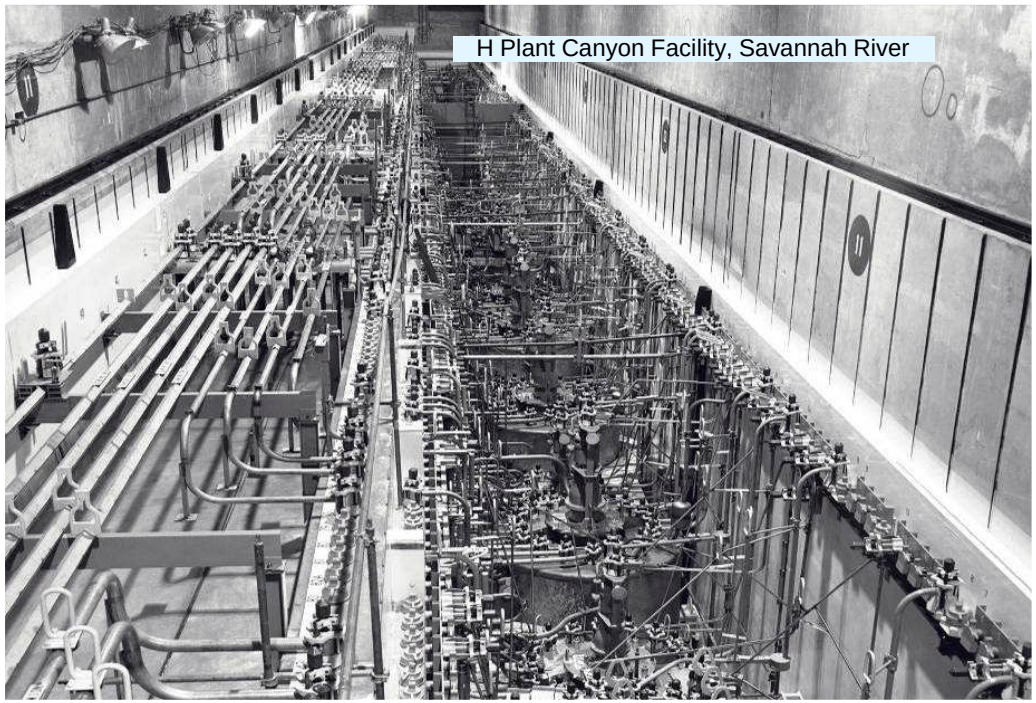
U.S. Department Of Energy

Facility Deactivation & Decommissioning (D&D) Executive Overview

2009 Edition

313 Fuel Fabrication Facility, Hanford 300 Area

Before and After: 320-M Alloy Mfg Facility, Savannah River


H Plant Canyon Facility, Savannah River

Contents

This document presents an overview of DOE's Complex-wide facility D&D project locations, scope, and issues:

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- ARRA D&D Scope
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- D&D Projects Locations
- D&D Budget Profile
- Challenges and Cost Drivers
- Typical Phases of D&D
- The 25 most significant ("Top") D&D Projects (Based on Cost)
- Assumptions (Data Sources and Programmatic Assumptions)
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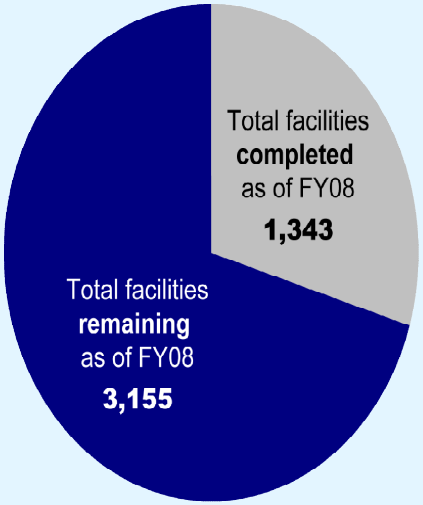
Appendix A: The Top 25 D&D Project Profiles Active or Initiated within the Next Five Years (FY 2009–2013)

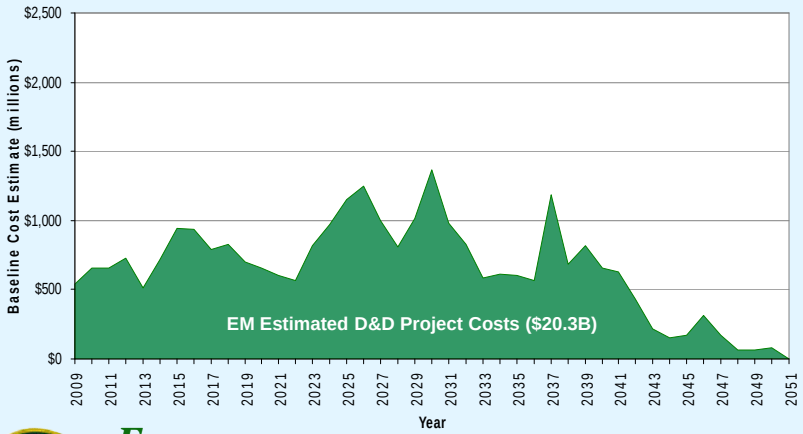
Appendix B: Basic Information on D&D

Appendix C: D&D Project Site Profiles

The EM D&D Program Landscape Has Changed

Prior to January 2009





EM Environmental Management

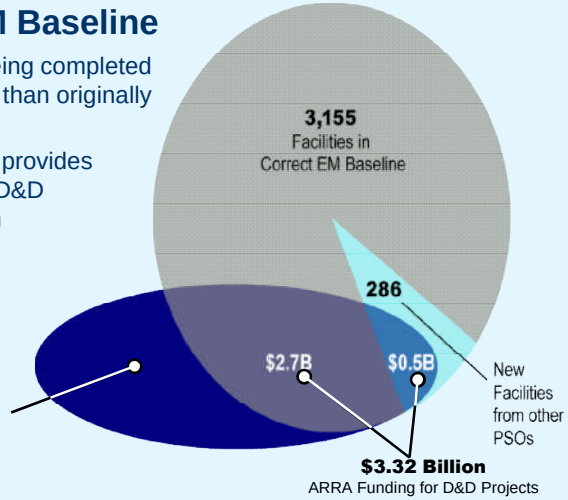
safety ❖ performance ❖ cleanup ❖ closure

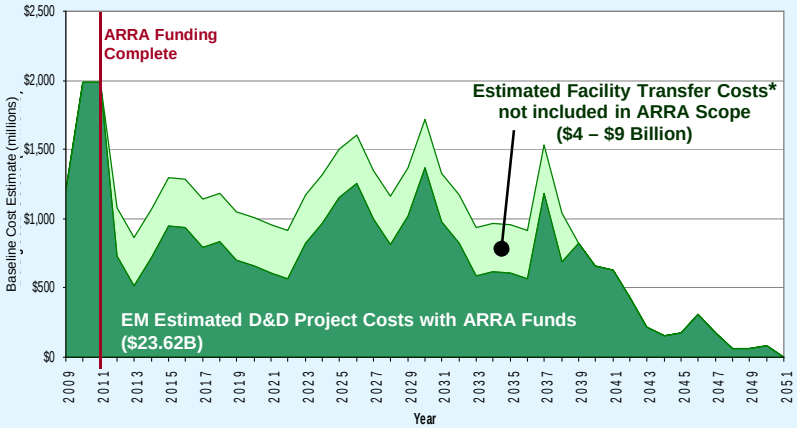
After January 2009

Facility Transfers Increase EM Baseline

ARRA Funding Accelerates EM Baseline

- Selected projects being completed 2 to 13 years earlier than originally planned.
- ARRA Funding also provides for the transfer and D&D of new facilities from other PSOs.





* The schedule for facility transfers has not been finalized. To graphically depict the magnitude of the effect, the total estimated cost of the transfers was levelized over the period of 2012 through 2038 and added to the base program.

ARRA Impact on EM's D&D Program

ARRA D&D Funding

- $3.32 Billion
- 293 Facilities to be Demolished
- 2 Reactors to be In-Situ Decommissioned
- Approximately 15 Facilities to be Deactivated/Made Demolition-ready
- Miscellaneous Projects

Acceleration of EM Baseline

- $2.7 Billion
- 235 Facilities to be Demolished

Site	$ (1,000s)	# Facilities to be Demolished	# Facilities to be Deactivated
Brookhaven National Lab	$39,255	3	2
Hanford	$1,182,365	70	–
Idaho National Lab	$114,000	67	2
Los Alamos National Lab	$132,975	10	–
Nevada Test Site	$28,325	5	–
Oak Ridge Operations	$378,310	16	2
Paducah	$59,100	18	–
Portsmouth	$42,000	12	–
Savannah River Site	$709,000	31	–
Separations Process Research Unit	$17,000	2	–
West Valley	$40,000	1	2
Total	**$2,742,330**	**235**	**8**

New Facility Transfers

- $0.5 Billion
- 58 Facilities to be Demolished

Site	$ (1,000s)	# Facilities to be Demolished	# Facilities to be Deactivated
Argonne National Lab	$49,250	**2**	**1**
Brookhaven National Lab	$3,100	*	–
Idaho National Lab	$103,875	**21**	–
Oak Ridge Operations	$296,800	**35**	**6**
Total	**$453,025**	**58**	**7**

* New facility transfer scope includes removal of A/B Waste Lines.

EM ARRA D&D Site Summary

EM received $6 billion in funding from the American Recovery and Reinvestment Act of 2009 (ARRA). $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 majority of the D&D projects were selected because they can be completed by 2011 with the ARRA funding and provide significant footprint reduction.
- These projects will be executed in addition to the D&D scope in the current baseline and will potentially alter the configuration of the list of Top 25 Projects over the next three years.*

*The sites are in the process of updating their Analytical Building Blocks (ABBs) and cost profiles to reflect the changes in the baseline resulting from ARRA funding. These data are projected to be available in October 2009.

(Continued on next page)

EM ARRA D&D Site Summary (cont.)

Site	D&D Scope Funding ($1,000)	D&D % of Total ARRA Funds	# of Facilities to be Demolished	Other D&D Scope in Addition to Demolition
Argonne National Lab	$49,250	50%	2	• Deactivation of Alpha-Gamma Hot Cell Facility, including disposition of irradiated fuel specimens and other wastes and materials • Disposition of TRU wastes from other excess nuclear facilities
Brookhaven National Lab	$42,355	100%	3	• Remove A/B Waste Lines • Remove BGRR graphite blocks
Hanford	$1,182,365	72%	70	None
Idaho National Lab	$217,875	47%	88	None
Los Alamos National Lab	$132,975	63%	10	None
Nevada Test Site	$28,325	64%	5	None
Oak Ridge Operations	$675,110	89%	51	• Prepare the K-27 Uranium Enrichment facility for demolition by removing contaminated legacy equipment and waste from the facility • Prepare Alpha-5 for accelerated D&D by completing all legacy material removal and disposition • Complete removal of legacy material from the entire second floor of Beta-4
Paducah	$59,100	75%	18	None
Portsmouth	$42,000	36%	12	None
Savannah River Site	$709,000	44%	31	• Complete In-Situ Decommissioning of P Reactor • Complete In-Situ Decommissioning of R Reactor • Accelerate D&D in various areas around SRS
Separations Process Research Unit	$17,000	54%	2	None
West Valley	$40,000	54%	1	• Accelerate Main Plant Process Building D&D • Begin removal of Vitrification Facility
Total	**$3,195,355***	**53%**	**293**	

* An additional $123 million in D&D funding was allocated to ETEC and the U/Th Reimbursement Program, however these projects do not have any D&D scope.

Excess Facilities Planned for Transfer to EM

In December 2007 the Assistant Secretary for Environmental Management (EM-1) invited the DOE Program Secretarial Offices (PSOs) of Nuclear Energy (NE), Science (SC), and the National Nuclear Security Administration (NNSA) to propose facilities and legacy waste for transfer to EM for final disposition or D&D.

This request was the follow up to an August 10, 2006, US DOE Program Decision Memorandum FY-2008–2012 Corporate Program Review ("Unfunded Environmental Liabilities," IPL #103-107) that documents then Deputy Secretary Clay Sell's direction for EM to resume the acceptance of D&D and environmental remediation of excess facilities and legacy waste disposition.

In parallel with the EM-1 initiative, the Oak Ridge Reservation is conducting a large, highly complex project — the Integrated Facility Disposition Project (IFDP) — that 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.

The table on the next page summarizes, by site, the number of facilities that EM has agreed to accept.

ORNL Building 2026

INL TRA-632 Hot Cell #1

ANL Building 331

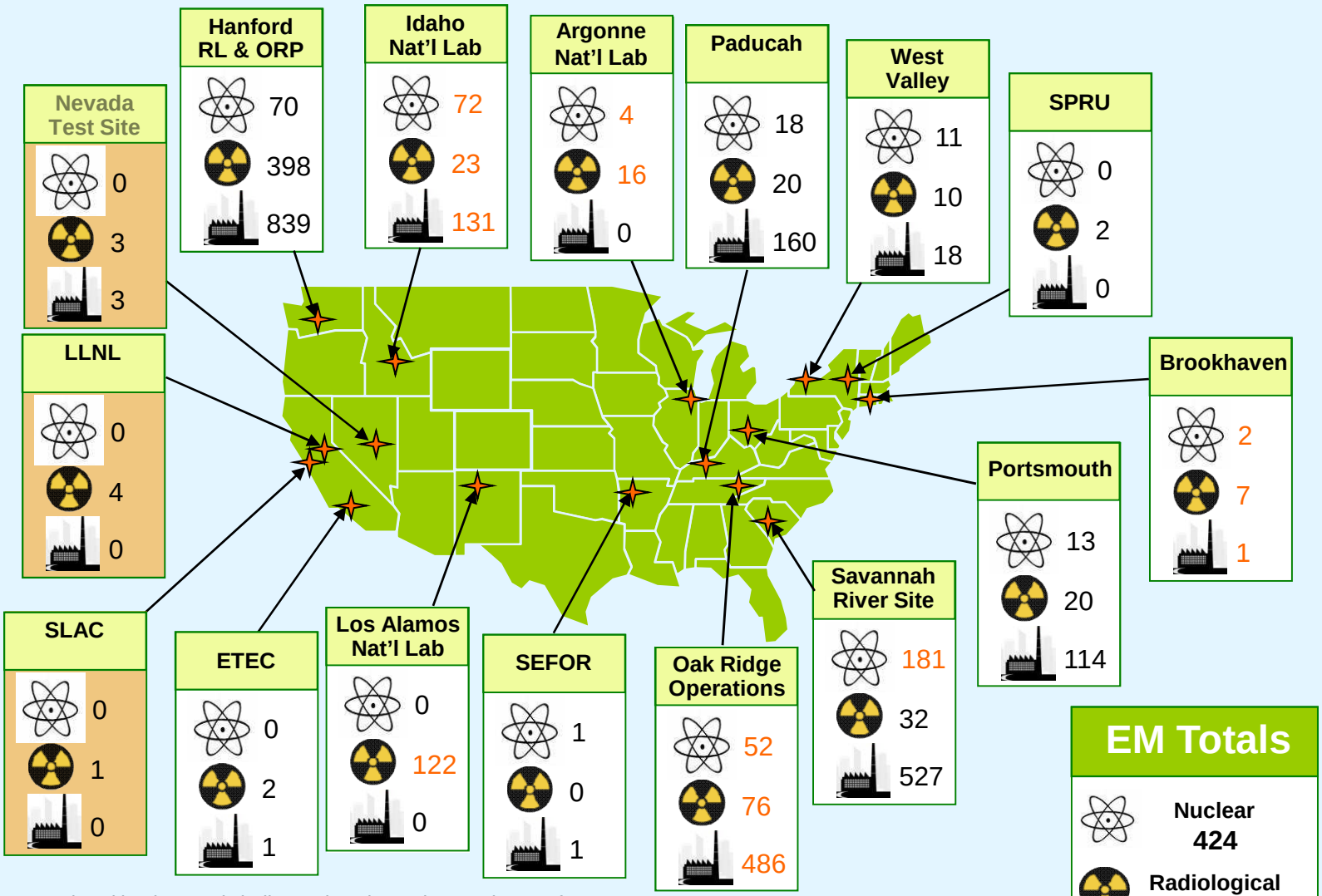
Y-12 Building 9201- Alpha-5

Excess Facilities Planned for Transfer to EM (cont.)

Site	PSO	# Facilities	GSF	D&D ROM Cost Range ($1,000,000)
Argonne National Lab	SC	11	1,369,350	$238.4 – $426.8 [1, 2]
Brookhaven National Lab	SC	8	95,000	$63.4 – $126.8 [3]
Idaho National Lab	NE	31	194,261	$103.7 – $207.4 [1, 4]
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	693,361 [5]	Included with Y-12 [9]
Nevada Test Site	NNSA	6	19,299	$6.3 – $12
Stanford Linear Accelerator Center	SC	1	100,000	$36 – $50
Savannah River Site	NNSA	1	71,966	$58 – $116
Y-12 National Security Complex	NE	2	255,656	$4,000 – $8,000 [7, 8, 9]
Y-12 National Security Complex	SC	17	1,002,350	
Y-12 National Security Complex	NNSA	71	1,874,436 [6]	
Total		**286**	**5,880,949**	**$4,579 – $9,086**

Notes:
1. Does not include facilities added by PSO after site walkdowns.
2. Does not include waste cleanout project not directly supporting D&D.
3. Does not include environmental restoration project.
4. Does not include programmatic transfers.
5. Does not include the EGCR Complex, which EM has recommended not accepting.
6. Does not include the Y-12 Steam 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 $4 – $8 billion.
8. Total CD-1 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.

Remaining EM Facilities and Planned Transfers for D&D



EM Totals

Nuclear	424
Radiological	736
Industrial	2281

*Colored backgrounds indicate sites that only contain transfers to EM.
*Colored numbers indicate a new total for the respective hazard class as a result of pending transfers.
*A breakout of baseline facilities and planned transfers is presented on the following pages.

Types of Facilities in EM D&D Projects

	Current Baseline					Planned Transfers		Totals	
EM Site	Type	Lifecycle	Completed as of FY 08	Remaining	Gross Square Feet (1000's)	Facility Transfers	Gross Square Feet (1000's)	Facilities	Gross Square Feet (1000's)
Argonne National Laboratory	Nuclear	0	0	0		4			
	Radiological	78	69	9		7			
	Industrial	0	0	0		0			
	Site Total	**78**	**69**	**9**	**4,500**	**11**	**1,369**	**20**	**5,869**
Brookhaven	Nuclear	1	0	1		1			
	Radiological	11	10	1		6			
	Industrial	0	0	0		1			
	Site Total	**12**	**10**	**2**	**50**	**8**	**95**	**10**	**145**
Energy Technology Engineering Center	Nuclear	0	0	0		0			
	Radiological	6	4	2		0			
	Industrial	25	24	1		0			
	Site Total	**31**	**28**	**3**	**50**	**0**	**0**	**3**	**50**
Hanford (RL+ORP)	Nuclear	98	28	70		0			
	Radiological	447	49	398		0			
	Industrial	1175	336	839		0			
	Site Total	**1720**	**413**	**1307**	**6,800**	**0**	**0**	**1,307**	**6,800**
Idaho	Nuclear	75	24	51		21			
	Radiological	50	32	18		5			
	Industrial	262	136	126		5			
	Site Total	**387**	**192**	**195**	**500**	**31**	**194**	**226**	**694**
Lawrence Livermore National Laboratory	Nuclear	0	0	0		0			
	Radiological	0	0	0		4			
	Industrial	0	0	0		0			
	Site Total	**0**	**0**	**0**	**0**	**4**	**149**	**4**	**149**

Types of Facilities in EM D&D Projects (cont.)

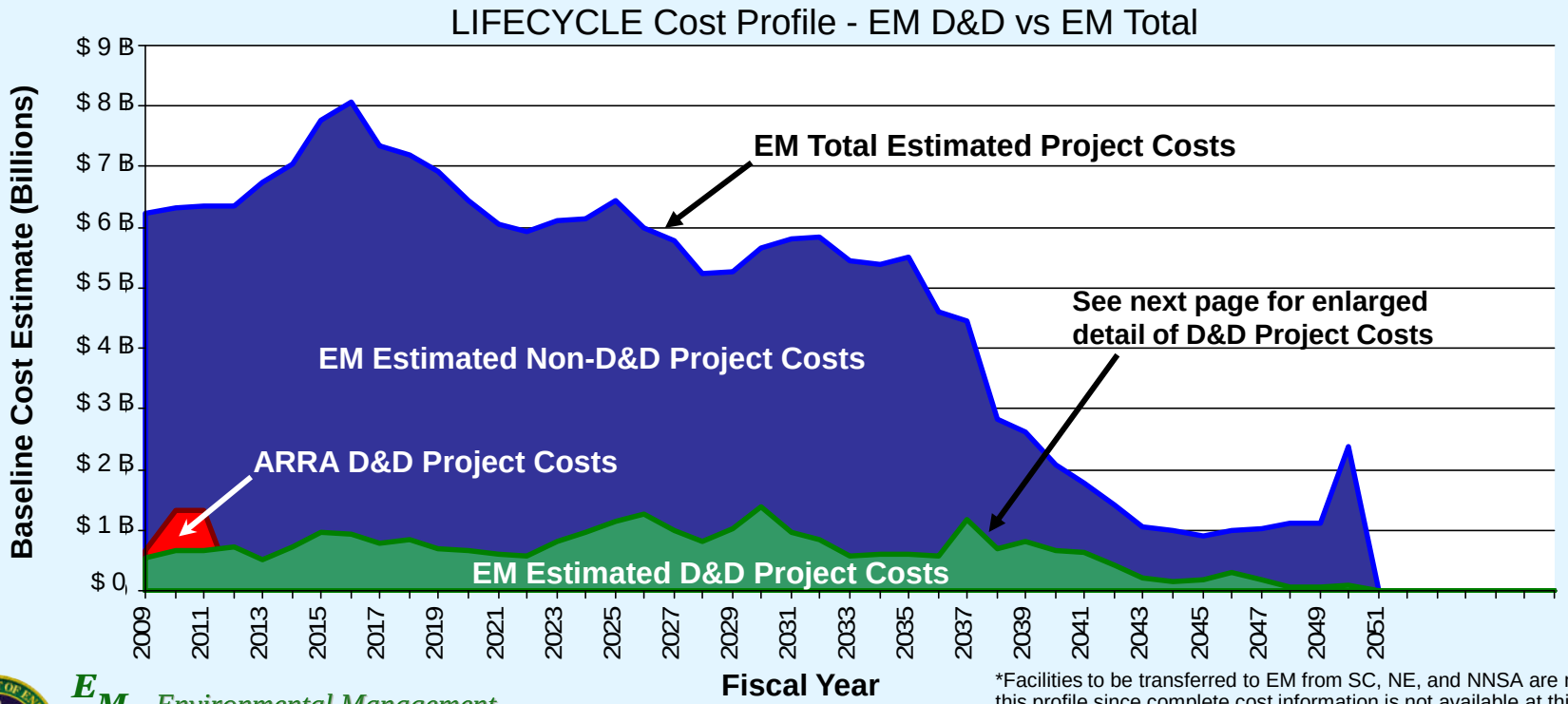
	Current Baseline					Planned Transfers		Totals	
EM Site	Type	Lifecycle	Completed as of FY 08	Remaining	Gross Square Feet (1000's)	Facility Transfers	Gross Square Feet (1000's)	Facilities	Gross Square Feet (1000's)
Los Alamos National Laboratory	Nuclear	0	0	0		0			
	Radiological	121	0	121		1			
	Industrial	0	0	0		0			
	Site Total	**121**	**0**	**121**	**500**	**1**	**56**	**122**	**556**
Nevada Test Site	Nuclear	0	0	0		0			
	Radiological	0	0	0		3			
	Industrial	0	0	0		3			
	Site Total	**0**	**0**	**0**	**0**	**6**	**19**	**6**	**19**
Oak Ridge	Nuclear	25	8	17		35			
	Radiological	71	26	45		31			
	Industrial	630	301	329		157			
	Site Total	**726**	**335**	**391**	**4,500**	**223**	**3,826**	**614**	**8,326**
Paducah	Nuclear	18	0	18		0			
	Radiological	22	2	20		0			
	Industrial	172	12	160		0			
	Site Total	**212**	**14**	**198**	**8,600**	**0**	**0**	**198**	**8,600**
Portsmouth	Nuclear	13	0	13		0			
	Radiological	27	7	20		0			
	Industrial	121	7	114		0			
	Site Total	**161**	**14**	**147**	**10,600**	**0**	**0**	**147**	**10,600**
Savannah River	Nuclear	191	11	180		1			
	Radiological	40	8	32		0			
	Industrial	759	232	527		0			
	Site Total	**990**	**251**	**739**	**8,000**	**1**	**72**	**740**	**8,072**

Types of Facilities in EM D&D Projects (cont.)

	Current Baseline					Planned Transfers		Totals	
EM Site	Type	Lifecycle	Completed as of FY 08	Remaining	Gross Square Feet (1000's)	Facility Transfers	Gross Square Feet (1000's)	Facilities	Gross Square Feet (1000's)
Separations Process Research Unit	Nuclear	0	0	0		0			
	Radiological	2	0	2		0			
	Industrial	0	0	0		0			
	Site Total	**2**	**0**	**2**	**100**	**0**	**0**	**2**	**100**
Southwest Experimental Fast Oxide Reactor	Nuclear	1	0	1		0			
	Radiological	0	0	0		0			
	Industrial	1	0	1		0			
	Site Total	**2**	**0**	**2**	**1,000**	**0**	**0**	**2**	**1,000**
Stanford Linear Accelerator Center	Nuclear	0	0	0		0			
	Radiological	0	0	0		1			
	Industrial	0	0	0		0			
	Site Total	**0**	**0**	**0**	**0**	**1**	**100**	**1**	**100**
West Valley	Nuclear	14	3	11		0			
	Radiological	13	3	10		0			
	Industrial	29	11	18		0			
	Site Total	**56**	**17**	**39**	**400**	**0**	**0**	**39**	**400**
EM Totals (including closed sites)	Nuclear	436	74	362		62			
	Radiological	888	210	678		58			
	Industrial	3,174	1,059	2,115		166			
	TOTALS	**4,498**	**1,343**	**3,155**	**45,600**	**286**	**5,880**	**3,441**	**51,480**

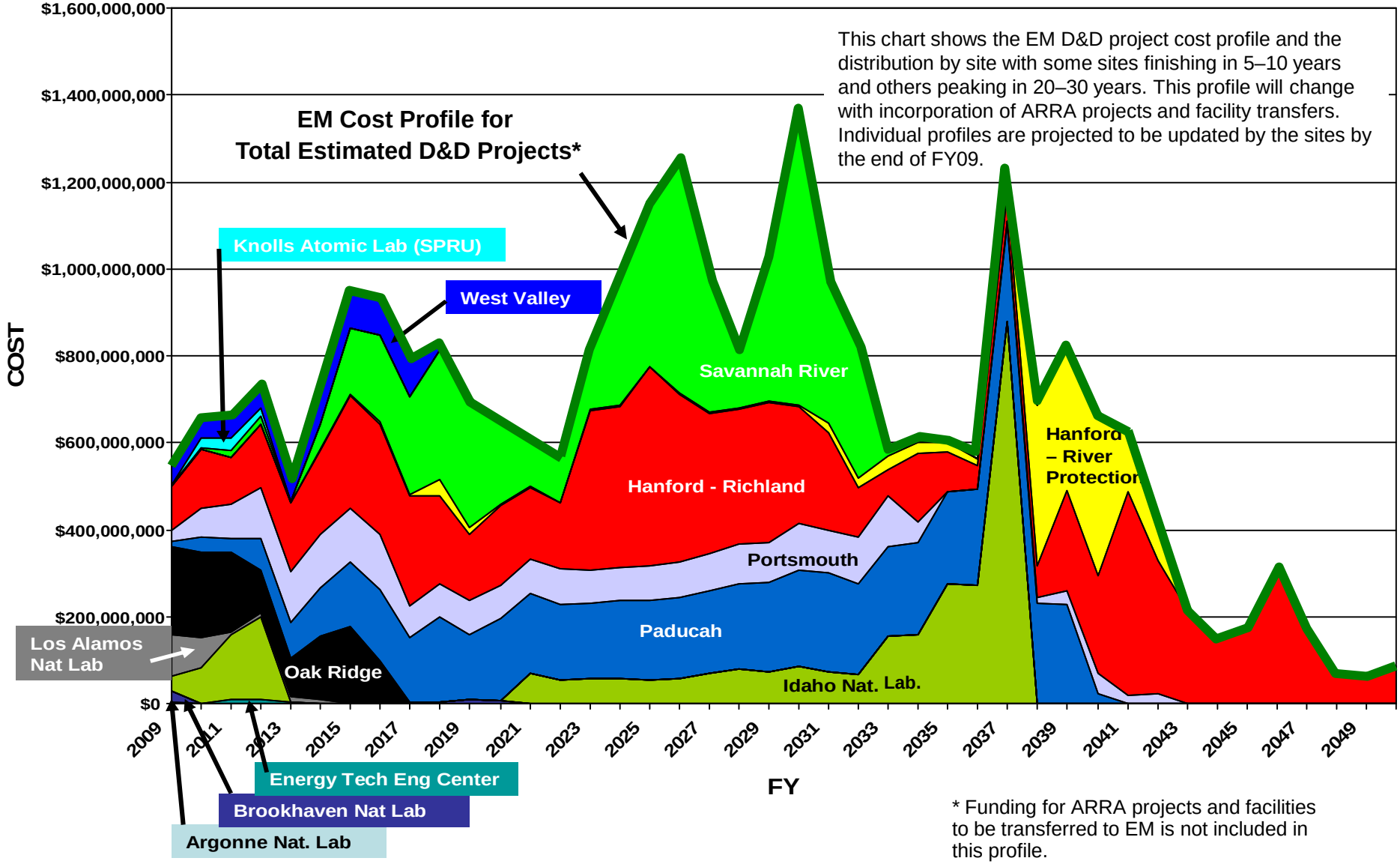
EM D&D Cost Profile Comparisons

Cost numbers are as of August 18, 2008	Overall Cost (Millions $) DOE, EM, and EM D&D*						
	2008	2009	2010	2011	2012	2013	2014
DOE	$23,413	$23,769	$23,857	$24,572	Not Available		
EM	$5,261	$6,237	$6,314	$6,341	$6,342	$6,753	$7,050
EM D&D (% of EM Total)	$433 (8.3%)	$544 (8.7%)	$654 (10.3%)	$660 (10.4%)	$731 (11.5%)	$516 (7.6%)	$717 (10.2%)
ARRA D&D		$664	$1327	$1327			
ARRA Non D&D		$536	$1073	$1073			



*Facilities to be transferred to EM from SC, NE, and NNSA are not included in this profile since complete cost information is not available at this time and the schedule for the transfers has not been finalized.

DOE EM Facility D&D Estimated Cost Profile By Site – FY 2009-2050



This chart shows the EM D&D project cost profile and the distribution by site with some sites finishing in 5–10 years and others peaking in 20–30 years. This profile will change with incorporation of ARRA projects and facility transfers. Individual profiles are projected to be updated by the sites by the end of FY09.

* Funding for ARRA projects and facilities to be transferred to EM is not included in this profile.

Major EM Sites by Total D&D Cost

EM Project Sites	Current Baseline Facility D&D Scope					Excess Facility (Unfunded liability) Transfers to EM***			Combined Post-Transition Total	
	D&D Facilities Progress	Years until >90% Complete*	D&D Facilities Remaining	Remaining Lifecycle D&D Cost (ABB "Progress" Costs)**	Baseline PBS 004X costs (with some S&M and Waste Remediation)	Significant Number Change to Present Scope	Number of Facilities	$$ Range	Number of Facilities	$$ Range
Hanford – Richland, WA	28%		1047	$6.8 - 7.3 Billion	$24.6 - 25.8 Billion				1047	**$6.8 - 7.3 Billion**
Savannah River, SC	25%		739	$5.2 - 5.8 Billion	$5.2 - 5.9 Billion		1	$58-116 Million	740	**$5.2 - 5.9 Billion**
Paducah, KY	7%		198	$3.9 - 13.2 Billion	$7.2 - 14.1 Billion				198	**$3.9 - 13.2 Billion**
Portsmouth, OH	9%		147	$2.6 - 5.5 Billion	$5.3 - 12.2 Billion				147	**$2.6 - 5.5 Billion**
Idaho National Energy Laboratory – ID	50%		195	$1.7 - 1.8 Billion	$2.4 - 2.5 Billion		31	$104-207 Million	226	**$1.8 - 2.0 Billion**
Hanford – River Protection (ORP), WA	0%		260	$1.6 - 2.1 Billion	No D&D PBS				260	**$1.6 - 2.1 Billion**
Oak Ridge, TN	46%		391	$1.2 - 1.2 Billion	$3.3 - 3.7 Billion		223	$4-8 Billion	614	**$5.2 - 9.2 Billion**
West Valley, NY	30%		39	$466 - 527 Million	$630 - 721 Million				39	**$466 - 527 Million**
Los Alamos National Laboratory – NM	0%		121	$213 - 249 Million	$213 - 251 Million		1	$11-21.5 Million	122	**$224 - 271 Million**
SPRU at Knolls Atomic Power Laboratory – NY	0%		2	$79 - 79 Million	$197 - 197 Million				2	**$79 - 95 Million**
Brookhaven National Laboratory – NY	83%		2	$68 - 94 Million	$77 - 118 Million		8	$63.4-127 Million	10	**$131- 221 Million**
Energy Technology Engineering Center (ETEC) – CA	90%		3	$22 - 29 Million	$106 - 152 Million				3	**$22 - 29 Million**
Southwest Experimental Fast Oxide Reactor (SEFOR) – AR	0%		2	$16 - 24 Million	No D&D PBS				2	**$16 - 24 Million**
Argonne National Laboratory – IL	88%		9	$13 - 14 Million	$13 - 14 Million		11	$238-427 Million	20	**$251 – 541 Million**

Probability of Near Term Completion

- = >90% complete in 5 years
- = >90% complete in 10 years
- = >90% complete beyond 10 years

Significant Number Change to Present Scope

- = <10% of Original Remaining Facilities
- = 10-25% of Original Remaining Facilities
- = >25% of Original Remaining Facilities

* ARRA funding may affect completion status due to acceleration of some scope.

** In isolating facility D&D costs using the ABB data it appears that some D&D "progress" costs have been mis-categorized as S&M or infrastructure support costs. For example, the Portsmouth D&D costs are less than half the Paducah D&D costs. This will be resolved in future ABB data updates. Due to the scope definition of some projects, facility D&D could not be fully isolated. Some waste site remediation, surveillance and maintenance, material disposition is included in these costs.

*** Does not include facility transfers at LLNL, SLAC or NTS as these sites do not have a significant EM presence; the number of facilities for these three sites is approximately 20, budget impact is small.

Facility D&D Challenges and Cost Drivers

Reactors, Canyons, and Processing Facilities

Robust Structures: Reactors, canyons, other processing facilities, and laboratories/hot cells were constructed with massive concrete shielding 3 to 10 feet thick, congested piping galleries, and heavy steel containment vessels or domes. The uranium gaseous diffusion plants are built of steel and asbestos transite panels with up to 100 acres under roof.

Highly Contaminated: Contain significant amounts of contamination, contaminated piping and equipment, and residual nuclear material holdup, often requiring remote handling and shielded transport packaging. Containment systems must be maintained until final stage demolition. Criticality potential must be characterized and monitored.

Legacy Waste and D&D Waste Disposition: Older facilities used to store legacy waste or debris, require waste disposition step. Quantity and variety of waste types in storage and generated by the D&D and remediation processes require multiple disposition paths.

Unknown Conditions: Many older, often under-funded or abandoned facilities have inadequate records or drawings and unknown legacy conditions, requiring extensive investigating, sampling, and characterization of conditions. Conservative safety planning and increased contingencies are necessary for the unknown risks.

Degraded Conditions: Many facilities have been utilized or vacated far beyond normal design-life with less than optimal maintenance for many years. This has created conditions requiring either upgrades to safety systems and structures to maintain a safe work environment for D&D personnel or a need for expensive remote (robotic) D&D operations.

Unique / One-of-Kind Facilities: Facilities were built or modified for first-of-kind research or prototype programs with unique hazards or challenges. This drives extra hazard characterization, mitigation research, planning, and training preparation. Little to no experience or information exists to help benchmark the planning for these projects.

EM Manages a Flow of Transfers & Dispositions

EM inherited a legacy inventory of excess contaminated nuclear-weapons-complex research and production sites and facilities from other DOE Program Offices during and continuously since its creation in 1989. This began a cleanup-focused program that continues into the future. Old obsolete nuclear facilities transition into EM responsibility to be dispositioned primarily through the D&D process.

Transition excess contaminated sites & facilities from Operations to Disposition

Office of Nuclear Energy (NE) managed sites and facilities

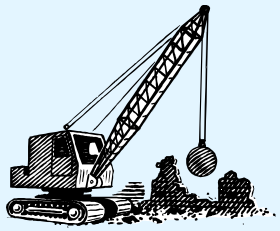
Office of Science (SC) managed sites and facilities

National Nuclear Security Administration (NNSA) managed sites and facilities

Demolish or transfer cleaned sites and facilities to new ownership

Environmental Management (EM) **managed sites and facilities for D&D and cleanup.**

Majority of facilities are demolished, leaving land for new uses (e.g., Energy Parks).



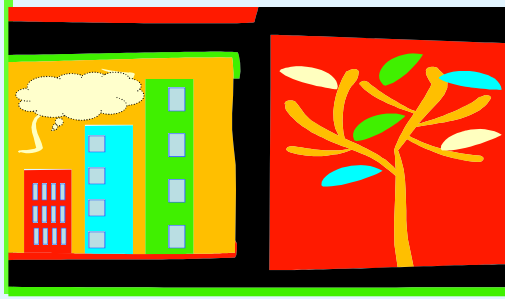
Legacy Management (LM) Managed Sites for long-term monitoring

or

Local Government Agencies or Private Commercial Acquisition for business parks

or

Other Government Agencies (Parks & Forest Service, BLM, etc.) for preserves



Typical Phases of D&D

The following phases are defined in guides under DOE O 430.1B and are not necessarily sequential. Some phases may be combined or skipped depending on the conditions encountered and the D&D strategy implemented.

Facility Stabilization / Transition: Primarily defines the last steps of an operational facility or one in stand-by mode with the objective to remove nuclear materials, spent fuels, containerized wastes, and classified documents and equipment, allowing the security levels and security systems to be reduced. Operational procedures and standards are reduced to minimum standards. The radiological hazard classification level may be reduced. Most effectively implemented by operational skill of craft. **(DOE G 430.1-5 Transition Implementation Guide)**

Facility Deactivation: A facility maintains active safety and contamination confinement systems for personnel safety and environmental control. Deactivation may involve removing or fixing contamination; removing hazards; and removing occupants in order to permit the shut down or removal of active systems. The radiological hazard classification level may be reduced. This is typically a minimum surveillance and maintenance holding condition for future decommissioning funding priority and is determined by the EM-developed End-Point Process. Characterization of unknown conditions, materials, wastes, and hazards help to mitigate surprises during planning and execution of work. **(DOE G 430.1-3 Deactivation Implementation Guide)**

Facility Decommissioning: While decommissioning can include elements of the prior steps, the most frequent result is dismantlement or demolition. However, alternative disposition end-states are possible such as entombment (in situ decommissioning) or re-utilization. Complexity and costs depend on the hazards, unknown conditions, levels of contamination, and the variety of waste types generated. Additional characterization of unknown conditions, materials, wastes, and hazards help to mitigate surprises during planning and execution of work. **(DOE G 430.1-4 Decommissioning Implementation Guide)**

What are the biggest D&D projects?

Presently there are approximately 70 planned major D&D projects over the next 40+ years. Three different lists have been generated:

1. **Top 25 EM D&D Projects Scheduled for FY 2009–2013 Years (page 20)**

   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 (page 21)**

   These are the biggest D&D projects that are presently funded in fiscal year 2009.

3. **Top 25 EM D&D Projects Budgeted for FY 2009–2050 Years (page 22)**

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

The first list of the top 25 D&D projects scheduled in the next five years is used for the project descriptions in Appendix A. These projects are highlighted in pale blue on page 20. The top 25 projects for the other timeframes (i.e., the Top 25 Scheduled in FY 2009 and the Top 25 Budgeted for 2009-2050) include many of these **"BLUE" projects**, but also include other projects that are not among the top 25 scheduled in the 2009–2013 timeframe. For example, 12 of the top 25 projects scheduled for 2009-2050 are among the top 25 for 2009-2013. The other 13 projects are not scheduled to begin until after 2013.

D&D cost estimates shown in this document are taken from ABB submittals in 2008. The projects' costs, used here to define and sort project size, reflect only the "progress" dollars for the D&D activities. Surveillance and maintenance costs and progress costs are however shown in the graphic cost profiles; surveillance and maintenance costs that are not visible on the ABB Budget and Schedule Profiles are either too low for the scale of the graph or are reported as zero.

Top 25 EM D&D Projects

The tables on the next three pages present the top 25 D&D Projects based on ABB cost data submitted in 2008. The project costs used to define and sort project size reflect only the "progress" dollars assigned to that ABB. The tables are arranged into three groups according to the time period in which they have "progress" costs budgeted:

- FY2009 – FY2013
- FY2009 only
- Total Life Cycle (2009 – 2050)

Several of these ABBs are receiving ARRA funding with outyear scope being pulled-up to FY2009 – FY2011 (highlighted in pink). The numbers in the following tables cannot be updated until project specific ARRA cost data are verified and publicly released. Initial data suggests that three ABBs will be elevated to the top 25 groupings:

- Richland ABB #404 Regulatory Decisions and Closure Integration
- Portsmouth ABB #166 D&D Balance of Plant
- Idaho ABB #106 INTEC D&D – 601 & 640

The following limitations are noted for these data:

- No update information is available at this time for Savannah River Site or Office of River Protection ABBs.
- The sites are in the process of updating all of their ABBs and cost profiles to reflect the changes in the baseline resulting from ARRA funding and FY09 budget updates. It is possible that the composition and order of these tables could change as a result of these updates. The updated data are projected to be available in October 2009.

The Top 25 EM D&D Projects Scheduled for FY 2009–2013

Note: Durations are based on the number of years with "progress" dollars budgeted. Several D&D projects with current activity (e.g., SRS F Area) have several years with no D&D activities before resuming D&D later. In these cases the durations will not be equal to the interval between the Start Year and the End Year.

