

## **GETTING MORE "BANG FOR THE BUCK" IN SCHEDULING D&D PROJECTS**

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AUTHOR: Tom Baillieul/Jay Thomas

Organization: U.S. Department of Energy

Address: 505 King Avenue, Rm. A496

Columbus, OH 43201

Phone: (614) 424-7226 Fax: (614) 424-3951

### **ABSTRACT**

Expansion of work within the DOE's Environmental Management (EM) Program and a dwindling of funds available for D&D efforts, makes it inefficient to continue multiple projects in parallel with less than optimal annual funding for each. Stretching out completion schedules results in significant cost increases due to escalation and the need to carry management and support costs over the longer time period. The Chicago Operations Office developed an approach to integrate schedules and funding for decommissioning projects at the Battelle Columbus Laboratories (BCLDP) and the RMI site in Ashtabula, OH (RMIDP).

Under the integrated approach, the BCLDP was divided into two separate sub-projects. Emphasis in FY 1995 and 1996 was given to completion of clean-up at the Battelle King Avenue site, using funds originally earmarked for the RMIDP. This has accelerated the King Avenue work by 8 months, with savings of \$4.7 million. From FY 1997 to FY 1999, the bulk of available funds would be reassigned to complete the RMI Project, while planning proceeded for the more technically challenging clean-up of the Battelle West Jefferson Nuclear Sciences Area. In 1999, full attention would be returned to the BCLDP. Following this approach the overall BCLDP schedule would be extended by two years, with a slight cost increase due to extended surveillance and maintenance. This is more than offset by the schedule savings projected for the RMIDP, calculated to be 6 years and \$25-40 Million from the current baseline plan. Other integration options are possible, the deciding factors being: health and safety risk; overall cost savings; contracting requirements; technical feasibility; and institutional considerations. Integration of two relatively small decommissioning projects can serve as a model for increased efficiency of operations at the national level.

### **THE PROBLEM**

The environmental restoration portion of the EM Program grew extremely rapidly, from \$495 Million in 1989 (the first year of the EM Program), to over \$2.0 Billion in 1994 (U.S. Department of Energy, 1990 and 1993). At the same time, DOE's mission was also changing dramatically. Nuclear arms reductions world wide resulted in whole facilities being shut down and transferred to the EM Program for decontamination and clean-up. Complicating these efforts

were agreements with state regulatory agencies which, for the first time, had the ability to enforce specific clean-up actions and schedules at DOE facilities nationwide.

Prior to 1994, the EM strategy was to try and accommodate all demands to the maximum extent possible -- and to request an ever increasing budget from Congress to carry out the program. With the election of the current Congress in late 1994, deficit reduction and curtailment of Federal spending are now the name of the game.

Currently, the EM Program is experiencing a flattening, or even a decline, in funding at the same time that many EM clean-up projects are moving from the assessment phase into more costly remediation. Especially hard hit in the competition for available funding are decontamination and decommissioning (D&D) activities. D&D deals primarily with structures and as such does not usually fall under the same regulatory requirements and agreements which drive most other clean-up activities. This is true even when the building or structure in question represents a significant threat to public health and safety or the environment.

Additionally, the DOE's Environmental Management Program, like other government agencies, allocates funding on an annual basis, not on a total project basis as is the case with most private industry. It is inefficient to continue multiple projects in parallel with less than optimal annual funding for each. The arithmetic is not hard to do: as projects stretch out in time, total costs increase because of escalation and the need to carry management and support costs over the longer time period.

### **THE DOE-CHICAGO INTEGRATION APPROACH**

The decontamination and decommissioning program at the Chicago Operations Office (CH) is not immune to the funding problems besetting the rest of EM. D&D activities in FY 1994 accounted for virtually 50% of CH's total environmental restoration funding. In 1994, this liability was concentrated in two projects at privately-owned facilities where the government had accepted liability for all, or a major share, of the clean-up.

The Battelle Columbus Laboratories Decommissioning Project (BCLDP) comprises clean-up activities at two research complexes, one in the City of Columbus, and one in rural Madison County, Ohio. The King Avenue (Columbus) site houses corporate offices and general research laboratories. The West Jefferson (Madison County) site comprises a number of facilities formerly dedicated to nuclear research. Fifteen buildings, or portions thereof, and associated soil areas, which became radioactively contaminated as a result of performance of work under the government contract are to be decontaminated and released without radiological restrictions to Battelle. The project has been set up as a cost-share venture (90% DOE - 10% Battelle). Commercial nuclear research at Battelle was performed under a license from the Nuclear Regulatory Commission (NRC). Accordingly, Battelle has also prepared a Decommissioning Plan to comply with the requirements of 10 CFR Parts 30, 40, and 70. This plan, which is based on the approved DOE baseline, was accepted by the NRC in late 1993.

