IMPLEMENTATION OF DOE/NFDI D&D COST ESTIMATING TOOL (POWERtool) FOR INACTIVE FACILITIES AT THE SAVANNAH RIVER SITE

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ABSTRACT

The Savannah River Site (SRS) has embarked on an aggressive D&D program to reduce the footprint of excess facilities. Key to the success of this effort is the preparation of accurate cost estimates for decommissioning. SRS traditionally uses “top-down” rough order-of-magnitude (ROM) estimating for decommissioning cost estimates. A second cost estimating method (POWERtool) using a “bottoms-up” approach has been applied to many of the SRS excess facilities in the T and D-area. This paper describes the use of both estimating methods and compares the estimated costs to actual costs of 5 facilities that were decommissioned in 2002.

INTRODUCTION

The SRS 2025 Vision is to complete the site’s Environmental Management missions and transform SRS to a site focused on National Security. The Vision applies innovative cleanup reform approaches to accelerate both cleanup and risk elimination. This includes an aggressive objective of decommissioning 72 inactive facilities that are located on the periphery of the site by fiscal year 2006 (FY06). To accomplish this, innovative tools are being utilized to plan the cost effective decommissioning of these facilities.

Initial rough order-of-magnitude (ROM) estimates were made for decommissioning the facilities in the T, D and M Areas. These ROM estimates are based on a standardized model originally developed by the INEEL Mapping process and modified for use at SRS. The model is based on the floor area of a facility multiplied by standard rates and difficulty factors. These ROM estimates provided an adequate level of accuracy for initial planning.

Polestar Applied Technology, Inc. providing technical support to DOE’s National Facility Deactivation Initiative (NFDI), developed a computer based software tool for producing high quality “bottoms-up” D&D estimates for all facilities entering into the D&D program. This software provides sufficient detail for baseline planning. In 2001 this relational database, named POWERtool, was used at over 15 facilities across the DOE complex with savings of over 80% in project estimating costs over conventional baseline estimating methods. The Facilities Decontamination and Decommissioning (FDD) Program at SRS deployed this tool for decommissioning estimates within two areas of the site. Actual cost data from the demolition of several facilities is compared to
the estimates with the intent of adjusting the tool to better estimate future D&D activities at SRS.

An initial investment decision in a pilot activity was made to demonstrate the effectiveness of POWERtool by estimating the D&D cost of the Consolidated Incinerator Facility (CIF) at SRS. SRS utilized the POWERtool developers to estimate the D&D costs as well as providing on-the-job training for SRS personnel. Upon completion of the pilot demonstration, SRS applied the estimating software to the T and D-area inactive facilities in the site-wide D&D initiative. This paper describes the POWERtool process for cost estimating the T and D-area inactive facilities. As of this date, actual data is available from the demolition of 5 of the T-area facilities and is presented and compared to both the ROM cost estimate and the POWERtool estimate. Plans are in place for continued capturing of the actual costs for decommissioning these facilities in sufficient detail as these facilities are decommissioned. This enables the continuous feedback process for overall improvement in D&D cost estimating.

AERIAL PHOTOGRAPHS OF T-Area and D-Area

Fig. 1. T-Area (August 2002)
ESTIMATING PROCESS

Upon completion of on-the job training at the CIF, the estimating team became more familiar with the POWERtool software and developed an effective strategy for estimating facilities. First, the team learned the library unit descriptions used in the software. For example, a breathing air receiver is considered as one piece of large “clean” equipment for estimating purposes. All equipment, regardless of what it was used for, is estimated as to its relative size and whether or not it is contaminated. Second, the model allows for adding comments to the extent necessary to further explain the estimator’s logic or basis of estimate. Next, the developers gave general suggestions on estimating linear footage which allowed the estimates to be consistent and conservative yet not requiring tape
measurements. These suggestions included comparing a known length to an unknown length and using natural stride techniques for estimating long distances. Linear footage is necessary to estimate the steel structure of a building along with the piping, ductwork, and non-load bearing walls. Fourthly, estimating the linear footage of conduit and small piping is time consuming and unnecessary for the model. It does not significantly affect the costs associated with structural steel, and if necessary can be viewed as a component of extra tons of steel. A final suggestion from the developers was to get as much information as possible from drawings before field walkdowns.