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($ Million)	Duration (years)	Start Year	End Year
Paducah Gaseous Diffusion Plant	199	**Gaseous Diffusion Plant (GDP)**	$3,747	29	2012	2040
Idaho National Laboratory	107	**Idaho Nuclear Technology and Engineering Center (INTEC) – Remainder**	$1,134	22	2008	2037
Richland Operations Office	331	**Plutonium Finishing Plant (PFP) Disposition**	$1,097	11	2009	2019
Savannah River Site	60	**F Area**	$1,046	21	2008	2035
Richland Operations Office	403	**Zone 11 (PUREX Zone)**	$790	10	2009	2027
West Valley Demonstration Project	319	**Nuclear Facilities**	$466	11	2008	2018
River Protection	147	**Tank Farm**	$436	30	2013	2042
Portsmouth Gaseous Diffusion Plant	167	**Process Buildings**	$424	22	2012	2033
Richland Operations Office	408	**Zone 18 (U Plant Zone)**	$409	17	2009	2026
Oak Ridge Reservation	274	**K-25 Building**	$384	5	2008	2012
Richland Operations Office	417	**Fast Flux Test Facility (FFTF)**	$365	22	2009	2030
Oak Ridge Reservation	284	**Central Campus, Isotope Circle and Reactor Facilities**	$290	10	2008	2017
Los Alamos National Laboratory	485	**DP Site**	$146	4	2008	2011
Oak Ridge Reservation	275	**K-27 Building**	$132	6	2010	2016
Paducah Gaseous Diffusion Plant	200	**Inactive Facilities**	$122	10	2008	2017
Oak Ridge Reservation	287	**Bethel Valley Reactors**	$113	9	2008	2016
Richland Operations Office	414	**River Corridor Nuclear Facilities**	$105	10	2009	2018
Oak Ridge Reservation	273	**ETTP Main Plant Area**	$95	6	2008	2016
Oak Ridge Reservation	280	**Alpha-4 and other EM Facilities**	$90	9	2009	2017
Separations Process Research Unit	318	**Bldgs H2 and G2 and Remediate Ground Water Contamination Source**	$79	4	2008	2012
Los Alamos National Laboratory	486	**TA-54**	$52	8	2008	2015
Oak Ridge Reservation	288	**Centrifuge Facilities**	$43	9	2008	2016
Brookhaven National Laboratory	502	**Brookhaven Graphite Research Reactor (BGRR)**	$42	3	2008	2010
Richland Operations Office	335	**K East & West Reactor Basins**	$40	2	2009	2010
Idaho National Laboratory	109	**Reactor Technology Complex (RTC)/ Power Burst Facility (PBF)**	$35	5	2008	2012

= ABB affected by ARRA **= Top 25 Project (FY2009 – 2013)**

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

The Top 25 EM D&D Projects Scheduled for FY 2009

Note: Durations are based on the number of years with "progress" dollars budgeted. Several projects with current D&D activity (e.g., SRS F Area) have several years with no D&D activities before resuming D&D later. In these cases the durations will not be equal to the interval between the Start Year and the End Year.

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($ Million)	Duration (years)	Start Year	End Year
Idaho National Laboratory	107	**Idaho Nuclear Technology and Engineering Center (INTEC) – Remainder**	$1,134	22	2008	2037
Richland Operations Office	331	**Plutonium Finishing Plant (PFP) Disposition**	$1,097	11	2009	2019
Savannah River Site	60	**F Area**	$1,046	21	2008	2035
Richland Operations Office	403	**Zone 11 (PUREX Zone)**	$790	10	2009	2027
West Valley Demonstration Project	319	**Nuclear Facilities**	$466	11	2008	2018
Richland Operations Office	408	**Zone 18 (U Plant Zone)**	$409	17	2009	2026
Oak Ridge Reservation	274	**K-25 Building**	$384	5	2008	2012
Richland Operations Office	417	**Fast Flux Test Facility (FFTF)**	$365	22	2009	2030
Oak Ridge Reservation	284	**Central Campus, Isotope Circle and Reactor Facilities**	$290	10	2008	2017
Los Alamos National Laboratory	485	**DP Site**	$146	4	2008	2011
Paducah Gaseous Diffusion Plant	200	**Inactive Facilities**	$122	10	2008	2017
Oak Ridge Reservation	287	**Bethel Valley Reactors**	$113	9	2008	2016
Richland Operations Office	414	**River Corridor Nuclear Facilities**	$105	10	2009	2018
Oak Ridge Reservation	273	**ETTP Main Plant Area**	$95	6	2008	2016
Oak Ridge Reservation	280	**Alpha-4 and other EM Facilities**	$90	9	2009	2017
Separation Process Research Unit	318	**Bldgs H2 and G2 and Remediate Ground Water Contamination Source**	$79	4	2008	2012
Los Alamos National Laboratory	486	**TA-54**	$52	8	2008	2015
Oak Ridge Reservation	288	**Centrifuge Facilities**	$43	9	2008	2016
Brookhaven National Laboratory	502	**Brookhaven Graphite Research Reactor (BGRR)**	$42	3	2008	2010
Richland Operations Office	335	**K East & West Reactor Basins**	$40	2	2009	2010
Idaho National Laboratory	109	**Reactor Technology Complex (RTC)/ Power Burst Facility (PBF)**	$35	5	2008	2012
Brookhaven National Laboratory	504	**High Flux Beam Reactor (HFBR)**	$26	5	2008	2020
Los Alamos National Laboratory	487	**TSTA**	$14	3	2008	2010
Argonne National Laboratory – East	293	**Bldg 301**	$13	2	2008	2009
Idaho National Laboratory	111	**Test Area North (TAN)**	$9	22	2008	2037

= **ABB affected by ARRA**

= **Project also on FY 2009-2013 Top 25 Project List (Page 20)**

The Top 25 EM D&D Projects Budgeted for FY 2009–2050

Note: Durations are based on the number of years with "progress" dollars budgeted. Several projects with current D&D activity (e.g., SRS F Area) have several years with no D&D activities before resuming D&D later. In these cases the durations will not be equal to the interval between the Start Year and the End Year.

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($ Million)	Duration (years)	Start Year	End Year
Paducah Gaseous Diffusion Plant	199	**Gaseous Diffusion Plant (GDP)**	$3,747	29	2012	2040
Savannah River Site	62	**H Area**	$1,530	21	2014	2035
Idaho National Laboratory	107	**Idaho Nuclear Technology and Engineering Center (INTEC) – Remainder**	$1,134	22	2008	2037
River Protection	154	**Waste Immobilization and Treatment Plant (WTP)**	$1,132	5	2038	2042
Richland Operations Office	331	**Plutonium Finishing Plant (PFP) Disposition**	$1,097	11	2009	2019
Savannah River Site	60	**F Area**	$1,046	21	2008	2035
Richland Operations Office	411	**Zone 5 (B Plant Zone)**	$993	13	2018	2041
Richland Operations Office	407	**Zone 17 (T Plant Zone)**	$865	11	2012	2044
Richland Operations Office	403	**Zone 11 (PUREX Zone)**	$790	10	2009	2027
Idaho National Laboratory	93	**Calcine Disposition (including Bin Sets)**	$762	2	2036	2037
Richland Operations Office	406	**Zone 12 (REDOX Zone)**	$537	16	2018	2047
West Valley Demonstration Project	319	**Nuclear Facilities**	$466	11	2008	2018
River Protection	147	**Tank Farm**	$436	30	2013	2042
Portsmouth Gaseous Diffusion Plant	167	**Process Buildings**	$424	22	2012	2033
Richland Operations Office	408	**Zone 18 (U Plant Zone)**	$409	17	2009	2026
Richland Operations Office	402	**Zone 1 (200-E Administration Zone)**	$408	11	2016	2048
Oak Ridge Reservation	274	**K-25 Building**	$384	5	2008	2012
Richland Operations Office	417	**Fast Flux Test Facility (FFTF)**	$365	22	2009	2030
Richland Operations Office	418	**Sodium Disposition**	$307	15	2015	2029
Savannah River Site	70	**S Area**	$299	6	2027	2032
Idaho National Laboratory	105	**Advanced Mixed Waste Treatment Plant (AMWTP)**	$292	17	2021	2037
Oak Ridge Reservation	284	**Central Campus, Isotope Circle and Reactor Facilities**	$290	10	2008	2017
Savannah River Site	63	**J Area**	$215	6	2027	2032
Savannah River Site	64	**K Area**	$207	9	2020	2030
Savannah River Site	65	**L Area**	$160	9	2024	2032

= **ABB affected by ARRA**

= **Project also on FY 2009-2013 Top 25 Project List (Page 20)**

Data Sources and Programmatic Assumptions

The information collected in this D&D reference guide has come from a variety of sources:

- D&D cost estimates are budgetary information extracted from the 2008 Analytical Building Blocks or ABBs. ABBs were created at a work breakdown level just below the Project Baseline Summary (PBS) to provide additional flexibility in analyzing funding alternative scenarios. The projects' costs, used here to define and sort project size, reflect only the "progress" dollars for the D&D activities. Combined surveillance-maintenance (S&M) costs and progress costs are, however, shown in the graphic cost profiles.
- The costs will not necessarily match PBS costs, as there are soil or waste site remediation ABBs, infrastructure maintenance ABBs, and oversight management ABBs that are, at times, consolidated at the PBS level, and that have been, by design, excluded from the D&D project costs for sorting purposes. *(Some costs appear to be inaccurately categorized, causing distortion in "progress" dollars at sites such as Portsmouth. EM-30 is in the process of refining ABB costs. Included in this effort is the standardization of the split between progress and maintenance costs. This refinement will result in higher "progress" costs for Portsmouth, as well as some other sites.)*

Data Sources and Programmatic Assumptions (continued)

- Project facility numbers and size (square feet) were extracted from the Facility Information Management System (FIMS), estimated from available project descriptions, or extracted from field reports.
- "Facility Background" and "Project Descriptions" have been extracted from project reports, inquiries, the Integrated Planning, Accountability, and Budgeting System (IPABS) PBS work scope descriptions, as well as from the site's internet web pages.
- Approximately 300 excess contaminated facilities were accepted for transfer from the DOE Office of Science, Office of Nuclear Energy, and the National Nuclear Security Administration in 2009. The largest number of facilities accepted are at the Oak Ridge Reservation (under the Integrated Facilities Disposition Project) and the Idaho National Laboratory (see pages 6 & 7 for additional details). The schedule for the transfers is still evolving and therefore the effect on the EM budget profile is not fully known at this time.
- ARRA funding results in 18 unique projects with D&D scope. These projects are designed to accelerate progress and reduce facility backlog from the current baseline, and in some cases, address new facilities transferred from other PSOs. The impact on the priorities and profiles of the present projects is not fully known at this time; the sites are in the process of updating their ABBs and cost profiles to reflect these changes in the baseline.

Completed D&D Project Sites

- Ashtabula Uranium Plant Closure Project
- Columbus Nuclear Research Facility Closure Project
- Fernald Uranium Plant Closure Project
- Mound Radioisotopic Plant - Miamisburg Closure Project
- Rocky Flats Plutonium Plant Closure Project

Ashtabula Closure Project (D&D Completed)

Site Owner: RMI Titanium Company (RMI), a division of Earthline Technologies

Cleanup Contractor: LATA-Sharp Remediation Services, LLC (LSRS)

Project Beginning Date: Closure contract awarded September 30, 2005

Original Mission of the Site: The site was utilized to support uranium extrusion operations that began in 1962.

Types of Wastes: Low-level waste, mixed low-level waste, and hazardous and industrial wastes.

Declaration of Physical Completion: The contractor declared physical completion on November 1, 2006, more than 2 weeks ahead of schedule.

Uranium Processing Facilities
Ashtabula, Ohio

Columbus Closure Project (D&D Completed)

Site Owner: Department of Energy

Cleanup Contractor: Battelle

Project Beginning Date: In December 1993, the NRC issued a letter approving Battelle's Decommissioning Plan.

Original Mission of the Site: The Columbus Site consisted of the King Avenue and West Jefferson sites. The King Avenue site consisted of nine affected buildings and was historically a part of the government's fuel and fabrication program. The West Jefferson site consisted of six buildings and was historically a site that performed nuclear research.

Types of Wastes: Primarily uranium and thorium.

Declaration of Physical Completion: Remediation at the King Avenue Site was completed in FY 2000 and the facilities were released to Battelle. Remediation at the West Jefferson site was completed in FY 2006.

Fernald Closure Project (D&D Completed)

Site Owner: Department of Energy

Cleanup Contractor: Fluor Fernald

Project Beginning Date: Shutdown in 1989, Closure contract awarded November 2000

Original Mission of the Site: The site was utilized to as a uranium processing facility for 37 years to support the U.S. weapons program

Types of Wastes: Low-level waste, mixed low-level waste, and hazardous and industrial wastes.

Declaration of Physical Completion: The contractor declared physical completion on October 29, 2006.

Received Formal Acceptance: Received from DOE on January 22, 2007, that clean-up of the 1,050-acre site is now complete.

Mound Plant - Miamisburg Closure Project (D&D Completed)

Site Owner: Department of Energy

Cleanup Contractor: CH2M HILL Mound

Project Beginning Date: In 1998, a sales contract was established between the Miamisburg Mound Community Improvement Corporation (MMCIC) and DOE that allowed conveyance of the Mound property subject to the CERCLA 120(h) process.

Original Mission of the Site: Much of the work at the Mound Plant during the Cold War involved production of the polonium-beryllium initiators used in early atomic weapons and the manufacture of and research related to radionuclides.

Types of Wastes: Facilities contained plutonium, beryllium, and other hazardous substance contamination.

Declaration of Physical Completion: The contractor declared physical completion on July 31, 2006.

Received Formal Acceptance: DOE accepted completion of the scope in March 2007

Radioisotopic Processing Facilities
Miamisburg, Ohio

Rocky Flats Closure Project (D&D Completed)

Site Owner: Department of Energy

Cleanup Contractor: Kaiser-Hill

Project Beginning Date: In January 2000, Kaiser-Hill signed a closure contract for cleanup. The cleanup required the removal of more than 800 structures, including six plutonium processing and fabrication complexes.

Original Mission of the Site: The Rocky Flats Plant was established in 1951 as part of the United States' nationwide nuclear weapons complex to manufacture nuclear weapons components, operating from 1952 to 1994. The key component produced at Rocky Flats was the plutonium pit, commonly referred to as the "trigger".

Types of Wastes: Facilities contained substantial plutonium, beryllium, and other hazardous substance contamination; more than 500,000 cubic meters of low-level radioactive waste. Remediation of more than 360 potentially contaminated environmental sites was also required.

Declaration of Physical Completion: In October 2005, DOE and its contractor completed an accelerated 10-year, $7 billion cleanup.

Received Formal Acceptance: The EPA certified completion of site cleanup and closure on June 11, 2007.

Completed Major D&D Projects

- Hanford
  - 300 Area/100 Area
  - N Reactor
- Idaho National Laboratory
  - Loss of Fluid Test Reactor
  - Test Area North
  - Engineering Test Reactor
- Savannah River
  - T-Area Closure

Hanford Site – 300 and 100 Areas

The 300 Area's two main functions were production (or fabrication) of fuel for the reactors (performed in the north end of the area) and chemical research to improve the entire production process. Some of the buildings in the 300 Area were constructed during World War II.

N Reactor operated from 1963 to 1987 when it was shut down for maintenance, refueling, and safety upgrades. In April 1986 the accident at the Chernobyl nuclear plant in the Soviet Union drew public attention to N Reactor. In early 1988, DOE decided to place N Reactor on standby. The N Reactor Area has been deactivated. This area contains slightly more than 100 buildings.

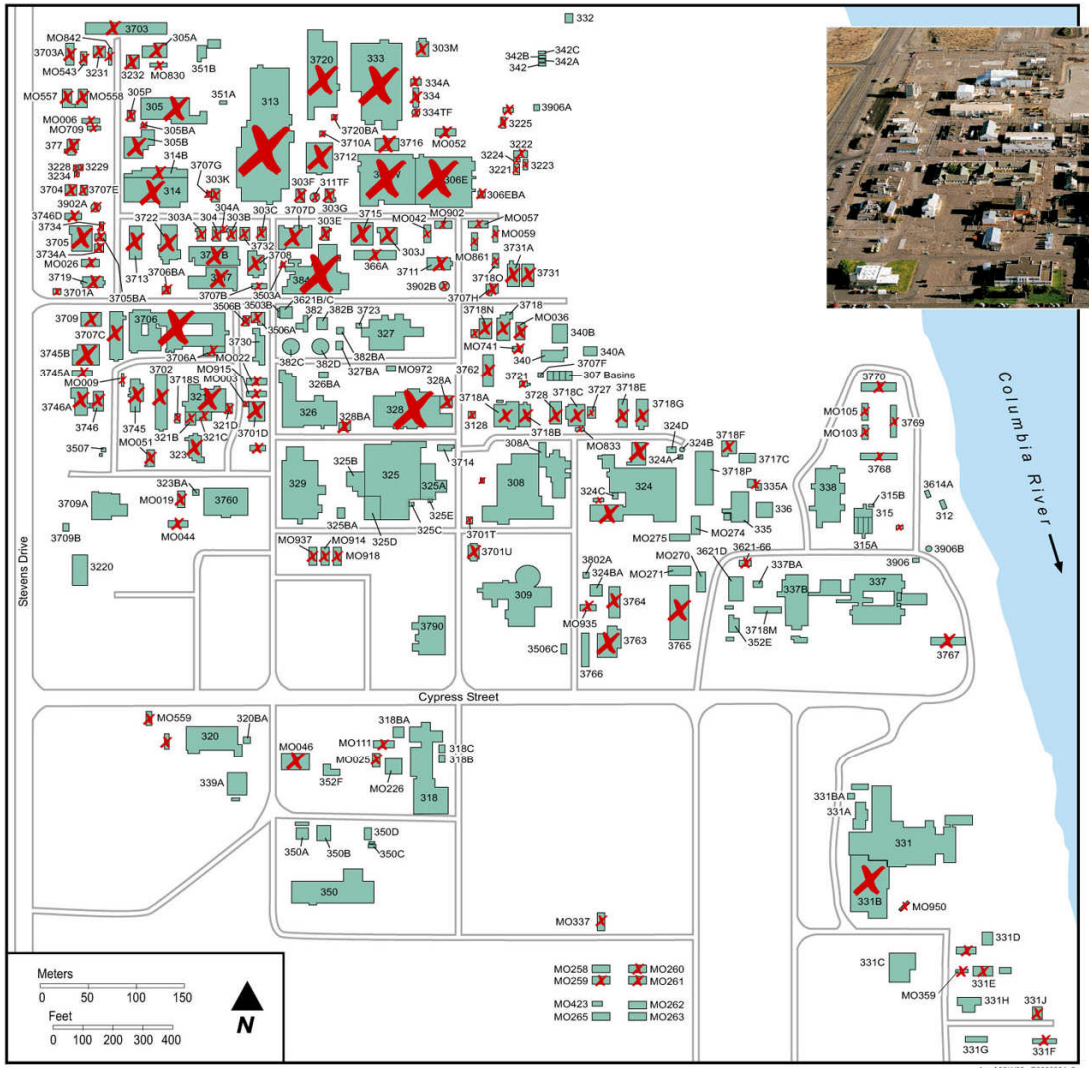
Demolition progress at the 300 Area and 100 N Area (as of February 2009) are shown on the following pages.

Hanford 300 Area — Summer 2005

Hanford 300 Area — Summer 2008

E08 10024

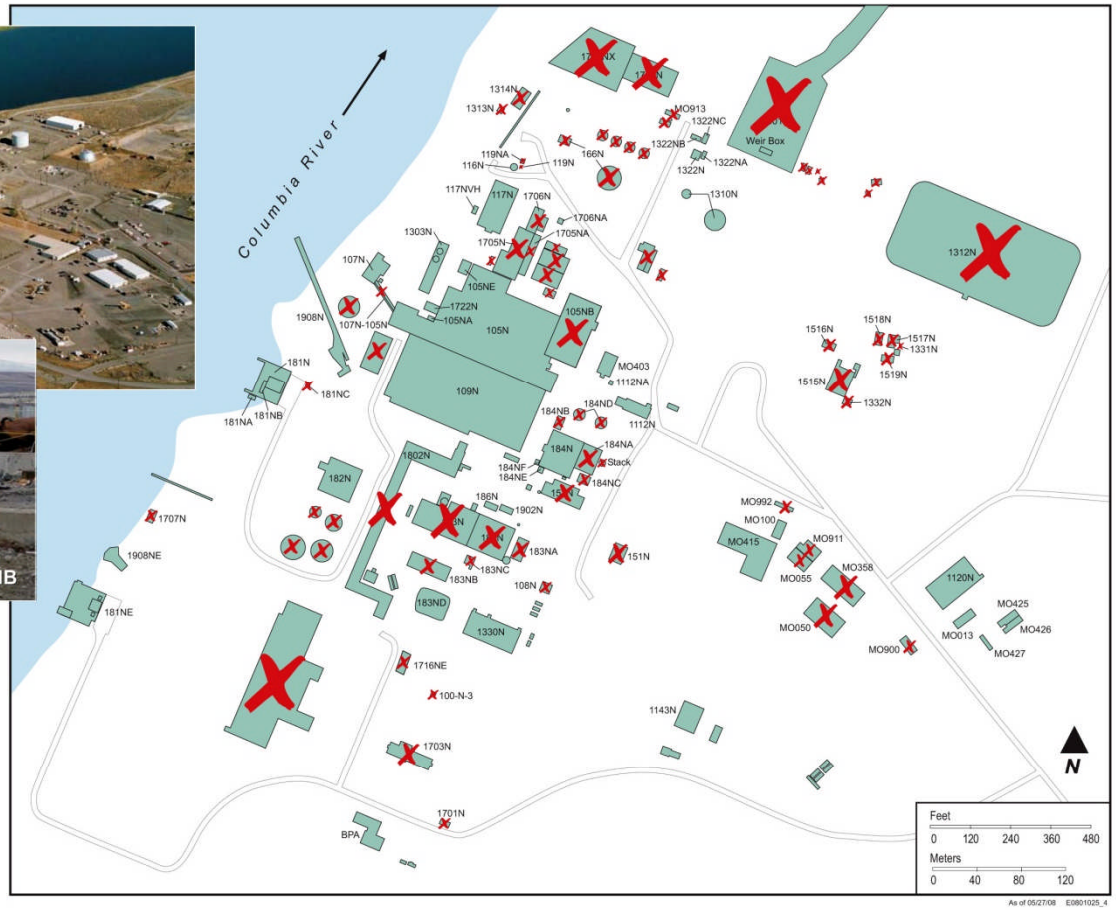
Hanford Site – 300 Area D4 Facility Demolition



Demolition Progress

~~303A~~	318	331G	~~384~~	3707F	~~3734A~~	MO226
~~303B~~	318B	331H	~~3128~~	~~3707G~~	~~3745~~	MO258
~~303C~~	318BA	~~331J~~	3220	~~3707H~~	~~3745A~~	~~MO259~~
~~303E~~	318C	332	~~3221~~	~~3708~~	~~3745B~~	~~MO260~~
~~303F~~	320	~~333~~	~~3222~~	~~3709~~	~~3746~~	~~MO261~~
~~303G~~	320BA	~~334~~	~~3223~~	3709A	~~3746A~~	MO262
~~303J~~	~~321~~	~~334A~~	~~3224~~	3709B	~~3746D~~	MO263
~~303K~~	~~321B~~	~~334TF~~	~~3225~~	~~3710A~~	3760	MO265
~~303M~~	~~321C~~	335	~~3228~~	~~3711~~	~~3762~~	MO270
~~304~~	~~321D~~	~~335A~~	~~3229~~	~~3712~~	~~3763~~	MO271
~~304A~~	~~323~~	336	~~3231~~	~~3713~~	~~3764~~	MO274
~~305~~	323BA	337	~~3232~~	3714	~~3765~~	MO275
~~305A~~	324	337B	~~3234~~	~~3715~~	3766	~~MO337~~
~~305B~~	324A	337BA	~~3503A~~	~~3716~~	~~3767~~	~~MO559~~
~~305BA~~	324B	338	3503B	~~3717~~	~~3768~~	MO423
~~305P~~	324BA	339A	~~3506A~~	~~3717B~~	~~3769~~	~~MO543~~
~~306E~~	324C	340	~~3506B~~	3717C	~~3770~~	~~MO557~~
~~306W~~	324D	340A	3506C	~~3718~~	3790	~~MO558~~
~~306EBA~~	325	340B	3507	~~3718A~~	3802A	~~MO559~~
307	325A	342	3614A	~~3718B~~	~~3902A~~	~~MO709~~
308	325B	342A	~~3621-66~~	~~3718C~~	~~3902B~~	~~MO741~~
308A	325BA	342B	3621B/C	~~3718E~~	3906	MO744
309	325C	342C	3621D	~~3718F~~	3906A	~~MO830~~
310	325D	350	3701	~~3718G~~	3906B	~~MO833~~
310S	325E	350A	3701A	3718M	~~MO003~~	~~MO842~~
310T1	326	350B	3701D	~~3718N~~	~~MO006~~	~~MO881~~
310T2	326BA	350C	~~3701T~~	~~3718O~~	~~MO009~~	~~MO902~~
310T3	327	350D	~~3701U~~	3718P	~~MO019~~	MO905
310T7A	327BA	351A	~~3702~~	~~3718S~~	~~MO022~~	~~MO914~~
310T7B	~~328~~	351B	~~3703~~	~~3719~~	~~MO025~~	~~MO915~~
310V	~~328A~~	351C	~~3703A~~	~~3720~~	~~MO026~~	~~MO918~~
~~311TF~~	~~328BA~~	352C	~~3704~~	~~3720BA~~	~~MO036~~	~~MO935~~
312	329	352E	~~3705~~	~~3721~~	~~MO042~~	~~MO937~~
~~313~~	331	352F	~~3705BA~~	~~3722~~	~~MO044~~	~~MO950~~
~~314~~	331A	~~366A~~	~~3706~~	~~3727~~	~~MO046~~	MO972
~~314B~~	~~331B~~	~~377~~	~~3706A~~	~~3728~~	~~MO051~~	
315	331BA	382	~~3706BA~~	3730	~~MO052~~	
315A	331C	382B	~~3707B~~	~~3731~~	~~MO057~~	
315B	331D	382BA	~~3707C~~	~~3731A~~	~~MO059~~	
315C	~~331E~~	382C	~~3707D~~	~~3732~~	~~MO105~~	
315D	~~331F~~	382D	3707E	~~3734~~	~~MO111~~	

Hanford Site – 100 N Area D4 Facility Demolition



Demolition Progress

105N	117N	181NA	183ND	186N	1310N	1322NB	~~1519N~~	~~1714N~~	~~1900N~~	~~MO358~~	~~MO992~~
105NA	117NVH	181NB	184N	1112N	~~1312N~~	1322NC	~~1701N~~	~~1714NA~~	1902N	MO403	
~~105NB~~	~~119N~~	181NE	~~184NA~~	1112NA	~~1313N~~	1330N	~~1703N~~	~~1714NB~~	1908N	MO415	
105NE	~~119NA~~	~~181NC~~	~~184NB~~	1120N	~~1314N~~	~~1331N~~	~~1705N~~	~~1715N~~	1908NE	MO425	
107N	~~151N~~	182N	~~184NC~~	1143N	~~1315N~~	~~1332N~~	~~1705NA~~	~~1716NE~~	~~13N~~	MO426	
~~107N-105N~~	~~153N~~	~~183N~~	~~184ND~~	~~1300N~~	~~1316N~~	~~1515N~~	~~1706N~~	1722N	MO013	MO427	
~~108N~~	~~163N~~	~~183NA~~	184NE	~~1301N~~	~~1316NA~~	~~1516N~~	1706NA	~~1723N~~	~~MO050~~	~~MO900~~	
109N	~~166N~~	~~183NB~~	184NF	1303N	1322N	~~1517N~~	~~1707N~~	~~1723NX~~	~~MO055~~	~~MO911~~	
116N	181N	~~183NC~~	~~185N~~	~~1304N~~	1322NA	~~1518N~~	~~1712N~~	~~1802N~~	MO100	~~MO913~~	

Idaho National Laboratory

Since June 2005, D&D has been completed on 123 buildings/ structures, for a total footprint reduction of 1.4 million square feet.

<u>Completed projects include:</u>

- Loss of Fluid Test Rector (LOFT) Complex
- Test Area North (TAN) Technical Support Facility (TSF) Complex
- Engineering Test Reactor (ETR)
- Power Burst Facility (PBF) Reactor
- Coal Fired Steam Generating Plant

Loss of Fluid Test Reactor (LOFT)

Idaho National Laboratory – Test Area North (TAN)

Test Area North (TAN) Technical Support Facility (TSF)

TAN-607 Hot Shop during demolition (September 2007)

Idaho National Laboratory – Engineering Test Reactor (ETR)

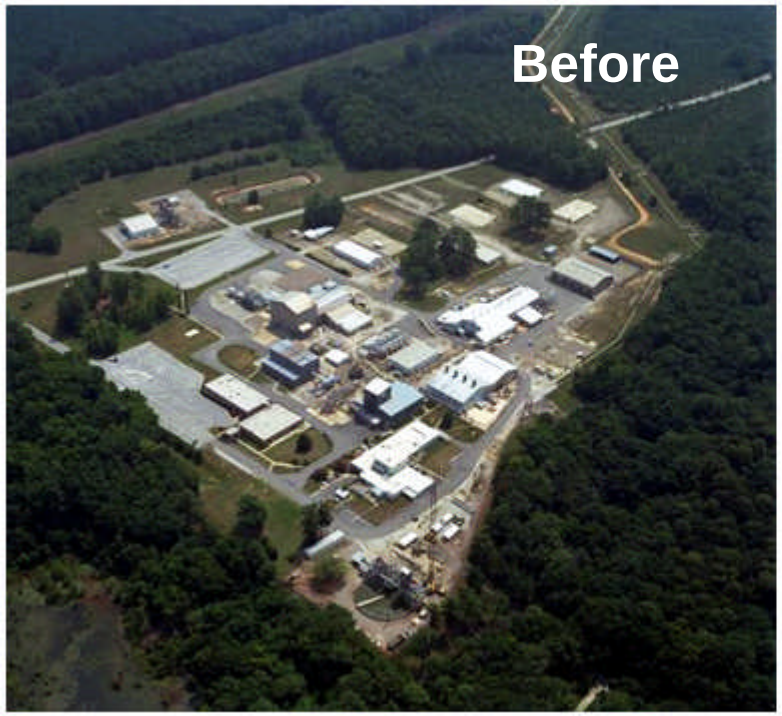
ETR Building Pull-down

Engineering Test Reactor Vessel Rotate

ETR Building Debris Clearing

Engineering Test Reactor Disposed in Idaho CERCLA Disposal Facility (ICDF)

Savannah River Site – T Area Closure



In 2003, SRS signed an agreement with its regulators for an innovative process that integrates soil and groundwater cleanup with D&D activities to close entire areas of the site. In 2006, SRS closed T Area, the first of 14 major areas identified under the Area Completion initiative. This Area Completion resulted in cost savings of more than $37 million and the cleanup was completed two years ahead of schedule. Other Area Completions at M-, P-, R- and D-Areas are presently underway and are expected to yield similar cost savings.

Appendices

A. Top 25 D&D projects budgeted for FY 2009 – 2013

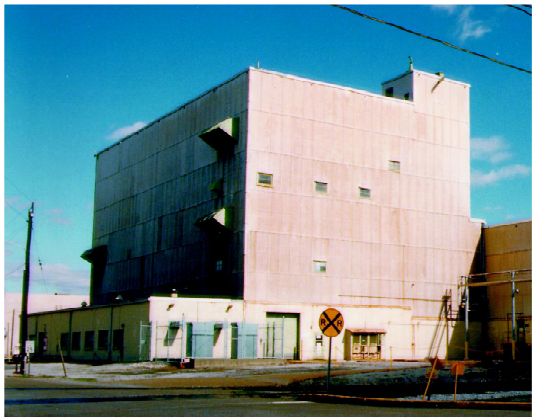
B. Deactivation and Decommissioning Basics

C. D&D project sites and their list of projects

U.S. Department Of Energy

Facility Deactivation & Decommissioning
Appendix A — Top 25 Projects (FY 2009–2013)

2009 Edition



Introduction to Top 25 Projects (FY 2009–2013)

- D&D cost estimates shown in this document are taken from ABBs submitted in 2008. The projects' costs, used here to define and sort project size, reflect only the "progress" dollars for the D&D activities. Surveillance and maintenance costs and progress costs are shown in the graphic cost profiles. These are the top 25 D&D projects with "progress" costs budgeted in FY2013 or before.
- The Top 25 Projects represent 37% of all D&D projects identified by 67 ABBs. Similarly they also represent $11.7 Billion, which is 49% of the total low end of the D&D cost range identified to date.
- Surveillance and maintenance costs are not visible on some ABB Budget and Schedule Profiles because they are either too low for the scale of the graph or are reported as zero.
- Durations are based on the number of years with "progress" dollars budgeted. Some projects with current D&D activity (e.g., SRS F Area) have several years with no D&D activities before resuming D&D later. In these cases the durations will not be equal to the interval between the Start Year and the End Year.
- The level of detail provided for individual "Project Descriptions" pages vary greatly and is consistent with the level of planning accomplished to date. Projects in the out years typically have only general or conceptual levels of available detail that will evolve as additional planning is accomplished.

Top 25 Projects (FY 2009–2013)

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($Million)	Duration (yrs)	Start Year	End year
Paducah Gaseous Diffusion Plant	199	Gaseous Diffusion Plant (GDP)	$3,747	29	2012	2040
Idaho National Laboratory	107	Idaho Nuclear Technology and Engineering Center (INTEC) – Remainder	$1,134	22	2008	2037
Richland Operations Office	331	Plutonium Finishing Plant (PFP) Disposition	$1,097	11	2009	2019
Savannah River Site	60	F Area	$1,046	21	2008	2035
Richland Operations Office	403	Zone 11 (PUREX Zone)	$790	10	2009	2027
West Valley Demonstration Project	319	Nuclear Facilities	$466	11	2008	2018
River Protection	147	Tank Farm	$436	30	2013	2042
Portsmouth Gaseous Diffusion Plant	167	Process Buildings	$424	22	2012	2033
Richland Operations Office	408	Zone 18 (U Plant Zone)	$409	17	2009	2026
Oak Ridge Reservations	274	K-25 Building (ETTP)	$384	5	2008	2012
Richland Operations Office	417	Fast Flux Test Facility (FFTF)	$365	22	2009	2030
Oak Ridge Reservation	284	Central Campus, Isotope Circle and Reactor Facilities	$290	10	2008	2017
Los Alamos National Laboratory	485	DP Site	$146	4	2008	2011
Oak Ridge Reservation	275	K-27 Building (ETTP)	$132	6	2010	2016
Paducah Gaseous Diffusion Plant	200	Inactive Facilities	$122	10	2008	2017
Oak Ridge Reservation	287	Bethel Valley Reactors	$113	9	2008	2016
Richland Operations Office	414	River Corridor Nuclear Facilities	$105	10	2009	2018
Oak Ridge Reservation	273	ETTP Main Plant Area	$95	6	2008	2016
Oak Ridge Reservation	280	Alpha-4 and other EM Facilities	$90	9	2009	2017
Separations Process Research Unit	318	Buildings H2 and G2 and Remediate Ground Water Contamination source	$79	4	2008	2012
Los Alamos National Laboratory	486	TA-54	$52	8	2008	2015
Oak Ridge Reservation	288	Centrifuge Facilities (ETTP)	$43	9	2008	2016
Brookhaven National Laboratory	502	Brookhaven Graphite Research Reactor (BGRR)	$42	3	2008	2010
Richland Operations Office	335	Hanford RL K East & West Reactor Basins	$40	2	2009	2010
Idaho National Laboratory	109	Reactor Technology Complex (RTC)/ Power Burst Facility (PBF)	$35	5	2008	2012

= **Top 25 Project (FY 2009-2013)**

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Paducah Gaseous Diffusion Plant

Project Summary Table

Location Description:	
Site/Area Description	Paducah / Gaseous Diffusion Plant Buildings
EM Field Office	Portsmouth-Paducah Project Office
Facility Description:	
Major Facility Type	DOE Hazard Category 2
No. Buildings	Four major
Gross Total Building Square Feet	Over 3.2 million
Construction	Steel
Current Facility State	Active uranium enrichment plant, GDP planning underway.
Brief Background	The plant was opened in 1952 to produce highly enriched uranium to fuel military reactors and produce nuclear weapons.
Source Term	Uranium
Project Description:	
Gross Estimated Cost	$3.75 Billion
Projected End-State	Demolition, brownfield for industrial reuse
Project Start and End Dates	2012 – 2040
Contractor	Paducah Remediation Services, LLC
Identifiers	ABB – 199; PBS PA-0040

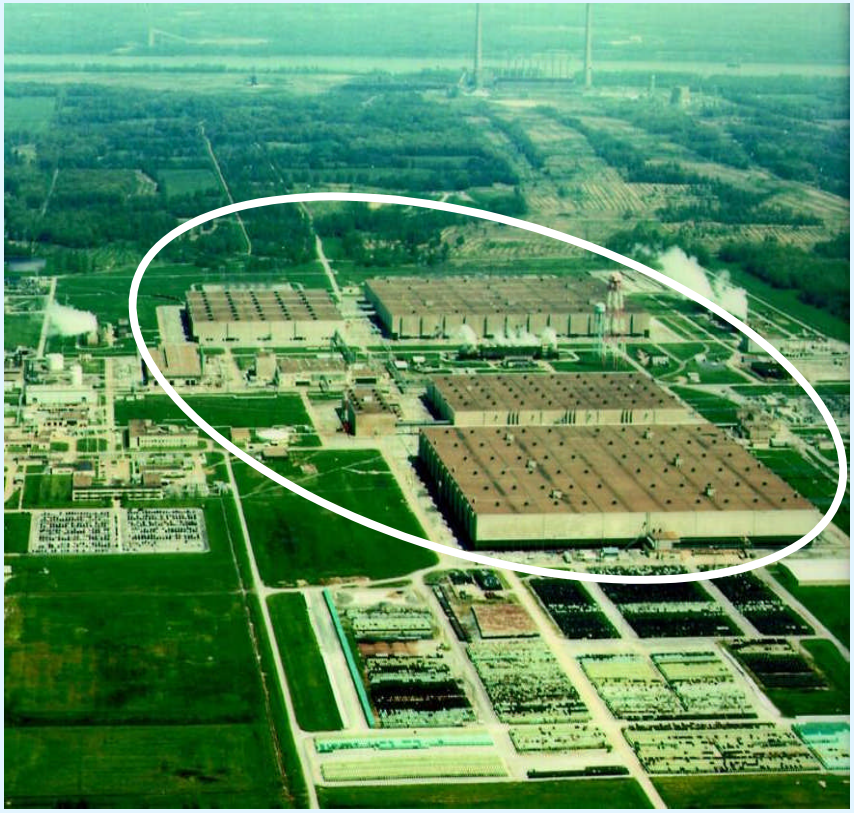
Paducah Gaseous Diffusion Plant

Facility Background

Paducah's Gaseous Diffusion Plant has been operated by United States Enrichment Corp (USEC) since the creation of USEC. It is the only operating uranium enrichment facility in the United States. Uranium enrichment began in the early 1940s at the nation's first gaseous diffusion plant, K-25, at Oak Ridge, Tennessee. In December 1950, the Paducah site (the location of the former Kentucky Ordnance Works) was chosen from a short list of eight locations for construction of a new gaseous diffusion plant.

The current ~3500 acre plant site encompasses 419 facilities, of which four are large process buildings that cover approximately 72.5 acres.

Completion of plant construction with the first production cells going on line occurred in September 1952. The first enriched uranium product withdrawals were made in November 1952 and the first 2.5-ton product cylinders with partially enriched uranium were shipped to Oak Ridge. In the 1960s, the Paducah plant's mission changed from enriching uranium for nuclear weapons to one focused on producing fuel for commercial nuclear power plants. Until recently, Paducah and its sister plant located near Portsmouth, Ohio, worked together to enrich uranium for use in nuclear power plants. In May 2001, USEC consolidated its enrichment operations at Paducah. The following year, transfer and shipping operations were also consolidated at Paducah.



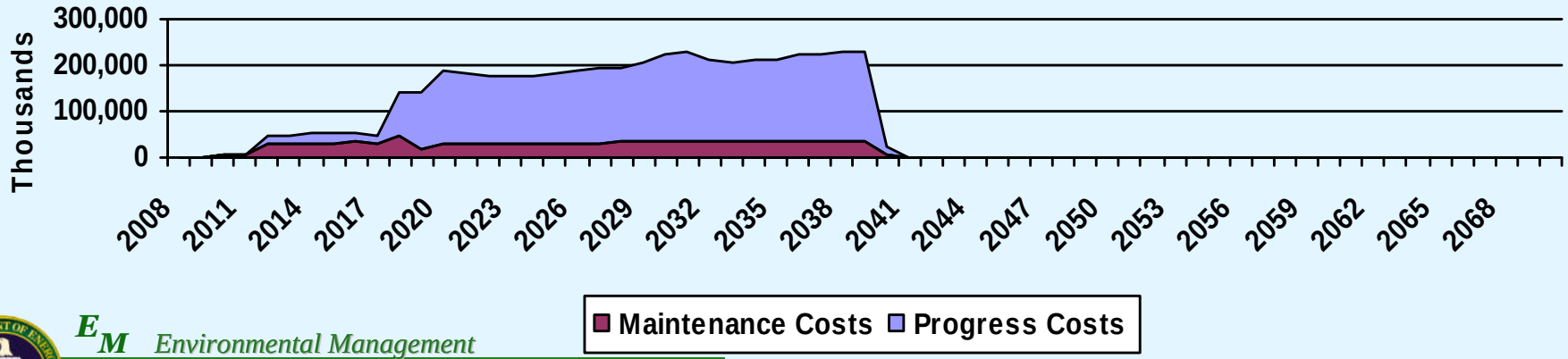
Paducah Gaseous Diffusion Plant

Project Discussion

The primary objectives of the Remediation contract are to remediate and disposition sites; perform facility D&D; and operate the site waste storage facilities to include waste disposition. D&D includes 1,760 enrichment stages and ~400 miles of process piping. Major site projects include:

- Groundwater Remediation – ~2,010 acres of dissolved phase contaminated groundwater.
- Surface Water Remediation – Includes remediation of sediments in on- and off-site ditches, creeks, and storm sewers.
- Burial Grounds Remediation – Includes remediation of ~72.6 acres of buried waste.
- Soils Remediation – ~ 93,000 cubic yards of soil.
- Waste Disposition – ~ 3.7 million cubic yards of soil and building debris anticipated through D&D.