Physical decontamination efforts began in 1989, and a major replan of the project occurred between 1992 and 1993 (BCLDP, 1994). Under this revised baseline, project completion was scheduled for FY 2000, at a total estimated cost of \$228 Million. Annual federal funding in support of the project was assumed to be \$20-23 Million.

The second of the large D&D efforts is located in Ashtabula, Ohio, in the northeastern corner of the state. The RMI Titanium Company Extrusion Plant (RMI) was a prime contractor to the U.S. Department of Energy (DOE) from 1961 through August 1987. From September 1987 through November 1992 RMI was a subcontractor to the Fernald Environmental Management Program (FEMP) operated by Westinghouse Environmental Management Company of Ohio (WEMCO). All extrusion operations at RMI ceased on October 31, 1990. As of April 1, 1993, RMI became a prime contractor to the Department of Energy's Chicago Operations Office (DOE-CH), and all decommissioning efforts are being performed through funding from DOE-CH.

The RMI site is also licensed by the NRC, and is listed in NRC's Site Decommissioning Management Plan (SDMP). Site Characterization and Decommissioning Plans have been submitted to the NRC but have not yet been approved. Pre-decommissioning activities and contaminated soil removal are on-going. In 1994, the RMI project was baselined as a component of the Chicago Environmental Restoration Baseline Plan. Under that plan, the project was expected to take 16 years at a total cost of \$274 Million. Annual funding was projected at an average of \$12-14 Million.

All projects carry a certain amount of fixed costs for management, health and safety programs, engineering, training, etc. These fixed costs are not strictly proportional with the costs of performing the physical activity of the project. For any given support function, there is usually a large range between the staffing (and therefore cost) to maintain basic requirements and the maximum amount of physical work that can be supported before the support organization has to increase in size. This second ratio identifies the optimum project effort -- the largest group of workers that can be managed by the smallest support organization.

It became obvious to CH that the annual funding being allocated to the two D&D projects (nominally \$35 Million in 1994) fell significantly below the optimum needed to complete both projects in the shortest amount of time (Figure 1). The solution was to integrate the funding profiles of the two projects to make the maximum effective use of available resources. Each D&D project, or logical portion thereof, would be provided an optimum level of funding to allow completion in the shortest time possible. Under this approach it would be possible to achieve an improved schedule for the combined effort (Figure 2).

The selected sequence of project efforts was the result of several considerations. Work at Battelle's King Avenue campus was well under way and proceeding in an effective, efficient manner, with all NRC approvals in place. There could be no value in redirecting an effort that was so nearly complete.

The original schedule for the BCLDP was based on an assumption that a DOE storage site for project Transuranic wastes would be identified by January, 1995. This issue has been problematic for the project since May, 1991. At that time, Assistant Secretary Leo Duffy directed that Transuranic waste not be shipped to the designated site in Hanford, Washington in response to that State's objections. As a result of this direction, work on the JN-1 Hot Cell Building, our highest risk facility, was replanned to defer activities until the end of the project. Resolution of this issue was expected to require more time than allowed for in the project baseline and was the key reason for breaking the Battelle project into two components.

In FY 1995 and 1996, emphasis was placed on completion of the King Avenue portion of the Battelle Project. A portion of the funds budgeted for the RMI project were reassigned to accelerate the effort in Columbus. Less money was required than originally estimated because of continuous improvements in productivity and reductions in management and overhead costs. The schedule for completion of work at the King Avenue facility has now been accelerated by 8 months, with savings from the original baseline of \$4.7 million. While the Battelle King Avenue work is under way, the RMI Project will continue to receive \$5-6 Million for necessary surveillance and maintenance, characterization, waste reduction, and procurement of one or more contractors to perform the D&D under a fixed-price approach.

Because of the relative simplicity of decontamination work at the RMI -- where the goal is to turn this moderately contaminated facility into a "green field" site -- it was assumed that NRC approval of a D&D plan, and procurement of the requisite decommissioning contractor would be very straight forward. At the end of FY 1996, the plan was for the RMI Project to accelerate activities using funds currently in the budget for the BCLDP. It was assumed that the RMI D&D could be completed by 1999 (2½ - 3 years). Completion of the RMI Project in 1999 would save at least 8 years from the current project schedule, with commensurate cost savings in excess of \$40 Million.

