

**Accelerated Clean-up of the United States Department of Energy, Mound Nuclear Weapons Facility in Miamisburg, Ohio**

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**ABSTRACT**

CH2MHILL is executing a performance-based contract with the United States Department of Energy to accelerate the safe closure of the nuclear facilities at the former Mound plant in Miamisburg, Ohio. The contract started in January 2003 with a target completion date of March 31, 2006. Our accelerated baseline targets completion of the project 2 years ahead of the previous baseline schedule, by spring 2006, and for \$200 million less than previous estimates. This unique decommissioning and remediation project is located within the City of Miamisburg proper and is designed for transfer of the property to the Miamisburg Mound Community Improvement Corporation for industrial reuse. The project is being performed with the Miamisburg Mound Community Improvement Corporation and their tenants co-located on the site creating significant logistical, safety and stakeholder challenges. The project is also being performed in conjunction with the United States Department of Energy, United States Environmental Protection Agency, and the Ohio Environmental Protection Agency under the Mound 2000 regulatory cleanup process. The project is currently over 95% complete.

To achieve cleanup and closure of the Mound site, CH2MHILL's scope includes:

- Demolition of 64 nuclear, radiological and commercial facilities
- Preparation for Transfer of 9 facilities (including a Category 2 nuclear facility) to the Miamisburg Mound Community Improvement Corporation for industrial reuse
- Removal of all above ground utility structures and components, and preparation for transfer of 9 utility systems to Miamisburg Mound Community Improvement Corporation
- Investigation, remediation, closure, and documentation of all known Potential Release Sites contaminated with radiological and chemical contamination (73 identified in original contract)
- Storage, characterization, processing, packaging and shipment of all waste and excess nuclear materials
- Preparation for Transfer of the 306 acre site to the Miamisburg Mound Community Improvement Corporation for industrial reuse

In the first two and a half years the project has successfully completed more demolition work, more environmental remediation work and more waste shipping than any other period in site history while improving the safety statistics of the site significantly. CH2M HILL Mound

established a safety culture to promote line management safety responsibility and continues to place a high emphasis on safety performance even in an accelerated closure environment. The Occupational Safety and Health Administration (OSHA), Time Restricted Case (TRC) and Days Away and Restricted Time (DART) rates improved 76% and 90%, respectively, since contract start from 2002 to 2005. These rates are the lowest the site has ever seen. The site has also gone over 1 million hours without a Lost Workday Case accident.

Covered below are the key strategies for safety improvement and project delivery that have been successful at the Miamisburg Closure Project are presented.

## **INTRODUCTION**

On January 1, 2003 CH2M Hill Mound, Inc. (CHM) began a contract with the Department of Energy (DOE) for the accelerated cleanup of the former DOE nuclear weapons facility known as Mound. The contract provides for saving over \$200M and approximately 2-year acceleration from the previous contractors' baseline. The contract scope includes demolition of 64 nuclear, radiological, and commercial buildings, 73 soil contamination potential release sites (PRS), and the transfer of 9 buildings and 306 acres of the site to the city of Miamisburg. The contract is Cost Plus Incentive Fee with a target cost of \$314M and a target completion date of March 31, 2006.

The criteria for successful completion of the project stress safe, compliant closure. All cleanup activities must be completed ahead of schedule and below cost preparing the site for future industrial reuse. At the same time, support for the transition of the displaced Mound workforce to other jobs is being provided.

Greater than 95% of the project is complete. All 64 buildings have been demolished (564,111 square feet). 62 of the 73 PRS's have been excavated generating over 195,000 cubic meters of low level waste soil. More than 198,000 cubic meters of waste has been shipped by rail and truck to disposal facilities at the Nevada Test Site and Envirocare of Utah. Over 50 km of piping and transfer lines and 240 gloveboxes have been removed. All accountable and excess nuclear material has been removed. The security program has been closed out and the removal of all classified material is complete. All TRU waste has been packaged and shipped to the Savannah River Site. In addition, 8 of 9 facilities and 8 of 9 site utility systems have been prepared for reuse and transfer to the city. The workforce has been reduced from 640 to less than 200.



Fig. 1. Mound plant yesterday



Fig. 2. Mound plant today >95% complete

## CH2M Hill Mound, Inc. Safety Performance

At contract start, CH2M Hill Mound quickly established a safety culture, to reinforce line management's responsibility for safety and total employee ownership and involvement. With the challenge to accelerate the safe closure of nuclear facilities at the former Mound Plant, it was imperative to establish expectations for safe performance of the work. This included industrial safety, radiation safety, nuclear safety and environmental compliance.