ABB - 199 Cost and Schedule Profiles



INL INTEC - Remainder

Project Summary Table

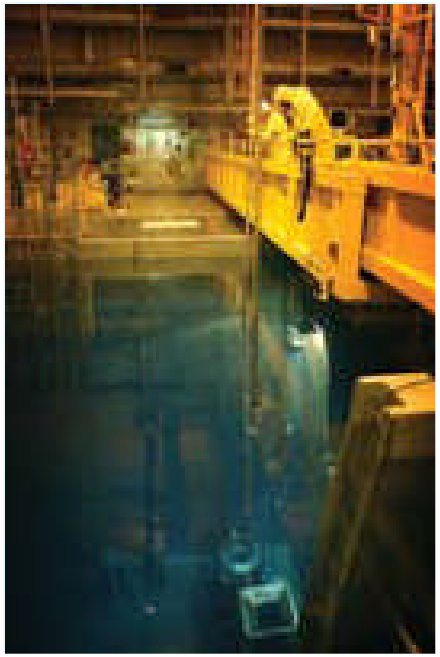
Location Description:	
Site/Area Description	Idaho National Laboratory / Idaho Nuclear Technology and Engineering Center
EM Field Office	Idaho
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	109
Gross Total Building Square Feet	1.2 million
Construction	Steel and concrete
Current Facility State	Obsolete processing and support facilities in the stabilization or deactivation phase.
Brief Background	Established in the 1950s to recover usable uranium in spent fuel from government reactors. Shutdown in 1992.
Source Term	Various
Project Description:	
Gross Estimated Cost	$1.13 Billion
Projected End-State	Demolition with some other disposition
Project Start and End Dates	2008–2037
Contractor	CH2M-WG Idaho, LLC
Identifiers	ABB – 107; PBS ID-0040B/C

INL INTEC - Remainder

Facility Background

The Idaho Chemical Processing Plant was established in the 1950s to recover usable uranium in spent fuel from government reactors. In addition, an innovative high-level liquid waste treatment process known as calcining was developed at the plant. Calcination reduced the volume of liquid radioactive waste generated during reprocessing and placed it in a more-stable granular solid form. The facility underwent an ambitious modernization during the 1980s, when safer, cleaner, and more efficient structures were built to replace most major facilities. In 1992, the Department of Energy announced that the changing world political situation and the lack of demand for highly enriched uranium made reprocessing no longer necessary. In 1998, the plant was renamed the Idaho Nuclear Technology and Engineering Center. Today, the more than 800 workers at INTEC have turned their focus to cleanup and protection of the Snake River Plain Aquifer.

INL INTEC - Remainder

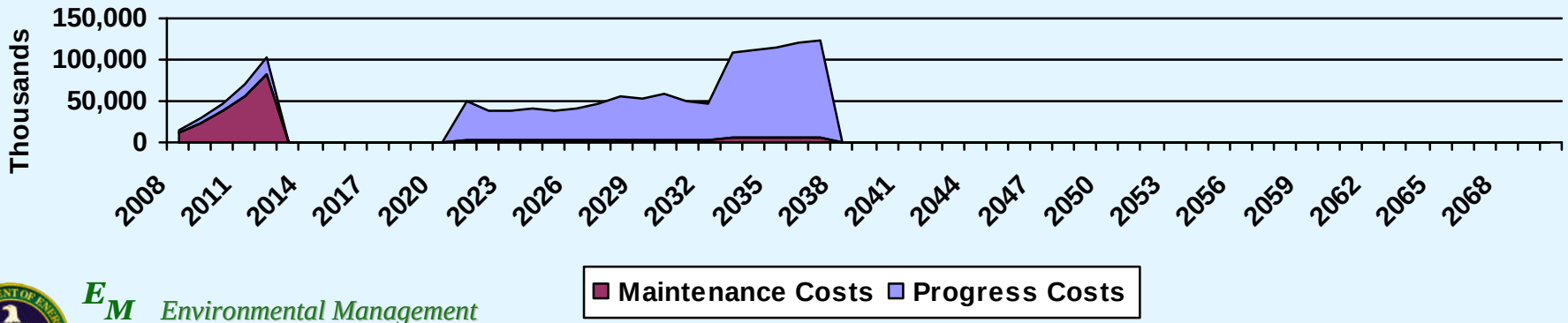


Project Discussion

Deactivation and decommissioning (D&D) activities at INTEC involve demolition of excess facilities—including demolition of two high-risk facilities, the 603 and 603A basins—and making three other high-risk facilities, the Chemical Processing Plant-601/627/640 Fuel Reprocessing Complex, ready for demolition. Spent fuel transfers are about 65% complete as of 2008.

- Remove excess nuclear material
- Close radioactive and hazardous waste tanks
- Treat liquid radioactive waste and ship offsite
- Transfer spent nuclear fuel from wet to dry storage
- Remediate SNF basin; treat and dispose of waste
- Remediate contaminated environmental sites
- Demolish facilities

ABB-107: INL INTEC - Remainder D&D Cost and Schedule Profiles



Hanford RL Plutonium Finishing Plant

Project Summary Table

Location Description:	
Site/Area Description	Hanford – 200 West Area
EM Field Office	Richland
Facility Description:	
Major Facility Type	Nuclear processing
No. Buildings	Approximately 43, Major building is PFP-234-5Z
Gross Total Building Square Feet	302,000
Construction	Steel frame and siding with concrete cell walls
Current Facility State	Stabilization and deactivation is in progress; SNM transfer to SRS is also in progress
Brief Background	Constructed in 1950 and used for plutonium processing.
Source Term	Pu
Project Description:	
Gross Estimated Cost	$1.1 Billion
Projected End-State	Slab on grade.
Project Start and End Dates	2009 – 2019
Contractor	CH2M-Hill Plateau Remediation Corp.
Identifiers	ABB – 331; PBS RL-0011

Hanford RL Plutonium Finishing Plant

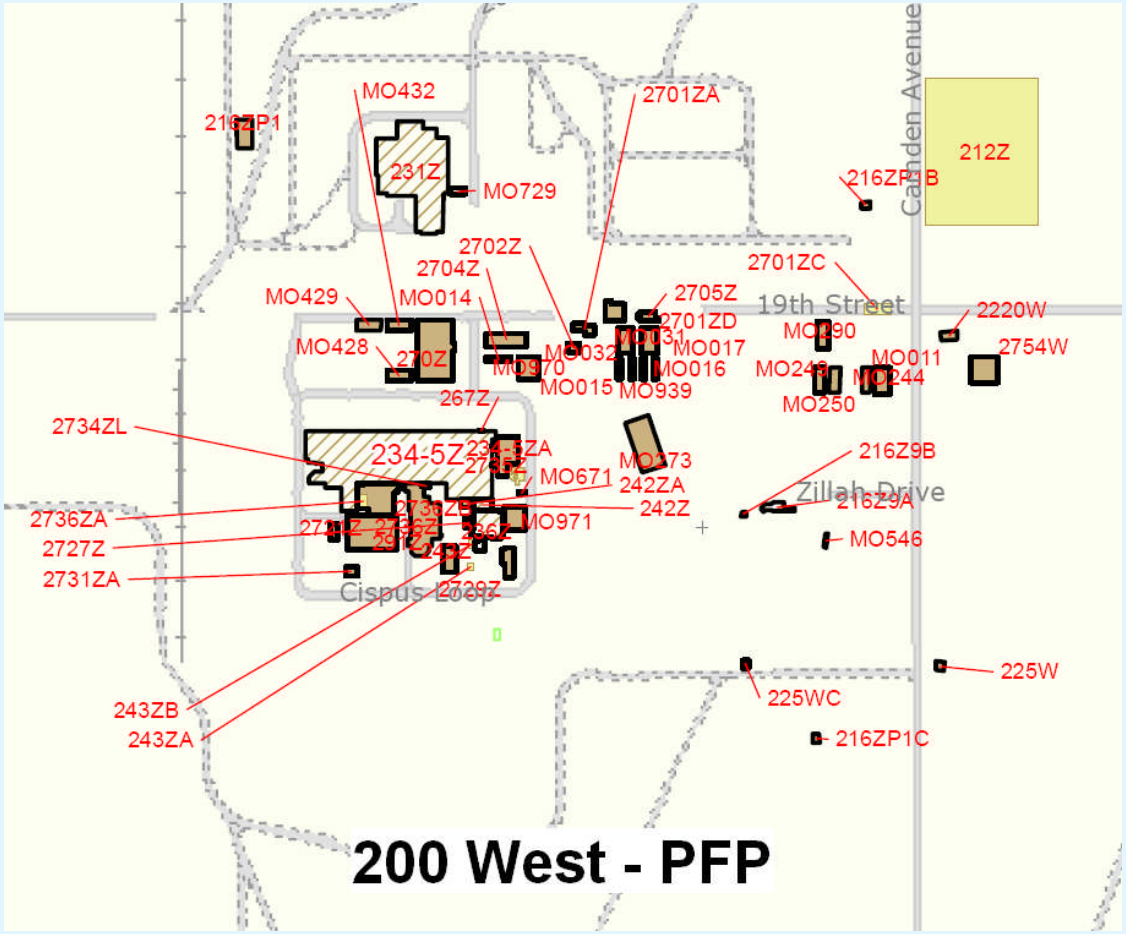
Facility Background

From 1949 to 1989, PFP processed plutonium nitrate solutions into a solid form for shipment to the nation's weapons production facilities. PFP produced more plutonium metal buttons than any other American facility.

Many of the defense nuclear material production lines were shut down with material still in various stages of the production process. This left Hanford with a sizeable inventory of plutonium materials in various forms.

In March 2004 the stabilization and packaging of PFP's inventory of nearly 18 metric tons of plutonium-bearing materials was completed. This material is in the process of being relocated to Savannah River.

There are 63 major buildings and ancillary facilities in the PFP complex. The major process facilities include the 234-5Z Processing Facility, the 236-Z Plutonium Reclamation Facility, and the 242-Z Americium Recovery Facility.



Hanford RL Plutonium Finishing Plant

Project Discussion

The main production areas of PFP have been undergoing stabilization and deactivation activities while maintaining a secure zone for the stored special nuclear materials waiting for transfer. Ancillary buildings and structures no longer critical to present activities are undergoing D&D. Extensive plutonium-processing glovebox removal is in process.

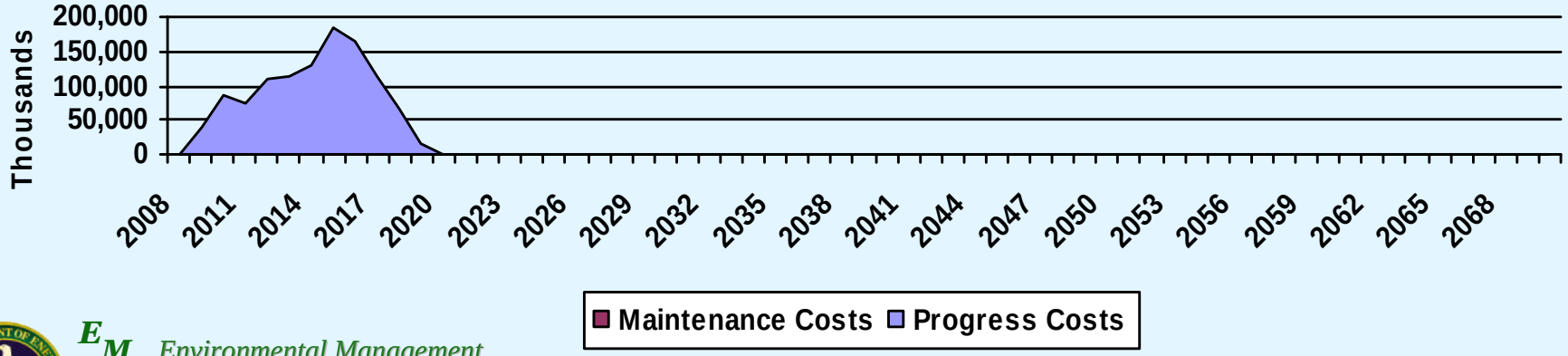
To date 19 of 63 buildings that existed in the PFP Complex have been cleaned out and demolished including removal of the 241-Z Waste Treatment/Storage Tank Facility and the 232-Z Waste Incinerator Building. Nearly 100 gloveboxes have been decontaminated and removed.

Upon removal of the SNM from the facility, security and safeguards requirements will be reduced or eliminated. This will allow uncleared D&D workers to access the facility and work efficiently.

The project costs shown are for the D&D portion of the work only. Plutonium disposition costs are included in another ABB.

Plutonium Finishing Plant

ABB - 331 Cost and Schedule profiles

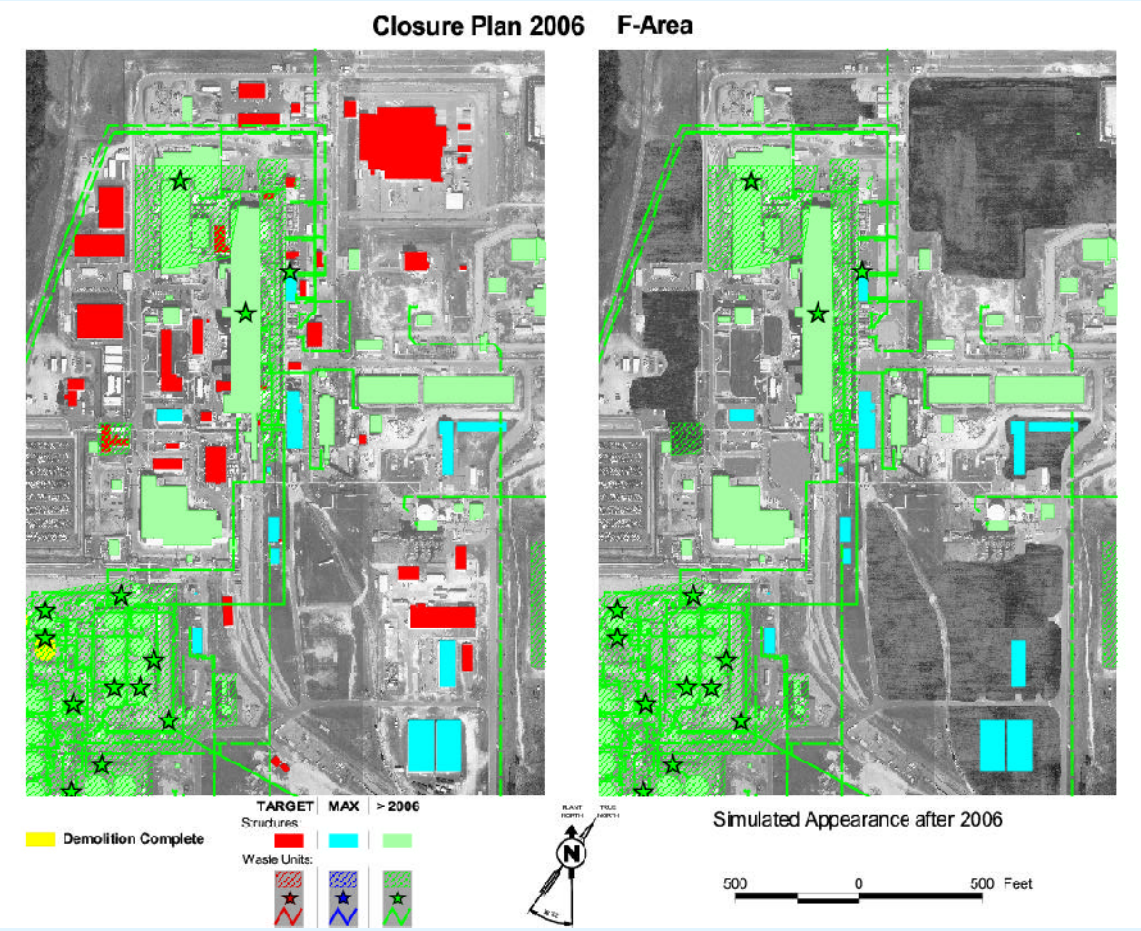


SRS F-Area, Process Canyon Facility

Project Summary Table

Location Description:	
Site/Area Description	Savannah River Site / F-Area
EM Field Office	Savannah River
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	90 Facilities include the F-Canyon Building, Depleted Uranium (DU) Processing Facility, FB-Line Facility, Metallurgical Facilities, Central Analytical Laboratory, the Mockup/Fabrication Facility, and the F-Area Tank Farm buildings.
Gross Total Building Square Feet	243,200
Construction	Concrete canyon and other
Current Facility State	Canyon operations have been shutdown. Facility is being used for repackaging TRU waste.
Brief Background	F Area primary function was to stabilize special nuclear material (SNM) from spent fuels, irradiated targets, and other legacy nuclear materials and to evaporate and store the liquid radioactive waste generated by these operations.
Source Term	Various
Project Description:	
Gross Estimated Cost	$1.05 Billion
Projected End-State	Demolition and In Situ Decommissioning (entombment) candidate
Project Start and End Dates	2008 – 2035
Contractor	Savannah River Nuclear Solutions
Identifiers	ABB – 60; PBS SR-0040

SRS F-Area, Process Canyon Facility



Facility Background

F Area is located in the center of the site and is 6.6 miles from A Area. F-Area waste units are located in the Fourmile Branch and Upper Three Runs Watersheds. The area primarily comprises heavy nuclear, industrial, warehouse, and administrative facilities. The current land use for F Area is site industrial.

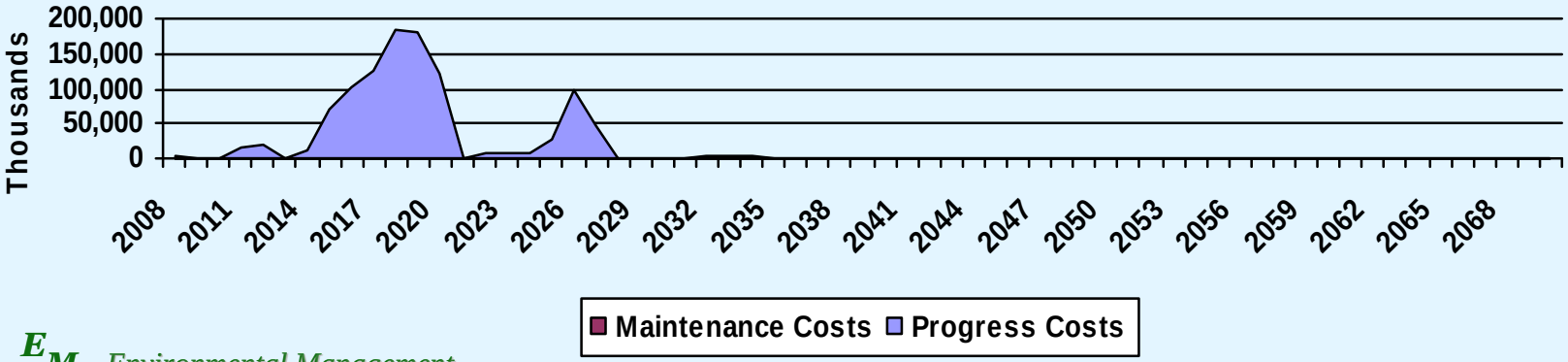
F Area facilities include the F-Canyon Building, Depleted Uranium (DU) Processing Facility, FB-Line Facility, Metallurgical Facilities, Naval Fuels Building (now demolished), Central Analytical Laboratory, the Mockup / Fabrication Facility, and the F-Area Tank Farm. F Area is one of the two areas located near the center of SRS where nuclear chemical separations and waste management operations are performed. The primary function of these facilities was to stabilize special nuclear material (SNM) from spent fuels, irradiated targets, and other legacy nuclear materials and to evaporate and store the liquid radioactive waste generated by these operations.

SRS F-Area, Process Canyon Facility

Project Discussion

F Canyon deactivation was completed in 1997 and will be decommissioned by In-Situ Decommissioning (ISD). FB Line, ancillary facilities, and administrative facilities in F Area will be demolished or made available for reuse by another DOE or federal program, unless needed for historic preservation or economic development. All liquid radioactive waste tanks in the tank farms will be closed (emptied and filled with grout). In addition, the 1F and 2F Evaporators and contaminated waste transfer systems will be closed by isolating utilities and filling with grout. All above-ground buildings or structures will be demolished, and a perimeter fence will secure any remaining F Area facilities.

ABB - 60 Cost and Schedule profiles



Hanford RL (Zone 11) PUREX Zone

Project Summary Table

Location Description:	
Site/Area Description	Hanford – 200 East Area
EM Field Office	Richland
Facility Description:	
Major Facility Type	Nuclear (Process Canyon Facility)
No. Buildings	1 Canyon structure, approximately 101 waste sites, approximately 119 structures
Gross Total Building Square Feet	319,000
Construction	Concrete Shear Walls
Current Facility State	PUREX is under surveillance and maintenance with the ventilation system operational. The PUREX storage tunnels have been deactivated and sealed. Tank farm facilities with the PUREX Zone remain to be deactivated.
Brief Background	The Plutonium Uranium Extraction Facility (PUREX) was constructed from 1953 to 1955 as the third generation of chemical separations plants. The facility was used for process operations until 1990. Shutdown ordered 12/22/1992 & deactivation complete 2/30/1995.
Source Term	TRU waste
Project Description:	
Gross Estimated Cost	$790 Million (anticipated to be less when updated in 2010)
Projected End-State	TBD, In Situ Decommissioning candidate
Project Start and End Dates	2009 – 2027, preliminary D&D starts in 2009, canyon D&D starts in 2022
Contractor	CH2MHill Plateau Remediation Corp.
Identifiers	ABB – 403; PBS RL-0040

Hanford RL (Zone 11) PUREX Zone

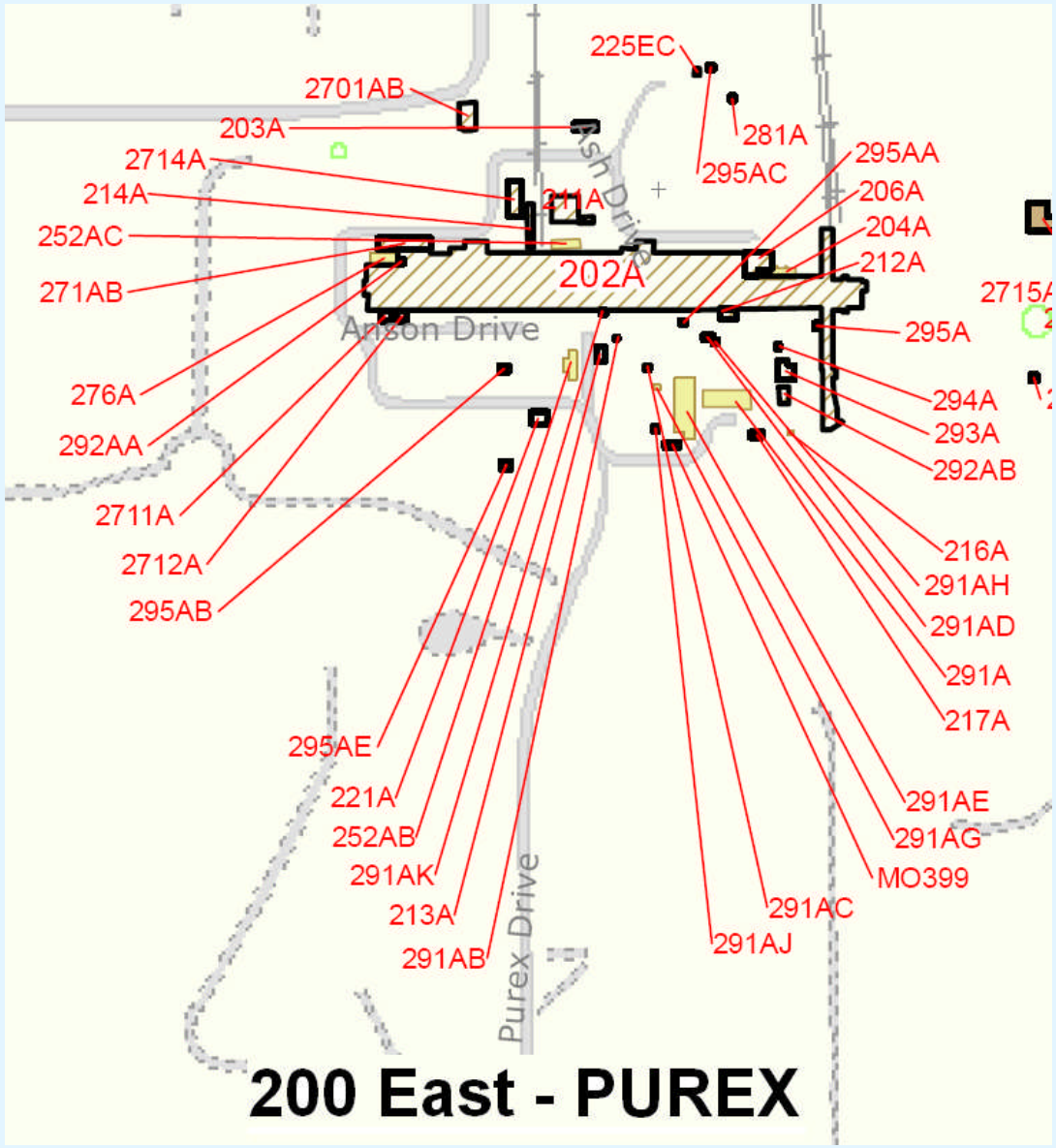
Facility Background

The Plutonium/Uranium Extraction (PUREX) facility was constructed from 1953 to 1955 as the third generation of chemical separations plants, or "canyon" facilities, to support plutonium production. PUREX was Hanford's largest chemical processing or separations facility and operated between 1956-72 and between 1983-88.

PUREX is as long as three-and-one-third football fields; 64 feet of height is above ground with another 40 feet below ground with concrete walls up to six feet thick which shielded workers from radiation. The PUREX Plant contains 33 miles of piping.

Deactivation of the facilities associated with the PUREX complex was completed in 1997.

In mid-1990s PUREX was used for developing the facility transition & deactivation model, defining end-point criteria and establishing the process of removing hazards or unstable conditions, shutting down active systems, removing all conditions within the facility requiring personnel and monitoring. This allowed the building to be stored at a low-cost, "cold-dark," inactive state for future D&D planning while more urgent hazards were remediated. This deactivation model has been repeated in other facilities across the complex.



Hanford RL (Zone 11) PUREX Zone

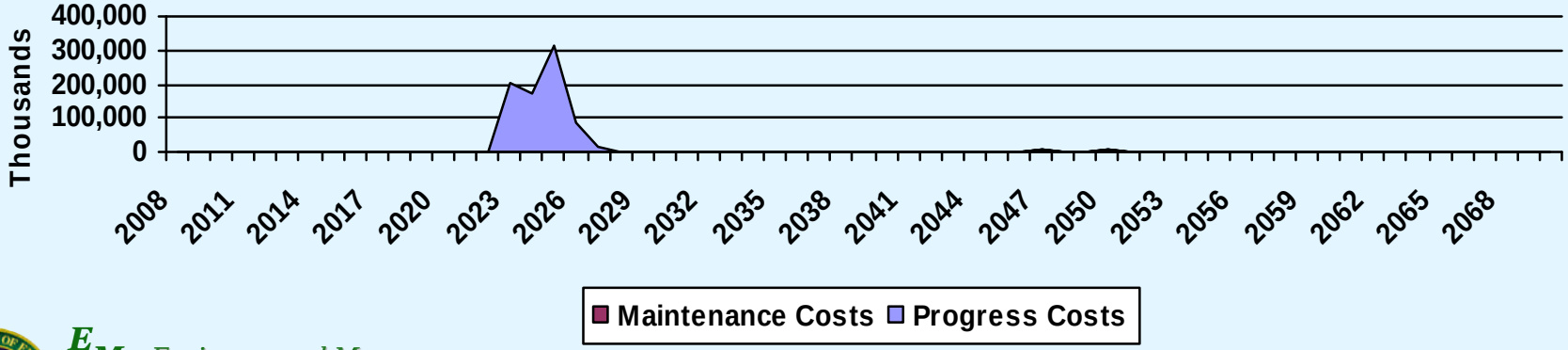
Plutonium-Uranium Extraction Plant deactivation was completed in 1997

Project Description

Surveillance and Maintenance is the only activity being performed at PUREX.

PUREX D&D is scheduled to start in 2023. It is a candidate for in-situ decommissioning, a concept that will entomb the robust portions of the facility. Entombment will be similar in approach to that planned for the U Plant, another canyon facility at Hanford. However, PUREX will be considerably more complex because of its greater size, residual transuranic contamination, greater internal gamma radioactivity, and the past use of railroad tunnels on one end of the facility for storage of highly radioactive items in railroad cars that are humanly unapproachable. The end state of the facility is unknown at this time. Once agreement on the end state is achieved, D&D planning and estimating can be initiated.

ABB - 403 Cost and Schedule profiles



West Valley Fuel Reprocessing Facility

Project Summary Table

Location Description:	
Site/Area Description	West Valley Demonstration Project
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	39
Gross Total Building Square Feet	Approximately 400,000
Construction	Concrete Hot Cell Shield Walls
Current Facility State	Obsolete & vacant nuclear processing facility. D&D in progress.
Brief Background	Spent fuel reprocessing facility, four-story, heavily-shielded reinforced concrete structure. A number of "cells" have been decontaminated .
Source Term	strontium-90, tritium, cesium-137, radium-226, and plutonium-238
Project Description:	
Gross Estimated Cost	$466 Million
Projected End-State	Demolish, Brownfield
Project Start and End Dates	2008 – 2018
Contractor	URS Washington Division; West Valley Environmental Services
Identifiers	ABB – 319; PBS OH-WV-0040

West Valley Fuel Reprocessing Facility

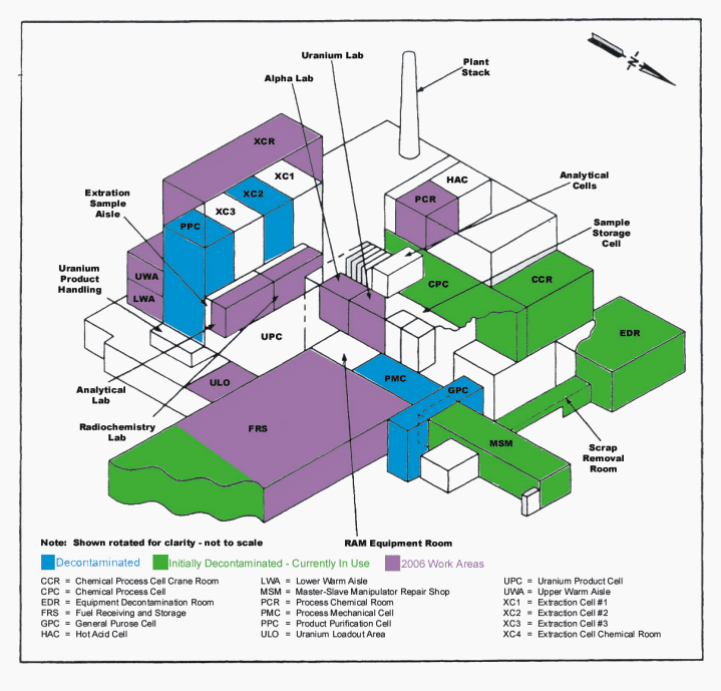
Facility Background

Located about 40 miles south of Buffalo, NY, the WVDP occupies the site of the only commercial nuclear fuel reprocessing facility to have operated in the United States. During commercial operations of the site in the late sixties and early seventies, approximately 640 metric tons of spent nuclear fuel was reprocessed. Reprocessing operations were halted between 1972 and 1976 to support facility modifications, but operations never resumed. When DOE became responsible for the site in 1980, approximately 600,000 gallons of liquid high level waste (HLW) were stored in two single shelled, carbon steel underground tanks. Since then, DOE has performed waste disposition, decontamination, deactivation, and disposition of facilities, and infrastructure/landlord activities. To date, the site has solidified over 600,000 gallons of HLW into 275 canisters and shipped over 1,000,000 cubic feet of low level waste (LLW).

The West Valley Demonstration Project is a unique operation within the Department of Energy. It came into being through the West Valley Demonstration Project Act of 1980. The Act requires that the Department be responsible for solidifying the high-level waste, disposing of waste created by the solidification, and decommissioning the facilities used in the process. The land and facilities are not owned by the Department. Rather, the project premises are the property of the New York State Energy Research and Development Authority (NYSERDA) and represents only 200 acres of the larger Western New York Service Center, which is approximately 3,300 acres, also owned by NYSERDA. After DOE's responsibilities under the Act are complete, the Act requires that the premises be returned to New York State. Until that time, the Act requires New York State to pay 10 percent of the Project costs, and the Department pays the remaining 90 percent.

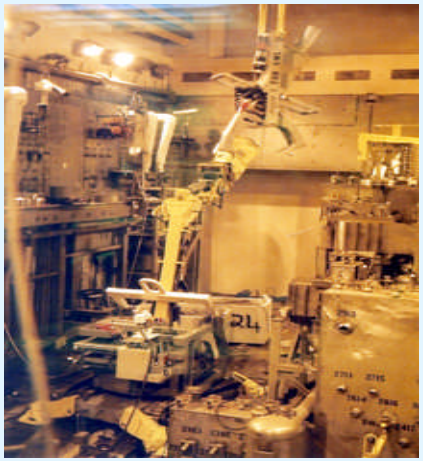
West Valley Fuel Reprocessing Facility

Project Discussion



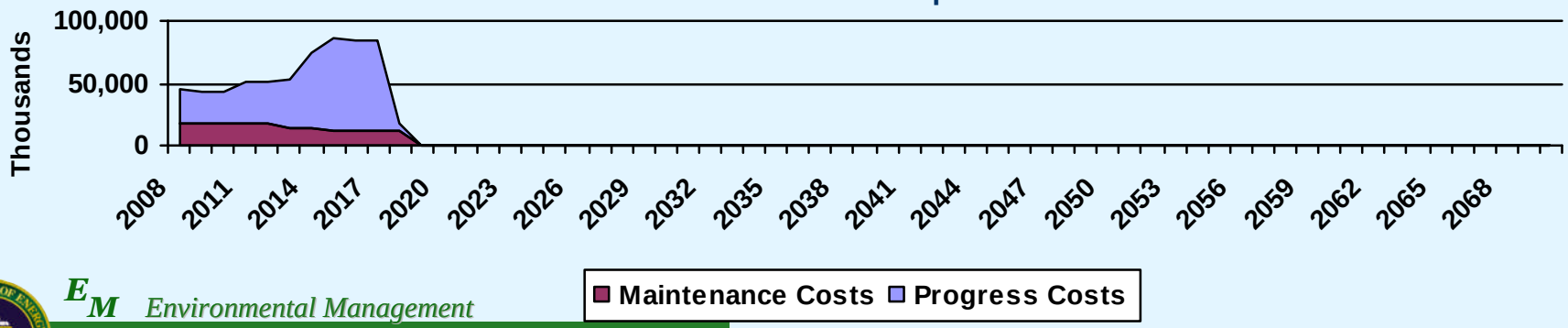
WVDP is moving forward with facility decontamination, and eventual decommissioning, as required by the WVDP Act.

Until DOE completes its evaluation and analysis of various closure alternatives in the Decommissioning Environmental Impact Statement and issues a Decommissioning Record of Decision, DOE plans to proceed toward Interim End State completion in FY 2012. The West Valley Demonstration Project Interim End State includes D&D of all DOE-managed facilities (foundations remain), with the exception of the former spent nuclear fuel reprocessing facility and any other support facilities required for the interim storage of the high-level waste canisters, the RH Waste Processing Facility; and the Vitrification Facility.



A primary focus for the project has been the decontamination of areas within the Mail Plant, specifically the Process Mechanical Cell, the General Purpose Cell, and Extraction Cell-2.

ABB - 319 Cost and Schedule profiles



Hanford Tank Farm

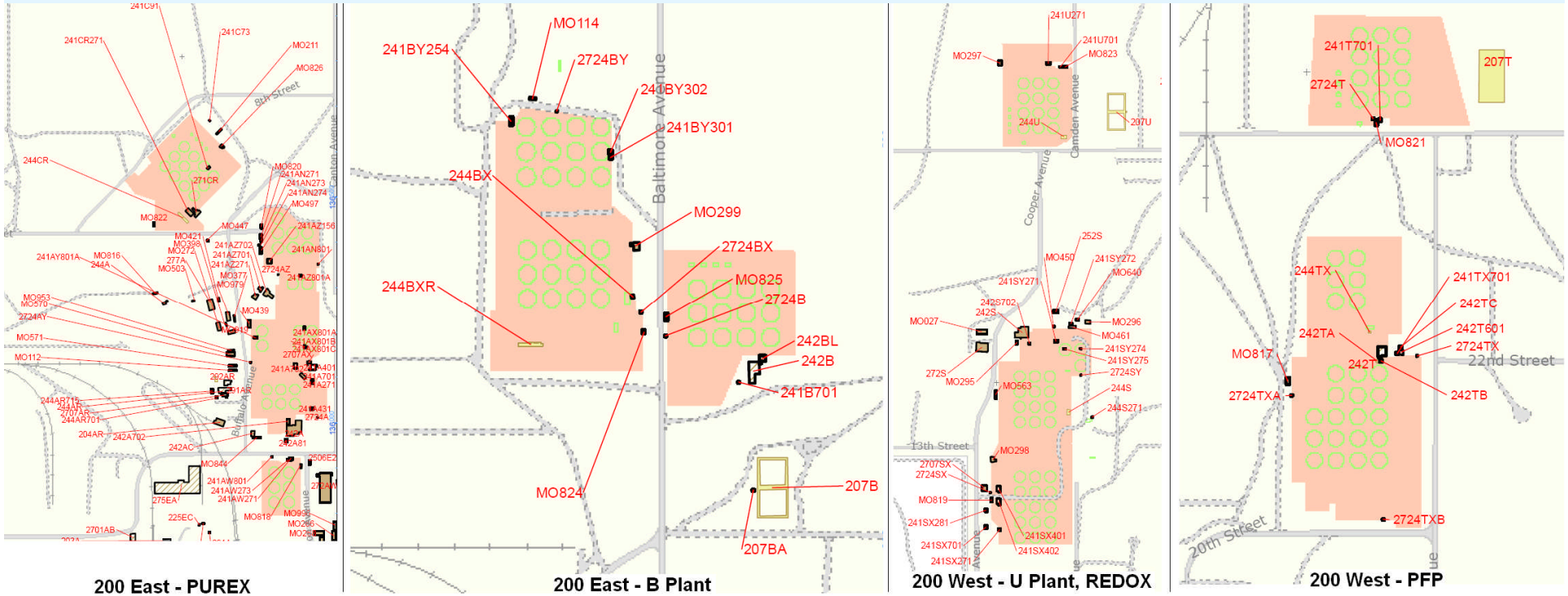
Project Summary Table

Location Description:	
Site/Area Description	Hanford / Tank Farms - 200 East and 200 West
EM Field Office	River Protection
Facility Description:	
Major Facility Type	Liquid Waste Underground tank farms support buildings
No. Buildings	443 structures, including underground tanks; approximately 260 buildings
Gross Total Building Square Feet	780,170
Construction	Steel, cement block, concrete
Current Facility State	Buildings are presently supporting waste transfer operations
Brief Background	Tank farms contain single shell tanks with highly radioactive liquid process waste; facilities support the transfer of waste to double shell tanks.
Source Term	Transuranic by-products from plutonium extraction process
Project Description:	
Gross Estimated Cost	$436 Million
Projected End-State	Tanks will be left in place, grouted and capped
Project Start and End Dates	2013 – 2042
Contractor	Washington River Protection Solutions
Identifiers	ABB – 147; PBS RP-0040

Hanford Tank Farm

Facility Background

The Office of River Protection (ORP) focus is the continued safe operations and maintenance of the Tank Farms that hold millions of gallons of liquid waste. Liquid radioactive waste is being transferred from single shell tanks to newer, safer double shell tanks as construction continues on the waste vitrification plant that will process this waste. As the tank farms are emptied the support facilities can be D&D. There are 177 underground storage tanks, 149 of which are single-shells, 28 are double-shells, and approximately 47 are know leakers.

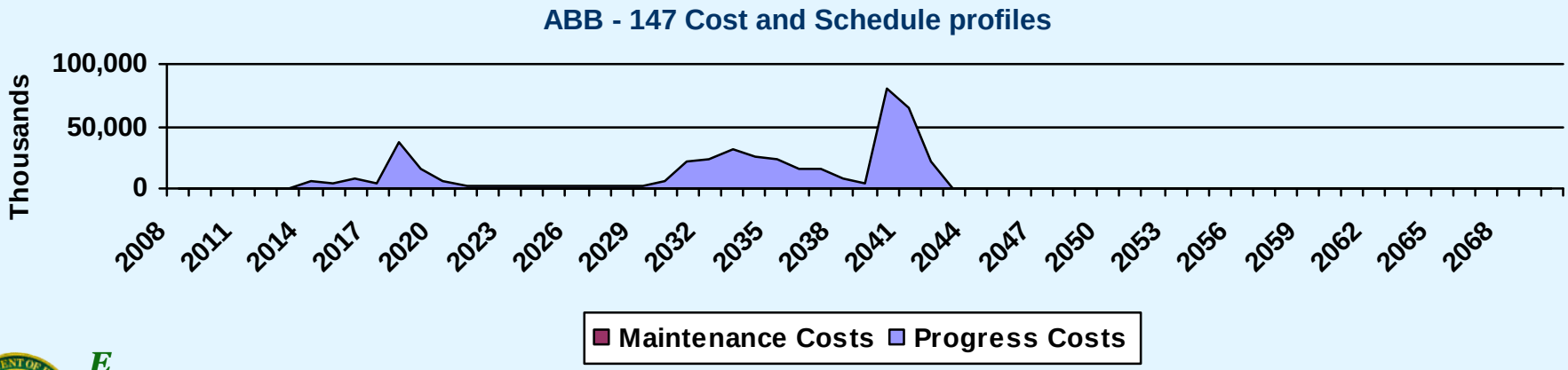


Tank Farms by Adjacent Facilities

Hanford Tank Farm

Project Discussion

The objective of the River Protection Project is retrieving, treating, and disposing of 54 million gallons of tank waste and closing hundreds of underground storage tanks. As the tanks are emptied the support facilities and structures around the tanks will undergo D&D, to clear the way for the waste tank disposition.



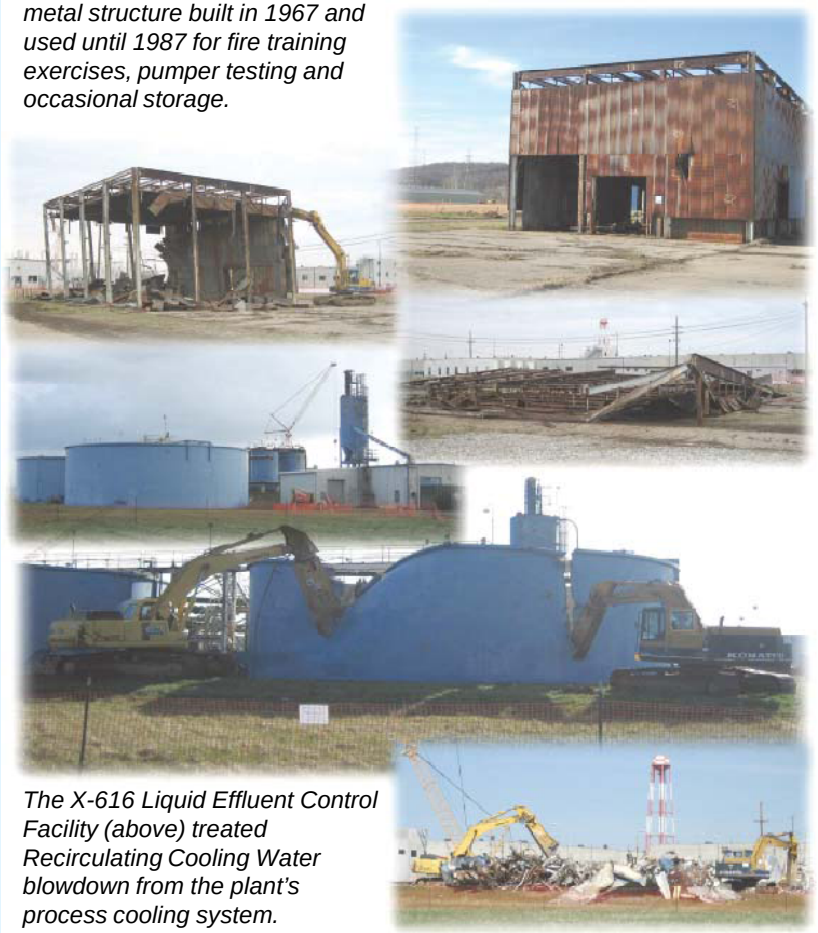
Portsmouth Process Buildings

Project Summary Table

Location Description:	
Site/Area Description	Portsmouth
EM Field Office	Portsmouth-Paducah Project Office
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	Multiple, including three major: X326, X330, X333
Gross Total Building Square Feet	Over 10 Million
Construction	Steel
Current Facility State	D&D in progress for miscellaneous surplus support facilities. Waiting for decision to proceed on GDP buildings.
Brief Background	The plant was opened in 1952 as part of a U.S. government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons.
Source Term	Uranium; highly enriched up to 90%
Project Description:	
Gross Estimated Cost	$424 Million
Projected End-State	Demolition; DOE controlled brownfield; Onsite disposal facility
Project Start and End Dates	2012 – 2033
Contractor	LATA/Parallax Portsmouth, LLC
Identifiers	ABB – 167; PBS PO-0040

Portsmouth Process Buildings

The X-106B Old Fire Training building (right and below) was a 2,400 square foot corrugated metal structure built in 1967 and used until 1987 for fire training exercises, pumper testing and occasional storage.