The team’s estimating strategy consists of four main objectives. First, before going out into the field, engineering drawings of each building were acquired to record the dimensions of the exterior and interior of the building as well as other pertinent information. For example, exterior dimensions are used in estimating the square footage of either transite or steel skin that covers buildings. The interior dimensions are used in estimations of the load bearing and non-load bearing walls. Next, learning the history of the buildings was another important preparation. The history helps in knowing if a building was clean or contaminated with radioactive or hazardous material and what kind of processes went on in the building. This information helps to determine what types of characterizations are needed to decontaminate and decommission the building. Thirdly, the team split up to gather information more efficiently. Estimator A was in charge of accounting for all the equipment in the building. This included both large and small equipment. Also, estimator A entered the walkdown information directly into POWERtool using a laptop computer. Estimator B was in charge of collecting data related to the steel structure, concrete, transite, steel skin and interior walls of the building. Estimator C was responsible for characterizations, housekeeping, library adjustments, and documents. Finally, after all the facilities data was entered into POWERtool, the team viewed a report of the information and associated D&D costs. The team evaluated the legitimacy of the costs and adjusted the data as necessary.

After estimating a few facilities, the estimating team learned several valuable lessons. These lessons sparked changes in the estimating technique and the POWERtool software. First, the team ran into problems estimating frame, load bearing versus non-load bearing wall, tin versus transite roofing, and basements. These problems were then accounted for by refining the work unit library in the POWERtool (a built-in function) for different situations. Next, the team added some new subtasks to the POWERtool library. These subtasks were steel structures higher than thirty feet and tank removal. Both of these subtasks were used in other POWERtool models and the developers helped the team adapt these subtasks to SRS’s POWERtool software. It is envisioned that continuous changes will be necessary as different types of facilities are estimated.

ESTIMATING RESULTS

Table 1 compares the two estimates and the actual costs for the decommissioning of 5 facilities in T-area. All of the facilities were non-contaminated, classified as “other industrial,” and include 33.8% site overhead.
Table 1. Comparison of Estimates and Actuals

<table>
<thead>
<tr>
<th>Facility</th>
<th>Area (sq. ft.)</th>
<th>ROM</th>
<th>POWERtool</th>
<th>Actual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>694-T</td>
<td>4535</td>
<td>247,000</td>
<td>42,989</td>
<td>94,907</td>
</tr>
<tr>
<td>694-2T</td>
<td>1815</td>
<td>99,000</td>
<td>37,782</td>
<td>70,364</td>
</tr>
<tr>
<td>684-T</td>
<td>440</td>
<td>33,000</td>
<td>15,802</td>
<td>47,759</td>
</tr>
<tr>
<td>704-T</td>
<td>6481</td>
<td>280,000</td>
<td>94,127</td>
<td>80,843</td>
</tr>
<tr>
<td>704-1T</td>
<td>6333</td>
<td>274,000</td>
<td>119,542</td>
<td>75,484</td>
</tr>
</tbody>
</table>

DISCUSSION OF RESULTS

The estimated cost, both by ROM and POWERtool, compared to actual costs to date for the demolition of five T-area facilities does not correlate well at this point. Reasons for the lack of correlation include:

- POWERtool unit costs were based on subcontracting fieldwork to commercial demolition contractors. Site labor was used for actual demolition.
- Current cost capturing structure was not based on individual facilities, consequently, some charges had to be allocated after the fact to individual facilities.
- Cost capturing was not conducted on a work unit level and directly compared (apples to apples).
- Uniform allocation of Engineering Planning, support, and division overheads to each facility regardless of size reflected higher actuals.
- Possible estimating error.
- Higher ramp-up costs occurring at SRS as the site embarks on a new program.
- Delays in demolition jobs (684-T) resulting in higher actual costs.

These disparities are being investigated and new methods of cost collection are being recommended such that both models can be adjusted to provide better estimates.

SUMMARY

The ROM model will continue to be used for first cut, high level estimates at SRS for the purpose of initial budget planning. This method works efficiently for estimating the hundreds of facilities in the D&D Program providing order-of-magnitude cost estimates for program planning. The implementation of POWERtool at SRS is envisioned to provide a method to efficiently manage large amounts of data for each facility and for many facilities. This will lead to high quality, detailed estimates for decommissioning. Continuous improvements in the SRS cost capturing methods as well as adjustments to the cost estimating models are recommended as SRS continues the D&D of facilities at SRS.