

THE LEGACY OF D&D: REAL PROGRESS OR CONTINUED DEFERRAL?

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ABSTRACT

The Department of Energy (DOE) Office of Environmental Restoration (EM-40) currently has a large inventory of facilities requiring decontamination and decommissioning (D&D). Recent projections indicated that this inventory will grow to more than 1300 facilities by 2019, at an estimated cost of cleanup projected to reach tens of billions of dollars, yet the progress in cleaning up the facilities continues to slow. With a concerted commitment by DOE, through systematic financial, regulatory, and programmatic approaches, the rate of progress in cleaning up this legacy of D&D facilities can be greatly increased.

INTRODUCTION

The Department of Energy is faced with an unprecedented environmental cleanup legacy from over five decades of nuclear defense and energy development activities. The cleanup involves facilities and sites that are contaminated with radioactive and hazardous materials at 38 Federal installations in 18 states as illustrated in Fig. 1 below. The sites that require soil and ground water cleanup under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or the Resource Conservation and Recovery Act (RCRA) have received significant attention by regulators and the public and the majority of DOE's environmental restoration funding. The facilities (buildings and other structures) that require cleanup through the process of decontamination and decommissioning (D&D) have received less attention and funding. As a result, the backlog inventory of facilities that require D&D is becoming very large, but the resources to make significant progress on that inventory have yet to be made available.

This paper describes DOE's existing and future inventory of facilities that require D&D. The issues associated with making substantial progress toward completing the inventory are discussed. Alternative approaches from a technical, budgetary, and regulatory perspective are described as means to provide for increased D&D progress.

BACKGROUND

Within the Department of Energy, the Office of Environmental Restoration (EM-40), referred to as ER, is responsible for the cleanup of inactive contaminated facilities and sites. Cleanup is conducted as two types of activities: remedial action, concerned with soil and ground water contamination, and D&D, concerned with structural facilities.

The DOE initiated a formal program for D&D in 1978, when the Surplus Facilities Management Program (SFMP) was formed. The SFMP was established to provide safe caretaking (surveillance and maintenance) and disposition (decommissioning) of retired, DOE-owned or DOE-sponsored nuclear facilities that were used to support



Fig. 1. DOE complex of installations.

defense activities, and nuclear energy research and the development of nuclear power.

In 1982, the SFMP was divided into two components. Those surplus facilities related to the development of civilian nuclear power and energy technology were assigned to the Office of Nuclear Energy, under a program that retained the SFMP name. The surplus facilities that had been primarily used for defense-related purposes were assigned to the Office of Defense Programs, under the name of the Defense D&D Program. These two programs, over a period of approximately ten years completed D&D at 134 facilities.

In late 1989 the DOE consolidated environmental restoration and waste management activities into the Office of Environmental Restoration and Waste Management (EM). The two D&D programs were consolidated in the Office of Environmental Restoration (EM-40), together with the D&D projects from the Office of Energy Research and the remedial action activities of DOE. Sixty-three D&D projects have been completed under the EM-40 D&D program.

The mission of the D&D activities within the Office of Environmental Restoration (ER) is to protect the public health and environment from radioactive contamination or hazardous materials contained in DOE's designated surplus nuclear facilities. D&D activities include tasks connected with assessment and characterization, environmental review, engineering, decontamination or decommissioning operations, close-out, and surveillance and maintenance. The objective is to cost-effectively maintain these surplus facilities awaiting decommissioning in a safe and secure state, to complete decommissioning activities of the facilities, and to make facilities available for reuse following decommissioning, when practical.

In January of 1992, EM created a special task force to respond to the impact of the break up of the former Soviet Union and to the corresponding consolidation of resources within the DOE's Office of Defense Programs. The net result of these events will be an enormous increase in the number of inactive and surplus facilities requiring D&D. In July of 1992, the importance of this task was underscored with formation of the Office of Facility Transition and Management (EM-60) to focus on the management of DOE facilities and installations undergoing shutdown and deactivation. EM-60 is now working with other offices within the DOE to coordinate a smooth transition from operational status to a safe shutdown or deactivated status which will minimize surveillance and maintenance requirements. EM-60 will evaluate the facilities, coordinate the disposition of those facilities which are suitable for reuse and, and turn over surplus facilities to EM-40 for surveillance and maintenance and incorporation into the existing D&D and remedial action program within the Office of Environmental Restoration.