The X-616 Liquid Effluent Control Facility (above) treated Recirculating Cooling Water blowdown from the plant's process cooling system.

Facility Background

The Portsmouth Gaseous Diffusion Plant in Piketon, Ohio, was operated by the United States Enrichment Corporation, a subsidiary of USEC Inc. The plant had a long history of enriching uranium for defense and commercial nuclear power needs.

Uranium enrichment began in the early 1940s as a U.S. defense initiative to produce fissionable material for the atomic bomb, initially at the nation's first gaseous diffusion plant, K-25, at Oak Ridge, Tennessee. In 1952, the AEC selected a tract of land in the Ohio Valley along the Scioto River in Pike County for the site of the Portsmouth gaseous diffusion plant. In March 1956, the plant was completed at a cost of $750 million. Construction required 69 million man-hours, more than 68,000 drawings and as many as 22,500 construction workers at its peak in the summer of 1954. More than 1,200 acres were cleared and more than 4.5 million cubic yards of earth were moved. The current 3,800 acre plant site encompasses 415 facilities including buildings, utilities, systems, ponds, and infrastructure units. Three of the buildings are large process buildings about a mile in length.

In the 1960s, the Portsmouth plant's mission changed from enriching uranium for nuclear weapons to producing fuel for commercial nuclear power plants. Until 2001, Portsmouth and its sister plant in Paducah, Kentucky, worked in tandem to enrich uranium for use in nuclear power plants.

Portsmouth Process Buildings

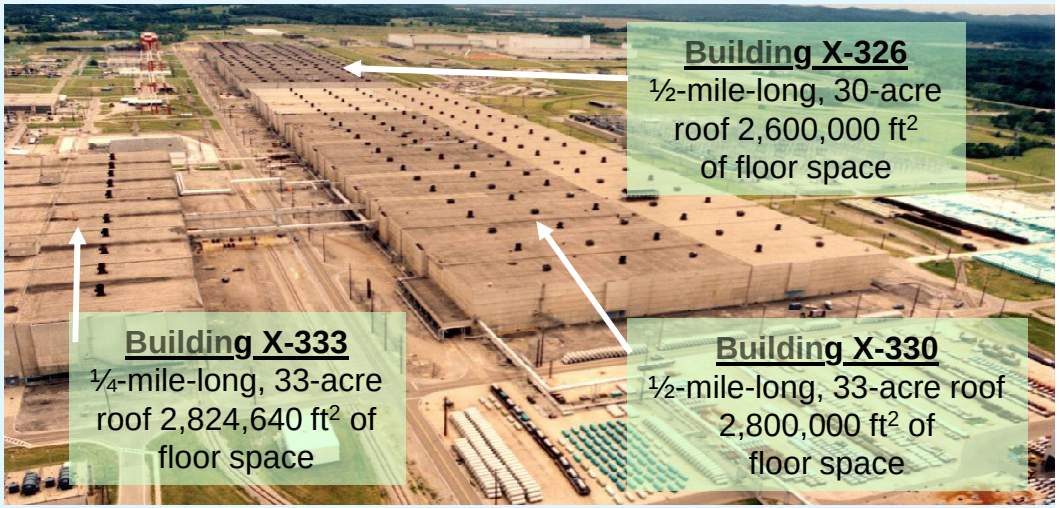
Project Discussion

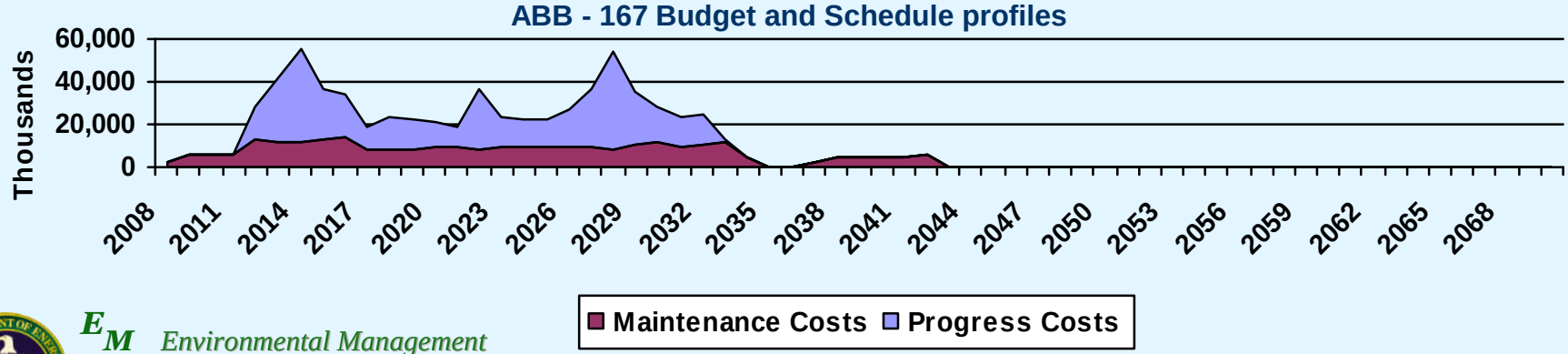
By 2006, the initial D&D at Portsmouth has completed 16 support buildings and cleaned out the contents of the Gas Centrifuge Enrichment Plant buildings. It included cleanout of waste and centrifuge equipment in two process buildings, relocation of office space for waste management operations, maintenance, storage and training, and project management. 1,383 old centrifuge casings were removed from the facilities.

Deactivation and cold shutdown was completed in 2008.

The scope of the pending D&D contract award includes 133 buildings (with approximately 10 million square feet of floor space) including two of the three GDP process buildings; the X-333 process building is comprised of 8 operating units and the X-330 process building is comprised of 11 operating units. The scope also includes ancillary facilities, cooling towers, a switchyard, warehouses, and environmental remediation of Solid Waste Management.

The extent and complexity of D&D is illustrated by 1,700 stages with over 1,500 miles of tubing.



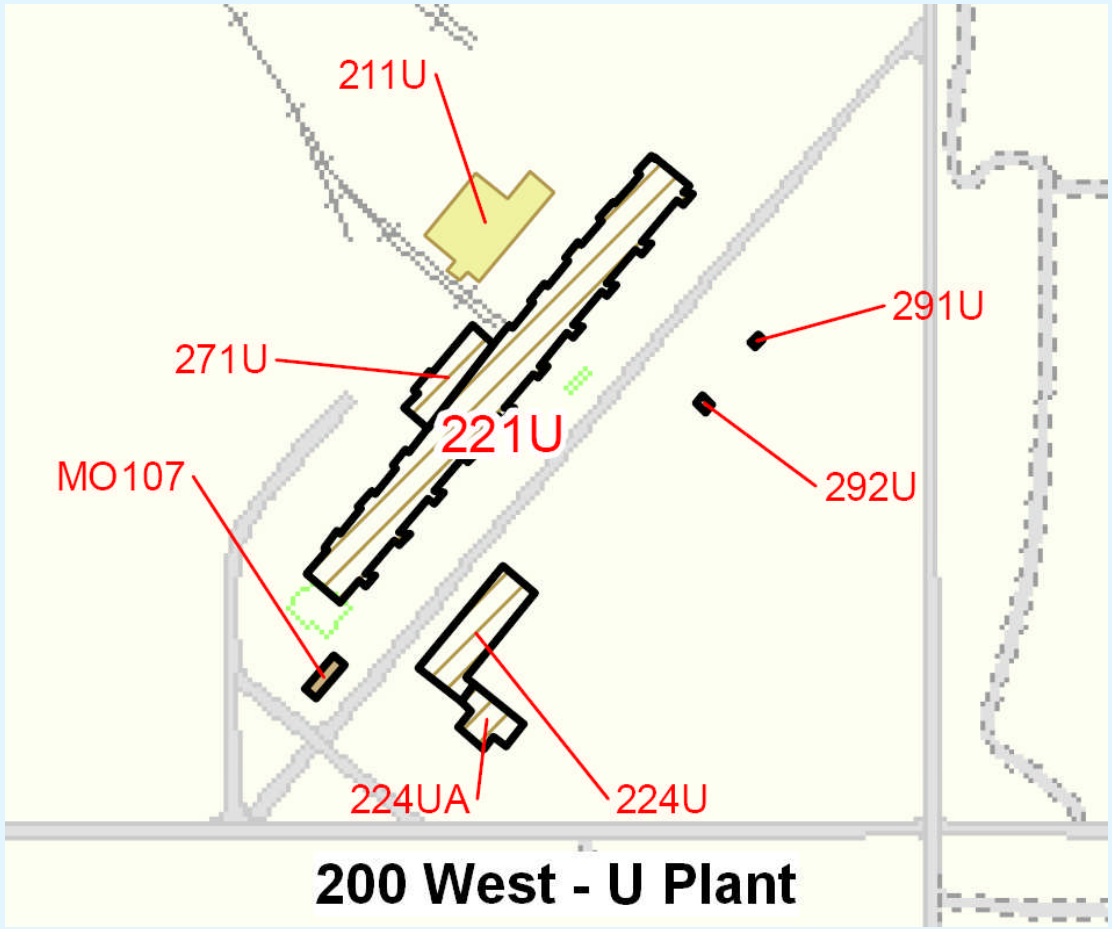


Hanford RL (Zone 18) U Plant Zone

Project Summary Table

Location Description:	
Site/Area Description	Hanford – 200 West Area
EM Field Office	Richland
Facility Description:	
Major Facility Type	Nuclear (Process Canyon Facility)
No. Buildings	Approximately 37 Structures, 1 Canyon Facility and 52 Waste Sites
Gross Total Building Square Feet	190,000
Construction	Steel reinforced concrete
Current Facility State	Deactivation
Brief Background	U-Plant was constructed in 1944 as one of three original chemical separation plants (B-Plant, U-Plant and T-Plant). U-Plant was never used for that purpose. The facility was subsequently used for training and contaminated equipment management.
Source Term	TRU waste
Project Description:	
Gross Estimated Cost	$409 Million
Projected End-State	In-Situ Decommissioning
Project Start and End Dates	2009 – 2026, preliminary D&D starts in 2009, canyon D&D starts 2015
Contractor	CH2MHill Plateau Remediation Corp.
Identifiers	ABB – 408; PBS RL-0040

Hanford RL (Zone 18) U Plant Zone



Facility Background

The 221-U Process Canyon Building is located in the 200 West Area of the Hanford Site.

It was constructed in 1944 - 1945 to support World War II plutonium production by extraction from fuel rods irradiated in the Hanford Site production reactors.

It was never used for this purpose because canyon buildings constructed earlier met the Hanford Site's production goals.

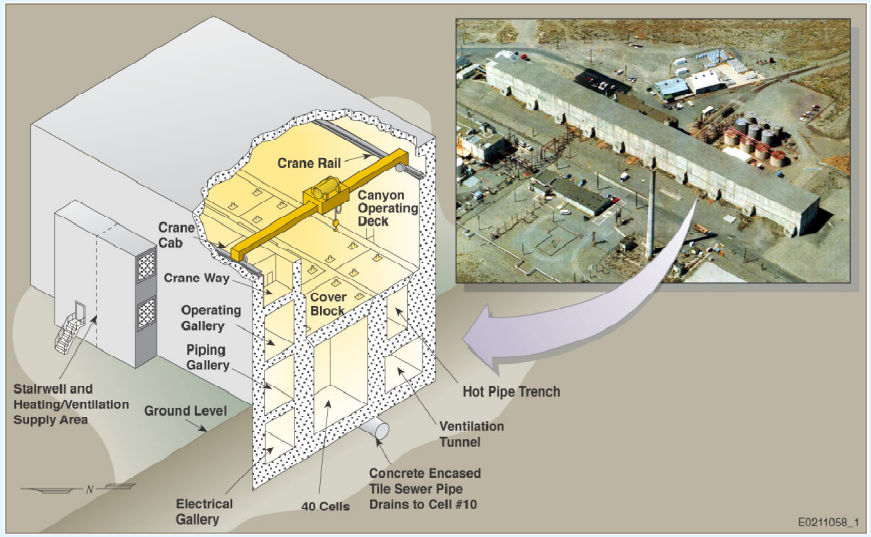
It was instead used to train B and T Plant operators until 1952, when it was converted to include a recovery process to extract uranium out of waste from other canyon facilities.

Process equipment was transferred from other canyon facilities and included remote-handled materials and transuranic (TRU) contaminated materials.

Placed in standby in 1958. From 1958 to 1964, U Plant was used to receive, decontaminate , and maintain contaminated equipment from other Hanford processing facilities.

Hanford RL (Zone 18) U Plant Zone

Project Discussion



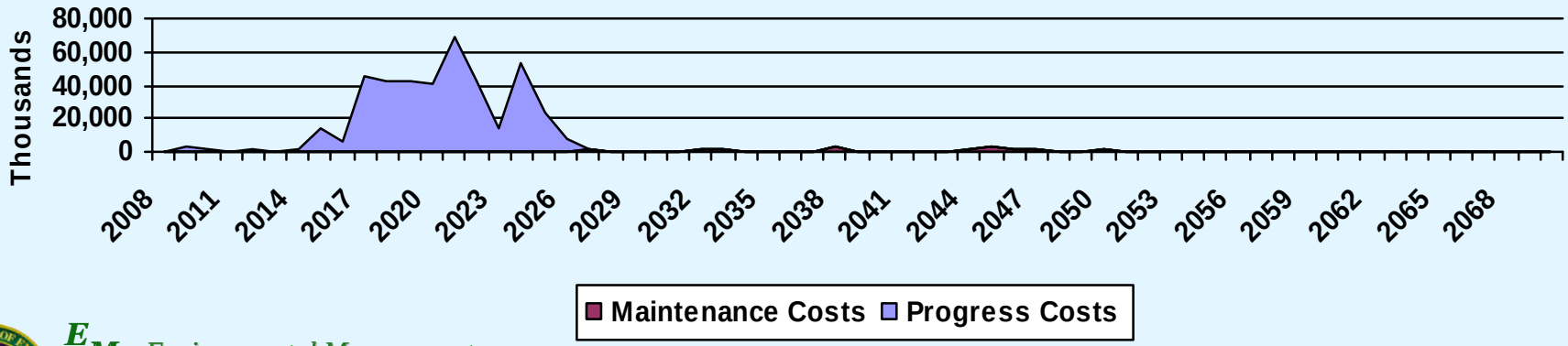
U-Plant decommissioning will serve as a pilot project under the Canyon Disposition Initiative (CDI) for the other four canyon buildings, B Plant, T Plant, PUREX, and REDOX.

Remedial investigation and characterization activities in support of the 221-U Facility feasibility study indicate that the 221-U Facility contains various levels of radiologically contaminated equipment, fission products, contaminated building materials, and/or miscellaneous debris from the fuels reprocessing. Soils around the facility are also contaminated.

A feasibility study was conducted to review 6 alternatives for remedial action.

Close-in-place, partially-demolished structure (In-Situ Decommissioning) was the chosen preferred alternative, as described in the CDI Proposed Plan and the DOE/EPA approved Record of Decision (ROD).

ABB - 408 Cost and Schedule profiles

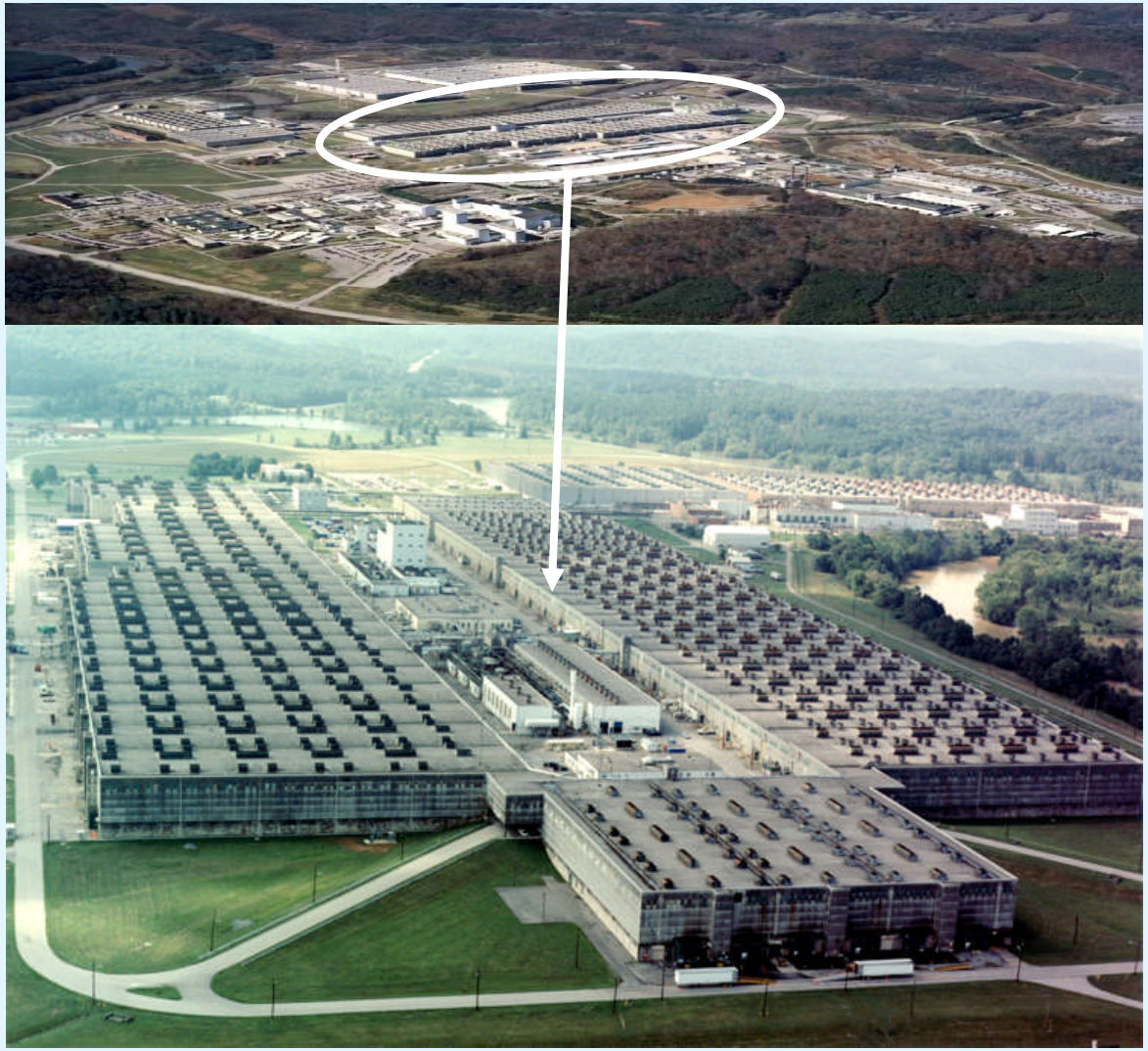


Oak Ridge K-25 Process Building

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; East Tennessee Technology Park
EM Field Office	Oak Ridge Operations Office
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	1
Gross Total Building Square Feet	1.64 Million
Construction	Steel, concrete, asbestos transite
Current Facility State	Defunct uranium enrichment plant. Operations ceased in 1965 and demolition commenced on the west wing. East wing requires further characterization.
Brief Background	The plant was opened in 1945 as part of a U.S. government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons.
Source Term	Uranium, Technetium-99, and other fission products waste
Project Description:	
Gross Estimated Cost	$384 Million
Projected End-State	Demolition; brown field industrial reuse
Project Start and End Dates	2008 – 2012
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 274; PBS OR-0040

Oak Ridge K-25 Process Building



Facility Background

ETTP, formerly known as the K-25 Gaseous Diffusion Plant, was a uranium enrichment production facility built in the 1940s and 1950s; the facility covers 45 acres on the 5,000 acre site. When it was built, the K-25 building was the largest industrial structure in the world.

The three-story, U shaped building, built during the Manhattan Project, covers 1.64 million ft2 and contains 3,018 stages of gaseous diffusion process equipment and associated auxiliary systems. Each stage consists of a converter, two compressors, two compressor motors, and associated piping. Some operations have been shut down for nearly 3 decades, and the entire production mission was ended more than 15 years ago.

The K-25 Building is a Nuclear Category 2 facility. In addition to uranium, biocontamination requires the use of respiratory protection, and constant S&M is required to reduce entry of water, which increases the potential for criticality if it encounters the highly enriched uranium (HEU) present in process equipment.

Oak Ridge K-25 Process Building

Project Discussion

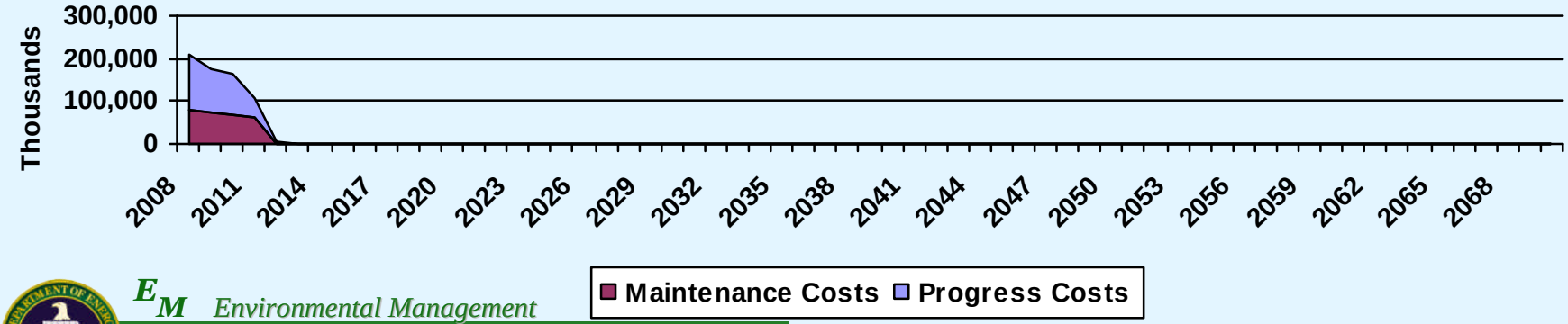
Due to the extreme degradation of the facility's structure, a revised D&D strategy had to be developed and implemented in 2007-2008. Deteriorated building conditions make special control measures necessary to allow work to be conducted safely in the K-25 Building.

The demolition process will leave the basement slabs, retaining walls, and the north wing of K-25 in place in a structurally sound condition. The slab and underground soil and utilities will be addressed in a future ROD for ETTP. Activities within the K-25 Building to date include clean-out and disposal of a large quantity of loose stored material and equipment, installation of a temporary power system and a reconfigured Radiation Criticality Accident Alarm System.

Recent (March 2009) activities include removal of the metal roof panels on the south end to allow access to the transite roof panels. The transite panels were discovered to be "glued" together at their overlap joints, making removal in one piece impossible. A different approach to removal or demolition is being considered.

Demolition of K-25

ABB - 274 Cost and Schedule profiles

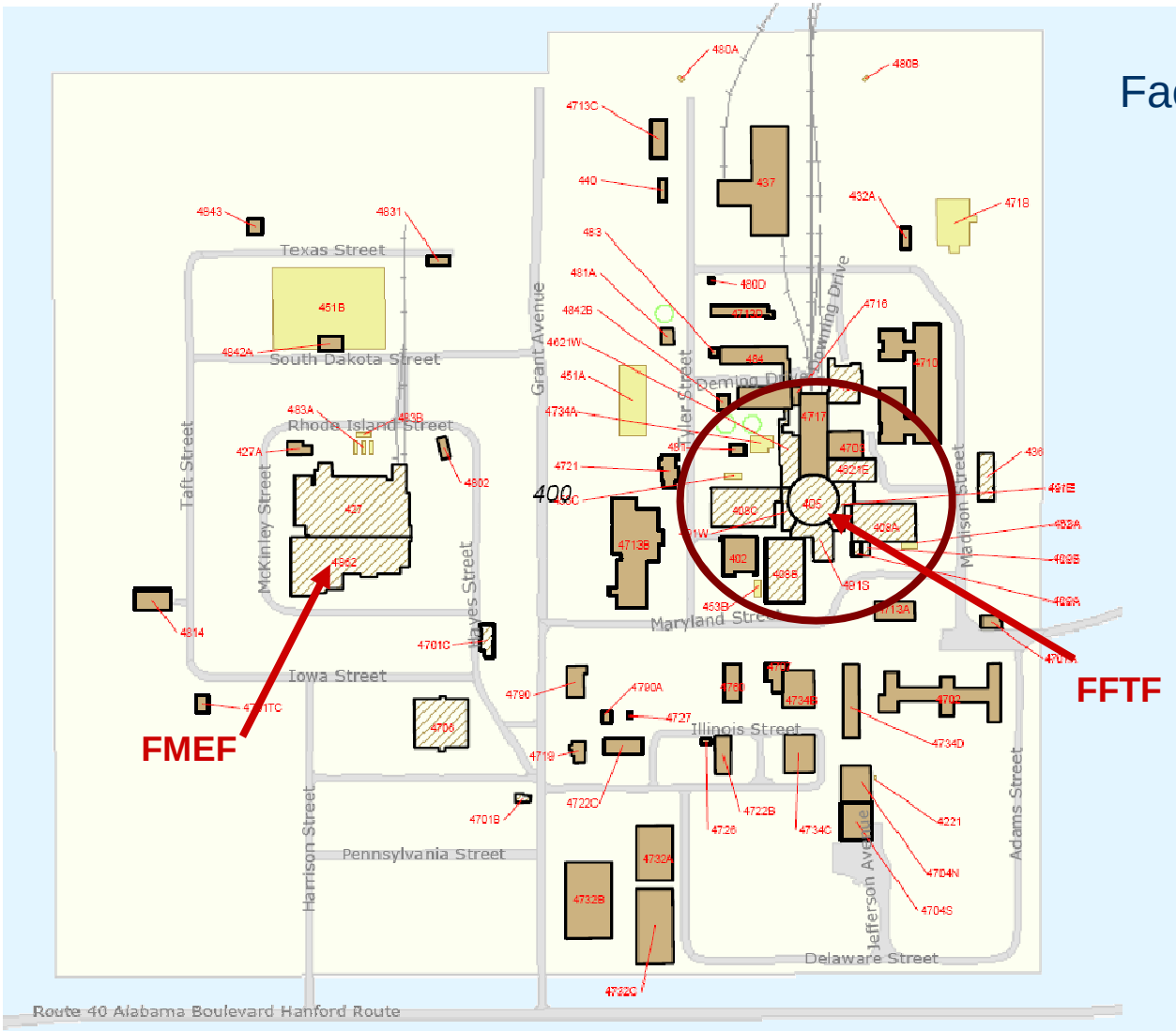


Hanford RL Fast Flux Test Facility (FFTF)

Project Summary Table

Location Description:	
Site/Area Description	Hanford – 400 Area- Fast Flux Test Facility
EM Field Office	Richland
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	Approximately 44, the major facility is the Fast Flux Test Reactor building
Gross Total Building Square Feet	299,000
Construction	Steel Reinforced Concrete with a Steel Containment Dome
Current Facility State	Defunct sodium cooled reactor; Deactivation in progress
Brief Background	Constructed in 1979. Operated from 1982-1992 to test advanced fuels as part of the Liquid Metal Fast Breeder Reactor Program.
Source Term	Uranium, uranium contaminated sodium
Project Description:	
Gross Estimated Cost	$365 Million
Projected End-State	In-Situ Decommissioning candidate
Project Start and End Dates	2009 – 2030; actual reactor D&D starts 2023
Contractor	CH2MHill Plateau Remediation Services
Identifiers	ABB – 417; PBS RL-0042

Hanford RL Fast Flux Test Facility (FFTF)



Facility Background

The FFTF was the world's largest liquid sodium-cooled, fast neutron test reactor of its kind.

Construction of the FFTF was completed in 1978; the first reaction took place in 1980, and 1982 to 1992 it was used to test various aspects of commercial reactor design and operation. FFTF also produced tritium and other medical and industrial isotopes.

From 1993 through 1996, the active parts of the facility were gradually halted, fuel rods removed and stored in above-ground dry storage vessels. From 1997 through 2004, FFTF was in various stages of deactivation. In 2005 the core support basket was drilled to drain the remaining sodium coolant, which effectively made the reactor unusable.

400 Area - FFTF

Hanford RL Fast Flux Test Facility (FFTF)

Project Discussion

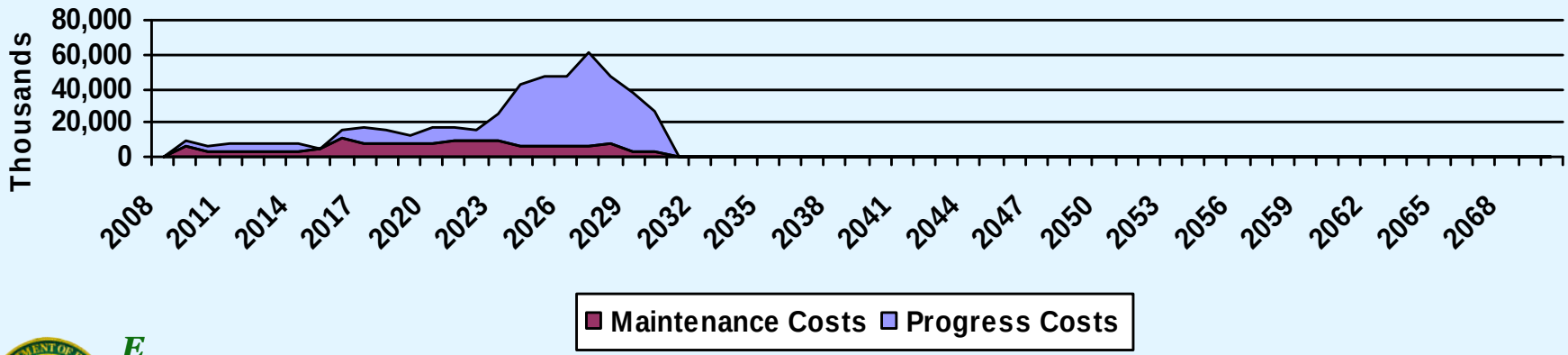
The facility is currently undergoing a major deactivation campaign, leading to a lower-cost S&M mode to allow some D&D with present annual budget.

Final cleanout phase will include cleaning the sodium residuals throughout the plant systems, piping, and vessels; disposition of the bulk sodium; and deactivation of the remaining plant auxiliary systems. The facility is a candidate for In-situ Decommissioning that would include dismantling and removing the above grade structures and entombing the below grade portion of the reactor containment building.

The rest of the 400 Area D&D that includes the FMEF and other ancillary support facilities is addressed in a separate ABB.

Fast Flux Test Facility (FFTF) (foreground)
with the Fuels and Materials Examination Facility (FMEF) (background)

ABB - 417 Cost and Schedule profiles



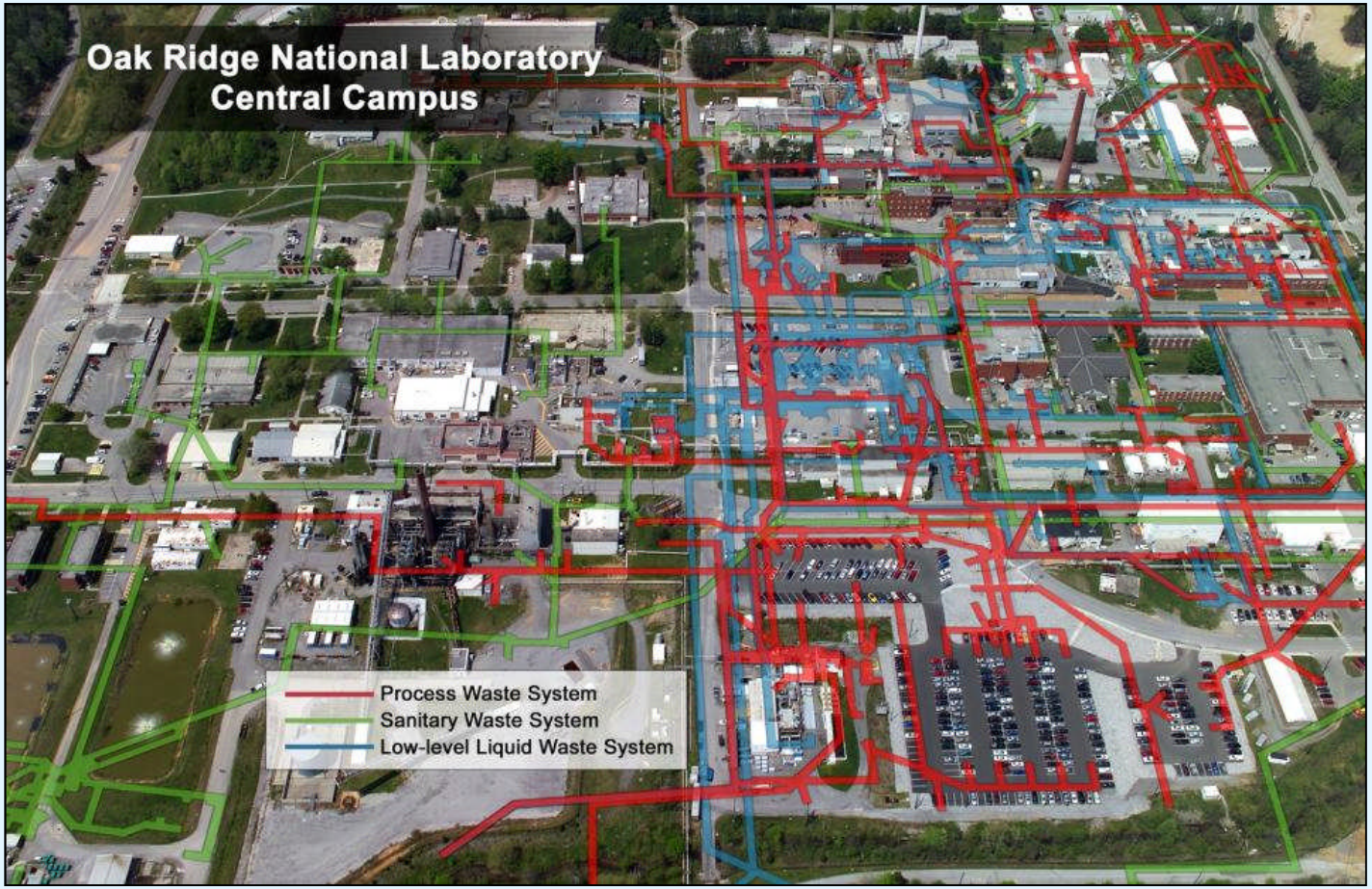
ORNL Central Campus, Isotope Circle and Reactor Facilities

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; ORNL
EM Field Office	Oak Ridge Operations Office
Facility Description:	
Major Facility Type	Industrial, radiological, nuclear
No. Buildings	Approximately 150
Gross Total Building Square Feet	700,000
Construction	Steel, concrete, asbestos transite
Current Facility State	Obsolete and abandoned research and support buildings; D&D in progress.
Brief Background	The plant was opened in 1943 as part of a U.S. government program to create the first gram quantities of plutonium.
Source Term	Transuranics, uranium, and fission products waste representing a significant amount of radiation (curies) in a small space.
Project Description:	
Gross Estimated Cost	$290 Million
Projected End-State	Demolition; brownfield industrial reuse
Project Start and End Dates	2008 – 2017
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 284; PBS OR-0042

ORNL Central Campus, Isotope Circle and Reactor Facilities

Facility Background

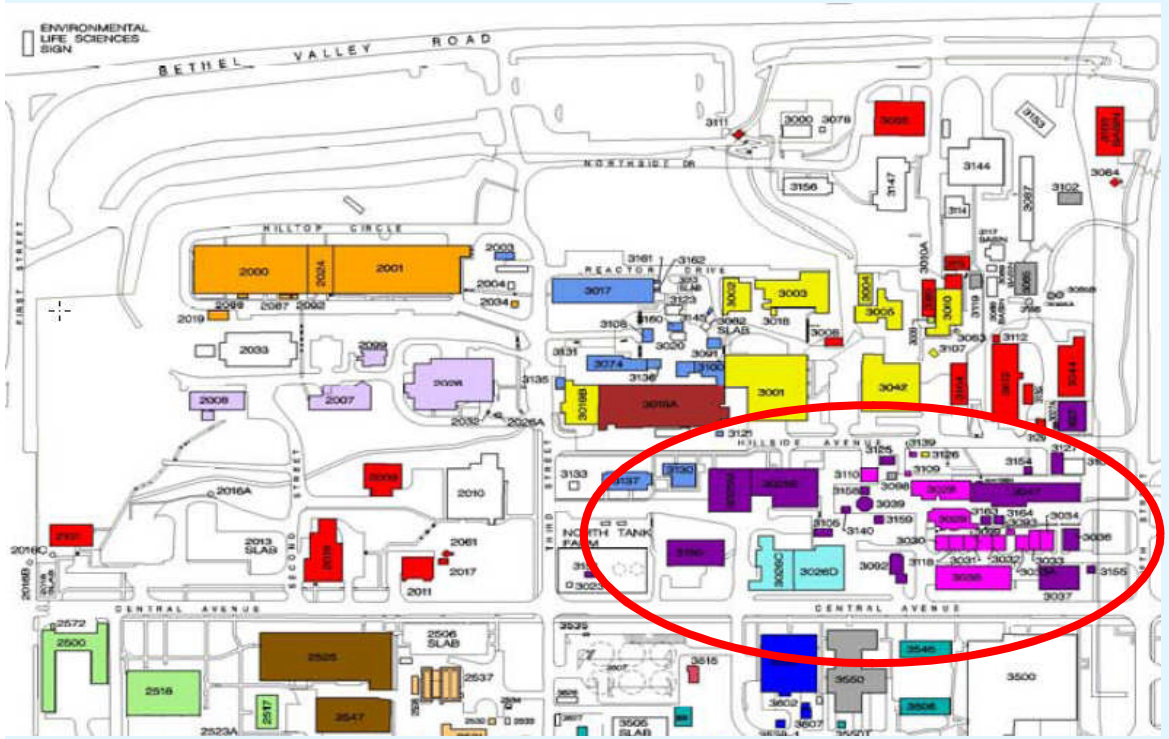


Activities carried out at the 3,300-acre Oak Ridge National Laboratory historically have supported both the defense production operations and civilian energy research effort. Cleanup addresses contamination from a variety of research and development activities, which were supported by multiple DOE programs over a long period of time.

The Oak Ridge National Laboratory currently conducts applied and basic research in energy technologies and the physical and life sciences. A significant number of additional contaminated facilities at this site are expected to be transferred to EM from the Office of Science over the next several years.

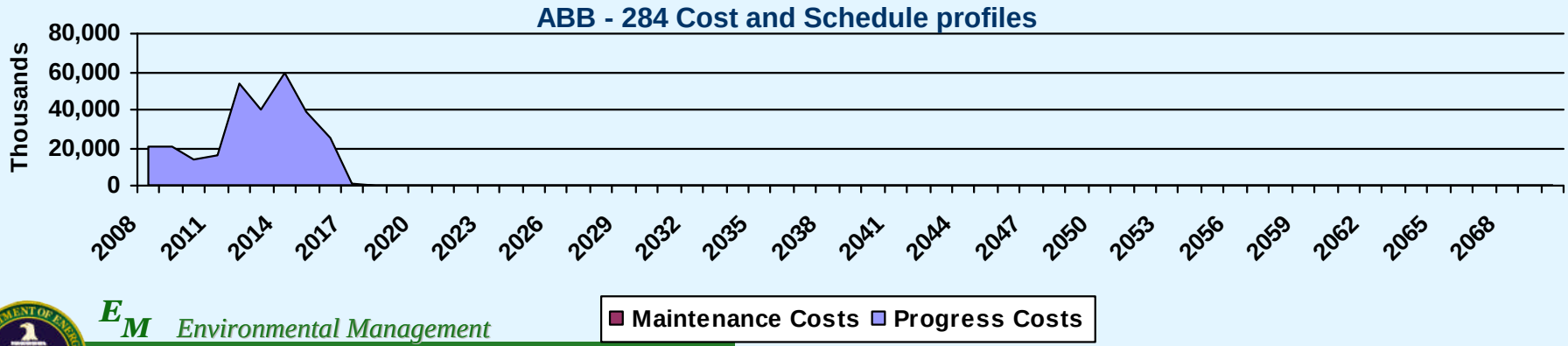
ORNL Central Campus, Isotope Circle and Reactor Facilities

Project Discussion



The facilities included within this project are Buildings 3026-C, 3026-D, 3028, 3029, 3038-AHF, 3038-E, 3038-M, 3047, 3517, 7025, and the Center Circle Facilities (Buildings 3030, 3031, 3032, 3033, 3033-A, 3034, and 3118). The scope of deactivation includes surveillance and maintenance activities, engineering, contamination control and structural stabilization of each facility; radioluminescent (RL) light removal in Building 3026; re-roofing Buildings 3030, 3118, and 3031; Hot Cells Cleanup in Buildings 3047 and 3517; Yttrium (Y) Cell and Barricades Cleanup in Building 3038; Glove Boxes & Hoods Removal in Buildings 3038 and 3047, and Inventory Transfer from Building 3517.

An extra challenge to the D&D efforts for the ORNL Central Campus is the web of interconnecting waste piping networks (see previous page). The connections must be identified, isolated and sealed for each facility undergoing D&D, while maintaining functionality for the few facilities needing the systems to be operational.



Los Alamos DP Site

Project Summary Table

Location Description:	
Site/Area Description	Los Alamos National Laboratory; Technical Area 21
EM Field Office	NNSA/EM Sites
Facility Description:	
Major Facility Type	Radiological
No. Buildings	16
Gross Total Building Square Feet	127,000
Construction	Steel, concrete, cement block, asbestos transite
Current Facility State	Defunct & vacant facility. D&D in progress.
Brief Background	TA-21 was the site of chemical research for refining plutonium and plutonium metal production from 1945 to 1978.
Source Term	Plutonium
Project Description:	
Gross Estimated Cost	$146 Million
Projected End-State	Demolish; Brownfield
Project Start and End Dates	2008 – 2011
Contractor	TBD
Identifiers	ABB – 485; PBS VL-LANL-0040-D

Los Alamos DP Site

Facility Background

TA-21, encompassing DP West and DP East, is located on DP Mesa immediately east-southeast of the Los Alamos town site at an elevation of 7,140 feet.

