

## U.S. Department of Energy Facility

### Deactivation & Decommissioning (D&D) Program Map – #10233

Chuck Urland\*, Michelle Gresalfi\*, Andrew Szilagyi\*\*, and Yvette Collazo\*\*

\*Project Enhancement Corporation, Germantown, Maryland 20874

\*\*U.S. Department of Energy, Washington, DC 20585

#### ABSTRACT

The Office of D&D and Facility Engineering (EM-44) has developed a comprehensive document that presents an overview of DOE's Complex-wide deactivation and decommissioning (D&D) Program. This document, referred to as the D&D Program Map, provides details on facility D&D project locations, scope, and issues and consolidates program data from multiple locations into a single definitive reference. The information is displayed graphically and in tabular format; and is supplemented with numerous pictures. The D&D Program Map will be updated on a prescribed basis to maintain an accurate and current reflection of the status of the EM D&D Program. Data and figures presented in the D&D Program Map are used throughout this paper to illustrate the content of the D&D Program Map.

#### INTRODUCTION

The primary mission of the Department of Energy (DOE) Office of Environmental Management (EM) is the cleanup and remediation of the Nation's nuclear weapons production complex, excess science research and nuclear energy development facilities, and other assets that have reached the end of their useful life. As the Cold War closed and the veil of secrecy lifted, it revealed a huge environmental legacy including a large inventory of nuclear and radiological facilities needing final disposition. EM has been focused on the D&D of these facilities with a goal of reducing the safety and environmental hazards (or liability), and the reduction in facility and infrastructure footprint to reduce the associated surveillance and maintenance costs by removing these facilities from the DOE inventory.

EM continues to make progress in this formidable task. At the end of FY08, a total of 1,343 facilities have been decommissioned, as detailed in Table I. However, much work remains to be done; the current EM baseline indicates that 3,155 facilities remain with an estimated D&D cost of \$20.3 Billion (in current year dollars).

**Table I. Types of Facilities in EM D&D Projects**

Facility Type	Number of Facilities			Gross Square Feet (1,000's)
	Lifecycle	Completed as of FY 08	Remaining	
Nuclear	436	74	362	
Radiological	888	210	678	
Industrial	3,174	1,059	2,115	
<b>TOTALS</b>	<b>4,498</b>	<b>1,343</b>	<b>3,155</b>	

**THE CHALLENGE: KEEPING TRACK OF PROGRESS**

The Headquarters role of keeping track of the D&D Program and managing the necessary data has proven to be as daunting as the actual field work. D&D projects exist at 16 different sites distributed across the country as illustrated in Figure 1. The major sites with a D&D mission include Hanford Site (Richland & River Protection) in Richland, Washington; Savannah River Site in Aiken, South Carolina; Oak Ridge Reservation in Oak Ridge, Tennessee; Idaho National Laboratory in Idaho Falls, Idaho; Portsmouth Gaseous Diffusion Plant in Piketon, Ohio; Paducah Gaseous Diffusion Plant in Paducah, Kentucky; and West Valley Demonstration Project in West Valley, New York. D&D projects are also ongoing at several smaller sites, most of which are not EM-managed that include Los Alamos National Laboratory in New Mexico; Brookhaven National Laboratory in Long Island, New York; Energy Technology Engineering Center in Santa Susana, California; Knolls Atomic Power Laboratory in Niskayuna, New York; Argonne National Laboratory in Chicago, Illinois; Lawrence Livermore National Laboratory in Livermore, California; Stanford Linear Accelerator Center in Palo Alto, California; Nevada Test Site in Mercury, Nevada; and the Southwest Experimental Fast Oxide Reactor at the University of Arkansas.