CURRENT STATUS OF D&D ACTIVITIES

The D&D program is currently comprised of more than 400 facilities at thirty-eight Federally-owned sites in eighteen states. These facilities (buildings or rooms within buildings, laboratories, production plants, reactors and reactor vessels, vaults, hot cells, production and laboratory reactors, production facilities, glove boxes, canyons, isotope separation facilities, and other nuclear and non-nuclear facilities equipment, utilities, tank, sewers, etc.) have been contaminated with radioactive and hazardous materials. An estimate of the number

and types of facilities currently in the program is illustrated in the Fig. 2 graph below.

There has been limited progress on the inventory. The majority of the completed D&D projects to date, with the notable exception of the Shippingport Station Decommissioning Project, have involved relatively small facilities. Most of the larger facilities in the complex (e.g., the uranium enrichment process buildings in Oak Ridge and the production reactors at Hanford and Savannah River) have not been addressed. Many ongoing projects have been slowed or stopped, and there are few significant D&D "new-starts" projected for the near term. The primary reason for this situation is the lack of sufficient funding for the D&D projects. Additional, underlying reasons include the following:

- The perception that surplus facilities may be kept safely for an indefinite period of time.
- The perception that the risk to human health and the environment is generally less for the surplus facilities awaiting D&D than for the RA projects involving the cleanup of soil and ground water contamination. Contaminated surplus facilities are perceived as containing contamination whereas contaminated soil and ground water are perceived as releasing contamination.
- The lack of regulatory/legal drivers from agencies outside of DOE which require prompt cleanup of the surplus facilities awaiting D&D. RA projects generally have CERCLA or RCRA-driven timetables often incorporated into tri-party or Federal Facility Agreements (FFA) with the state, EPA, and DOE, for cleanup.

A majority of the Environmental Restoration budget year funding reflects funding required to comply with negotiated compliance or cleanup agreements, such as Federal Facility Agreements/Consent Orders (FFA/CO) or environmental requirements, such as Records of Decision (RODs) under CERCLA where failure to meet schedule could result in stipulated penalties under existing agreements. Thus, legally driven projects receive priority funding within DOE, and D&D projects are generally deferred. The current budget review process is focused on the importance of meeting legal and regulatory imposed milestones. With this competition for funds, RA projects appear to overshadow the D&D projects, and the end result could be that DOE's capability to perform

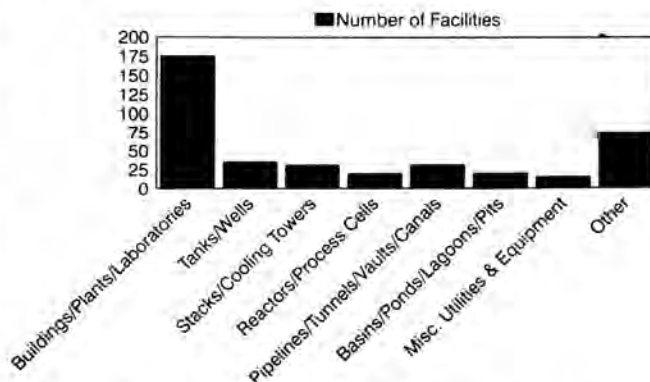


Fig. 2. Current inventory of D&D facilities.

D&D will diminish to the point where it will be difficult to re-mobilize to perform the work when funding becomes available.

Currently, a relatively small percentage of DOE funding is being allocated for D&D projects each year. The funding profile in Table I below indicates that funding allocations for D&D projects (including S&M) have remained relatively stable as a portion of the overall ER program. Yet the program inventory has increased during this period, and increasingly rigorous surveillance and maintenance requirements for the existing inventory have resulted in a substantial net decrease in the percentage of funds that are directed towards actual D&D (cleanup) activities. It is difficult to determine the precise break out of S&M costs as a proportion of the total D&D funding, but they have clearly increased to the point where they constitute the majority of the current D&D funding.

TABLE I
Environmental Restoration (EM-40) Funding Profile

| | \$ (Million) | | | |
|-----------------|--------------|---------|---------|----------|
| | FY 1990 | FY 1991 | FY 1992 | FY 1993* |
| Total EM-40 | 657 | 1,102 | 1,372 | 1,844 |
| Total D&D & S&M | 63 | 129 | 112 | 192 |
| % D&D | 9.6 | 11.6 | 8.1 | 10.4 |
| * Estimated | | | | |

THE FUTURE OF D&D

The D&D program is expected to grow substantially in future years as additional DOE facilities are shut down, become surplus, and transferred to the Office of Environmental Restoration and Waste Management. According to a May 1991 request by Leo Duffy for a projection of facilities to be decommissioned, more than 1,300 facilities were projected to enter the program by 2019. With the planned reconfiguration of DOE's weapon complex already underway, the number of facilities to be added to the D&D inventory is certain to increase and likely to be in the thousands. The graph in Fig. 3 below depicts a projected distribution of facilities to enter the program at five installations with significant facility inventories in the DOE complex.