During the period that the RMI project is receiving full funding, the Battelle Project will continue necessary surveillance and maintenance, and minor material removal at the West Jefferson site. A nominal funding level of \$4-5 Million per year was planned for the 1997-1998 time period. During this time period, it was assumed that the transuranic waste issue would be resolved successfully. In fiscal year 1999, D&D activities at the West Jefferson site would begin a ramp-up with the procurement of the necessary D&D services. Actual decontamination efforts will last approximately 3 years (at an assumed annual funding level of \$25-28 Million).

## **IMPACTS**

This integrated approach to D&D projects is expected to result in significant cost savings for the taxpayer. For the Battelle Project there will be an overall schedule delay of 2-3 years and a cost increase of \$10-12 Million. This is more than offset by the schedule savings projected for the RMI work. Total savings (from the current baseline plans) are expected to be 8 years and \$30 Million.

There are no anticipated health and safety impacts from this approach as a full surveillance and maintenance program will be conducted at each site that is awaiting D&D. It was recognized that there would be unavoidable programmatic impacts from breaking the Battelle Project into two pieces. The cost for surveillance and maintenance at the West Jefferson facility is more than at the RMI site because active controls are required to maintain the containment in the hot cells. These cells date from the mid-1950s, and maintenance costs are rising as building systems and structures wear out. Delay will increase the chance that institutional knowledge of hot cell operations will be lost as staff take other jobs, retire, or die. There will also be additional costs to re-establish a project organization and procure a full-service D&D contractor. However, without a site for the TRU waste, significant decontamination activities would be impossible as well.

The Nuclear Regulatory Commission has recently issued a ruling which calls for completion of D&D actions within 24 months of the approval of a D&D Plan. Under both the prior and current approaches to D&D planning Battelle and RMI will have to ask for a formal schedule extension.

### **OTHER CONSIDERATIONS**

Since the time the decision was made to integrate the funding and schedules for the BCL and RMI Decommissioning Projects, several changes have occurred. First, funding at the \$35 Million level did not materialize as expected. Thus, even with the planned sequencing of projects it has become more difficult to establish an optimum work effort while doing the necessary forward planning and staging (in addition to basic surveillance and maintenance) at the reserved site. One saving factor for the BCLDP has been project's ability to reduce its funding requirements because of productivity improvements.

Responding to the Ohio Congressional delegation, the EM Program agreed to accelerate the transfer of the management of the two Ohio D&D projects from the Chicago Operations Office to the fledgling Ohio Field Office. The RMI Project was transferred April 1, 1995, and the BCL Decommissioning Project is scheduled for transfer at the beginning of FY 1997. This has thrown into question whether the original integration plan is still valid. However, the Ohio Field Office has expressed an intent to pursue an integrated approach as a way of maximizing its own resources.

As noted above, the proposed approach to sequencing the two Ohio D&D projects is just one of several alternatives. Since the first proposal was made in January 1994, additional options for TRU waste disposal for the BCLDP have been identified. One option which has been evaluated is on-site shielded cask storage of TRU which will allow full decontamination of the hot cells to proceed uninterrupted. While not the preferred solution, on-site storage is technically feasible and cost-effective. It was also recognized that forward motion on the BCLDP was likely the best lever to move DOE decision makers to identify an interim TRU storage site. Most recently, the BCLDP was identified as one of the few sites able to ship TRU waste in support of a plan to open the WIPP site in FY 1997, one year earlier than currently scheduled.

Given that a hiatus to address the TRU disposal problem is not really required, there is no technical reason not to complete the BCLDP project in its entirety prior to launching full bore into the RMI D&D effort. The key decision factors then become the needs and desires of the primary stakeholders -- the facility owners, the U.S. NRC, the Ohio EPA, and the DOE offices overseeing the tasks.

Another change for D&D projects within the EM Program was the decision by the Assistant Secretary in early 1995 to identify those smaller projects which, with sufficient funding, could actually be completed by the year 2000. It was recognized that there is a need to present the public and Congress with visible successes if financial support for the entire program is to be maintained. There are a number of projects nation wide (including the BCLDP and the RMI Project) which meet the criteria for accelerated completion. This "small sites" strategy is a larger scale version of the one described here. Success is most readily achieved by applying the resources necessary to complete a manageable number of projects in the shortest practicable time.

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