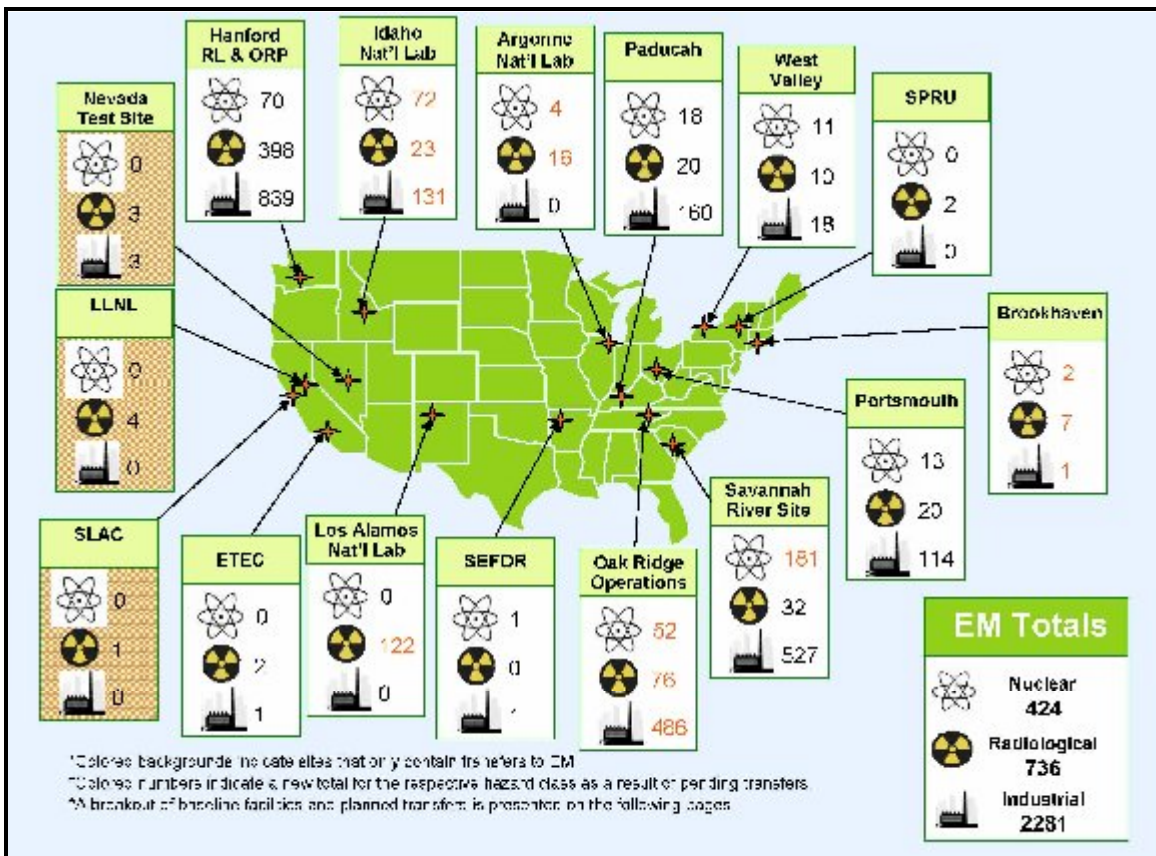


Figure 1. Remaining EM Facilities and Planned Transfers for D&D

Progress tracking challenges are compounded by the fact that no single compilation of D&D Program information exists. To get a complete understanding of the D&D Program, data needs to be extracted from multiple information sources (identified in Table II), including Integrated Planning, Accountability, and Budgeting System (IPABS); Project Baseline Summary (PBS); Analytical Building Blocks (ABBs); Facility Information Management System (FIMS); and baseline documents from the individual sites. This clearly is not an efficient way to track the progress of a complex, high profile program.

**Table II. D&D Data Sources**

<b><i>IPABS</i></b> IPABS serves a framework for all the activities and programs overseen by EM, consolidating planning, budgeting, and management functions into one integrated set of corporate data [3].
<b><i>PBS</i></b> The PBS is the summary-level report that describes the major management characteristics of each project. The baseline is the collective key performance, scope, and cost parameters for the project [4].
<b><i>ABBs</i></b> An ABB is a discrete, site-specific component of existing EM scope. ABBs were created at a work breakdown level just below the PBS to provide flexibility in analyzing funding alternative scenarios for out-year planning estimates since EM's projects often extend beyond the near-term. Each ABB can have a progress and maintenance component. Progress costs include the cost of activities that are advancing the mission and the application of additional funds generally results in additional progress achieved. Maintenance costs include activities required to control existing facilities, wastes, and materials in a safe, stable condition.
<b><i>FIMS</i></b> FIMS is the DOE corporate database for real property as required by DOE Order 430.1B Real Property Asset Management [5-6]. The database provides DOE with an inventory and management tool that assists with reporting to several entities and provides online access to DOE facility information.