The DOE D&D liability is large. The current inventory is 400 facilities with an estimated cost measured in tens of billions of dollars. If the current trends in D&D funding continue, the progress toward working off the D&D backlog will be very small compared to the ultimate effort required.

Advantages of Performing D&D

Considering the current backlog of D&D projects and the potential for large numbers of facilities to be added in the future, an increased emphasis on D&D is needed in order to establish a sustainable DOE D&D program which continuously transitions, treats and removes facilities from the vast inventory, and gears up for projects at a steady, significant rate. Without a commitment to such a program, the legacy of facilities requiring cleanup will continue to constitute a grow-

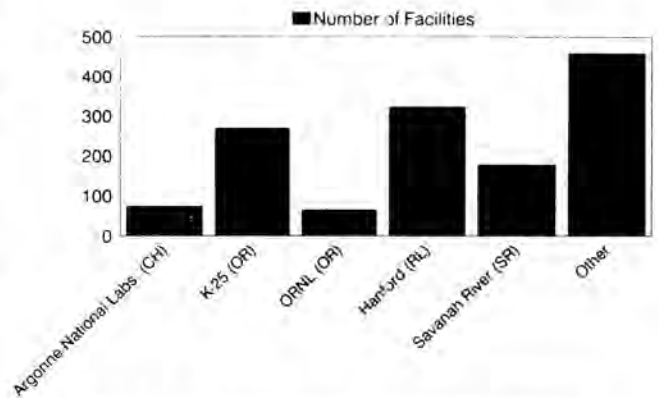


Fig. 3. Projected inventory of D&D facilities.

ing national environmental hazard and financial liability. Additionally, as outlined below, there are a number of advantages for DOE to promote the D&D of contaminated facilities:

- *To emphasize the Department's commitment to the 30-Year Goal to clean up the 1989 inventory of inactive sites and facilities by 2019.* As outlined in the Five Year Plan (FYP), DOE is committed to this 30 year goal of compliance and cleanup. An aggressive D&D program is required to meet this goal.
- *To avoid long-term costs of surveillance and maintenance.* Maintaining the surplus nuclear facilities in safe shutdown is a primary component of the D&D program and process, thus protecting the public and the environment from contamination. In addition, surveillance and maintenance also serves to maintain the preparedness of the facility for the ultimate goal: decontamination and decommissioning or the eventual removal of the threat of contamination from which the population and environment are being protected. This role becomes increasingly difficult and expensive as maintenance responsibilities broaden to include replacement or repairs of the utilities, substructures, and superstructures of the facilities. Prolonged states of surplus coupled with facility degradation places a large financial burden upon the program, and the long-term costs to maintain many of the facilities could exceed the cost to D&D them.
- *To re-use facilities for other purposes.* Many facilities within the D&D program are buildings which do not require dismantlement. These buildings, once decontaminated, could be used for other purposes, either within the EM-40 program, or in other programs, such as DOE's Waste Management Program, EM-30. EM-40 could effectively use the decontaminated buildings instead of constructing new facilities for the temporary storage of construction-related materials, wastes, or equipment to be utilized for the D&D of other facilities within that installation. Decontaminated buildings could be turned over or returned to EM-30, which often requires extensive amounts of RCRA-permitted storage for their waste operations. Many facilities, once decontaminated and decommissioned involve dismantlement, and thus

provide large amounts of materials suitable for recycling and re-use. It is estimated that many D&D projects will generate substantial amounts of scrap metal or concrete with insignificant quantities of radioactive contamination. D&D planning efforts are now beginning to address recycling with expectations for the successful utilization of materials, particularly scrap metal which could have a significant market value.

Other strong incentives for promoting an aggressive D&D program include: eliminating potential sources of future contamination releases; promoting an integrated Environmental Restoration program consisting of coordinated Remedial Action and D&D projects; and maintaining and improving the technology and the infrastructure for accomplishing D&D cleanup goals. In addition, many contaminated facilities are located on or near RCRA or CERCLA cleanup sites. D&D will ultimately need to be performed to successfully release or de-list these sites after cleanup. Finally, the D&D of contaminated nuclear and industrial facilities is an international problem. A strong U.S. program in these areas will provide the nation with an opportunity to successfully compete on an international level in a rapidly growing field.