The DP West Plutonium Facility, located at TA-21, began operations in September 1945 and was used continuously for plutonium processing and research until mid 1978. The process included recovery of plutonium from scrap and cleanup materials through acid dissolution and oxidation-reduction processes to produce metal. The processes included machine shops, a waste incinerator, furnaces, and chemical process lines. In addition, Pu-238 heat source work and special chemistry research to concentrate scarce isotopes was carried out.

Buildings in DP East were used as a high temperature laboratory as part of Project Rover. After 1977, TA-21-155 became the TSTA (Tritium Systems Test Assembly) Research Facility. TA-21-155 was a fusion program center for polonium, actinide, and tritium research until declared excess in 2000.

DP West

Material Disposal Areas (MDAs) located at TA-21 include MDAs A, B, T, U and V. These MDAs are listed as solid waste management units (SWMUs) in LANL's Hazardous Waste Facility Permit.

Los Alamos DP Site

Project Discussion

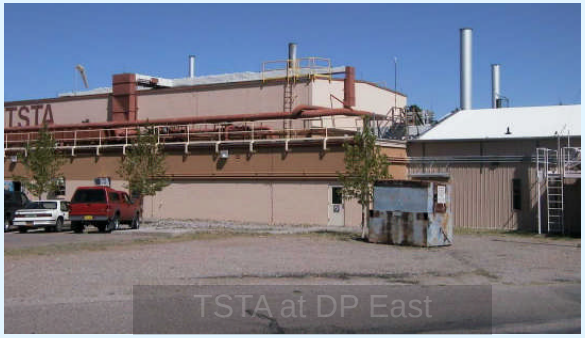
The facilities in DP West are inactive. Several of these buildings underwent decontamination efforts that also included removal of all gloveboxes, process equipment, process piping, storage tanks, process ventilation ductwork (internal & external), waste lines in utility tunnels and trenches, areas of contaminated ceilings and walls. Floor areas were decontaminated or capped with a new concrete floor, utility trenches in process rooms were filled with concrete, and fixative was applied in other areas.

D&D scope for DP West consists of five large buildings and ancillary structures, including a radioactive liquid waste treatment facility. These buildings comprise the most visible skyline upon entering Los Alamos from the east.

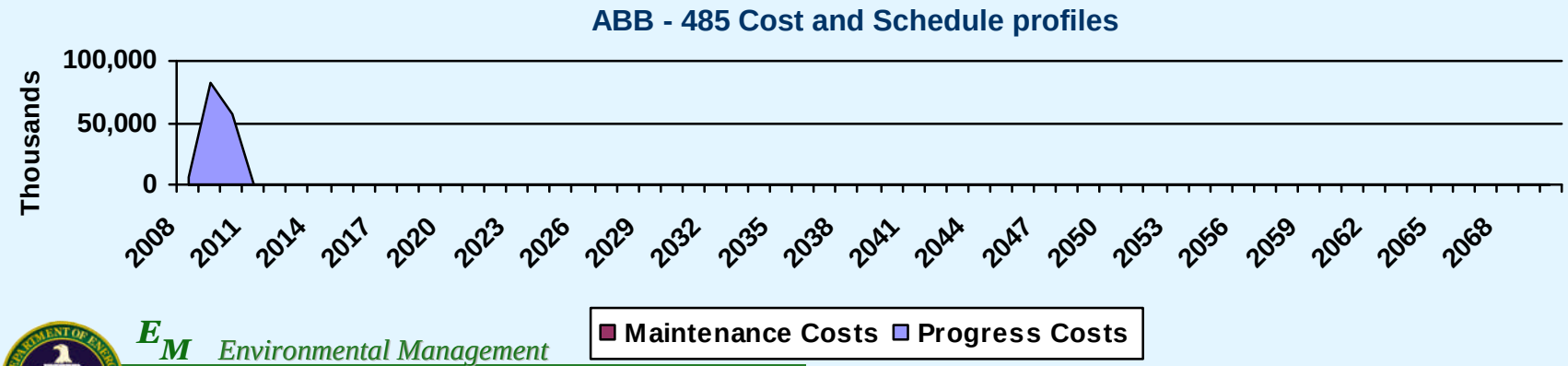
The scope for D&D of DP East consists of the TSTA facility. TSTA was the last facility accepted for transfer to EM in 2001, and until the 2009 re-initiation of transfers. Comprehensive deactivation, with EM's assistance, was conducted by the Office of Science resulting in a safe and stable facility.

D&D of DP West is in progress and characterization of DP East and the central corridor buildings is on-going.

DP West Buildings



TSTA at DP East



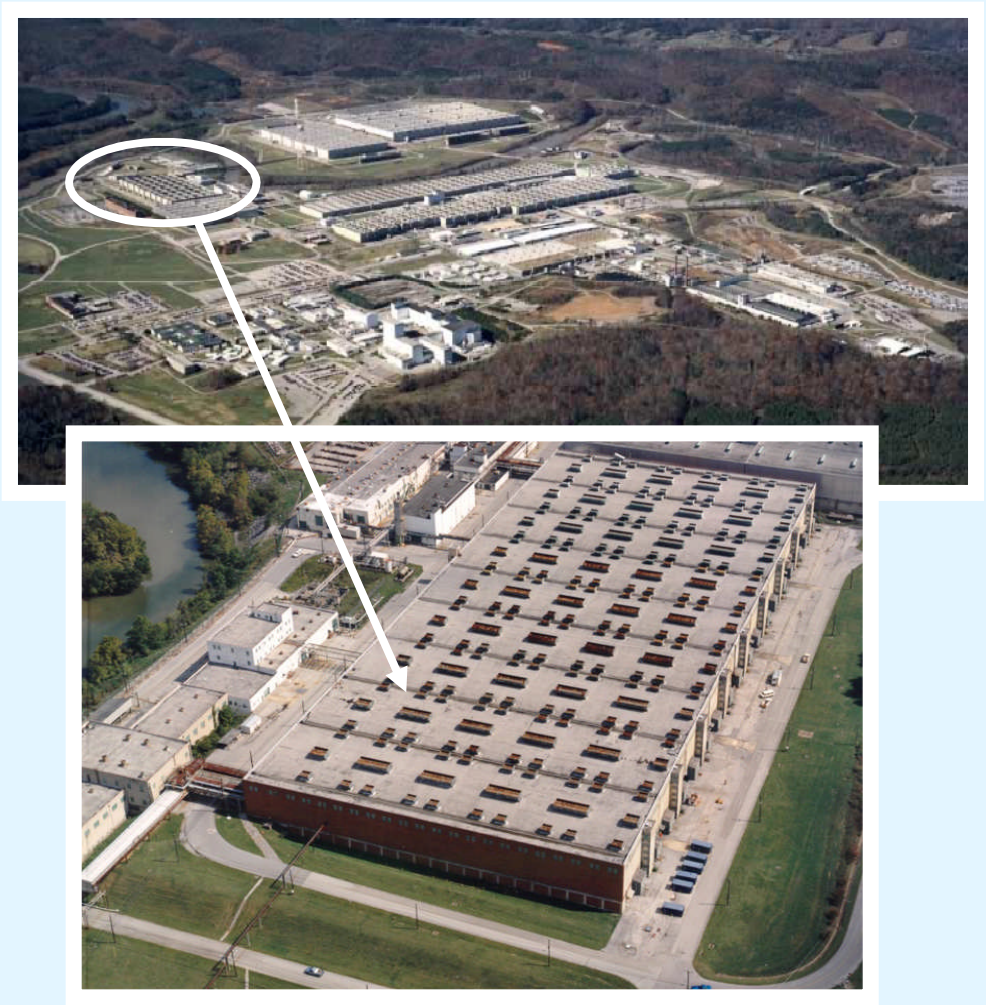
Oak Ridge K-27 Process Building

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; East Tennessee Technology Park
EM Field Office	Oak Ridge Office
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	1
Gross Total Building Square Feet	374,000
Construction	Steel, concrete, asbestos transite
Current Facility State	Obsolete and abandoned uranium enrichment plant; D&D in progress
Brief Background	The plant was opened in 1945 as part of a U.S. government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons.
Source Term	Uranium
Project Description:	
Gross Estimated Cost	$132 Million
Projected End-State	Demolition; brownfield industrial reuse
Project Start and End Dates	2010 – 2016
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 275; PBS OR-0040

Oak Ridge K-27 Process Building

Facility Background



The former K-25 Site and Building K-27 located at the East Tennessee Technology Park began operations during World War II as part of the Manhattan Project. Its original mission was to produce enriched uranium for use in atomic weapons. The plant was permanently shut down in 1987 and is undergoing cleanup for ultimate conversion to a private sector industrial park.

Current major activities at the site include restoration of the environment, deactivation and decommissioning of facilities, and disposition of wastes.

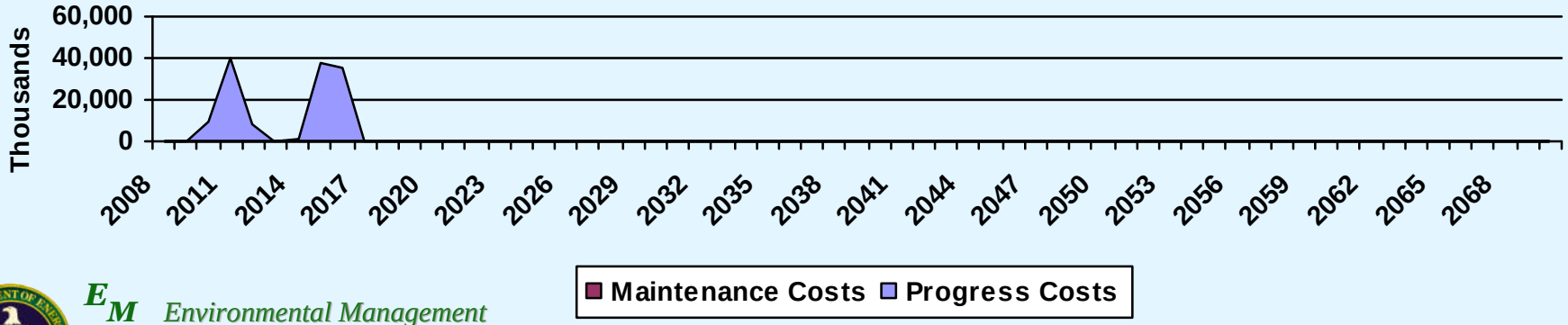
Oak Ridge K-27 Process Building

The K -27 building contains 540 stages of gaseous diffusion process equipment and associated auxiliary systems. Each stage consists of a converter, two compressors, two compressor motors, and associated piping. The scope of the K-27 Building D&D subproject is to abate the hazardous materials (began in FY2001), remove process equipment and excess materials, demolish building structures, and dispose of associated wastes. The purpose is to mitigate potential hazards associated with the asbestos, PCB, uranium, technetium and trace transuranic contamination that resulted from past operations and deterioration from lack of use and maintenance. D&D work will start with the removal and disposal of asbestos and other hazardous materials from within the buildings. Process and non-process equipment, piping and excess materials will be removed and properly disposed. The exterior transite panel skin of the building will be removed and disposed. Finally, the building structures will be demolished consistent with the Action Memorandum and K-25 Historic Preservation Memorandum of Agreement (signed by the Advisory Council for Historic Preservation, State Historic Preservation Officer, and Oak Ridge Manager).

Project Discussion

Process equipment is being foamed for contamination control. The foam fixes contaminants in place.

ABB - 275 Cost and Schedule profiles



Paducah Inactive Facilities

Project Summary Table

Location Description:	
Site/Area Description	Paducah / C-340 Complex, C-410/420 Complex, Inactive warehouses & trailers
EM Field Office	Portsmouth-Paducah Project Office
Facility Description:	
Major Facility Type	Equivalent to DOE Hazard Category 2, Radiological and Industrial
No. Buildings	Approximately 30
Gross Total Building Square Feet	395,000
Construction	Concrete, Steel & asbestos transite
Current Facility State	Miscellaneous surplus support facilities to the GDP; D&D in progress.
Brief Background	These facilities were built in the 1950s to convert uranium oxide and hexafluoride to metals.
Source Term	Uranium
Project Description:	
Gross Estimated Cost	$122 Million
Projected End-State	Demolition; brownfield industrial reuse
Project Start and End Dates	2008 – 2017
Contractor	Paducah Remediation Services
Identifiers	ABB – 200; PBS PA-0040

Paducah Inactive Facilities

Facility Background

The facilities in this group were used for hazardous materials storage, general storage, shops for maintenance and industrial cleaning, chemical conversion processes, and other general purpose industrial activities.

Paducah Inactive Facilities

Project Discussion

This project involves the D&D of 15 of 17 facilities including warehouses, a cleaning facility, storage buildings, trailers, and small structures totaling ~ 145,000 square feet. D&D of the last Inactive Facility in this group was completed in 2009.

There are two remaining inactive facilities for which D&D is underway in which chemical conversion processes took place:

- C-410/420 Complex ~194,000 square feet
- C-340 Complex ~55,000 square feet

Contamination in both of these facilities includes uranium and hazardous materials such as asbestos, heavy metals, and PCBs.

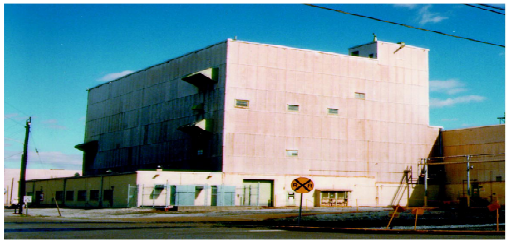
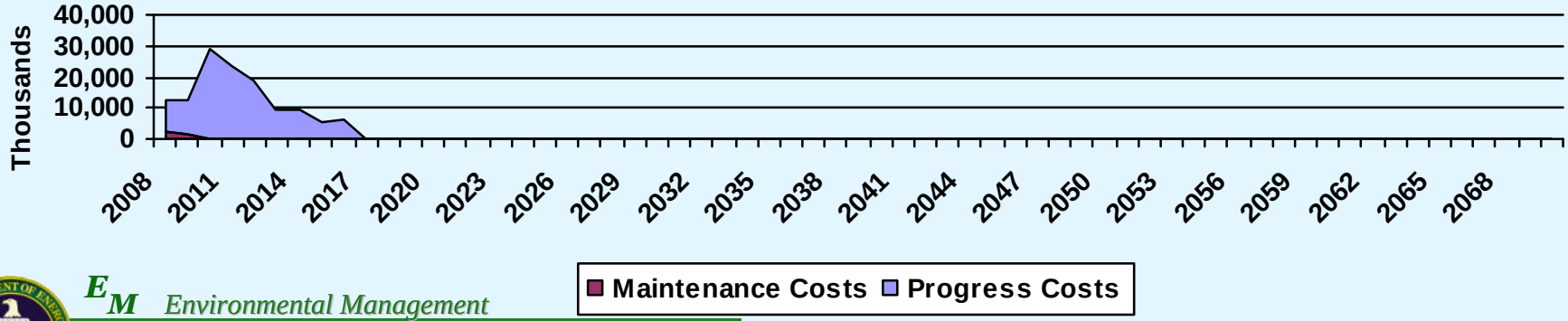


ABB - 200 Cost and Schedule profiles



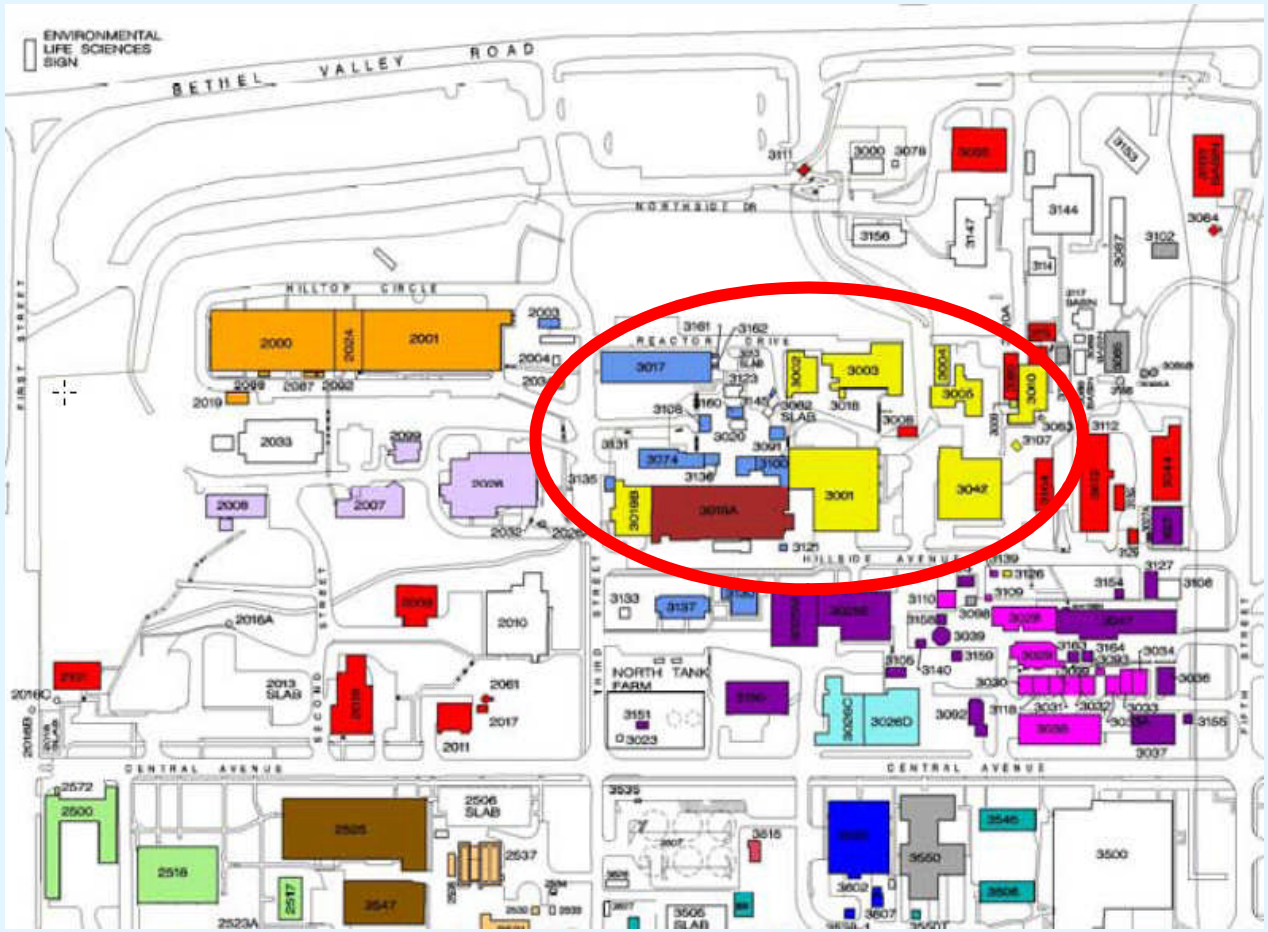
Oak Ridge National Laboratory Bethel Valley Reactors

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; ORNL
EM Field Office	Oak Ridge Operations Office
Facility Description:	
Major Facility Type	Industrial, radiological, nuclear
No. Buildings	54 inactive buildings covered under the Bethel Valley ROD. Of those 54, 4 are reactors: 3001, 3005, 3010, and 3042.
Gross Total Building Square Feet	300,000
Construction	Steel, concrete, cement block, asbestos transite
Current Facility State	Obsolete and abandoned research & prototype reactors; D&D in progress.
Brief Background	The plant was opened in 1943. The graphite reactor was the pilot facility for the Hanford B Reactor.
Source Term	Transuranics, uranium, fission products
Project Description:	
Gross Estimated Cost	$113 Million
Projected End-State	Demolition, brown field industrial reuse
Project Start and End Dates	2008 – 2016
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 287; PBS OR-0042

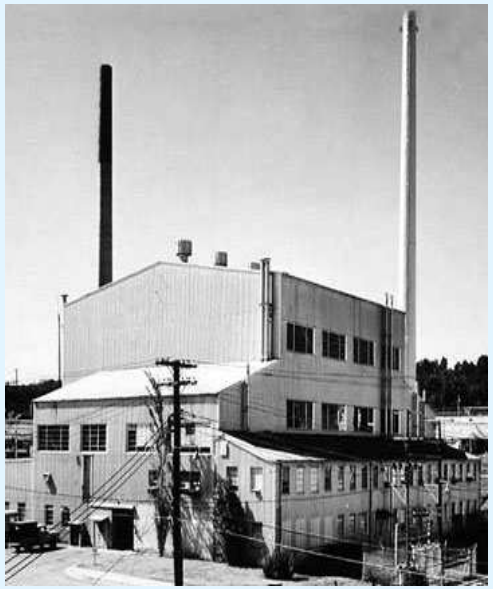
Oak Ridge National Laboratory Bethel Valley Reactors

Facility Background



The X-10 Graphite Reactor, designed and built in ten months, went into operation in November 1943. The reactor used neutrons emitted in the fission of uranium-235 to convert uranium-238 into a new element, plutonium-239. The X-10 Graphite Reactor, formerly known as the Clinton Pile, was the world's second nuclear reactor and was the first reactor designed and built for continuous operation. The Graphite Reactor was designated a National Historic Landmark in 1966. In 2008 it was designated as a National Historic Chemical Landmark by the American Chemical Society. The control room and reactor face are accessible to the public during scheduled tours offered through the American Museum of Science and Energy.

Oak Ridge National Laboratory Bethel Valley Reactors

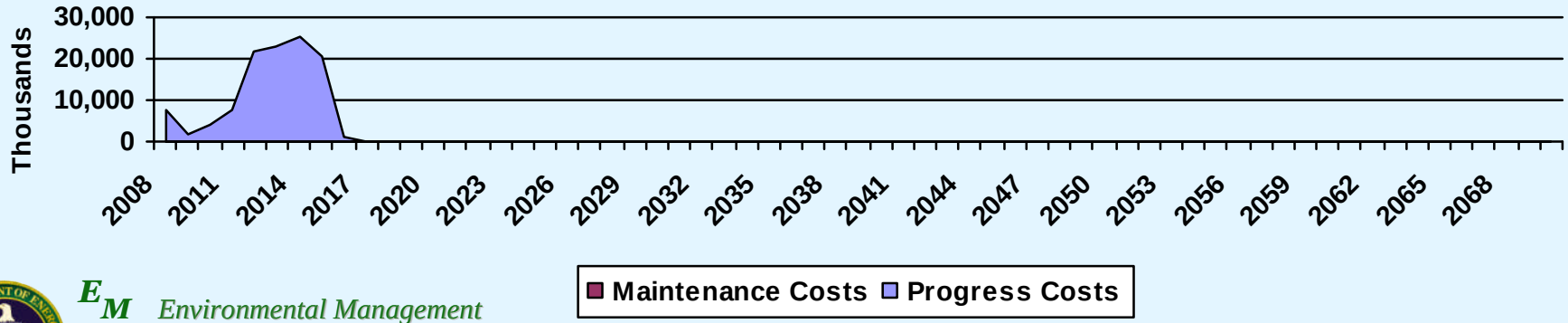


Project Discussion

Buildings scheduled for D&D will be stripped of contaminated equipment and materials and then dismantled to grade. Clean rubble will be grouted into below grade areas of the facilities. Contaminated rubble and equipment will be transported to the EMWMF. Bethel Valley will require DOE institutional control for many years into the future. At the completion of this project and Bethel Valley Remedial Action (PBS OR-43203), the current ER scope for the Bethel Valley area will be complete. Active ORNL operations will continue in the Bethel Valley area during remediation and after remediation activities are complete. The Fission Product Pilot Plant and High Level Chemical Development Laboratory will be dismantled and transported to the EMWMF. The following facilities will be dismantled to grade, with contaminated materials transported to the EMWMF and uncontaminated debris grouted into the below grade areas of the ORRR: Oak Ridge Research Reactor; Low-Intensity Test Reactor, auxiliary buildings associated with the two reactors, and the Metal Recovery Facility. The core of the ORNL Graphite Reactor will be entombed, preserving the outer shell and most of the building and facility as a Registered National Historic Landmark. Equipment in the Fission Product Development Laboratory will be removed for disposal, the cells decontaminated, and the building will be dismantled to grade.

The Bulk Shielding Facility, High Radiation Level Analytical Laboratory, Isotopes Facilities, and the Tritium Target Preparation Facility will have contaminated equipment and structures removed and sent to the EMWMF. The buildings will be dismantled to grade and clean debris grouted into below grade areas or transported to a sanitary landfill. The area will require long-term institutional control because of residual contamination stabilized in place, primarily associated with the remedial action sites.

ABB - 287 Cost and Schedule profiles

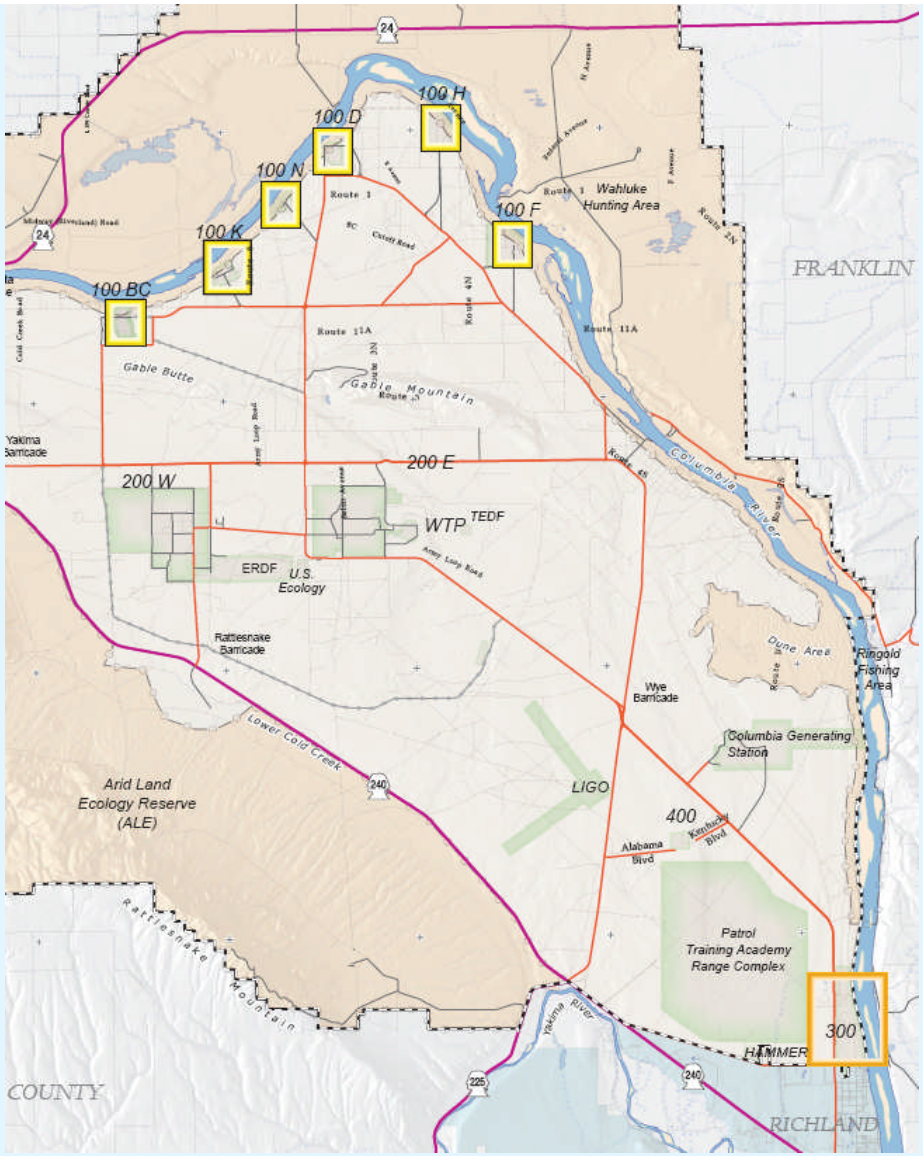


Hanford River Corridor Nuclear Facilities

Project Summary Table

Location Description:	
Site/Area Description	Hanford / 100-300 Areas – River Corridor
EM Field Office	Richland
Facility Description:	
Major Facility Type	Reactors (Radiological), Uranium Manufacturing, Radiochemical Laboratories (Nuclear), Miscellaneous Industrial
No. Buildings	120 in 100 Area and 112 in 300 Area
Gross Total Building Square Feet	744,400 in 100 Areas and 908,900 in 300 Area
Construction	Steel reinforced concrete, metal sided buildings, underground tanks, above ground tanks, utilities.
Current Facility State	100-N and 300 Area demolition in progress; 5 of 9 100 Area reactors Interim Safe Storage (ISS) complete; 3 reactors are in the ISS process; B reactor has been designated a national historic landmark
Brief Background	100 Area was home to 9 production reactors; 300 area contained the fuel fabrication facilities.
Source Term	Uranium/Cesium/Strontium/Plutonium
Project Description:	
Gross Estimated Cost	$105 Million
Projected End-State	100 Area - Reactor cocooned; 300 Area – brownfield for industrial reuse except 4 major retained facilities for Office of Science use to support the Capability Replacement Laboratory
Project Start and End Dates	2009 – 2019 (retained facilities planned demolition extends out to approximately 2030)
Contractor	Washington Closure Hanford Corp.
Identifiers	ABB – 414; PBS RL-0041

Hanford River Corridor Nuclear Facilities



Facility Background

Hanford's (Columbia) River Corridor stretches over 210 square miles and is the home to 9 former production reactors, including the B Reactor that produced the plutonium for the weapon that ended WW II. Also located along the River Corridor are fuel fabrication, research, and support facilities.

The River Corridor contains over 760 waste sites and burial grounds, the majority of which surround the 9 reactor areas. Since removal of these waste sites began in 1996, more than 6.5 million tons of contaminated materials have been excavated and moved away from the Columbia river.

RL's mission is the cleanup of the River Corridor. This cleanup requires the complex coordination of structure demolition, waste retrieval, and remediation of soil and ground water, as well as the phase-out of associated infrastructure while meeting demands of various tenant, federal, and state legal obligations.

Hanford River Corridor Nuclear Facilities

100 Area - Remediation of over 700 past practice waste sites along the Columbia River, the D&D of approximately 130 facilities, and the placement of 8 reactors (B, C, D, DR, F, H, KE, KW, N) into an Interim Safe Storage (ISS) condition. B Reactor has been preserved as a museum.

Reactors Cocooning Completed:

Reactor C - 1998

Reactor DR - 2002

Reactor F – 2003

Reactor D – 2004

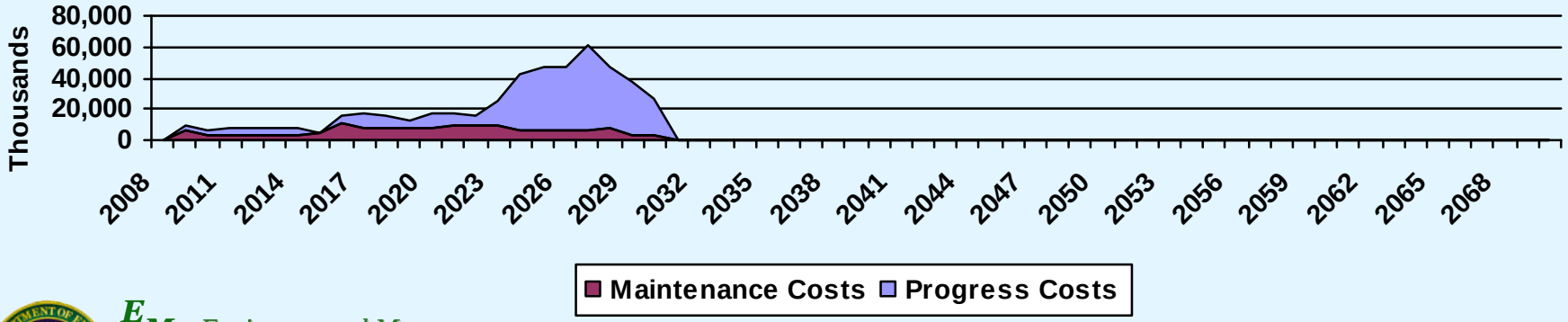
Reactor H – 2005

Interim Safe Storage (ISS) places the reactors in a cocooned mode for approximately 75 years. This will allow the decay of short-lived isotopes such as Co-60, providing a safer environment for D&D workers and more cost effective decommissioning.

300 Area - Remediation of approximately 50 waste sites and the D&D of excess facilities/ structures.

Project Discussion

ABB - 414 Cost and Schedule profiles



Oak Ridge ETTP Main Plant D&D

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; East Tennessee Technology Park
EM Field Office	Oak Ridge Office
Facility Description:	
Major Facility Type	Radiological
No. Buildings	35
Gross Total Building Square Feet	Approximately 150,000
Construction	Steel, concrete, cement block, asbestos transite
Current Facility State	Defunct uranium enrichment plant support facilities; D&D in progress.
Brief Background	The plant was opened in 1945 as part of a U.S. government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons.
Source Term	Uranium, Technetium-99, and other fission products waste
Project Description:	
Gross Estimated Cost	$95 Million
Projected End-State	Demolition; brown field industrial reuse
Project Start and End Dates	2008 – 2016
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 273; PBS OR-0040

Oak Ridge ETTP Main Plant D&D

Facility Background

The East Tennessee Technology Park site occupies approximately 5,000 administrative acres adjacent to the Clinch River and is located approximately 13 miles west of Oak Ridge, Tennessee. ETTP was originally built as a uranium enrichment facility for defense programs. The majority of the 125 major buildings on the site have been inactive since uranium enrichment production ceased in 1985.

There are approximately 35 facilities remaining, many of which have radioactive contamination. These facilities contribute to the technetium-99 and VOC plumes.

Oak Ridge ETTP Main Plant D&D

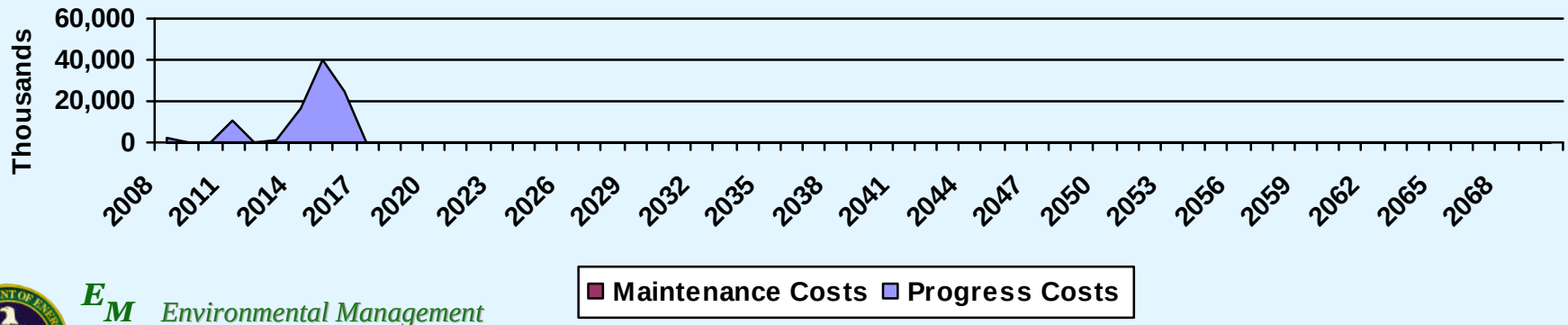
Project Discussion

This project requires the D&D of 35 remaining major buildings. The decommissioning in FY 2005 of the K-29, 31 and 33 gaseous diffusion process buildings (covering 110 acres) completed the largest decommissioning project ever undertaken by DOE.

D&D of the remaining facilities will be complete in 2015. The D&D of these other facilities include the planning, deactivation of utilities, asbestos and other hazardous material abatement, equipment dismantlement and disposal, structure demolition and waste disposal.

As of October 18, 2007, 190 Facilities had been demolished at the Main Plant and Lab Area

ABB - 273 Cost and Schedule profiles



Oak Ridge Alpha 4 and Other EM Facilities D&D

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; Y-12
EM Field Office	Oak Ridge Operations Office (in coordination with NNSA)
Facility Description:	
Major Facility Type	Radiological
No. Buildings	5 (Alpha 4/Building 9201-4 is the major building)
Gross Total Building Square Feet	562,000
Construction	Steel
Current Facility State	Obsolete and abandoned electromagnetic separations plant; D&D in progress.
Brief Background	Uranium enrichment facility using density separation with magnet. Replaced by the gaseous diffusion process at K-25.
Source Term	Uranium, TCE, mercury, lithium
Project Description:	
Gross Estimated Cost	$90 Million
Projected End-State	Demolition; brownfield for NNSA reuse.
Project Start and End Dates	2009 – 2017
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 280; PBS OR-0041

Oak Ridge Alpha 4 and Other EM Facilities D&D

Facility Background

Alpha 4 was completed in October 1944 and began operating as a uranium isotope separation facility in 1945. The process utilized electromagnetic separation ("Calutrons") to enrich uranium. The Calutrons were shut down in 1947 and the building remained in a standby mode until 1953. At that time a lithium isotope separation process using the column exchange method (Colex) was installed; production began in June 1955. The Colex process used substantial quantities of mercury as a solvent to affect the separation of high-purity Lithium-6 from natural lithium. The Colex production was shut down in December of 1962 and the facility was placed in standby mode until 1983.

Building 9201-4, Alpha 4

Alpha 4 is a four story structure with 562,000 gross square feet of floor space. It is one of the largest buildings on the Y-12 Plant, with several small ancillary buildings attached on the east and west sides.

Major Y-12 plant utilities connect through this facility; it is the hub of the entire electrical system of Y-12.

Alpha 4 is permanently shut down. Although the building is deteriorating, it is judged to be in good condition. The facility contains some recoverable quantities of mercury and lithium hydroxide, which are worker hazards, along with other hazardous materials such as asbestos and mixed wastes. About 50 to 70 workers occupy this building; extensive precautions are taken to protect the workers from the risk of exposure to the hazardous materials.

Alpha 4 Partial Interior

Oak Ridge Alpha 4 and Other EM Facilities D&D

Project Discussion

The near-term scope of this project includes performing surveillance and maintenance of surplus facilities and conducting high risk reduction cleanup projects at the Y-12 National Security Complex.

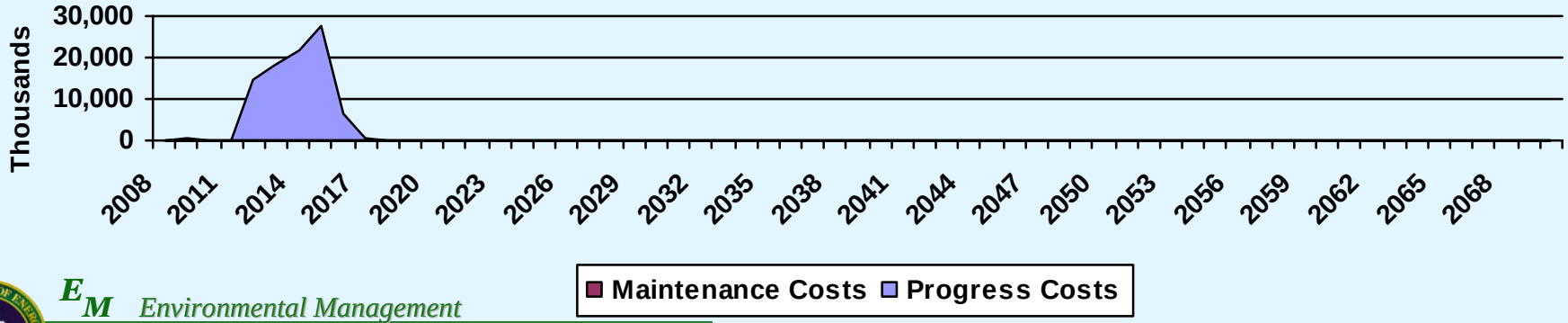
The Alpha 4 Facility D&D project includes:

- Characterization of radioactive and hazardous contamination
- Abatement of hazardous materials
- Deactivation that includes rerouting of electrical distribution and isolation from other services
- Removal of unattached stored materials
- Removal of selected processing equipment prior to demolition
- Demolition of Alpha 4 and related ancillary structures to grade level. Foundations and slabs will be decontaminated and left in place
- Waste packaging and disposal throughout the project

The project does not include environmental remediation of surrounding soils.

Alpha 4 Main Building

ABB - 280 Cost and Schedule profiles



SPRU Process Facilities D&D

Project Summary Table

Location Description:	
Site/Area Description	Knolls Atomic Power Laboratory (KAPL), Separation Process Research Unit
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	Two main buildings, plus tunnel and cooling tower
Gross Total Building Square Feet	Approximately 100,000
Construction	Concrete and structural steel including tanks in vaults and hot cells
Current Facility State	Obsolete and vacant facility. D&D characterization in progress.
Brief Background	Transuranic separations process research and development for PUREX and REDOX processes.
Source Term	Uranium, TRU, Plutonium
Project Description:	
Gross Estimated Cost	$79 Million
Projected End-State	Demolish; Brownfield for KAPL reuse
Project Start and End Dates	2008 – 2012
Contractor	URS Washington Division
Identifiers	ABB – 318; PBS VL-SPRU-0040

SPRU Process Facilities D&D

Facility Background

The Separations Process Research Unit (SPRU) consists of inactive facilities and structures at the Knolls Atomic Power Laboratory (KAPL) in Niskayuna, New York. SPRU was originally used by the Atomic Energy Commission for development of plutonium extraction; was used for REDOX processing in 1950; as a PUREX process pilot in 1951-53; placed in safe storage during 1953-54, and partially used for office space and waste processing since then.

SPRU consists of two main buildings, below-grade tunnels connecting the two, and a process liquid tank farm.

Building G-2
Building G-2 was constructed for REDOX processing and later used to pilot the PUREX plutonium separations chemical process. It has 22,000 square feet of floor space including a 7,500 square feet process area with five concrete cells partially below grade. Some support areas of Building G-2 were physically isolated.

Building H-2
Building H-2 was constructed to house liquid waste processing equipment for waste generated in Building G-2. The building has approximately 27,900 square feet of floor space on three floors, with nearly 70% of this space being located below grade.