### **The EM D&D Program Landscape has Changed**

In January 2009, the EM D&D Program drastically changed because of the following three major initiatives. These initiatives expand the scope of the EM program and increase the burden of tracking program progress.

In response to the Deputy Secretary's direction for EM to resume the acceptance of responsibility for D&D and environmental remediation of excess facilities [1], the Assistant Secretary for Environmental Management (EM-1) invited the DOE Program Secretarial Offices (PSOs) of Science (SC), Nuclear Energy (NE), and the National Nuclear Security Administration (NNSA) to propose facilities and legacy waste for transfer to EM for final disposition or D&D [2]. After reviewing all of the facilities proposed for transfer, EM has recommended that 63 facilities be considered for inclusion in the EM D&D Program.

In parallel with the EM-1 initiative, the Oak Ridge Reservation is conducting a large, highly complex project, known as the Integrated Facility Disposition Project (IFDP), which proposes to complete cleanup of the Oak Ridge site over the next 26 years. In addition to cleanup already owned by EM, IFDP incorporates cleanup scope currently owned by NNSA, SC, and NE and proposes to transfer this scope to EM for completion. IFDP proposes to transfer 223 facilities from SC, NE, and NNSA to EM for D&D.

Under the American Recovery and Reinvestment Act of 2009 (ARRA), EM received \$6 Billion in funding, of which \$3.32 Billion has been allocated for D&D projects across the Complex. The remainder of the funding has been allocated to environmental restoration

and waste disposition projects. The D&D projects to be undertaken with the ARRA funds are projects that can be completed by 2011 and provide a benefit of significant footprint reduction. As a direct result of the ARRA funding, part of the EM baseline has been accelerated with selected projects being completed 2 to 13 years earlier than originally planned. ARRA funding also provides for the accelerated transfer of some of the excess facilities from SC, NE, and NNSA mentioned above.

## THE SOLUTION: D&D PROGRAM MAP

In an effort to capture key program information and present it in a readily understood manner for multiple audiences, EM-44 has developed a document referred to as the D&D Program Map. The D&D Program Map is a comprehensive document providing an overview of DOE's Complex-wide facility D&D program, highlighting project locations, scope, and issues. The D&D Program Map consolidates program data from multiple locations into a single definitive reference document.

The 2008 ABB data serves as the foundation for the current version of the D&D Program Map, providing the lifecycle costs, scope, and schedule for each D&D project. Additional information on the work scope descriptions was extracted from IPABS. FIMS was used to augment facility information including facility number, hazard class, facility type, gross square footage (GSF), and construction type. The PBS identifiers for each project were also included. Facility numbers and size, projected end-state, and estimated date of disposition were also garnered from project descriptions and field reports from the individual sites when information from the above sources was at insufficient granularity to provide the necessary detail.



Figure 2. D&D Program Map

Development of the D&D Program Map was not without its share of challenges. Incomplete scope definitions within the ABBs and inconsistencies with FIMS data were some of the issues encountered. Reconciliation efforts have been initiated for the next scheduled update of the D&D Program Map (which will be based on fiscal year (FY) 2010 ABB update).

## D&D Program Map at a Glance

The D&D Program Map provides DOE management with a concise overview of the EM D&D Program. It also serves a technical communication tool to inform congressional staffers and stakeholders of the program and its status. Project related information presented includes:

*D&D Projects Locations.* As previously mentioned, D&D projects exist at 16 sites located in 12 different states. This is graphically depicted in the D&D Program Map with Figure 1 and is supported by tabular data.

*D&D Cost Profile.* A graphical presentation of the estimated D&D cost profile by site and a comparison of the EM D&D cost profile to the total EM cost profile are provided as shown in Figure 3.