Through October 2005, the project has achieved a 76% and 90% improvement in the OSHA Total Recordable Case (TRC) and Days Away and Restricted Time (DART) rates respectively since contract start in January 2003. The significance of this accomplishment is most noteworthy when it is noted that the volume and complexity of the work performed at Mound since January 2003 has been significantly accelerated (Fig. 3). Project fixed price subcontractor safety performance has been exemplary as well, with zero lost work day injuries since contract start. Project performance in the areas of radiation protection, nuclear safety and environmental compliance mirror the success achieved in industrial safety.

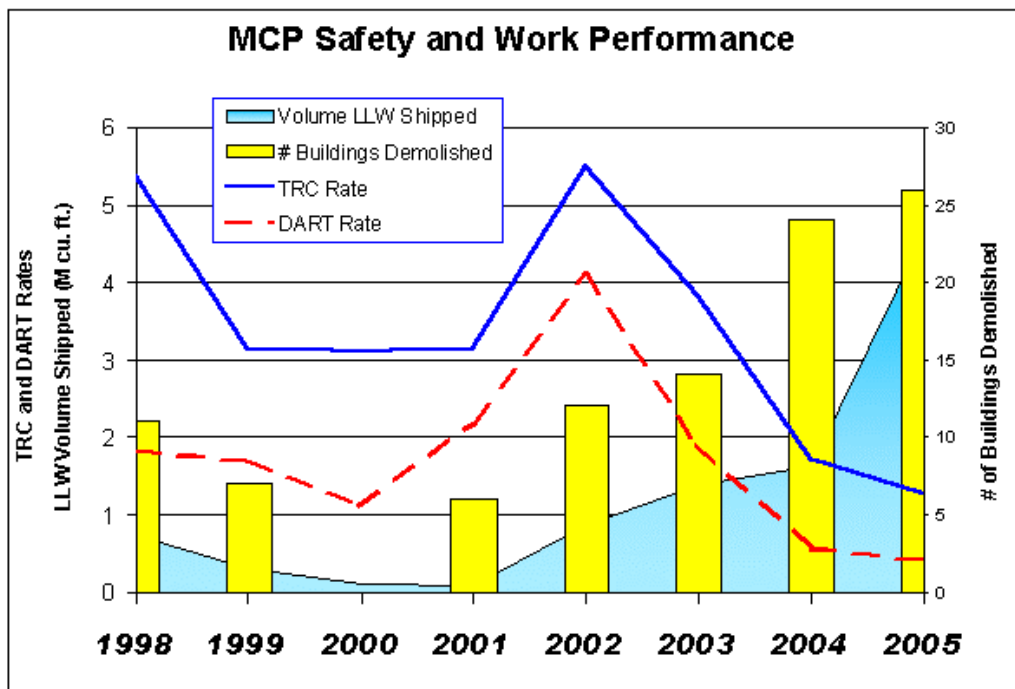


Fig. 3. MCP safety and production performance 1998 - 2005

### Safe Project Execution

During contract transition and early at the start of the project, project safety performance was reviewed, and areas for improvement were documented in the Miamisburg Closure Project Safety Improvement Plan. Elements of the Safety Improvement Plan included:

- Line Management Active Engagement
- Safety Program Enhancements

- Engaging the Workforce
- Communications
- Establishing Special Safety Emphasis Areas

Examples of the actions taken include:

- Created four highly visible Safety Focus Areas (Hazardous Energy Control, vehicles and heavy duty equipment, falls and hoisting and rigging)
- Implemented a Management Coaching and Mentoring Assessment Program
- Established Work Planning teams (workers, supervisors, industrial safety, radiological safety, waste compliance, etc.)
- Established the Joint Contractor/Union Safety Committee to facilitate the exchange of safety observations, review performance feedback and identify areas for safety focus
- Applied a focused effort to provide the right tools and the right PPE
- Worker training programs (decontamination & decommissioning training)
- Share safety information and lessons learned via a Weekly Toolbox Communication to the project
- Identify and control hazards through extensive use of Job Safety Hazard Analyses
- Individual responsibility of safety
- Line supervisor accountable for safe execution of work
- Reward safe work practices

Project safety performance, work execution including the work activities of subcontractors is routinely observed and analyzed by site safety personnel and the management team at all levels, to reinforce the expectations for the safe execution of work at Mound. The project implemented an aggressive Self Assessment Program to document line management observations and assessments; providing data for performance trending and feedback. Through October 2005, more than 900 documented self assessments have been performed. This information is routinely reviewed by the management team, and special assessment focus areas can be identified based on these reviews.

### **Key Strategies for Project Delivery**

Key strategies have proven instrumental in the project success. Each strategy is discussed below.

Projectized approach. A lifecycle baseline and working plan were developed with the end-state definition in mind. The baseline was established and then reviewed and agreed to by DOE to serve as the measurement point for contract performance and progress. The aggressive working plan that beat the baseline served to direct actual field work. Both the baseline and the working plan were formed around integrated schedules for all work activities. The project was organized around the major work activities in the plan to focus resources on accomplishing planned work. Progress against the baseline was tracked and measured. Daily and weekly project meetings with the project managers and DOE were held to establish priorities and address issues.

