get worker 'buy-in' on project mission

**ACQUISITION STRATEGY**

Background
- Extensive use of CPIF contracting mechanisms
- Encourage firm fixed price (FFP) contractors to bid
- Define the end state (the "what"), but shift the technical risk (the "how") to the contractor

Transition Lessons Learned
- Dormant sites require more readiness and maintenance requirements
- Do not underestimate time needed for baseline and procedural preparation

The Smartest Things We Did
- Selected contractors with previous site knowledge
- Used CERCLA standards as part of Request for Proposal (RFP) Statement of Work (SOW)

Things We Would Do Better
- Estimating Low Level Waste (LLW) soil volumes
- Establish volume caps for LLW soil and debris

**CONTRACT MANAGEMENT**

Background
- CPIF closure contracts with 70/30 cost-share ratio
- Utilize EM wide IDIQ contracts

Contract Compliance Lessons Learned
- "Manage the contract, not the contractor" is rule of thumb
- Don't underestimate need to thoroughly understand how performance is being determined and reported
- Use alternative performance indicators such as regulatory document close-out to track performance

Contractor Fee Lessons Learned
- Respond to and negotiate Request for Equitable Adjustment (REA) ASAP to maintain overall fairness for process

The Smartest Things We Did

- Shifted from CPAF to CPIF contracts

Things We Would Do Better

- More frequent updating of project risks
- Understand potential weakness of small business contractors (examples: business management, project controls management)
- Ensure remediation contracts include appropriate requirements for management and disposition of Government-owned records, and include contract milestone dates for disposition of those records within a timeframe that will support transition of the site to the DOE-LM in a timely manner

**REGULATORY COMPLIANCE**

Background

- State and Federal differences in interpretation of regulatory standards
- Use of ORISE as the independent verification contractor provided high level of confidence that work was performed appropriately

State Regulatory Lessons Learned

- Cooperative and involved regulators are essential for overall success
- Weekly communications developed strong teaming relationship

Federal Regulatory Lessons Learned

- Push US EPA to assume their lead role
- Encourage US EPA to have a more physical presence

The Smartest Things We Did

- Identified end state expectations and requirements early in the project
- Obtained RODs early and used ROD scope in the contract SOW development
– Make ROD's and regulatory agreements part of contract.

Things We Would Do Better

- Process regulatory document closeout in parallel (to the extent practicable) with completion of physical work

**TECHNOLOGY**

Background

- Contractor planned to utilize selective excavation to remediate Waste Management Unit and other site soils
- Technology was an enhancement not a requirement
- Obtained additional funding for "technology" related scope – (e.g., at Fernald, resolved Silo 3 and Silo 1 & 2 project definitions

Project Specific Lessons Learned

- Selective excavation has its advantages (potential cost savings) and disadvantages (extended schedule)

The Smartest Things We Did

- Utilized water fogger system to improve dust suppression during D&D
- Convince regulatory and stakeholders to construct onsite disposal facility at Fernald
- Spent time up-front building a strong working relationship with the corridor state transportation and emergency response personnel

Things We Would Do Better

- Make sure potential volume of waste streams is more accurately assessed as it is generated.

**ENGINEERING DESIGN AND CONSTRUCTION**

Background

- Minimal design requirements for Ohio sites
- Greatest challenge (at Fernald) was the design, construction and D&D of Silo 1 & 2 and remediation facilities in support of site closure

Construction Lessons Learned

- Implement "Cold & Dark" approach early in project to reduce safety risks and operating costs

The Smartest Things We Did

- Used 12 foot trenches around buildings to ensure isolation of utilities

Things We Would Do Better

- Spread out critical work activities from a time and sequence standpoint to prevent multiple critical paths from developing late in a project

**FUNDING AND RESOURCES**

Background

- Under CPIF contract, the funding profile is included in contract
- Annual appropriation was requested in accordance with the contract

Funding and Resources Lessons Learned

- Used regulatory milestones to support annual funding requests
- REA approval process does not allow efficient baseline change control
- Partner early with the DOE Recipient Office (e.g., LM) in order to jointly-develop a budget for the first five years post-closure, so that the EM Integrated

Priority List (IPL) reflects target funding that will meet the Recipient Office's needs, post-closure
- Involve the EM Office of Budget with post-closure budget planning, so that the Office of Budget can ensure the annual Secretarial Program Direction Memorandum (PDM) reflects site transfer dates and target funding levels that will be acceptable to both EM and the DOE Recipient Office (e.g., LM)

The Smartest Things We Did
- Developed 10 year plan, sold concept and obtained HQ buy in and received level funding leading to project success

Things We Would Do Better
- Small business contractors did not have adequate resources to develop and process contract changes
- Premature reallocation of funds based upon early project performance indicators

**COMMUNICATIONS**

Background
- The on-site presence of the DOE Contracting Officer significantly improved communications and facilitated resolution of problems
- Created a single organization to represent the various interest groups

Workplace Lessons Learned
- Be direct, open and honest about objectives, challenges, constraints and progress

Stakeholders and Media Lessons Learned
- Don't underestimate value in site walk-throughs; don't rely solely on teleconferences to communicate progress, issues and concerns
- Bring public in ASAP; be open and educate them to obtain early 'buy-in'
- Develop trust between Public/EPAs/DOE

The Smartest Things We Did
- Established a productive working relationship between the site owner and regulators (e.g., Columbus and Ashtabula sites)
- "Get it in writing" when significant decisions were established

Things We Would Do Better
- Establish more formal process to generate and maintain stakeholder meeting minutes
- Complete site clean up (DOE responsibility) before transition to a private entity

**CONCLUSION**

The Ohio Field Office was established in October of 1994. Originally, the Ohio Field Office was composed of the four closure sites in the State of Ohio and the West Valley Demonstration Project in the State of New York. Three sites (Ashtabula, Columbus and

Mound) previously under the Ohio Field Office have undergone Closure Contract Completion. The fourth site, the Miamisburg Closure Project, is undergoing final project completion and will achieve physical completion in 2010. In 2004, the Environmental Management Consolidated Business Center (EMCBC) located in Cincinnati, Ohio was established to consolidate support functions of the Department of Energy's (DOE) Environmental Management (EM) closure sites and other designated sites.
With the physical completion of the closure contracts at three of the four Ohio sites, and the stand-up of the EMCBC in 2004, the Ohio Field Office was officially disbanded and completely absorbed into the EMCBC on December 31, 2006.

As a result of the experiences gained through the administration and implementation of the four closure contracts, the Ohio Field Office and the EMCBC were able to recognize and share lessons learned with other sites, and have employed the lessons learned in the development and procurement of other DOE environmental restoration contracts.

## REFERENCES

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