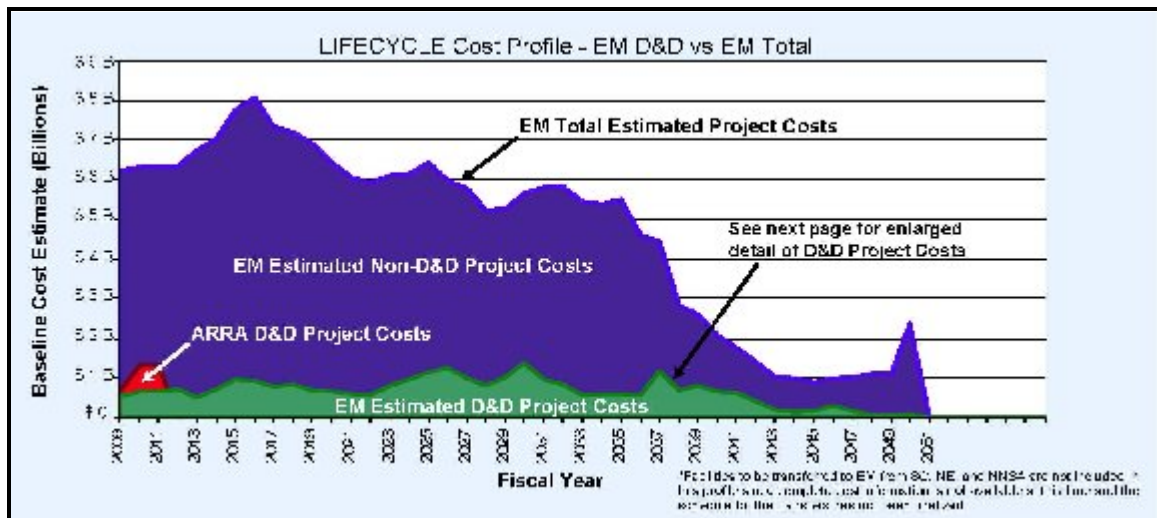


Figure 3. EM D&D Cost Profile Comparisons

*D&D Project Site Profiles.* An overview of the major sites engaged in D&D activities and a listing of ongoing and future D&D projects (based on ABB data submitted in 2008) at each site.

*The 25 most significant (“Top”) D&D Projects.* The “Top 25” D&D projects were determined based on project cost. The costs used to define and sort the projects are reflective of only the “progress” dollars reported in the ABB. The current version addresses 70 planned major D&D projects over the next 40+ years (it is anticipated that this number will increase with the new data submitted for the FY 2010 ABB update). A three page portfolio is presented for each of the Top 25 projects that includes a project summary table, facility background information, project discussion, and an estimated cost and schedule profile. These are tabulated in three formats, one of which is shown in Figure 4:

1. Top 25 EM D&D Projects Scheduled for FY 2009–2013.  
These are the biggest D&D projects that are presently funded or are planned to be funded in the next 5 years.
2. Top 25 EM D&D Projects Scheduled in FY 2009.  
These are the biggest D&D projects that are presently funded in FY 2009.



3. Top 25 EM D&D Projects Budgeted for FY 2009–2010.

These are the biggest D&D projects presently planned over the lifecycle of the EM program.

Site	ARRA	Project (ASB) Name	D&D Dates			
			Total Cost (\$ Mil.)	ARRA	Start Year	End Year
Paducah Gaseous Diffusion Plant	133	Gaseous Diffusion Plant (GDP)	\$3,747	25	2012	2040
Idaho National Laboratory	134	Idaho Nuclear Technology and Engineering Center (INTEC) – Remainder	\$1,114	27	2003	2012
Richland Gas Diffusion Office	32	Plutonium Finishing Plant (PFP) Disposition	\$1,077	14	2009	2010
Savannah River Site	80	F Area	\$1,045	21	2008	2010
Richland Gas Diffusion Office	423	Zone 11 (FLREX Zone)	\$730	10	2009	2017
West Valley Demonstration Project	212	Nuclear Facilities	\$620	11	2009	2010
West Valley	147	Tank Farm	\$491	20	2011	2042
Paducah Gaseous Diffusion Plant	133	Process Buildings	\$434	22	2012	2043
Richland Gas Diffusion Office	423	Zone 1B (L Plant Zone)	\$400	17	2009	2010
Cockfield Reservation	274	K-26 Building	\$337	0	2008	2012
Richland Gas Diffusion Office	417	Fast Flux Test Facility (FFTF)	\$337	20	2009	2010
Cockfield Reservation	284	Control Complex, Isotope Cycle and Reactor Facilities	\$290	10	2008	2017
Lawrence Livermore National Laboratory	488	DP Sites	\$141	4	2008	2011
Cockfield Reservation	278	K-27 Building	\$132	6	2010	2016
Paducah Gaseous Diffusion Plant	700	Inactive Facilities	\$122	10	2008	2017
Cockfield Reservation	287	Bethel Valley Reactors	\$118	0	2008	2018
Richland Gas Diffusion Office	414	West Corridor Nuclear Facilities	\$105	10	2009	2018
Cockfield Reservation	273	FFTF Main Plant Area	\$95	6	2008	2018
Cockfield Reservation	282	Alpha-4 and other EM Facilities	\$91	9	2009	2017
Research Triangle Research Triangle	318	Buildings H2 and B2 and Remediate Ground Water Contamination Source	\$79	4	2008	2012
Lawrence Livermore National Laboratory	488	TA-54	\$74	8	2008	2015
Cockfield Reservation	288	Centrifuge Facilities	\$43	0	2008	2016
Research Triangle Research Triangle	327	Bohannon Graphite Research Reactor (BGR)	\$40	5	2008	2010
Richland Gas Diffusion Office	328	K East & West Reactor Basins	\$40	2	2009	2010
Idaho National Laboratory	132	Reactor Technology Complex (RTC) Power Burst Facility (PBF)	\$35	5	2008	2012