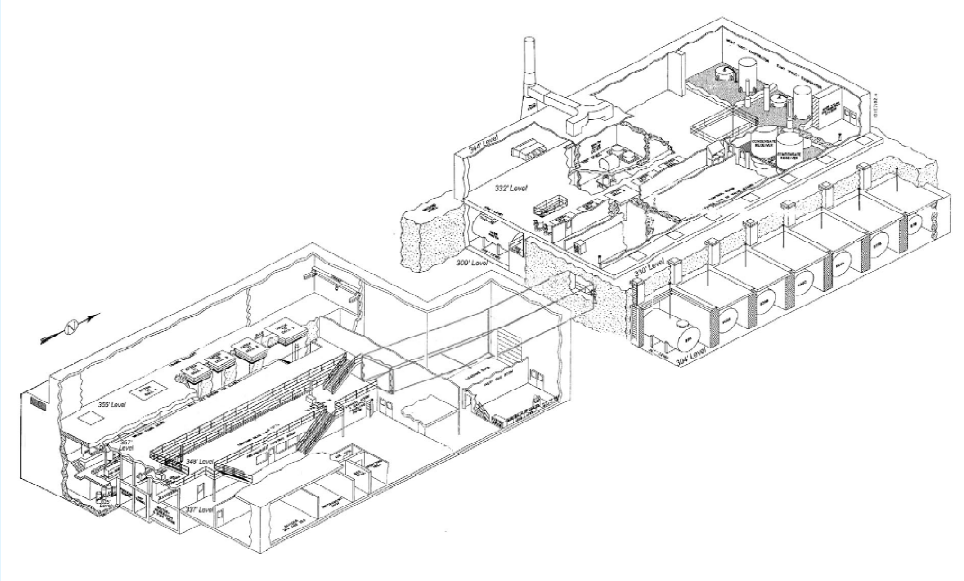
H-2 Tank Farm
On the east side of Building H-2 are six 10,000 gallon and one 5,000 gallon retention tanks located in seven underground concrete vaults.

Pipe Tunnels
The pipe tunnels run below-grade from the basement of G-2 to the basement of H-2. The tunnels are 8 feet high and varying widths, generally greater than 5 feet.

Underground Tank Farm

Underground Pipe Tunnel

SPRU Process Facilities D&D

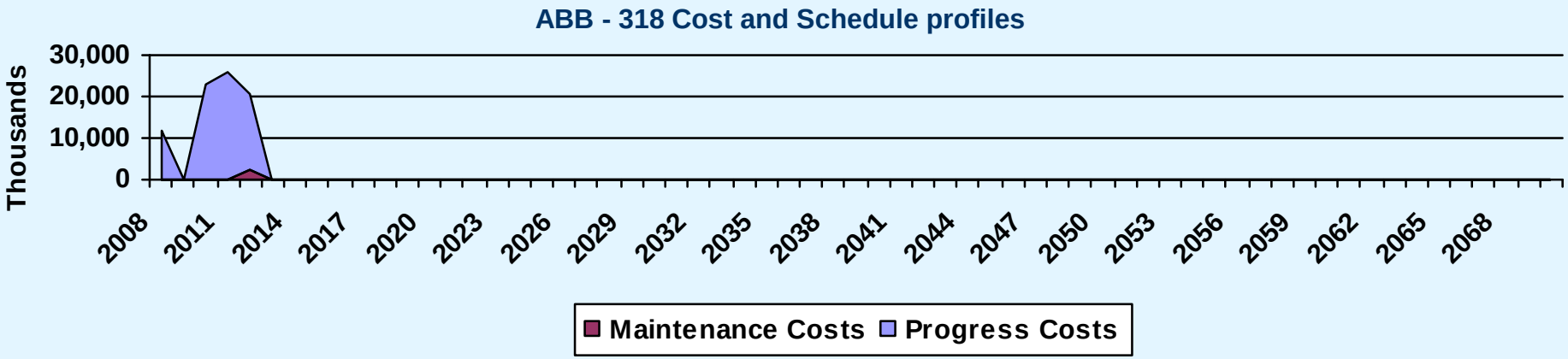


Project Discussion

In December 2007, EM announced award of a task order to Washington Group International of Oak Ridge, Tennessee to provide deactivation, demolition and removal of process facilities and removal of incidental contaminated soil; and decontamination of piping tunnels connecting the SPRU facilities to other operating facilities.

The resulting brownfield area will be returned to KAPL for reuse.

Characterization results and detailed D&D plans are scheduled for late summer, 2009.



Los Alamos TA-54 D&D

Project Summary Table

Location Description:	
Site/Area Description	Los Alamos National Laboratory; Technical Area 54
EM Field Office	NNSA/EM Sites
Facility Description:	
Major Facility Type	Radiological
No. Buildings	67
Gross Total Building Square Feet	280,000
Construction	Cement block, steel, asbestos transite
Current Facility State	The two Material Disposal Areas (MDA G & L) at TA-54 have buildings and structures that must be removed to allow remediation of soil beneath them.
Brief Background	TA-54 has functioned as a major storage and disposal area with some permitted treatment for Laboratory-derived wastes.
Source Term	Various
Project Description:	
Gross Estimated Cost	$52 Million
Projected End-State	Demolish; Brownfield
Project Start and End Dates	2008 – 2015
Contractor	TBD
Identifiers	ABB – 486; PBS VL-LANL-0040-D

Los Alamos TA-54 D&D

Facility Background

Technical Area (TA)-54 is located in the east-central portion of the Laboratory on Mesita del Buey between Pajarito Canyon (south) and Cañada del Buey (north). During the late 1950s, the Laboratory, with approval of the US Atomic Energy Commission and upon recommendation of the US Geological Survey, selected TA-54 for disposal of Laboratory-derived waste.

The site has functioned as a major storage and disposal facility with some permitted treatment for Laboratory-derived wastes. There are four Material Disposal Areas (MDAs), G, H, J, and L, at TA-54. Each was historically used to store and/or dispose of solid, sensitive (classified), hazardous, radioactive, or mixed waste generated at the Laboratory.

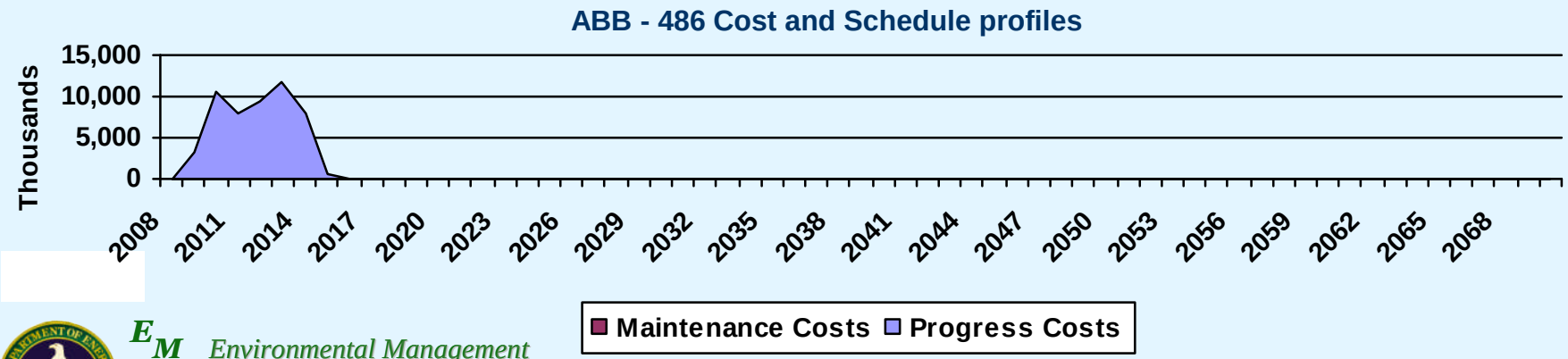
Figure 1. TA-54 aerial photograph (1995)

Los Alamos TA-54 D&D

Project Discussion

The project objectives are to decontaminate and demolish the TA-54 buildings. The project consists of non-process contaminated facilities that interfere with implementation of corrective actions at SWMUs MDA L and MDA G, as required by the Consent Order with the State of New Mexico. The buildings do not have extensive contamination; minor residual radiological material may exist in systems and on building surfaces. Other specific systems such as drainage and ventilation may exhibit residual local hazardous material inventory. There are no known or suspected releases under the buildings.

The project is organized into six D&D phases with each phase including from 6 to 19 buildings and smaller structures. The D&D phases correlate with the phased implementation of the preferred corrective measure of covers at MDA L and MDA G. Some of the structures are permitted or interim-status units that will require RCRA closure before D&D.



Oak Ridge Centrifuge Facility D&D

Project Summary Table

Location Description:	
Site/Area Description	Oak Ridge; East Tennessee Technology Park
EM Field Office	Oak Ridge Operations Office
Facility Description:	
Major Facility Type	Radiological
No. Buildings	17
Gross Total Building Square Feet	169,900
Construction	Pre-fabricated steel
Current Facility State	Obsolete Uranium Enrichment Plant.
Brief Background	The plant was opened in the 1970's using classified centrifuge technologies.
Source Term	Uranium
Project Description:	
Gross Estimated Cost	$42 Million
Projected End-State	Demolition; brownfield industrial reuse
Project Start and End Dates	2008 – 2016
Contractor	Bechtel Jacobs Company, LLC
Identifiers	ABB – 288; PBS OR-0043

Oak Ridge Centrifuge Facility D&D

Facility Background

The Centrifuge Facility supported the development and pilot testing of the gas centrifuge process for enriching uranium. The technologies housed in these facilities in the 1970's are still considered classified.

The facilities in this subproject supported the Centrifuge Operations. It is comprised of several very large facilities such as K-1210 Centrifuge Test Facility at ~49,600 square feet; K-1210A at ~11,700 square feet, and K-1220 Centrifuge Plant Demonstration Facility at ~75,600 square feet. There are also several smaller facilities including laboratories that supported centrifuge development. These facilities are located on the southeast sector of the ETTP site.

The K-1200 Complex (including 7 smaller facilities) and Buildings K-1600 and K-0101 which are currently leased will not be demolished by this project.

Oak Ridge Centrifuge Facility D&D

Project Discussion

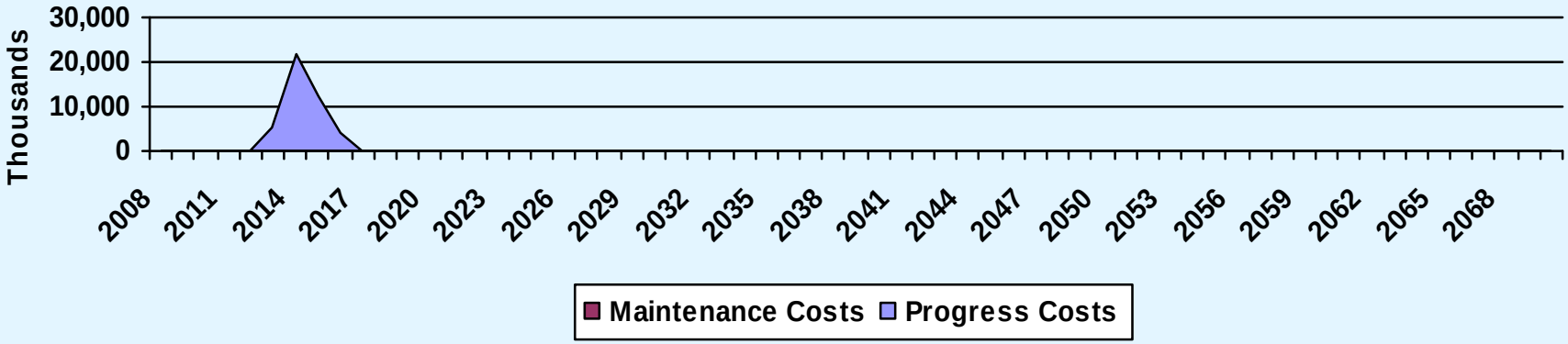
The Centrifuge Facility D&D project includes facilities not involved in the civilian uranium enrichment process.

This project will complete a portion of the closure of East Tennessee Technology Park, and includes D&D of 17 facilities covering 169,900 square feet. . The scope of this project includes demolition to the slab or basement; preparation of regulatory documents, facility characterization; hazardous material abatement, equipment dismantling and removal, demolition of buildings, structures and appurtenances, and segregation, characterization, packaging and disposal of waste streams to the appropriate waste facility.

Minimal D&D planning activities are currently underway. The project is scheduled to begin the bulk of the D&D activities in 2012 and is scheduled to be completed by 2017.

Due to the classified nature of the equipment and facilities, there is limited information available on the D&D planning efforts. Classification will make the disposition of this equipment a security/safeguards challenge to the D&D effort.

ABB - 288 Cost and Schedule profiles



Brookhaven Graphite Research Reactor (BGRR) D&D

Project Summary Table

Location Description:	
Site/Area Description	Brookhaven National Laboratory
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	1
Gross Total Building Square Feet	17,000
Construction	Steel, Concrete, Graphite
Current Facility State	Obsolete Reactor facility and museum.
Brief Background	Operation of the reactor was terminated and deactivation of the facility was initiated in 1968 . Defueling, off-site shipment of the fuel and most major deactivation actions were completed In 1972.
Source Term	Uranium
Project Description:	
Gross Estimated Cost	$42 Million
Projected End-State	Remove graphite core and demolish building
Project Start and End Dates	2008 – 2010
Contractor	Brookhaven Science Associates (Graphite removal subcontracted to SA Robotics)
Identifiers	ABB – 502; PBS BRNL-0040

Brookhaven-Graphite Research Reactor (BGRR) D&D

Facility Background

The Brookhaven Graphite Research Reactor (BGRR) operated until 1968 when operation of the reactor was terminated and deactivation of the facility was initiated. In 1972, defueling and off-site shipment of the fuel was completed and the BGRR complex was placed in a safe shutdown condition. From 1977 until 1997, portions of the facility were used as the Brookhaven National Laboratory (BNL) Science Museum. Between 1998 and 2005 several interim measures involving removal of contaminated structures, components and soils were completed through Action Memoranda or National Environmental Policy Act (NEPA) Categorical Exclusions.

The baseline plan as approved under the ROD and agreement between EM and SC specified the post D&D return of Building 701 to SC for long-term S&M. Subsequent to this agreement, in 2008, SC requested and EM agreed to the permanent transfer of Building 701 for D&D. As such, a modified approach that includes the near term demolition of the building is being evaluated in order to avoid the destruction of the currently planned environmental cap and replacing it at a later time.

Building 701, Reactor Building

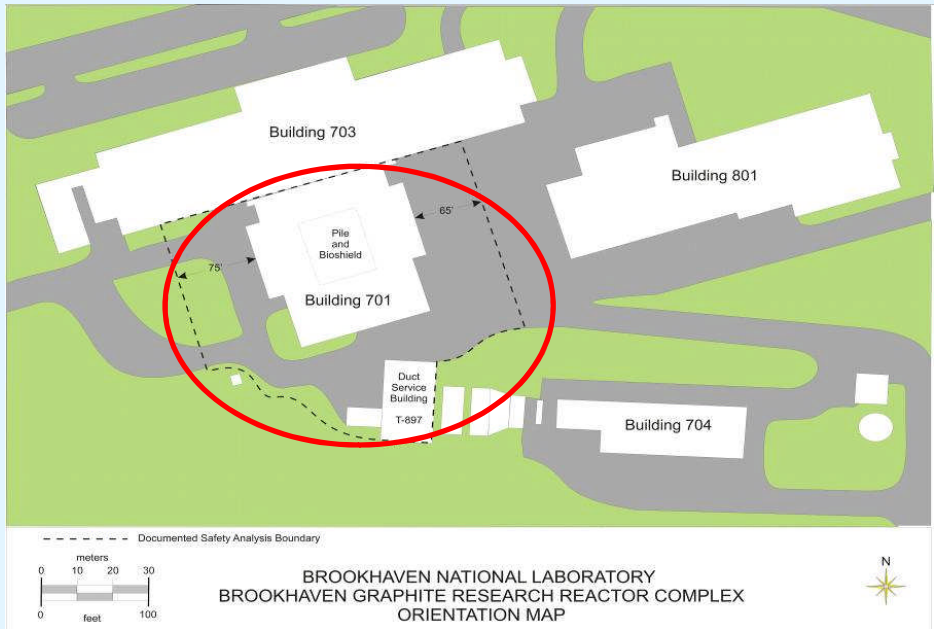
Building 701, or the Reactor Building, houses the biological shield and graphite pile. The building is also currently used as administrative offices and to support equipment and systems. The building covers a ground area of approximately 123 feet by 142 feet (16,800 square feet), and is 72 feet tall. It contains three floor levels plus the canal level below the main floor.

Building 702

Building 702 is the designation for the graphite pile, biological shield, control rods, and associated equipment. The control rod areas are contaminated and posted. The faces of the reactor are contaminated to various levels and posted accordingly. Building 702 is entirely enclosed within Building 701, so access to Building 702 is also controlled.

Graphite Pile

The graphite structure has the overall dimensions of a 25 foot cube. It is divided into two halves by a 3⅛ inch (8.0 centimeter) wide vertical gap. 68,000 graphite blocks in seventy-five layers of 4-by-4-inch blocks of various lengths up to 45 inches are laid horizontally to form the graphite structure.



Brookhaven-Graphite Research Reactor (BGRR) D&D

Project Description

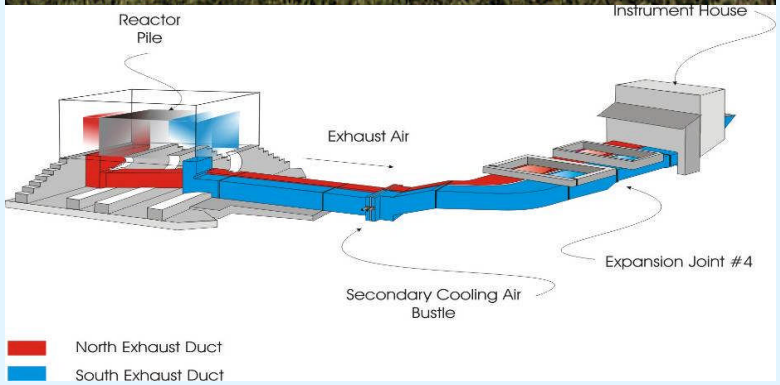
Interim remedial actions conducted from 1998 to 2005 included removal and disposition of :

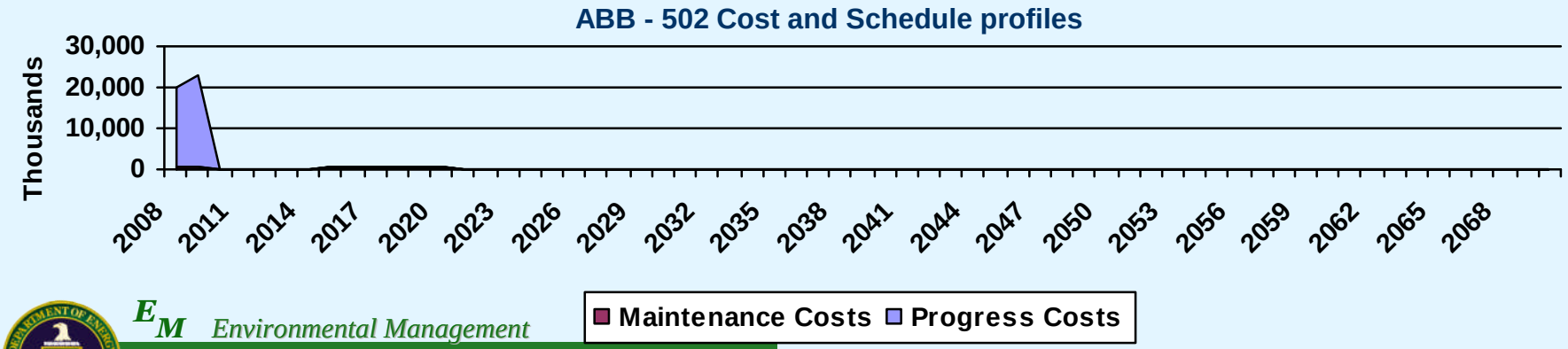
- 58,000 gallons of contaminated water that accumulated in the below ground ducts and the duct liner
- Experimental equipment and systems
- Reactor exhaust system components and above ground ducts
- Canal and water treatment enclosures and associated equipment and structural materials
- Graphite pile fan sump
- Contaminated soils

The current D&D project plans include :

- The removal of the graphite pile
- The removal of the biological shield
- Transportation and disposal of all project wastes
- Installation of an engineered water infiltration barrier
- Final cleanup of the reactor facility including documentation of the as-left conditions

At the conclusion of the BGRR project, the graphite pile will have been completely removed, and the biological shield will be removed to the 106'-9" elevation. The area beneath the graphite pile will be covered with concrete to shield the radioactive reactor support structure.





Hanford RL K East & West Reactor Basins D&D

Project Summary Table

Location Description:	
Site/Area Description	Hanford – 100 K Area
EM Field Office	Richland
Facility Description:	
Major Facility Type	Nuclear and Radiological
No. Buildings	Approximately 92
Gross Total Building Square Feet	674,876
Construction	Precast Concrete Frames w/ Concrete Shear Wall
Current Facility State	All fuel removed; K East sludge removed and basin being; water has been drained and basin filled with temporary fill. K West is storing radioactive sludge waiting for a disposition path.
Brief Background	Built in 1955; K Reactors were shut down in 1971. Fuel storage basins remained in operation, providing storage for N Reactor SNF throughout the 1970s and 1980s.
Source Term	29 m^3 of highly radioactive sludge, 70 tons of highly radioactive debris
Project Description:	
Gross Estimated Cost	$40 Million for K East; additional $157 million for K West (includes sludge processing)
Projected End-State	Remove all structures except reactors which are to be placed in ISS (cocooned)
Project Start and End Dates	2008 – 2019 for K East and 2032 for K West
Contractor	CH2M-Hill Plateau Remediation Corporation (CPRC)
Identifiers	ABB – 335, plus ABB - 336; PBS RL-0012

Hanford RL K East & West Reactor Basins D&D

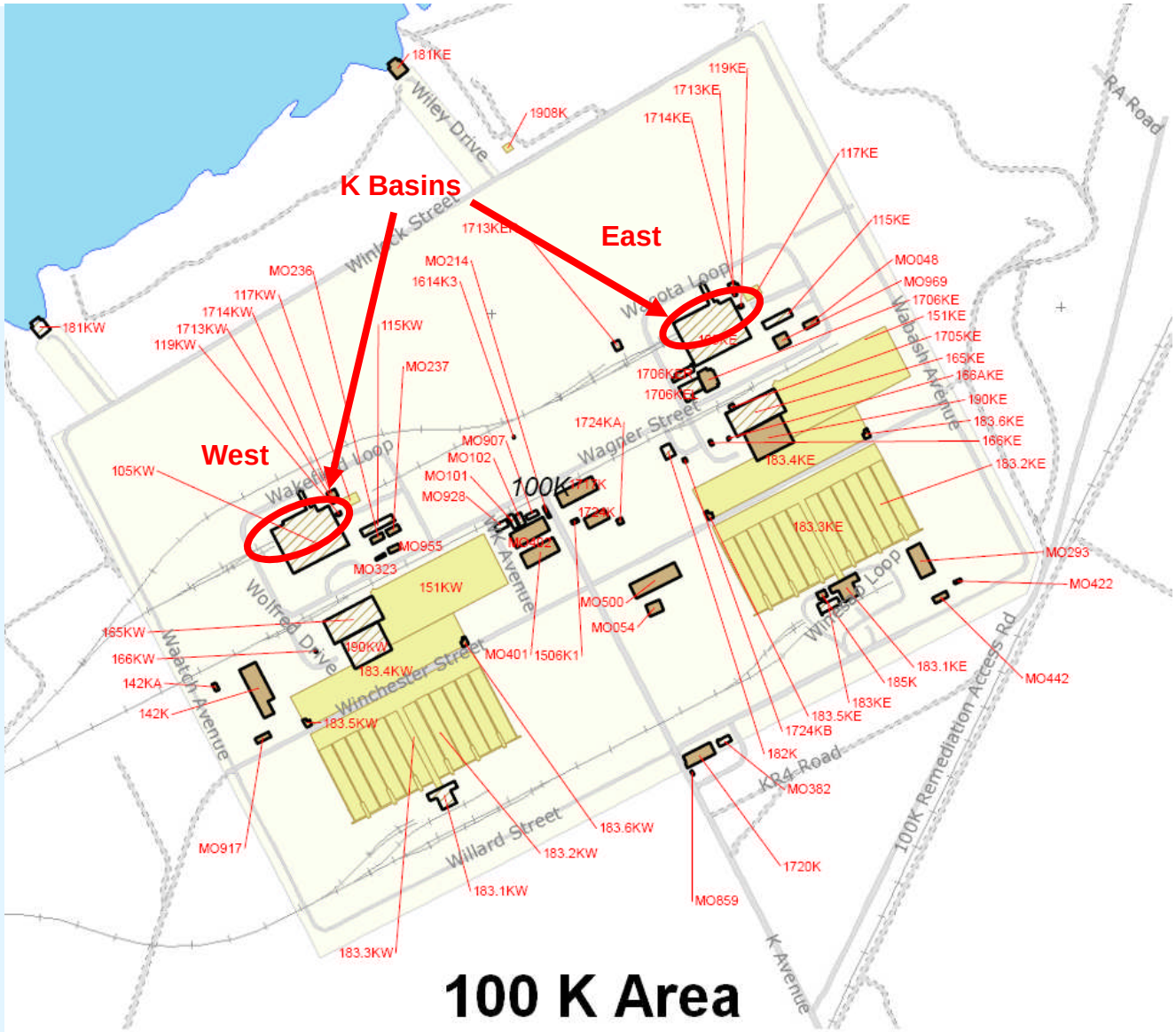
Facility Background

Built in 1955; Shut down between 1970 and 1971.

The fuel storage basins remained in operation, providing storage for up to 2,300 tons of SNF from N Reactor operations during the 1970s and 1980s. After cessation of reactor and processing operations the basins were holding SNF that remained for 20 years waiting for removal.

The highly radioactive SNF from the K Basins has been cleaned, packaged, and safely stored away from the Columbia River in the 200 Area Central Plateau.

Approximately 370 tons of radioactive debris has been removed and disposed. Sludge and sediment has been vacuumed into containers being held in K West basin for disposition.



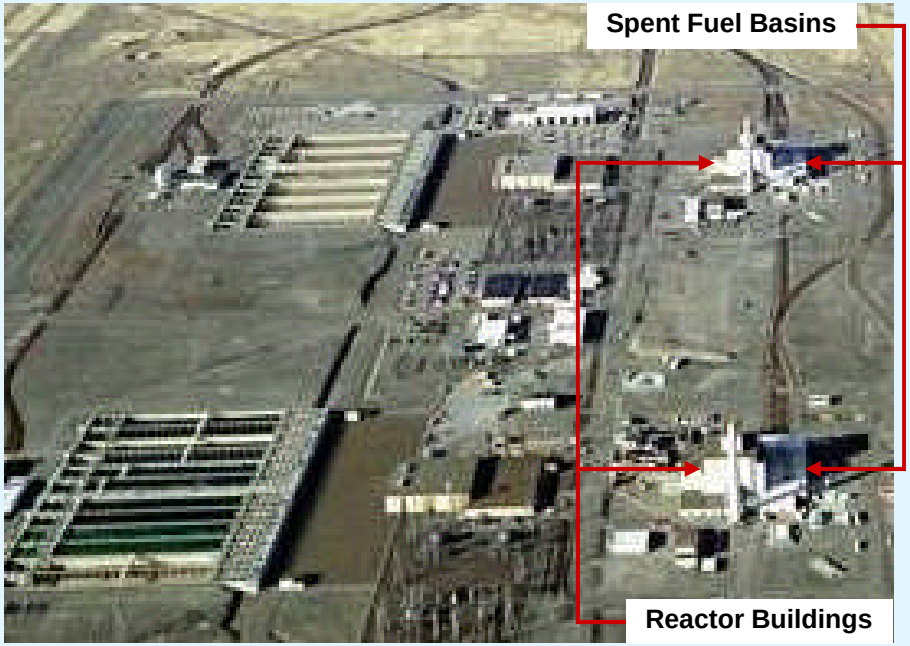
Hanford RL K East & West Reactor Basins D&D

Project Discussion

CPRC is responsible for the entire scope of the D&D and remediation of the K Areas under the new Plateau Remediation contract, which includes the reactor basins. Progress to date includes:

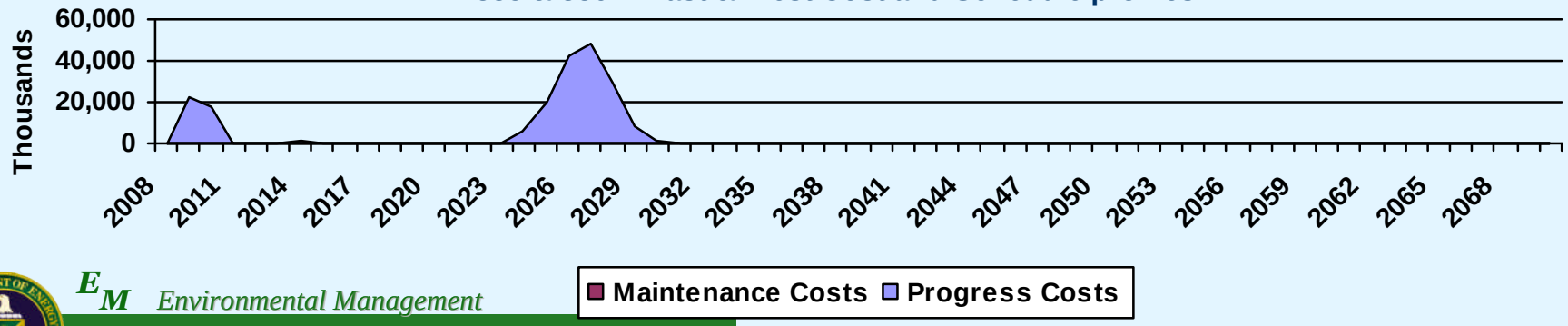
- Emptying the two basins of spent nuclear fuel (SNF), fuel storage racks, and fuel cleaning and packaging equipment.
- After pumping the K East basin sludge to K West, the water was drained and the building has been demolished; substructure demolition is occurring. Removal of encapsulated monoliths of contaminated areas and soil remediation are next.
- K West basin is storing 29 m^3 of highly radioactive sludge in containers for disposition.

A remaining challenge is processing the sludge to ensure no reactive uranium metal particles remain. Reactor decommissioning is in the planning stage for both reactors.



K East and K West Reactors, Basins, and Ancillary Structures

ABB – 335 & 336 K East & West Cost and Schedule profiles



INL RTC/PBF Reactors D&D

Project Summary Table

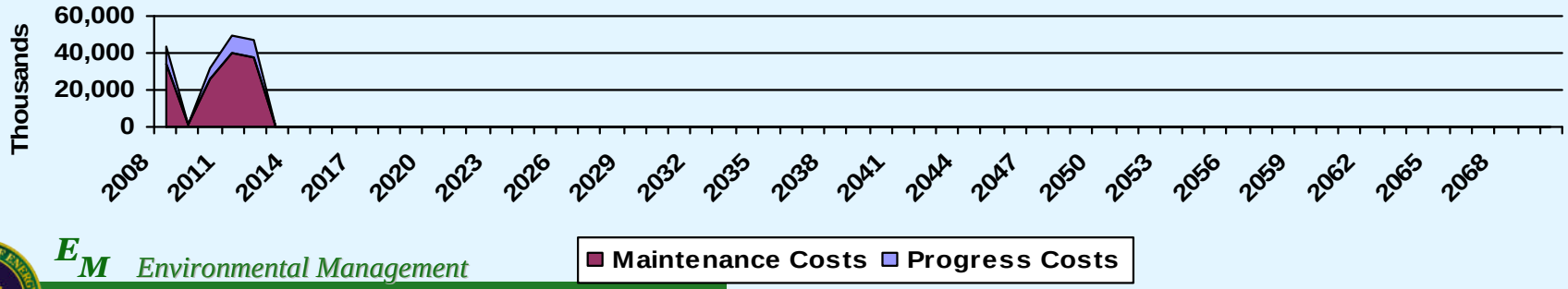
Location Description:	
Site/Area Description	Idaho National Laboratory / Reactor Technology Complex /Power Burst Facility
EM Field Office	Idaho Operations Office
Facility Description:	
Major Facility Type	Industrial, Radiological, Nuclear
No. Buildings	Approximately 26
Gross Total Building Square Feet	PBF reactor: 19,000 square foot, three-story facility. D&D has been completed. RTC: TBD
Construction	Reinforced concrete and steel structure
Current Facility State	Three defueled, obsolete, but highly radioactive reactors
Brief Background	These were test reactors for testing materials and operating methods.
Source Term	Cobalt, strontium, and cesium, tritium, lead, graphite, and uranium-235
Project Description:	
Gross Estimated Cost	$35 Million
Projected End-State	Demolition
Project Start and End Dates	2008 – 2012
Contractor	CH2M-WG Idaho, LLC
Identifiers	ABB – 109; PBS ID-0040B/C

INL RTC/PBF Reactors D&D

RTC Facility Background and Project Discussion

The most difficult projects at the Reactor Technology Complex (RTC) will be removal and demolition of the Engineering Test Reactor (ETR) and the Materials Test Reactor (MTR). Both were test reactors, used to determine the effects of radiation on a variety of materials. Although the reactors have been defueled, they contain a significant amount of highly radioactive cobalt, strontium, and cesium. The ETR has an estimated 3,000 curies of cobalt-60 inside the reactor. ETR is also expected to contain tritium contamination, and both reactors contain lead and graphite. Together, ETR and MTR contain more than 7,000 curies of irradiated beryllium, for which there is no current disposal path. Each reactor also has a highly contaminated canal and a series of cubicles from which little characterization data has been retrieved. Twenty-three excess and two high risk facilities will be safely demolished by the end of 2012.

INL RTC/PBF Reactors D&D Cost and Schedule profiles



U.S. Department Of Energy

Facility Deactivation & Decommissioning
Appendix B — D&D Project Basics

2009 Edition

A brief explanation of the DOE's Complex-wide facility D&D work

Contents

- What is D&D?
- Why is D&D Important?
- What are the DOE Facility Types being D&D?
- What are the Disposition End-State Options?
- What are the Major Challenges to the D&D Program?
- How is D&D Managed?
- Why are waste types important?
- Who are the typical Special Interests?

What is D&D?

D&D Projects encompass the many stages of taking an active/excess/abandoned facility to a final disposition end state. Various documents interchange the following words for the "D" in "D&D" projects. These labels can be overlapping in activity types. However, the general goal is the same for D&D project: reduce and ultimately eliminate risks, maintenance costs and foot print. The multiple "D" phases cause some D&D projects to be referred to as D4.

The following are general definitions:

- **Decontamination:** the removal of radiological, chemical, or hazardous contaminants to reduce the safety and health risks. The extent and costs of removing contamination influences the disposition alternatives and the subsequent D&D work methods. Decontamination can occur in any or all of the phases described below.
- **Stabilization (Deinventory) Phase**: A stabilization phase may be needed for facilities with unstable process materials requiring neutralization; for facilities with degraded infrastructure; and/or facilities with process system/pipeline holdup.
- **Deactivation Phase:** the removal of nuclear materials, process chemicals and hazardous materials and shutting down of process systems and equipment not required to maintain the safety envelope; relocation of personnel that, in combination, safely reduces or eliminates the need for costly surveillance and maintenance activities. Resulting facility is in minimum-cost, safe surveillance and maintenance condition **(long-term min-safe storage)** and ready for demolition. Frequently referred to as "cold and dark."
- **Decommissioning Phase:** The dictionary definition involves the steps to remove items necessary to maintain original mission purpose or to take out of service. Resulting facility is ready for final disposition end-state. **"Decommissioning"** is sometimes used to encompass the whole D&D and restoration process or later disposition phases. **DOE O 430.1B and associated Guides** use **"Decommissioning"** to mean final disposition process phase, post-deactivation, including various end-states. Two "reactor decommissioning" definitions: (1) all phases from de-fueling to soil remediation or (2) decommissioning occurs at post –de-fueling and ends with vacant building. Note the potential confusion if two parties are using different definitions for the scope of "decommissioning" work.
- **Disposition:** Final disposition is the end-state established for the facility such as federal reuse, release to public use, in-situ decommissioning (entombment), or demolition. **DOE O 430.1B and associated Guides** use **"Disposition Process"** to describe all D&D stages from deactivation to final end state.
- **Demolition or Dismantlement Phase:** The complete or partial removal of the facility structure. Debris is either recycled or disposed as waste depending on the type of contamination or material economics. This phase may leave bare ground, the concrete foundation, or the core structure based on end-state agreements or transition to environmental (soil & water) remediation projects.

The starting point for D&D projects varies depending on the stage or condition the facility has been left in. D&D can be funded and managed in distinct phases or as one continuous project.

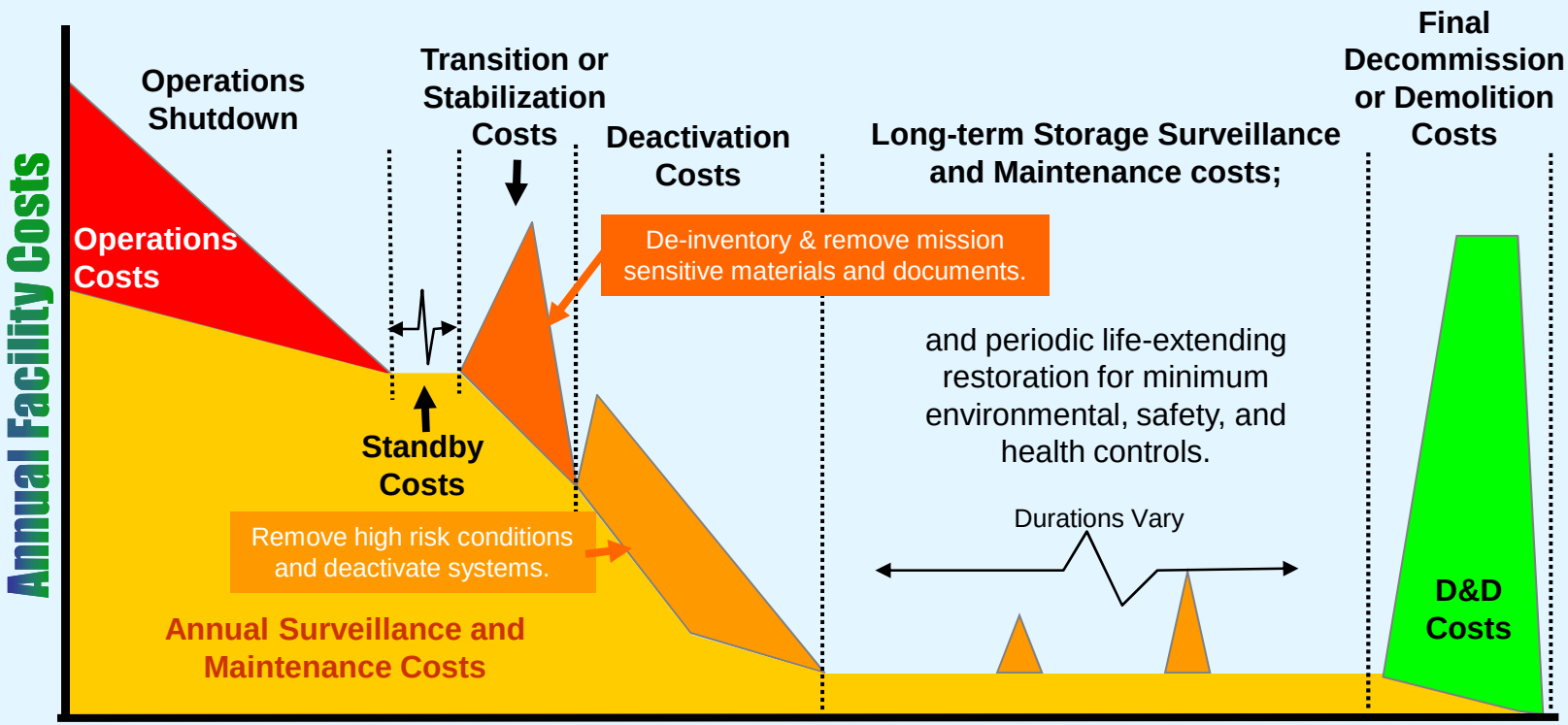
Typical D&D Costs

D&D costs of radiologically contaminated facilities vary considerably depending on the type of facility and extent of contamination.

- A rough estimate for Commercial Power Reactor D&D is about $500 Million
- Variability in DOE facilities makes generalization difficult. Rocky Flats completed D&D between 1999 and 2005. Preliminary evaluation of data indicates that average D&D costs at Rocky Flats were as follows:
  - Nuclear Facilities (Type 3): $1,200 per square foot
  - Radiological Facilities (Type 2): $800 per square foot
  - Industrial Facilities (Type 3): $100 per square foot

Typical End-of-Life Phases of a Nuclear Facility

This is the typical, conceptualized cost profile for the stages of facility disposition where the facility is transitioned from operations and deactivated to a low cost minimum surveillance and maintenance holding period until decommissioning funding is available.



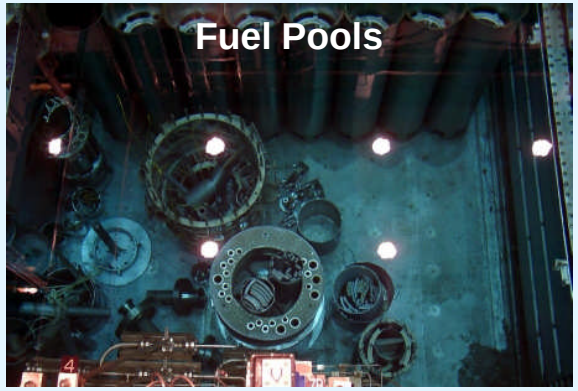
End-of-Life-Cycle Annual Costs Profile for a Radiolological Facility

Why is D&D Important?

Work Scope Background: Since the early days of the Manhattan Project, in the 1940's, the nuclear weapons program was under schedule-driven deadlines to deliver products. Costs, environment, and sometimes even safety were secondary to delivering results. Facilities were build in record-breaking size and speed, often for short-lived, mission-specific purposes. The 40 years of Cold War, from the 1950's through the 1980's drove similar production quota priorities. Old facilities were often unfunded and abandoned, as additional facilities were built for newer missions and changes in technology. As the Cold War closed and the veil of secrecy lifted, it revealed a huge environmental legacy including a large inventory of radiological facilities needing final disposition.

The key drivers for D&D are reduction in safety and environmental hazards or liability, and the reduction in facility and infrastructure footprint to reduce the associated surveillance and maintenance costs. **The longer these facilities sit, the further they degrade and the more dangerous and costly they are to maintain and/or disposition. Currently, there are more than a few facilities in such disrepair as to prohibit access to workers and as such requiring remote/robotic D&D approaches to be used.**

The goal for D&D is establishing the radiological facility end-of-life disposition path and removing facilities from the DOE EM inventory.



Facility Category Types Requiring D&D

Nuclear Facilities

Nuclear facilities contain or have contained nuclear materials that warranted robust designs both in structural mass and system redundancies. These are typically the reactor buildings, separation process canyons, nuclear process testing buildings, and nuclear materials fabrication buildings. Disposition of nuclear facilities requires detailed characterization, rigorous planning, application of appropriate technologies and thousands of man-hours of work in highly hazardous conditions.