ALTERNATIVES FOR D&D PROGRESS

Currently, with the emphasis on regulatory/legal drivers, D&D activities are likely to make significant progress only when there is significantly more funding than that required for all legally-required activities. With 87 FFA/CO currently in place and 27 in the planning stages, the increasing financial commitment necessary to satisfy the legally-required activities is not likely to leave sufficient funds for discretionary activities such as D&D.

There are several means by which the rate of progress of the D&D of facilities could be increased. A programmatic alternative involving a "D&D Initiative" within ER would signal a departmental and financial commitment to perform D&D at levels which appropriately address the current inventory. A second alternative involves placing a greater emphasis on risks and utilizing DOE's priority system (PS) to determine a fair, complex-wide evaluation of the risk in the determination of appropriate levels of funding for all remediation activities. A third alternative would involve the inclusion of D&D activities under compliance agreements to provide regulatory/legal drivers for performing the D&D of the facilities.

A D&D initiative could be implemented through a departmental commitment to perform a reasonable amount of actual D&D in view of our 30 year commitment to cleanup the 1989 inventory of contaminated facilities and sites. A D&D initiative would represent a high-level management decision that a certain amount of D&D is needed to support the overall EM mission. The D&D initiative would also lay the groundwork to establish an adequate D&D infrastructure to deal with the rapid growth in the EM inventory of surplus facilities. The initiative could be formed by setting aside a block of funding within the ER program and designating and maintaining that block of funds for D&D. Such a commitment would have to have sufficient emphasis and support to be maintained in the current environment of growing legal/regulatory commitments and limited resources. Therefore, the D&D initia-

tive would require a fundamental change in the way that the departmental budgets are constructed and reviewed. The D&D initiative would require wide-spread support within DOE and administration support outside of the DOE.

The second alternative would involve prioritizing the funding levels of ER activities with a primary emphasis on risk as opposed to the current emphasis on regulatory/legal drivers, which do not always accurately reflect the risks related to the cleanup activity. With a greater emphasis on risk, all proposed remediation activities throughout the DOE complex would be evaluated on an equivalent basis in efforts for obtaining funding. By performing a prioritization analysis, those surplus facilities posing minimal risk to the population or the environment would continue to be regarded as discretionary, and those facilities which pose risks equivalent to or greater than the legally-driven RA projects would receive equivalent funding appropriations to mitigate the risk associated with the facility under development. DOE presently has just such a tool for implementing this alternative, known as the Priority System (PS).

The DOE PS is a risk-based budgeting tool being developed to aid EM-40 in performing funding allocation analyses. The PS accounts for health risk, environmental risk, socioeconomic impact, regulatory compliance, uncertainty reduction, and costs in prioritizing EM-40 cleanup activities. The PS is currently undergoing a peer review. Once finalized, this system will balance local priorities and the national perspective in order to identify essential activities. A preliminary 1992 PS baseline facility risk estimate and facility risk ranking illustrated that several facilities requiring D&D ranked relatively high in the overall evaluation of proposed ER activities. The PS would provide the mechanism for targeting funds toward these high-risk facilities requiring D&D (as well as the high-risk RA projects). Eventually, compliance agreements could be revised to more equitably reflect the actual risk of existing DOE cleanup commitments and allow a comprehensive, complex-wide prioritization of ER cleanup activities.

A third alternative is to incorporate D&D activities into the CERCLA or RCRA processes, thereby obtaining a regulatory/legal driver for D&D. In some instances, this already exists. The DOE cleanups at Fernald and the Weldon Spring Site have included remedial actions and D&D within the context of agreements with the affected states and the EPA. However, the majority of the Department's Federal Facility Agreements and Consent Orders do not include D&D activities. The drawback to this approach is that significant additional time and resources would be required to perform D&D projects due to increased documentation, regulatory review, and approval requirements.

CONCLUSIONS

Three alternatives for improving the rate at which D&D projects are completed have been presented for consideration. Establishing a D&D Initiative would establish a departmental commitment to performing the D&D of the surplus facilities. Utilizing the risk based prioritization system would evaluate remediation activities on the basis of risk rather than legal requirements and determine funding levels on that basis. Incorporating D&D activities into

tri-party/federal facility agreements would provide a regulatory/legal driver for D&D activities.

To make significant progress towards completing cleanup of facilities in the existing inventory and with the

possibility of the addition of several thousand more facilities, a commitment to a significant D&D program is imperative.