= ABB affected by ARRA    
  = Top 25 Project (FY2008 - 2013)

See Appendix A for more information on these D&D projects.

Figure 4. Top 25 EM D&D Projects Scheduled for FY 2009-2013

**Major D&D Accomplishments.** A pictorial compilation documenting the success story of each completed D&D project and closed project sites is presented.

**ARRA D&D Scope.** A listing of the facilities to undergo D&D by EM as a result of ARRA funding is presented in tabular format, as shown in Figure 5. Graphical analysis of the impacts of the ARRA funding (and facility transfers) on the EM D&D Program is also presented.

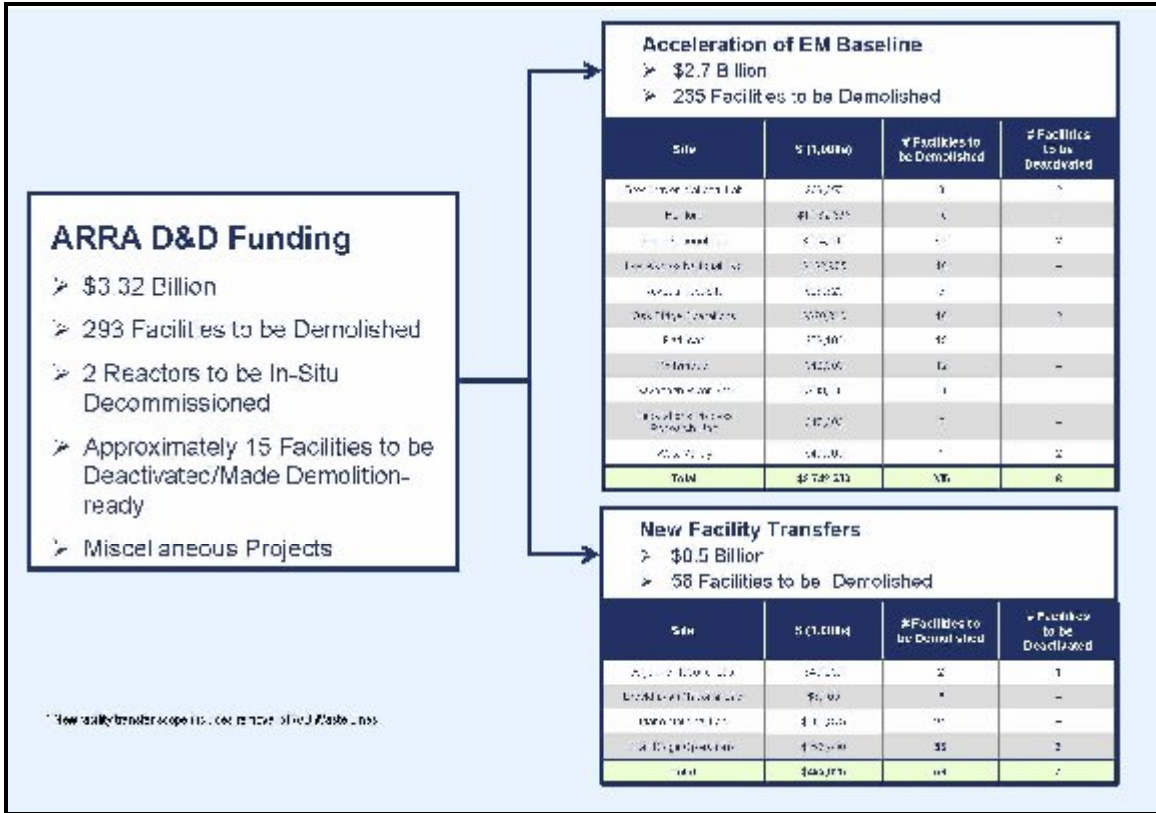


Figure 5. ARRA Impact on EM's D&D Program

*Scope of facilities to be transferred to EM for D&D.* A listing of the number of facilities by site that are proposed for transfer from SC, NE, and NNSA to EM for D&D is presented in a tabular format as shown in Figure 6.

Site	PSO	# Facilities	GSF	D&D ROM Cost Range (\$',000,000)
Argonne National Lab	SC	11	1,969,350	\$238.7 – \$728.8 <sup>2</sup>
Brookhaven National Lab	SC	8	95,000	\$63.4 – \$128.8 <sup>3</sup>
Idaho National Lab	NL	31	194,251	\$103.7 – \$207.4 <sup>4</sup>
Los Alamos National Lab	NNSA	1	56,259	\$10.8 – \$21.5
Lawrence Livermore National Lab	NNSA	4	149,011	\$62.6 – \$125
Oak Ridge National Lab	SC	133	693,381 <sup>5</sup>	Included with Y-12 <sup>2</sup>
Nevada Test. Site	NNSA	6	19,239	\$6.3 – \$12
Stanford Linear Accelerator Center	SC	1	100,000	\$36 – \$50
Savannah River Site	NNSA	1	71,956	\$58 – \$118
Y-12 National Security Complex	NE	2	255,656	\$4,000 – \$8,000 <sup>7,9,8</sup>
Y-12 National Security Complex	SC	17	1,002,550	
Y-12 National Security Complex	NNSA	71	1,074,435 <sup>6</sup>	
<b>Total</b>		<b>286</b>	<b>5,880,949</b>	<b>\$4,579 – \$9,086</b>

Notes: 1. Does not include facilities added by FFO at the site walkdowns.  