Radiological Facilities

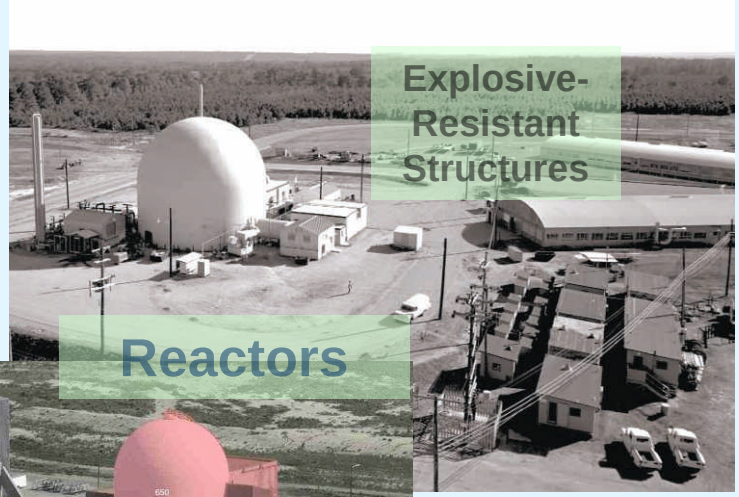
Radiological facilities are typically buildings that handled radioactive materials whose types or quantities allowed less robust structures and systems. These are typically radiological support operations such as laboratories, test facilities, or waste handling and storage buildings.

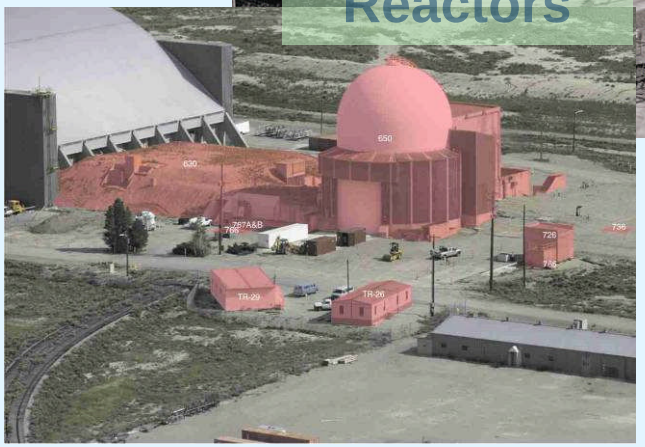
Industrial Facilities

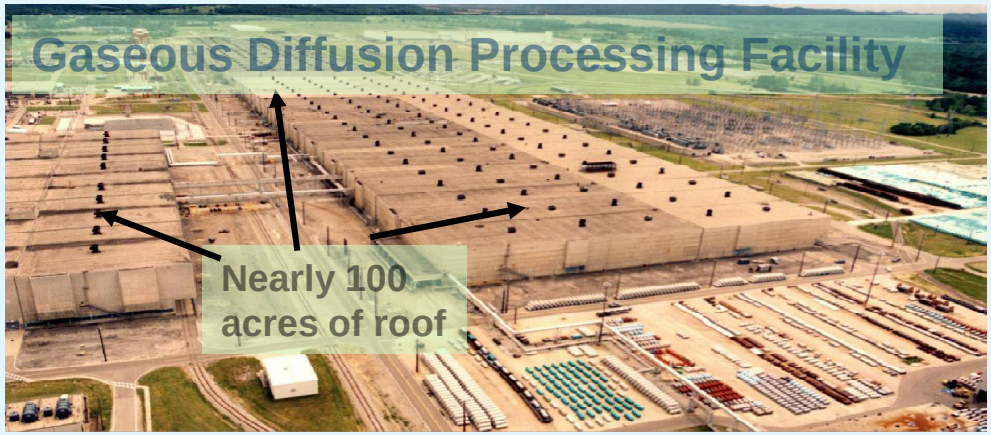
Industrial facilities are buildings and structures that provide non-radiological support operations. These can have a wide variety of hazards ranging from radioactive, chemical, and physical. These facilities include various ancillary structures whose inventory, contamination and other factors do not require categorization as nuclear or radiological hazards.

The majority of DOE's facilities are 40–50 years old; many with minimal surveillance and maintenance; some abandoned with some level of physical degradation.

Major Nuclear Facility Types To Be D&D

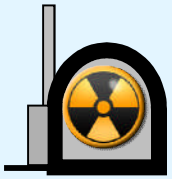




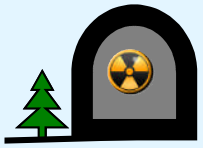


Nuclear Facility D&D End-State Options

Temporary, Partial, Complete



Long-term Min-safe Storage or S&M (cold & dark): This is a minimum safe, low-cost surveillance and maintenance storage or "moth-balled" condition. All significant quantities of nuclear materials are removed and facility is deactivated by shutting down the active safety and utility systems not required to maintain the safety envelope. The facility is monitored on a minimal cost schedule to maintain integrity of the remaining containment structures. Twenty-year structural upgrades provided as needed. Not a final end state. Allows prioritization flexibility to delay final disposition costs.



Partial D&D to Cocoon: All significant quantities of nuclear material and waste are removed and facility support buildings and utility systems are demolished. The building's central massive shield/containment structure is integrated with a new containment "cocoon" structure for passive containment of highly radioactive portions (generally the reactor core) over a minimum 50 to 100-year life with minimum monitoring. Not a final end-state. Reduces worker hazard exposure and waste disposition costs by allowing hazard reduction through natural radiological decay. This is most applicable to older, cast-in-place, reactor cores, and is the implemented strategy for the Richland reactors along the Columbia River.

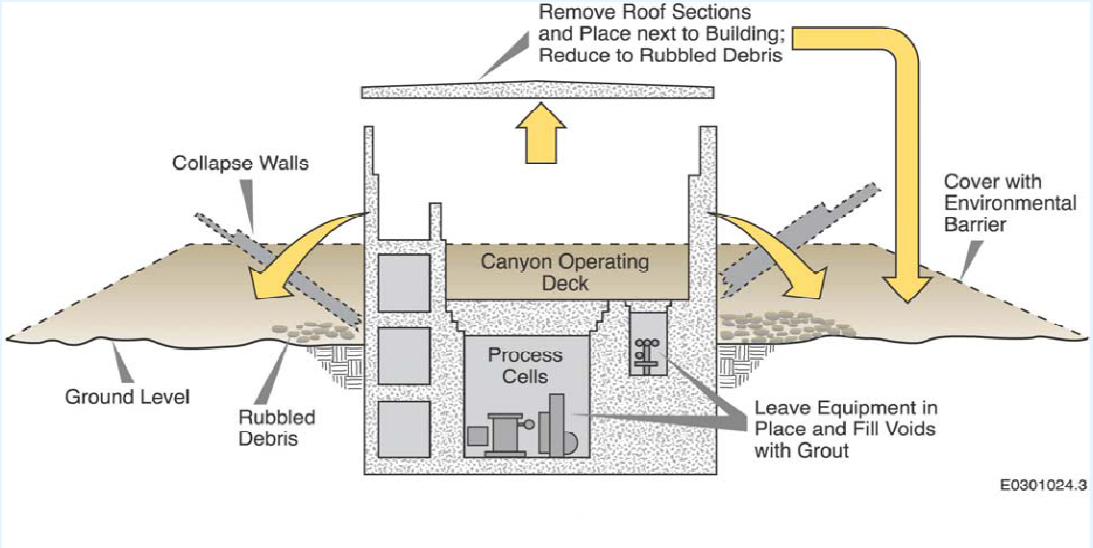
In-Situ Decommission (ISD): Similar to cocooning but considered a final end state. ISD (entombment) is designed to take advantage of the robust containment structure and grouted cavities to ensure "encapsulation" of chemicals and radioactive isotopes as required by performance assessments. Additional low level waste may be entombed in cavities prior to grouting and final capping. Minimum 1000-year life assumed in design. This strategy reduces worker safety risks and the cost of demolition and waste transportation and disposition. This is the strategy being implemented at the Richland U-Plant and Savannah River Reactor facilities.

Complete D&D: All structures and waste are removed. Most costly, but least controversial end-state.
Brownfield end-state: Property is retained for limited, controlled (limited access or industrial) uses.
Greenfield end-state (extremely high cost): property is cleaned to condition of unlimited reuse and releasable for private use.

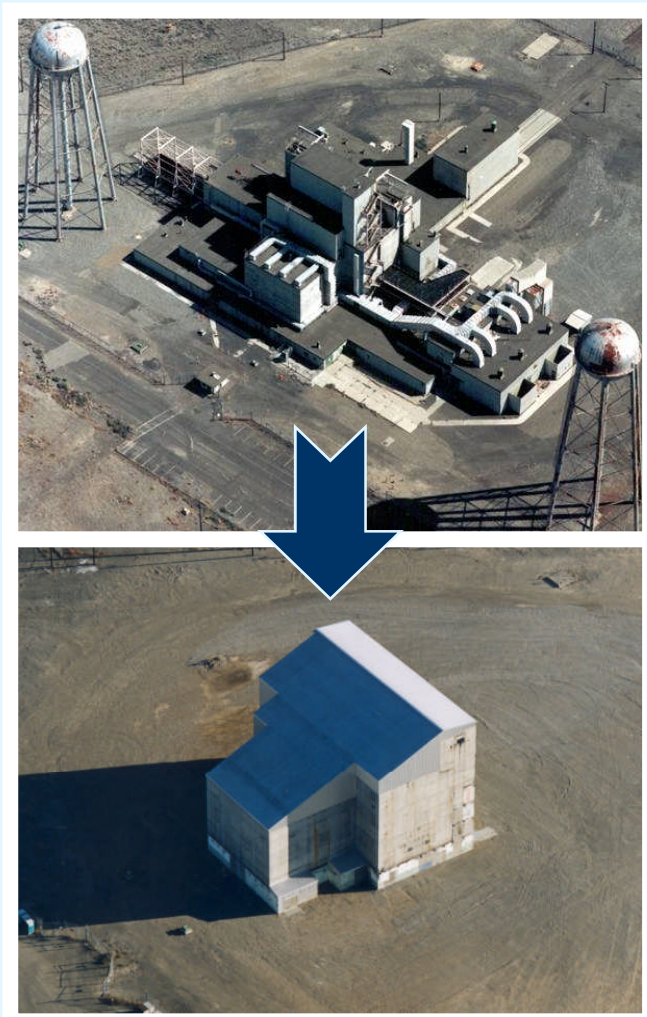
Nuclear Facility D&D Options

Cocoon or In-Situ Disposition (ISD)

Hanford "U" Canyon
In-Situ Disposition (ISD) Option



Partial D&D Hanford "C" Reactor Cocoon



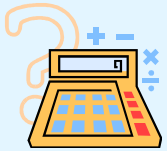
Currently limited in application to Savannah River P-Reactor and Richland U-Plant. From a planning perspective, lessons learned will be applied to the other major Richland canyons and Savannah River reactors. Planned guidance being developed by EM's Office of Engineering and Technology will establish ISD as an accepted end state and identify criteria for its use. Preliminary estimates indicates the potential cost savings can be tens of million dollars per facility.

Major Challenges to D&D Program

Lack of Priority – D&D has been a lower EM priority in risk based prioritization. Most facilities are maintained at a minimum surveillance and maintenance cost, in various states of partial or complete shutdown and are not seen as high risks requiring immediate disposition. However, some old facilities are not maintained and even those facilities in long-term storage have a limited life before major investments must be considered to maintain ability to safely enter the deteriorating structures for D&D work. Experience throughout the complex (most recently at Oak Ridge K-25 project) has repeatedly demonstrated the increased risks and project costs resulting from deferred D&D.

Non-EM Facilities/Future Liabilities/Expanding Scope – EM inherited a large backlog of legacy facilities from fifty years of nuclear research and operations. Other Program Offices continue to identify additional surplus facilities to be transferred to EM for D&D in the 5+ out-years. This backlog is continuing to grow. The 2008 evaluation of proposed transfers from NNSA, SC and EM estimated over 300 facilities and a cost range exceeding $6 Billion.

Negotiations to Resolve Final End-State – Each site has its own unique combination of stakeholders with their separate and often conflicting interests. Citizen advisory boards are established to create a forum where these conflicting positions can be discussed and compromise solutions defined that allow the D&D projects to move toward an established and agreed upon goal.



Risk Modeling – In parallel to the political interests of the end-state, there are the technical issues for establishing confidence that the end-state is safe and environmentally sound. This requires extensive characterization and risk modeling to define the most cost-effective end-state technical requirements.

Waste Disposition Mapping – One of the earliest strategic planning elements of D&D is characterizing the sizes and conditions of the facilities, and the type and levels of contamination. From this characterization, the classifications and volumes of generated waste are estimated to determine that each type of waste has, or will have, a disposition path and final destination. Disposition for wastes with no disposition paths are difficult, expensive and time consuming efforts.

How is DOE D&D Managed?

- **EM Management D&D Strategy and Budgeting Priority**:
  - Highest risk reduction
  - Highest S&M cost reduction (often interdependent with high risk)
  - High value (visibility) foot print reduction
- Some sites are managed by DOE Environmental Management (EM) as a total site environmental restoration project and some D&D projects are managed by EM in cooperation with NNSA or SC Operations at their sites for selected facility foot print reduction within an operating site.
- Most D&D projects are managed under a letter of agreement with the EPA as CERCLA "non-time-critical removal" projects with DOE EM as the lead agency.
- DOE is self-regulated for radiological waste under the AEA and uses DOE O 435.1 for waste management and oversight guidance. DOE also uses many Orders and Guides in project management, safety, conduct of radiological operations, and quality assurance.

DOE Facility D&D Specific Guides & Standards are also used to aid in the development, planning, and implementation of requirements and activities.

- DOE G 430.1-2 **Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition**
- DOE G 430.1-3 **Deactivation Implementation Guide**
- DOE G 430.1-4 **Decommissioning Implementation Guide**
- DOE G 430.1-5 **Transition Implementation Guide** – provides guidance for transitioning from facility operations to S&M and/or D&D.

Why Are Waste Types Important?

The wastes resulting from D&D activities have various levels of hazardous constituents. Disposal sites are licensed to accept waste within established limits. Therefore, D&D waste must be segmented into the types that can be sent along the appropriate disposal path. Radiological and hazardous waste costs are driven by stricter disposal standards, higher fees, and longer shipping routes to remote locations. Some waste disposition paths are hard to establish (and a few are not resolved) and will define the critical path of the project schedule. The general D&D goal is to minimize the most expensive waste types. General types of waste (in order of increasing costs to disposition) are as follows:

Reusable equipment or recyclable materials: clean or decontaminated items with marketable value are sold through excess process. **A DOE moratorium prohibits recycling metals from a radiological area. Resolving this moratorium could potentially result in significant cost offsets.**

Commercial waste or fill material: Uncontaminated waste materials can be taken to commercial landfills, or waste disposal sites.

Hazardous waste: Waste made up of or contaminated with chemicals and/or bio-hazards that are classified as harmful to life. Hazardous waste is incinerated or buried at facilities licensed for this type of waste.

Low-level Waste (LLW): Waste that is contaminated at low thresholds with radioactive isotopes makes up the majority of D&D waste. LLW can be disposed at licensed LLW burial grounds, either remote or on site, if on site burial operation is established.

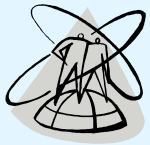
Mixed Waste or Mixed LLW (MW or MLLW): Hazardous waste that has radiological contamination or vice-versa. This waste is difficult to dispose of due to the dual category that disposal licenses rarely allow.

Transuranic Waste (TRU): Waste that is contaminated to thresholds, with primarily long-life, man-made alpha/beta emitters such as plutonium. Presently the Waste Isolation Pilot Plant (WIPP) is the only licensed disposal site for TRU waste.

High-Level Waste (HLW): Waste that is made up of materials with high levels of radioactivity, mostly gamma/ neutron emitters. This waste is kept in shielded dry casks or submerged in water pools at origin sites or licensed temporary storage sites until a HLW disposal site is licensed by the NRC.

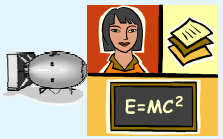
Major Special Interest Group Types

DOE sites have many stakeholders and private citizen groups with interests in the outcome or final disposition end-state of the D&D projects. To help resolve the inherent conflicts and manage the input of these interest groups, DOE assists in the creation of **Citizen Advisory Boards (CABs)**. These CABs provide a venue for building consensus and getting rational public input to the projects. Interest groups are generally motivated to:



Retain or Revitalize the Nuclear Mission: Groups that are interested in retaining the jobs and financial support structure that exists. Try to maintain the status quo as much as possible.

Convert Facilities to Commercial / Industrial / Research: Groups that support cleanup but want to retain the economic vitality by finding new federal missions or private businesses.



Historical Preservation: Groups that want to preserve areas and facilities for their scientific, World War II or Cold War historical significance.

Pristine Environmental Restoration: Groups that want to remove all trace of the facilities and return the land to some form of nature park or preserve for public access.

Native American Rights: Native American Groups that want to regain rights or access for historical or sacred traditions.

U.S. Department Of Energy

Facility Deactivation & Decommissioning
Appendix C — D&D Sites & Projects

2009 Edition

This document presents an overview of the major sites
and their list of projects yet to be accomplished.

DOE EM D&D Project Sites

- **Hanford (Richland & River Protection) Site, Richland, Washington**
- **Savannah River Site, Aiken, South Carolina**
- **Paducah Site, Paducah, Kentucky**
- **Idaho National Laboratory D&D Projects, Idaho Falls, Idaho**
- **Portsmouth Site, Piketon, Ohio**
- **Oak Ridge Reservation, Oak Ridge, Tennessee**
- **West Valley Site, West Valley, New York**
- **Los Alamos National Laboratory, Los Alamos, New Mexico**
- **Knolls Atomic Power Laboratory, Niskayuna, New York**
- **Brookhaven National Laboratory, Long Island, New York**
- **Argonne National Laboratory, Chicago, Illinois**
- **Energy Technology Engineering Center, Eastern Ventura County, California**
- **University Of Arkansas, Strickler, Arkansas**

D&D cost estimates shown in this summary document are taken from ABBs submitted in 2008. The projects' costs, used here to define and sort project size, reflect only the "progress" dollars for the D&D activities. Surveillance and maintenance costs and progress costs are shown in the graphic cost profiles. Project close out costs may extend beyond the D&D End Year.

Projects categorized as "Top 25" are described in Appendix A. This Appendix provides a site overview of all D&D activities. The balance of specific project descriptions will be completed in 2010.

Hanford Site Cleanup Projects Richland, Washington

The Hanford DOE Site is managed by EM's Richland Field Office and EM's Office of River Protection and a laboratory campus (Pacific Northwest National Labs [PNNL]) managed by the Office of Science (SC).

Richland Field Office has two major cleanup programs and three major contractors:

- River Corridor Closure D&D and Remediation Project, contracted to the Washington Closure Hanford Corp (WCH)
- Central Plateau D&D and Remediation Project, contracted to the CH2MHill Plateau Remediation Corporation (CPRC)
- Hanford Site-wide Infrastructure Support Services, contracted to Fluor Hanford Inc (FHI)

Office of River Protection has the Liquid Waste Tanks cleanup and a Vitrification Plant construction project:

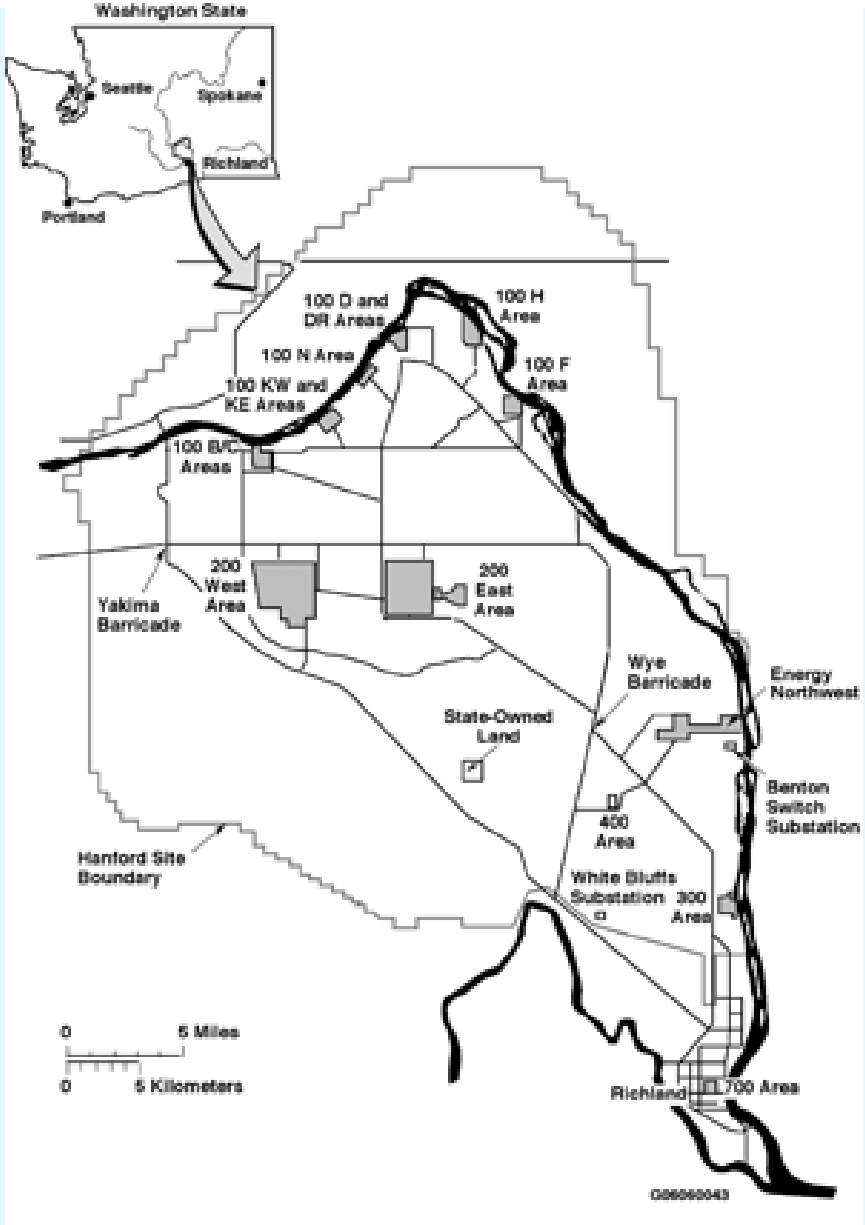
- Tank Waste Farms D&D and Remediation Project, contracted to Washington River Protection Solutions (WRPS).
- Waste Immobilization and Treatment Plant (WTP) construction project, contracted to Bechtel National-River Protection (BNRP)

Hanford Site

D&D Projects

Richland HANFORD SITE		
Facility Type	**Completed as of FY 08**	**Remaining (Life-cycle)**
Nuclear	28	52
Radiological	49	284
Industrial	336	711

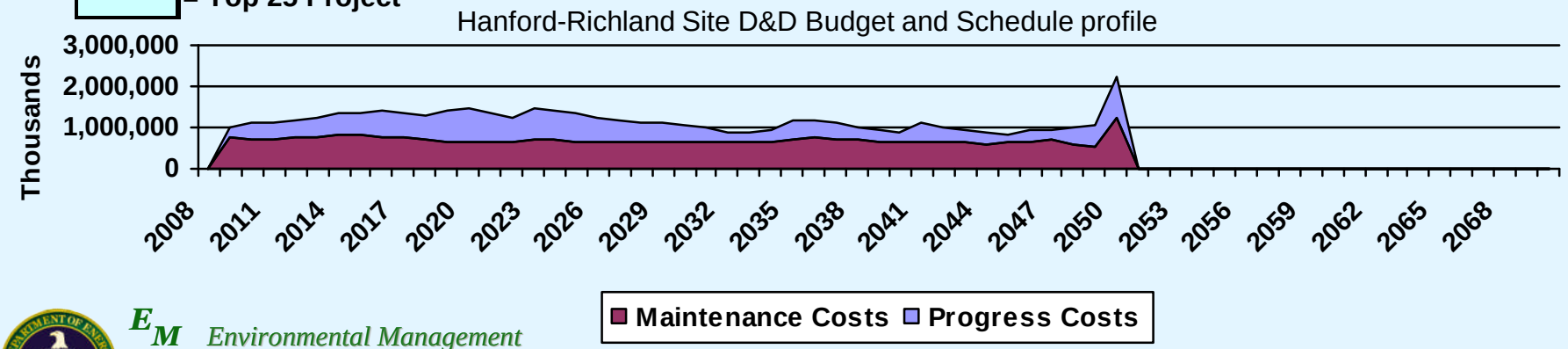
River Protection HANFORD SITE		
Facility Type	**Completed as of FY 08**	**Remaining (Life-cycle)**
Nuclear	0	18
Radiological	0	114
Industrial	0	128



Hanford-Richland Site D&D Projects

Site	ABB ID	Project (ABB) Name	D&D Total Cost ($Million)	D&D Duration (yrs)	Project Start Year	Project End Year
Richland Operations Office	331	**PFP Disposition (D4)**	$1,097	11	2009	2019
Richland Operations Office	403	**Zone 11 (PUREX Zone)**	$790	10	2009	2027
Richland Operations Office	408	**Zone 18 (U Plant Zone)**	$409	17	2009	2026
Richland Operations Office	417	**FFTF D4**	$365	22	2009	2030
Richland Operations Office	414	**River Corridor Nuclear Fac D&D**	$105	10	2009	2030
Richland Operations Office	335	**K East Basin D&D**	$40	2	2009	2010
Richland Operations Office	336	**K West Basin D&D**	$157	8	2014	2030
Richland Operations Office	402	**Zone 1 (200-E Admin Zone)**	$408	11	2016	2048
Richland Operations Office	406	**Zone 12 (REDOX Zone)**	$537	16	2018	2047
Richland Operations Office	407	**Zone 17 (T Plant Zone)**	$865	11	2018	2044
Richland Operations Office	409	**Zone 23 (100 Area)**	$26	2	2024	2025
Richland Operations Office	410	**Zone 26 (400 Area)**	$145	6	2018	2036
Richland Operations Office	411	**Zone 5 (B Plant Zone)**	$993	13	2018	2041
Richland Operations Office	412	**Zone 7 (CSB Zone)**	$121	6	2017	2033
Richland Operations Office	413	**Zone 9 (ETF Zone)**	$12	4	2017	2020
Richland Operations Office	418	**Sodium Disposition**	$307	15	2015	2029

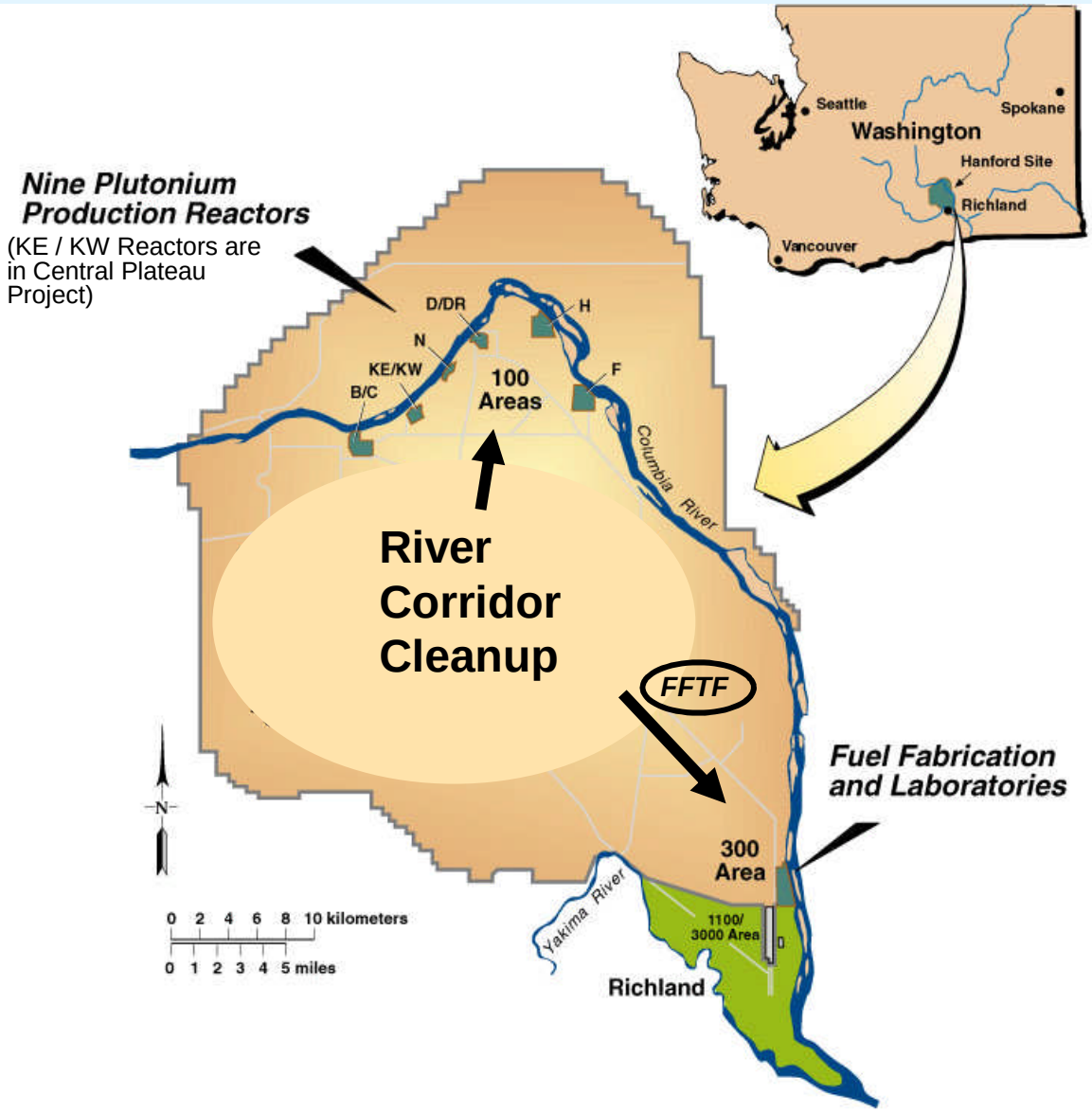
= Top 25 Project



Hanford Richland - River Corridor Cleanup Project

D&D Areas & Projects

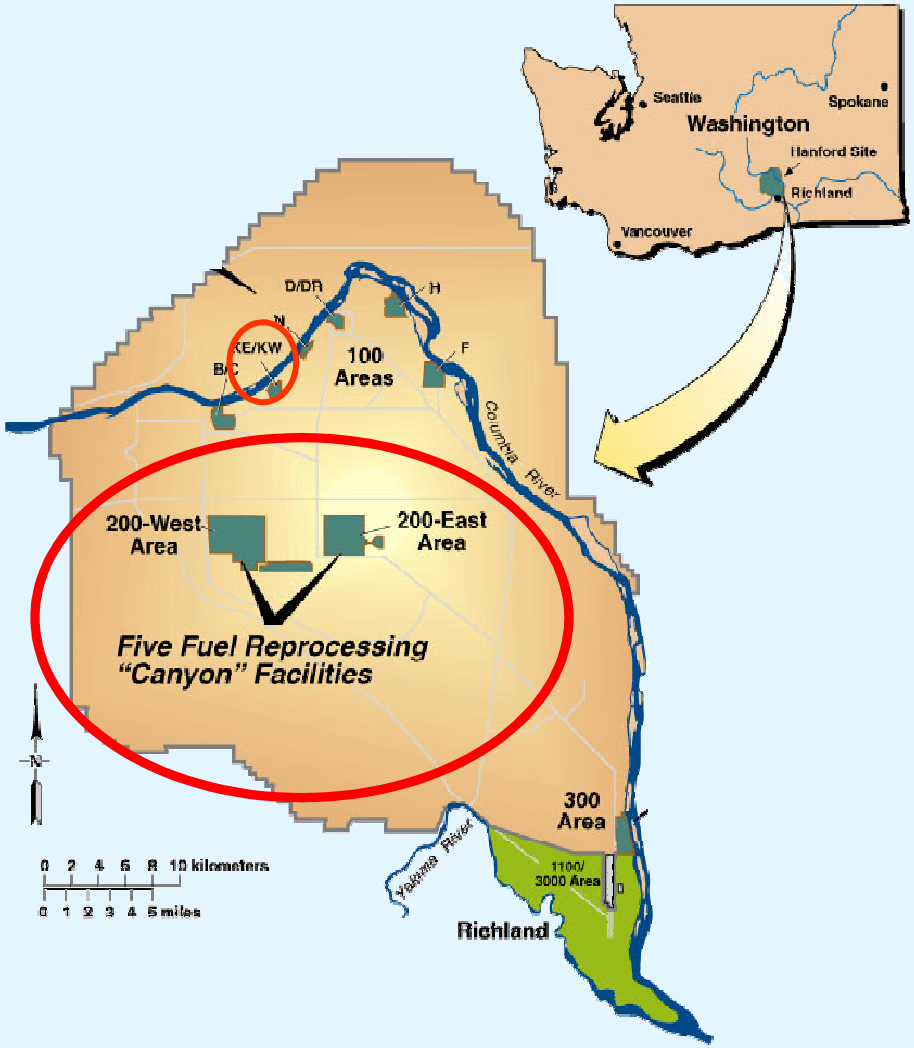
- **Hanford River Corridor Project**
  - 100 Area Reactors (B,C,D,DR,F,H,N)
    - *Reactors Cocooning Completed:*
      - *Reactor C - 1998*
      - *Reactor DR - 2002*
      - *Reactor F – 2003*
      - *Reactor D – 2004*
      - *Reactor H – 2005*
  - 300 Area Uranium Fuel Processing & Testing Facility
  - 400 Area Facility
    - Fast Flux Test Facility (FFTF) Reactor and Sodium disposition



Hanford Richland – Central Plateau

D&D Areas & Projects

- Central Plateau Isotope Separations Processing & Waste Facilities
  - 200 East
    - B Plant/ Waste Encapsulation & Storage Facility (WESF)
    - Plutonium/Uranium Extraction Plant (PUREX)
    - C Plant
  - 200 West
    - Plutonium Finishing Plant (PFP)
    - U Plant
    - T Plant
    - Uranium Oxide Plant
    - Reduction Oxidation (S) Plant (Redox)
  - 100 Area; K East, K West

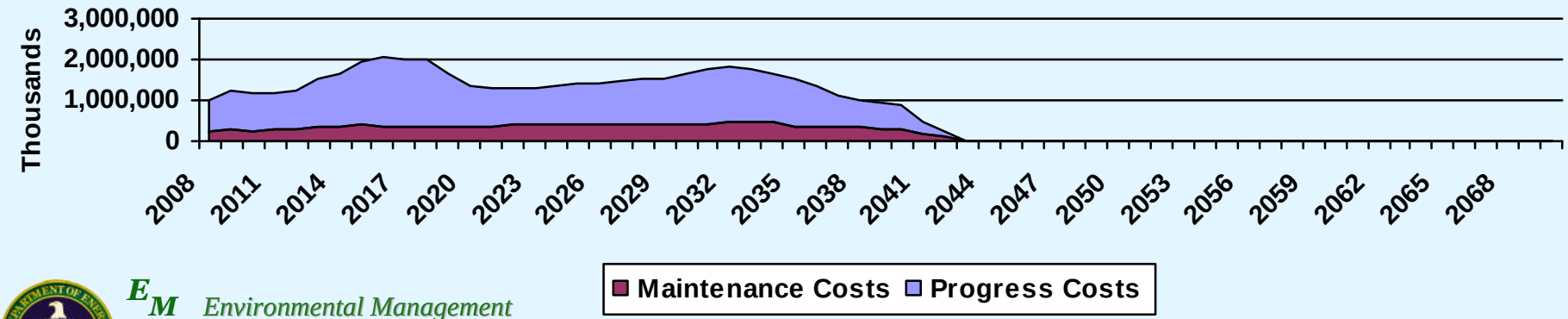


Hanford – River Protection Site D&D

Site	ABB ID	Project (ABB) Name	D&D Total Cost ($Million)	D&D Duration (yrs)	Project Start Year	Project End Year
River Protection	147	**Tank Farm D&D**	$436	30	2013	2042
River Protection	154	**WTP D&D**	$1,132	5	2038	2042

= **Top 25 Project**

Hanford - River Protection Site D&D Budget and Schedule profile



Savannah River Site D&D Projects Aiken, SC

Savannah River Operation Office includes two major cleanup programs:

- General site facility D&D and Remediation, contracted to Savannah River Nuclear Solutions (SRNS).
- Liquid Waste Tanks Disposition, contracted to Washington Savannah River Corp (WSRC).

The overall strategy at Savannah River is to perform integrated area closures, including facility D&D, soil cleanup and groundwater remediation.

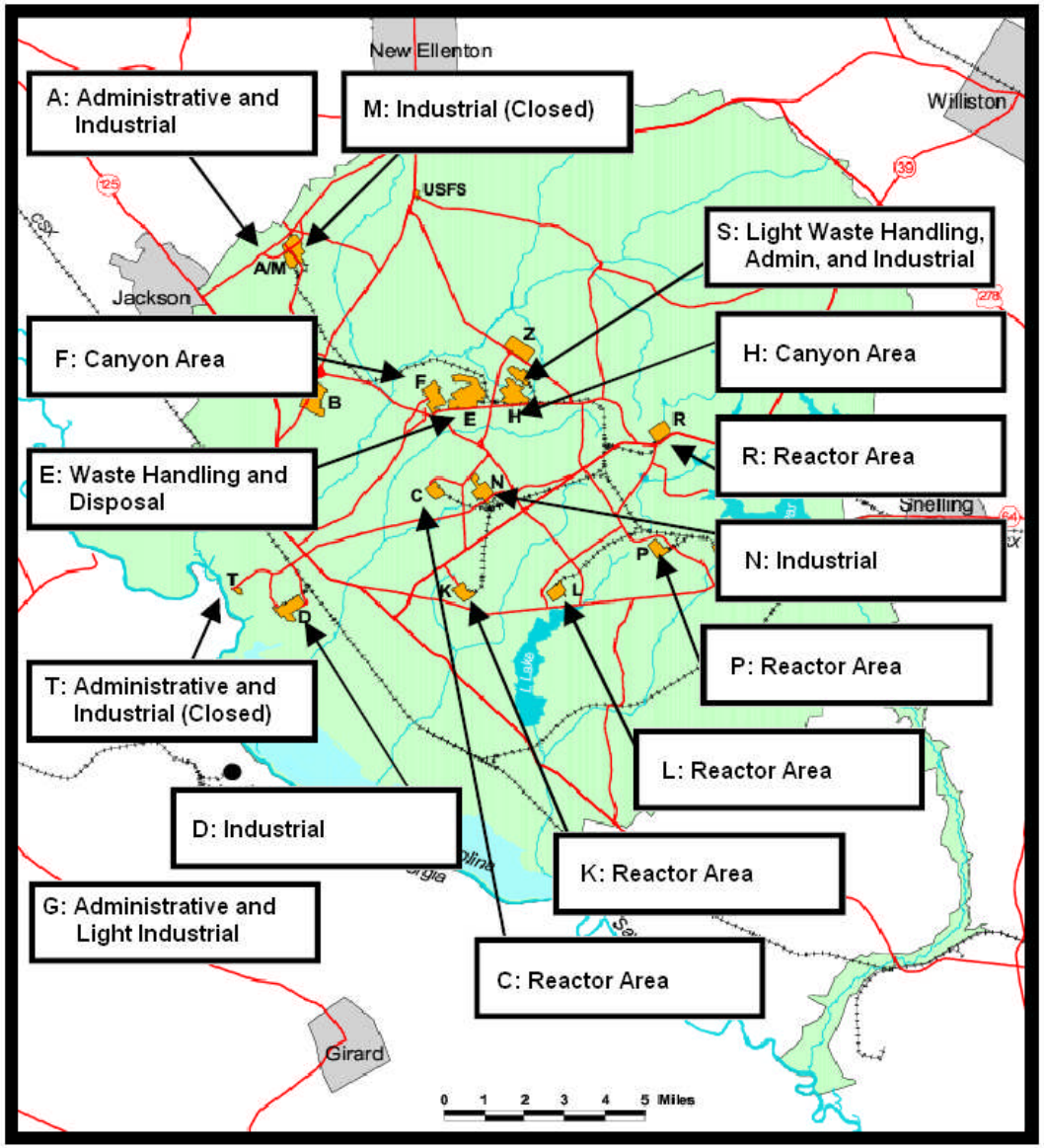
Area closures are planned to consolidate operations to the center of the site.