Communicate the plan to the workforce. The process of changing from an operating production culture to closure of the site introduces personnel and performance challenges. The working plan and strategy has to be clearly communicated to the staff on a continuous basis. Expectations of performance against the plan must be clear and consistent, and each person must

know how they fit into the plan. In order to provide a soft landing staff were given clear employment end dates with ample lead time to plan for job and career changes.

Incentivize safe closure. Both represented labor and the salaried workforce were incentivized for safe closure. The labor agreements were renegotiated to provide management with the flexibility to utilize personnel skills where they were most needed. In the agreements the workforce received annual monetary incentives as well as retirement benefits indexed to project performance. All incentives were tied to safety. Salaried personnel were incentivized through the issuance of closure units that derived their value from project performance. Salaried personnel also received early retirement benefits. Focused work teams consisting of both represented and salary personnel were charged with specific goals and received rewards in the form of gifts, luncheons, clothing, etc. based on achieve of those goals.

Early reduction of risk. The project focused on the early reduction of nuclear, security, and industrial risks that consume valuable personnel and funding resources. Nuclear materials were packaged and shipped to other DOE sites. Classified materials were dispositioned allowing security to be reduced. Targeted source term removal was employed to reduce nuclear safety requirements. The elimination of hazardous materials and energy sources coupled with taking the buildings to a rapid cold and dark status reduced the industrial safety risks associated with building demolition.

Reduce the infrastructure costs. Again the change from an operating production environment to plant closure requires a fundamental change in the deployment of available resources. The objective is to rapidly focus funding and personnel resources on closure activities in the plan. By challenging the status quo, major shifts were accomplished including: reduction to minimum staffing, reduced/eliminated programmatic requirements, reduced site foot print, reduced operations and maintenance costs, flexibility through outsourcing, and consolidation of waste management activities. These changes made resources available to accelerate planned closure activities.

Employ innovative techniques. Simpler is usually better. Less size reduction of equipment is safer. Decontamination can reduce the costs associated with waste packaging, transportation, and disposal. Investigation and characterization often eliminates the myths that grow around historical operations and allow safe work planning based on fact rather than innuendo. Use of fixatives and fogging can eliminated exposure potential. Commercial demolition techniques are often directly applicable in nuclear and radiological projects. An open and streamlined regulatory process that draws regulators and the DOE into working teams speeds the development and approval work and closure documents.

Managing the contract risks. Under the cost plus incentive fee contract the contractor and DOE accepts certain risks. The risks include safety performance, limited characterization of buildings and soils, and changing regulatory positions to name a few. Risks defined in the contract included potential for discovery of increased building contamination, increased waste volumes, discovery of other transuranic wastes, availability of treatment and disposal sites, labor issues, and pension funding. Definition of responsibility, shared responsibility, and limitations on risk were developed and agreed to with DOE. Risk mitigation plans were developed, tracked, and progress measured to actively minimize risks. Government furnished supplies and services were clearly defined in the contract and afford risk protection.

Focus on safety. Safe, compliant accelerated closure is achieved through rigorous work control processes implementing the principles of integrated safety management. Through work planning



teams that include workers, supervisors, safety professionals, waste compliance, etc. hazards and controls are identified. Line supervisors have direct responsibility and accountability for safe execution of work. All workers are held responsible for safety. Safe work is rewarded routinely through spot awards and team goal awards.

Workforce transition. Support the transition of the workforce to other jobs or careers is important when the project is working the workforce out of a job. Maintaining an open dialog on staffing reductions and providing support through the career transition center has minimized impacts to the workforce. Support in job searches, interview skills, and resume development as well as financial planning support has eased the transition for many employees. Over 80 personnel have accepted employment through the transition center. During the project no formal employee concerns have been file. Open and frequent communications with the two unions (United Steel Workers and Security, Police, and Fire Professionals Association) have kept grievances and complaints to a minimum.

## **CONCLUSION**

Sound planning and project execution has allowed the project to be completed over two years ahead of the previous baseline schedule at a saving of \$200 million while achieve the best safety record the Mound site has ever seen. The Mound site is being transitioned to the Miamisburg Mound Community Improvement Corporation (MMCIC). A cooperative working relationship between Ch2M Hill Mound and MMCIC has provided for efficiencies in the infrastructure and utility development necessary for the site reuse. MMCIC has created a total of 605 new private sector jobs for 42 companies that have located on the Mound site since the inception of the Mound reuse project. The Miamisburg Closure Project is coming to a successful completion demonstrating that safe, accelerated closure can have a positive affect on the DOE, community and its employees.