 2. Does not include waste element projects not directly supporting D&D.  
 3. Does not include environmental restorations on projects.  
 4. Does not include programmatic transfers.  
 5. Does not include the EG&G Complex, which EM has recommended not accepting.  
 6. Does not include the Y-12 Storm Plant Complex, which EM has recommended not accepting.  
 7. The site has estimated the total cost of transfers from ORNL and Y-12 to be between \$7 – \$8 billion.  
 8. Total CD cost range for the Integrated Facilities Disposition Project (IFDP) at ORNL & Y-12.  
 9. The facilities proposed for transfer under the IFDP have not yet been officially accepted by EM.

Figure 6. Excess Facilities Planned for Transfer to EM

In addition, the D&D Program Map contains some basic information on D&D (“D&D 101”) and a brief explanation of the DOE Complex-wide facility D&D work. Some of the information presented includes:

- An explanation of D&D and why it is important
- Identification of DOE facility types undergoing D&D and their disposition end-state options
- Explanation of the typical phases of D&D projects
- Discussion of the major challenges and cost drivers to the D&D Program
- Explanation of how D&D is managed within EM
- Identification of waste types and why they are significant



## References

1. DOE Program Decision Memorandum FY 2008-FY 2012 Corporate Program Review (“Unfunded Environmental Liabilities,” IPL #103-107)
2. DOE Memorandum for Distribution (Protocol for Excess Facility Transfers”), December 21, 2007
3. DOE/EM-0362, Accelerating Cleanup, Paths to Closure, Chapter 5, June 1998.
4. DOE Environmental Management (EM) Glossary of Terms (<http://www.em.doe.gov/Pages/PBSGlossary.aspx>)
5. FIMS Training Manual, Version 1.14, September 2009. (<http://fimsinfo.doe.gov/downloads.htm> )
6. FIMSWeb User’s Guide - 10/05/2009 (<http://fimsinfo.doe.gov/downloads.htm>)