Savannah River Site D&D Projects

Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	11	180
Radiological	8	32
Industrial	232	527

Reactor Name	Start-up Date	Shutdown Date	D&D Start Date
R-reactor	1953	1964	2014
P-reactor	1954	1988	2014
K-reactor	1954	Standby 1992	2020
L-reactor	1954	1988	2024
C-reactor	1955	1985	2015

Baseline Cost for all Reactor D&D assumes, and is dependent, on, the successful implementation of In-Situ Decommissioning (Entombment)

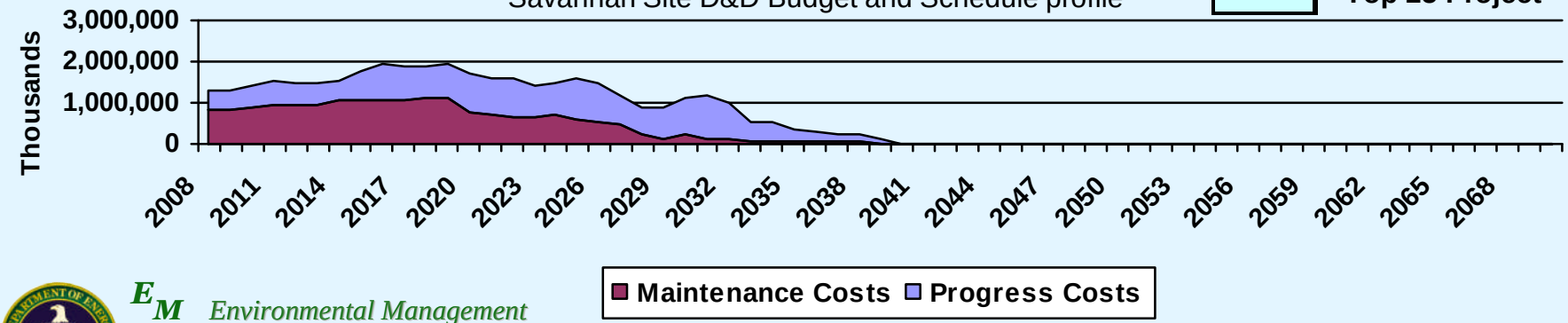


Savannah River Site Areas & ABBs

Site	ABB ID	Project (ABB) Name	D&D Total Cost ($Million)	D&D Duration (yrs)	Project Start Year	Project End Year
Savannah River Site	60	**F Area D&D**	$1,046	21	2008	2035
Savannah River Site	62	**H Area D&D**	$1,530	21	2014	2035
Savannah River Site	70	**S Area D&D**	$299	6	2027	2032
Savannah River Site	63	**J Area D&D**	$215	6	2027	2032
Savannah River Site	64	**K Area D&D**	$207	9	2020	2030
Savannah River Site	65	**L Area D&D**	$160	9	2024	2032
Savannah River Site	57	**C Area D&D**	$142	9	2015	2030
Savannah River Site	68	**P Area D&D**	$109	7	2014	2030
Savannah River Site	69	**R Area D&D**	$101	6	2014	2019
Savannah River Site	55	**A Area D&D**	$81	6	2021	2031
Savannah River Site	67	**N Area D&D**	$72	8	2022	2031
Savannah River Site	56	**B Area D&D**	$65	4	2028	2031
Savannah River Site	73	**Z Area D&D**	$46	4	2029	2032
Savannah River Site	61	**G Area D&D**	$22	10	2014	2031
Savannah River Site	59	**E Area D&D**	$21	5	2027	2031
Savannah River Site	72	**U Area D&D**	$9	4	2021	2024
Savannah River Site	58	**D Area D&D**	$9	4	2014	2031
Savannah River Site	66	**M Area D&D**	$4	2	2023	2030
Savannah River Site	71	**T Area D&D**	$1	2	2030	2031

Savannah Site D&D Budget and Schedule profile

= **Top 25 Project**



Paducah Gaseous Diffusion Plant Paducah, KY

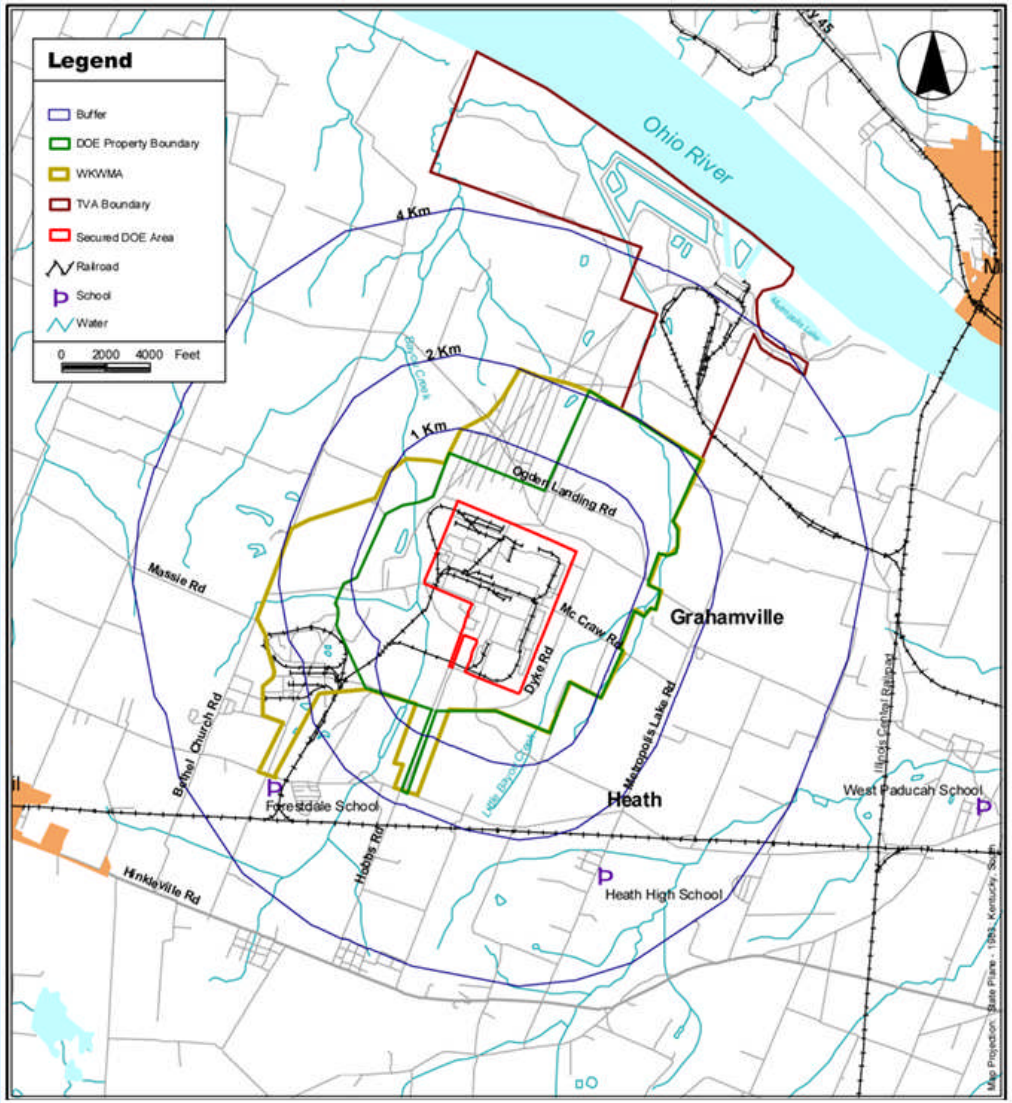
Nuclear Facility D&D Project

The Paducah Site Uranium Operations (cold standby) are managed by United States Enrichment Corporation (USEC), a private corporation.

Paducah Site Infrastructure Support, D&D and Remediation are managed by the Portsmouth-Paducah Project Office (PPPO), in Lexington, Kentucky:

- Site remediation and D&D is contracted to Paducah Remediation Services (PRS).
- Site Infrastructure Support service is contracted to Swift & Staley Team (SST).
- DUF6 Treatment Plant is being built and started up by Uranium Disposition Services (UDS).

D&D at Paducah



Paducah Site D&D Projects

Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	0	18
Radiological	2	20
Industrial	12	160

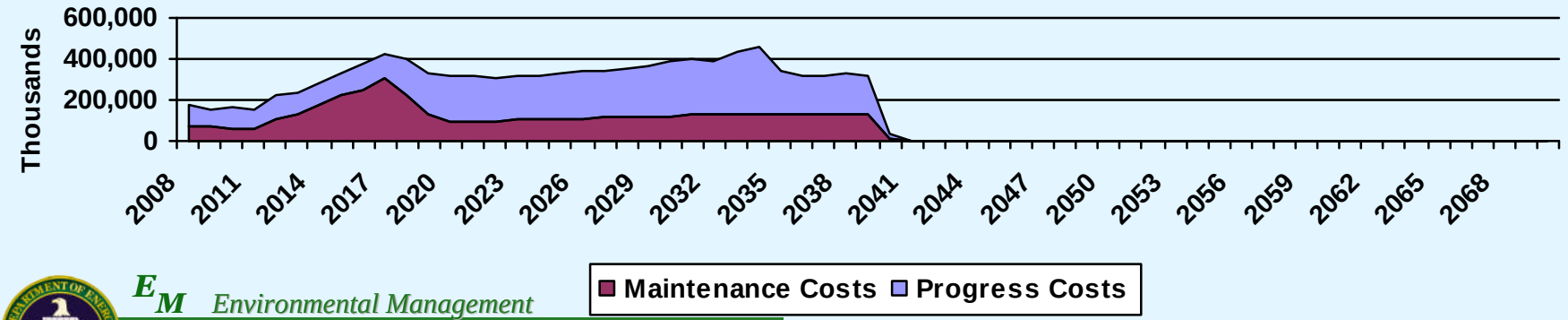
The plant was opened in 1952 as part of a U.S. government program to produce highly enriched uranium to fuel military reactors and produce nuclear weapons. Enrichment at Paducah originally was limited to low levels, and the plant served as a "feed facility" for other defense plants in Oak Ridge, Tennessee, and Piketon, Ohio, where the enriched uranium was processed. That mission changed in the 1960s, when Paducah, along with its sister plant in Piketon, began to enrich uranium for use in commercial nuclear reactors to generate electricity.

The former gaseous diffusion plant buildings are in the process of being transitioned to D&D by the existing site remediation contractor, and a request for proposal has been issued for the separate D&D contract for this project. D&D will first require the removal and disposition of hundreds large centrifuges.

Site	ABB ID	Project (ABB) Name	D&D		Project	
			Total Cost ($Million)	Duration (yrs)	Start Year	End Year
Paducah Gaseous Diffusion Plant	199	**GDP D&D**	$3,747	29	2012	2040
Paducah Gaseous Diffusion Plant	200	**Inactive Facility D&D**	$122	10	2008	2017

= **Top 25 Project**

Paducah Site D&D Budget and Schedule profile



The U. S. Department of Energy (DOE) - Idaho Operations are managed under the Office of Nuclear Energy (NE), and is contracted to the Battelle Energy Alliance. Idaho cleanup projects are managed under the Office of Environmental Management (EM). In addition to decommissioning hundreds of facilities, EM manages and dispositions radioactive and hazardous wastes and spent nuclear fuel (SNF) that originated from Cold War activities at the Idaho National Laboratory (INL) Site. The Advanced Mixed Waste Treatment Project is contracted to Bechtel-B&W Idaho (BBWI). The rest of the Idaho site cleanup is contracted to CH2MHill- Washington (now URS) Group Idaho (CWI).

Idaho National Laboratory D&D Projects

Idaho Falls, Idaho

INL is on the United States Environmental Protection Agency National Priorities List. Environmental remediation/D&D activities are underway or have been completed at ten Waste Area Groups encompassing about one hundred operable units, including the Naval Reactors Facility (NRF) and the Materials and Fuels Complex (MFC), formerly known as Argonne National Laboratory-West.
(The INL Site Environmental Management Program is not responsible for activities at the NRF or the MFC.)

Idaho National Laboratory D&D Projects

Test Area North (TAN) Technical Support Facility (TSF) Complex before demolition

Test Area North (TAN) Technical Support Facility (TSF) Complex after demolition (May 2008)

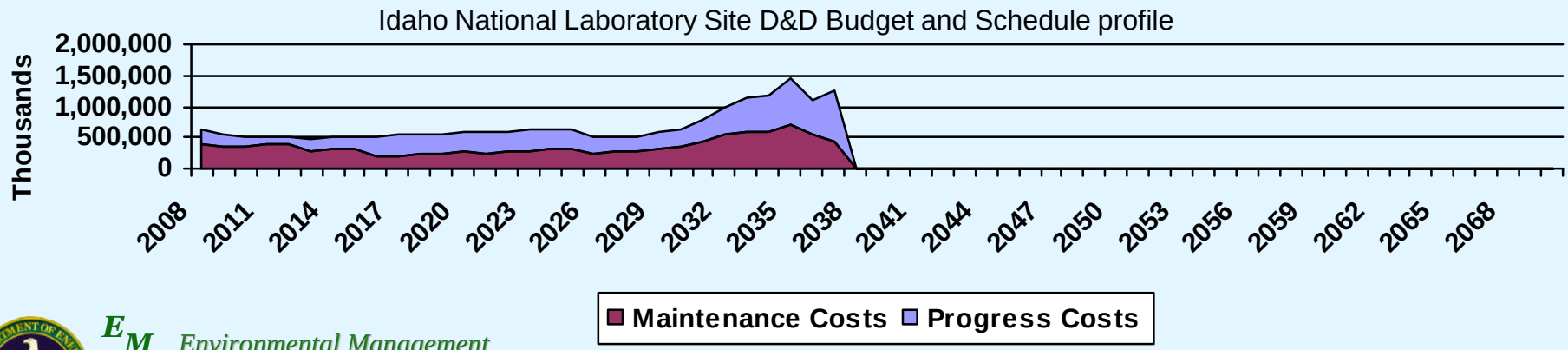
Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	24	51
Radiological	32	18
Industrial	136	126

D&D Projects at the Idaho National Laboratory (INL)

The Idaho Cleanup Project spans 890 square miles and includes five geographic areas: Idaho Nuclear Technology and Engineering Center (INTEC), Radioactive Waste Management Complex (RWMC), Test Area North (TAN), Reactors Technology Complex (RTC, formerly Test Reactor Area), and the Power Burst Facility. The project also includes several laboratories 50 miles east of Idaho Falls.

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($Million)	Duration (yrs)	Start Year	End Year
Idaho National Laboratory	107	**INTEC D&D -- remainder**	$1,134	22	2008	2037
Idaho National Laboratory	109	**RTC/PBF D&D**	$35	5	2008	2012
Idaho National Laboratory	111	**TAN D&D**	$9	22	2008	2037
Idaho National Laboratory	105	**AMWTP D&D**	$292	17	2021	2037
Idaho National Laboratory	110	**RWMC D&D**	$82	17	2021	2037
Idaho National Laboratory	106	**INTEC D&D -- 601 & 640**	$79	17	2021	2037
Idaho National Laboratory	84	**SNF Final Disposition (D&D)**	$104	1	2035	2035
Idaho National Laboratory	93	**Calcine Disposition (including Bin Sets) - D&D**	$762	2	2036	2037

= **Top 25 Project**



Portsmouth Gaseous Diffusion Plant

Nuclear Facilities D&D Project, Piketon, Ohio

The Portsmouth Site Uranium Operations are managed by United States Enrichment Corporation (USEC), a private corporation.

Portsmouth Site Infrastructure Support, D&D and Remediation are managed by the Portsmouth-Paducah Project Office (PPPO), in Lexington, Kentucky:

- Site remediation and D&D is contracted to LATA Parallax Portsmouth (LPP).
- Site Infrastructure Support service is contracted to Theta Pro2Serve Mgmt (TPM).
- DUF6 Treatment Plant is being built and started up by Uranium Disposition Services (UDS).

D&D at Portsmouth

The Energy Policy Act of 1992 (EPAct) created the United States Enrichment Corporation (USEC), a wholly owned Government corporation, to initiate the transfer of the uranium enrichment operation to the private sector. The act transferred the DOE uranium enrichment enterprise, primarily the Paducah and Portsmouth Gaseous Diffusion Plant (GDP) sites to USEC. In 2000, USEC ceased enrichment operations at the Portsmouth GDP site. As a matter of energy security policy, the Department in 2001 placed a portion of the Portsmouth GDP site on cold standby.

Deactivation and cold shutdown was completed in 2008 and a draft Request for Proposal was issued the same year. Uranium was enriched in a sequence, starting in X-333, then X-330, and finally, X-326. D&D will be performed in the same sequence, based on the enrichment process, from lower radiological levels in X-333 to the highest in X-326, where 90% HEU was produced.

Portsmouth D&D Projects

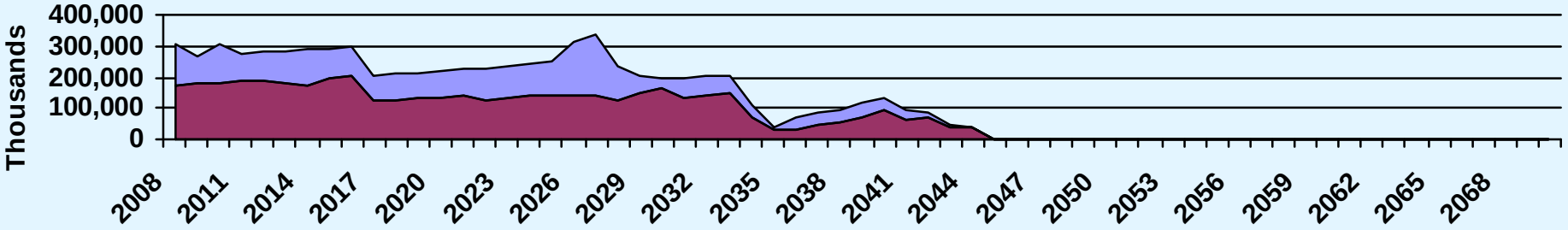
Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	0	13
Radiological	7	20
Industrial	7	114

Demolition of the Inactive X-770 Mechanical Test Facility in early 2007

Site	ABB ID	Project (ABB) Name	D&D Project			
			Total Cost ($Million)	Duration (yrs)	Start Year	End Year
Portsmouth Gaseous Diffusion Plant	167	**D&D of the Process Buildings**	$424	22	2012	2033
Portsmouth Gaseous Diffusion Plant	166	**D&D Balance of Plant (A1 and A2)**	$147	5	2030	2034

= Top 25 Project

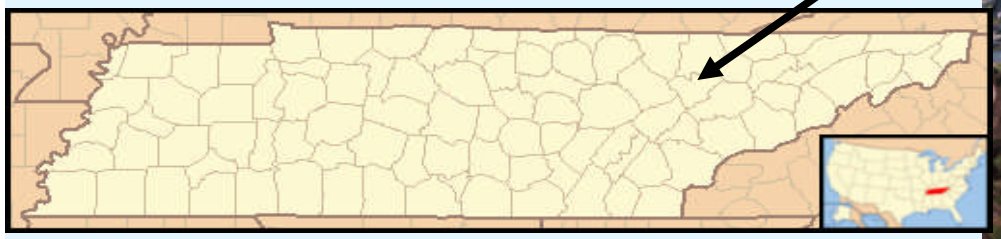
Portsmouth Site D&D Budget and Schedule profile



Maintenance Costs **Progress Costs**

Note: D&D of the DUF6 conversion plant is planned to start in 2035 at the conclusion of operations

Oak Ridge Reservation D&D Projects, Oak Ridge, Tennessee



Oak Ridge National Laboratory operated by Office of Science

Oak Ridge Reservation is managed by four offices of the DOE.

Oak Ridge National Laboratory (ORNL) is managed by the Office of Science (SC).

Uranium Operations at Y-12 are managed by the National Nuclear Security Administration (NNSA) and the Office of Nuclear Energy (NE).

The environmental restoration, D&D and remediation of the East Tennessee Technology Park (ETTP) and other surplus Oak Ridge areas are managed by Environmental Management (EM):

- ETTP and ORNL D&D and remediation, contracted to Bechtel-Jacobs Corp (BJC).

D&D at Oak Ridge Reservation

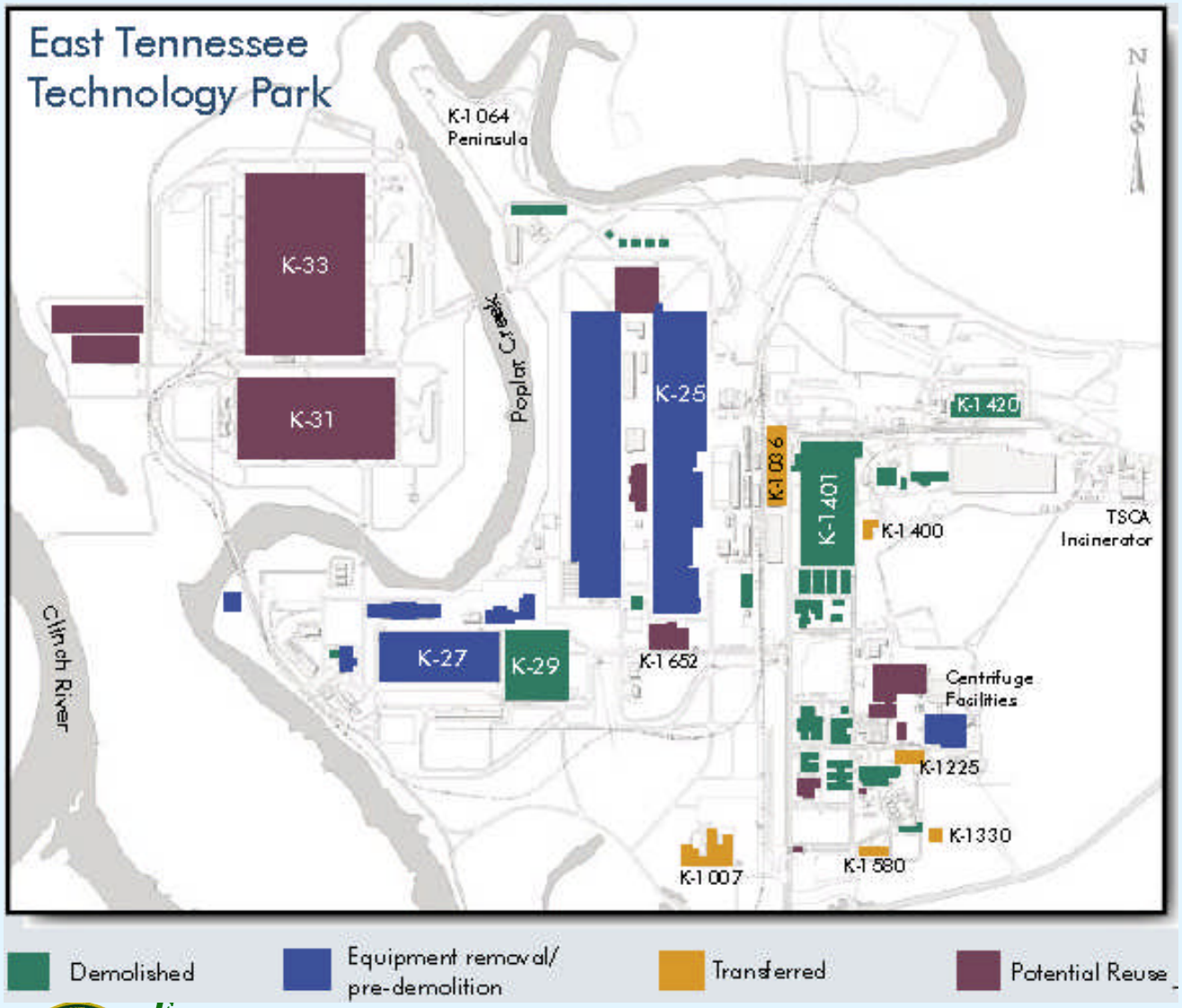
Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	8	17
Radiological	26	45
Industrial	301	329

The majority of ORO programs are performed at facilities located on the 33,725-acre Oak Ridge Reservation located in Anderson and Roane Counties in East Tennessee. The Oak Ridge facilities include the Oak Ridge National Laboratory (ORNL); the Y-12 National Security Complex; and the East Tennessee Technology Park (ETTP).

ETTP D&D scope includes decommissioning of facilities. There are approximately 500 facilities, including 125 major buildings that require decommissioning. The highest priority at the site is the decommissioning and decontamination of the K-25 and K-27 gaseous diffusion process buildings due to the deteriorating condition of the buildings affecting worker safety.

D&D at ORNL and Y-12 is being managed through the Integrated Facilities Disposition Project (IFDP). The full IFDP scope includes the demolition of more than 200 old nuclear facilities and 5 million square feet of space at the Oak Ridge National Laboratory (ORNL) and the Y-12 nuclear weapons plant, including facilities already within the EM program (e.g., Alpha 4 at Y-12).

East Tennessee Technology Park (ETTP) D&D and Remediation Site



Demolished | Equipment removal/ pre-demolition | Transferred | Potential Reuse

The East Tennessee Technology Park (ETTP) was previously known as the K-25 Uranium Enrichment Plant. This plant enriched uranium for commercial and military customers. The ETTP has been transferred for regional industrial revitalization. Radiological facilities are being demolished or converted for other industrial uses.

The ETTP D&D project includes approximately 500 facilities (125 major buildings) requiring D&D. The decommissioning in FY 2005 of the K-29, -31, and -33 gaseous diffusion process buildings completed the largest decommissioning project ever undertaken by DOE (covering 110 acres).

Four ABBs address current and future projects with magnitude indicated by the following square footage:

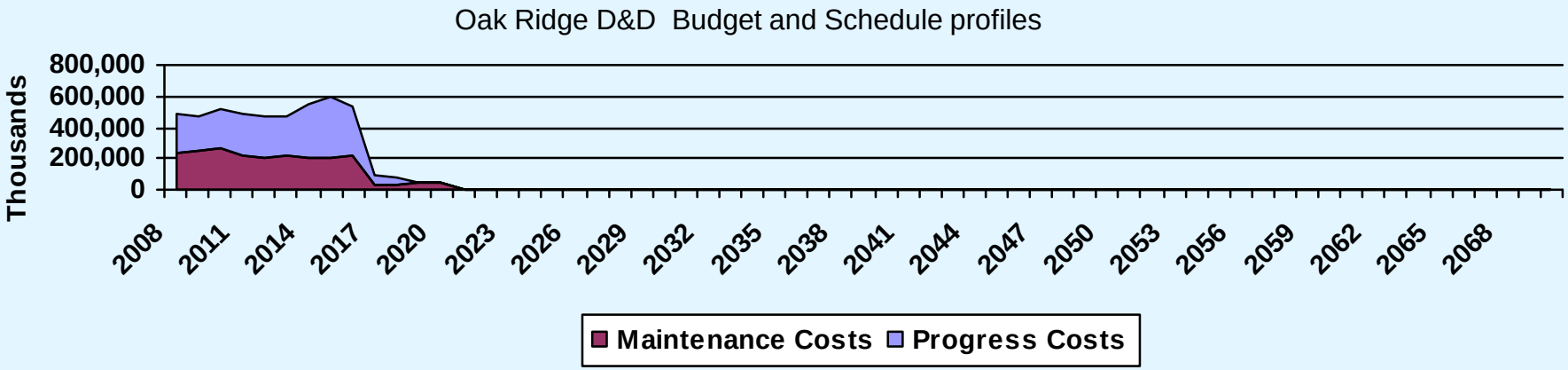
- K-25 Building – 1,640,000
- K-27 Building - 374,000
- Main Plant Area - 150,000
- Centrifuge Facilities - 169,900

Their estimated cost and duration are shown on the next page.

Oak Ridge Reservation D&D Projects

Site	ABB ID	Project (ABB) Name	D&D		Project	
			Total Cost ($Million)	Duration (yrs)	Start Year	End Year
Oak Ridge Reservation	274	**K25 Building D&D**	$384	5	2008	2012
Oak Ridge Reservation	284	**Central Campus, Isotope Circle and Reactor Facilities D&D**	$290	10	2008	2017
Oak Ridge Reservation	275	**K27 Building D&D**	$132	6	2010	2016
Oak Ridge Reservation	287	**Bethel Valley Reactors**	$113	9	2008	2016
Oak Ridge Reservation	273	**ETTP Main Plant Area D&D**	$95	6	2008	2016
Oak Ridge Reservation	280	**Alpha-4 and other EM facilities D&D**	$90	9	2009	2017
Oak Ridge Reservation	288	**Centrifuge Facility S&M and D&D**	$43	9	2008	2016
Oak Ridge Reservation	289	**CNF Closure**	$3	1	2008	2008

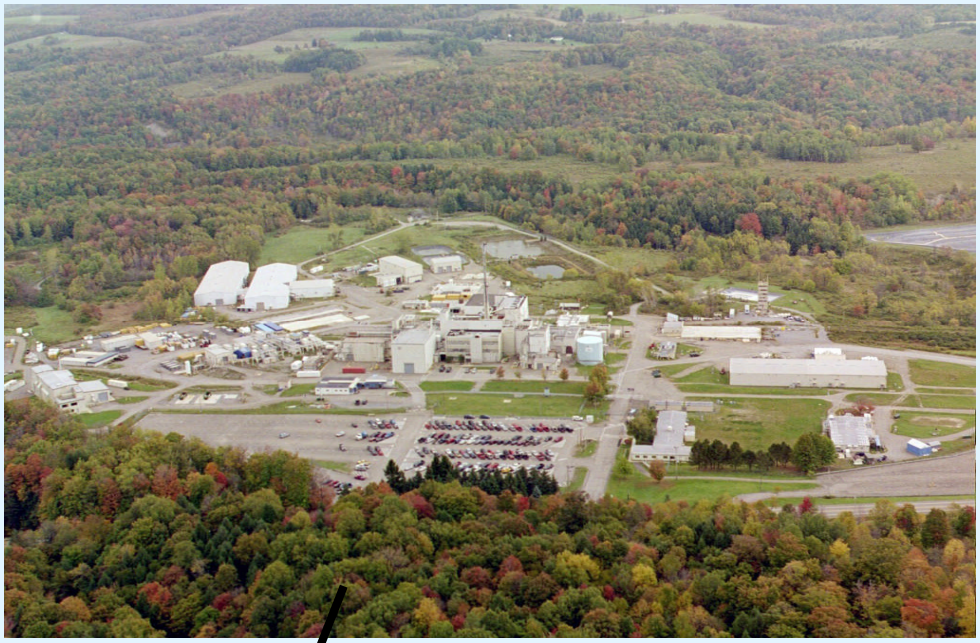
= **Top 25 Project**



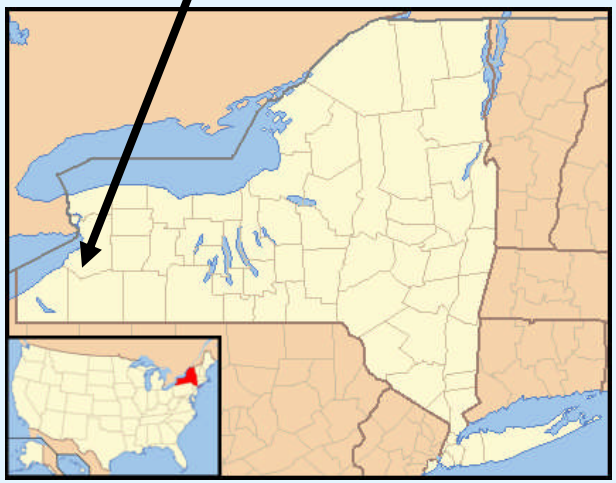
West Valley Demonstration Project

Cattaraugus County, West Valley, New York

The West Valley Demonstration Project (WVDP) is managed by the DOE Office of Environmental Management. The work is contracted to West Valley Environmental Services. Since the entire WVDP is represented by only one ABB within the Top 25 Project list, the facility background and project description are included in Appendix A.



Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	3	11
Radiological	3	10
Industrial	11	18

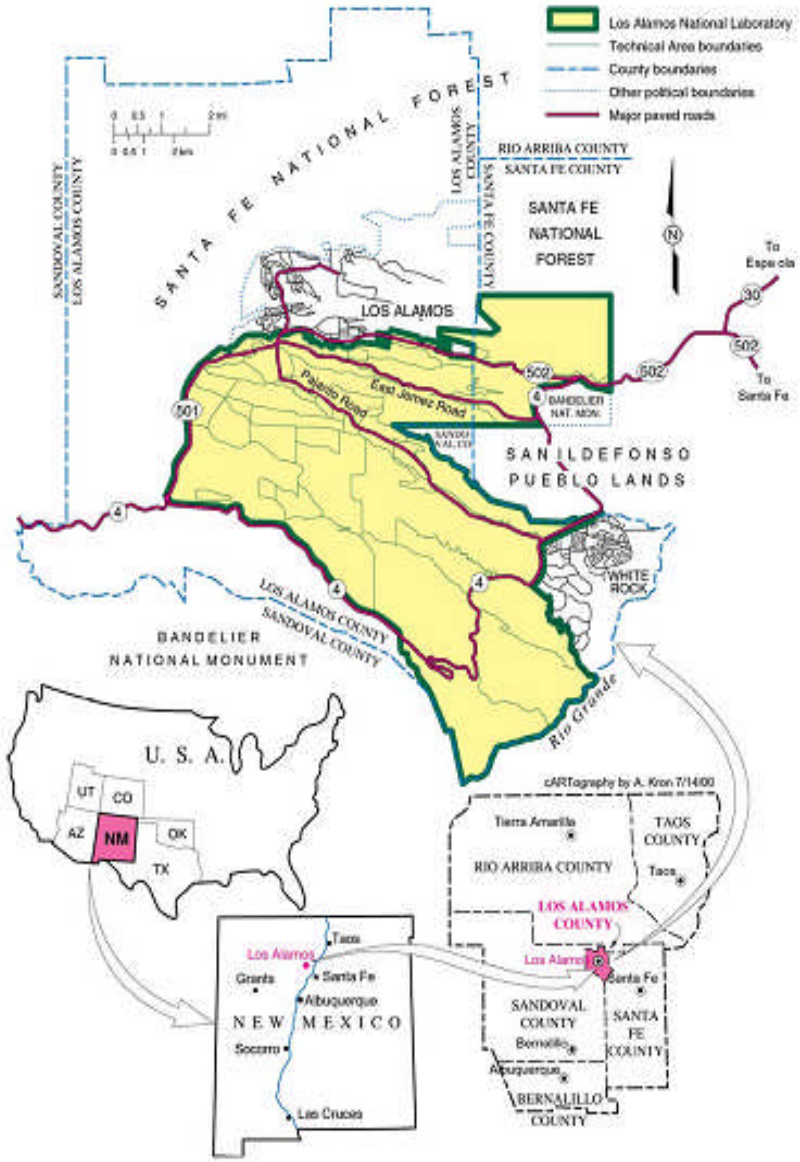


Los Alamos D&D Projects, Los Alamos National Laboratory

Los Alamos, NM

Los Alamos National Laboratory site operations are managed by the Office of National Nuclear Security Administration (NNSA). Site operations are contracted to Los Alamos National Security (LANS), a joint venture between the University of California and four major corporations.

LANL D&D and remediation work is funded through the Office of Environmental Management (EM) and contracted through LANS to subcontractors.



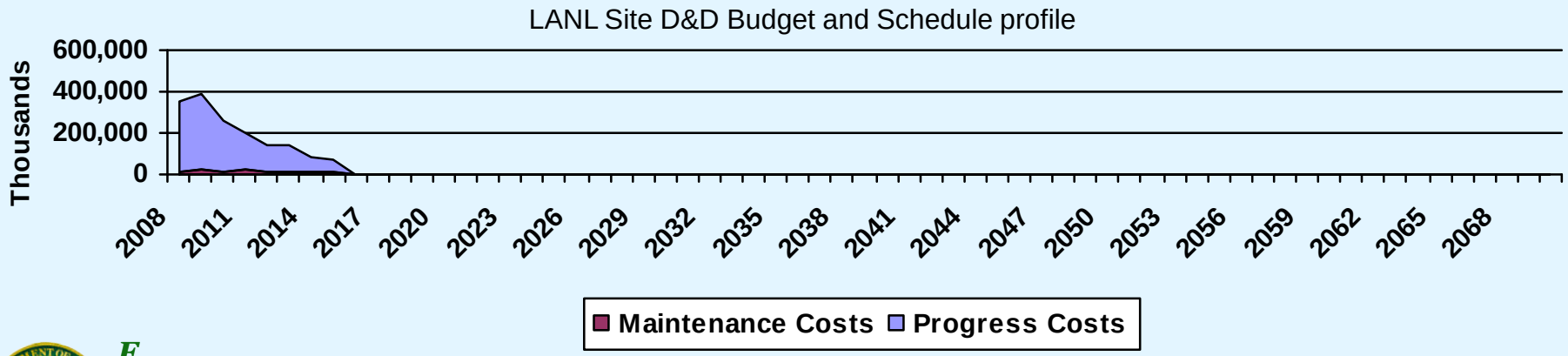
Los Alamos D&D Projects

Los Alamos National Laboratory

All D&D projects at LANL are included in the "Top 25." Project descriptions are included in Appendix A.

Site	ABB ID	Project (ABB) Name	D&D		Project	
			Total Cost ($Million)	Duration (yrs)	Start Year	End Year
Los Alamos National Laboratory	485	**DP Site D&D**	$146	4	2008	2011
Los Alamos National Laboratory	486	**TA-54 D&D**	$52	8	2008	2015
Los Alamos National Laboratory	487	**TSTA D&D**	$14	3	2008	2010

= **Top 25 Project**

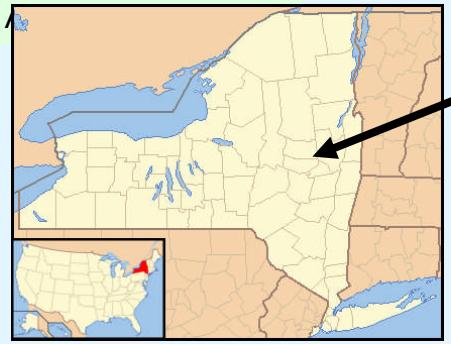


Separations Process Research Unit (SPRU) Project

at the Knolls Atomic Power Laboratory (KAPL)

Niskayuna, New York

Knolls Atomic Power Laboratory operation is managed by the DOE Office of National Nuclear Security Administration (NNSA), contracted to Lockheed Martin.
D&D and Remediation of the SPRU area is managed by the **Office of Environmental Management (EM) and the environmental restoration portion was contracted to Accelerated Remediation Co. (ARC), LLC. D&D of the two buildings is contracted to URS Washington Division.**
Since the entire SPRU D&D program is represented by only one ABB within the Top 25 Project list, the facility background and project description are included in Appendix A



Brookhaven Environmental Restoration D&D Projects

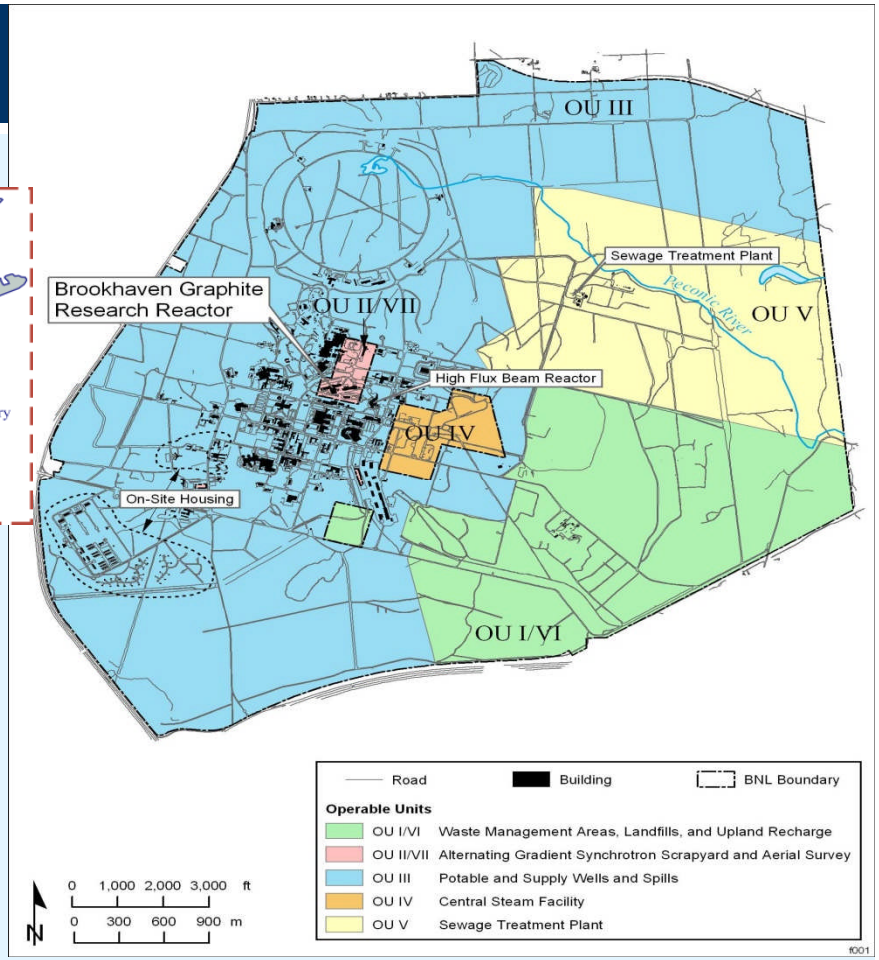
Brookhaven National Laboratory, Long Island, NY

One of 10 national laboratories overseen and primarily funded by the Office of Science of the U.S. Department of Energy (DOE), Brookhaven National Laboratory is located in the Town of Brookhaven in Suffolk County on Long Island, approximately 60 miles east of New York City. The BNL site occupies about 5,300 mostly-wooded acres in Suffolk County. Many of the Lab's facilities are near the center of the site, in a developed portion that covers about 1,700 acres.

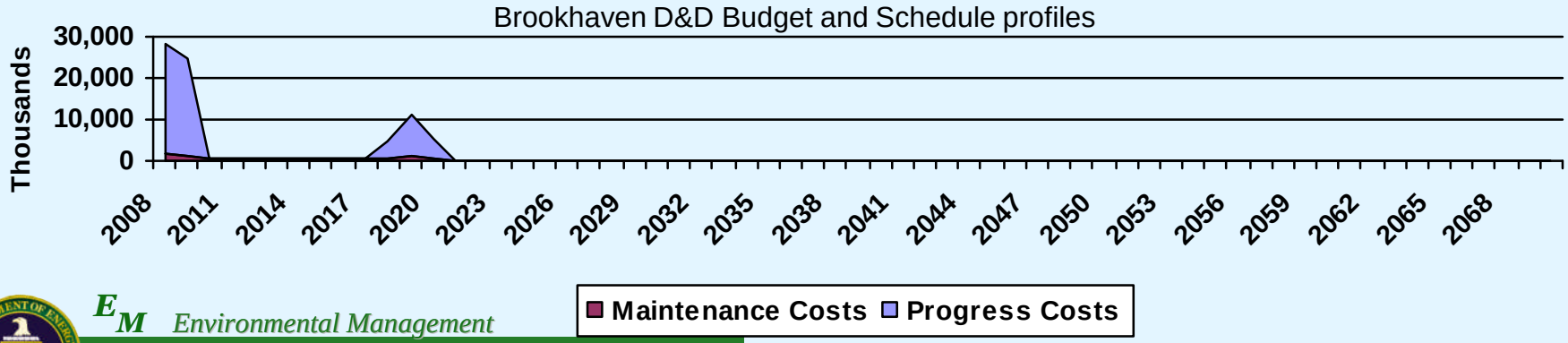
Environmental Restoration Project was established in 1993 to complete Brookhaven National Laboratory's cleanup activities.

Ongoing Environmental Restoration Project activities are dominated by the decommissioning of the Brookhaven Graphite Research Reactor (BGRR) and High Flux Beam Reactor (HFBR), with the BGRR scheduled for near term D&D, while the HFBR is scheduled to be deactivated and allowed to radioactively decay, thus leading to a more efficient D&D project.

Brookhaven National Lab - D&D Projects



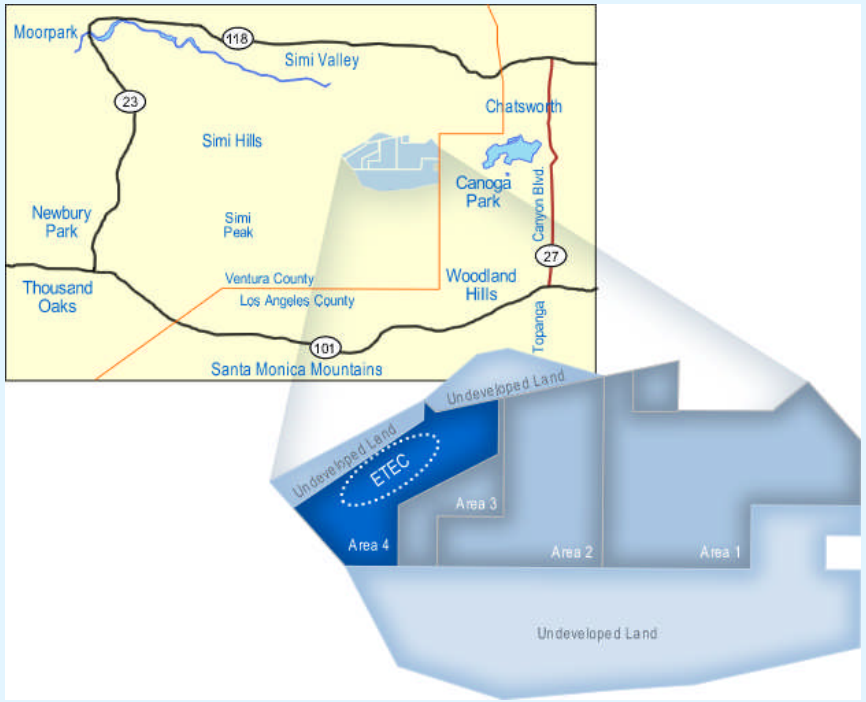
Facility Type	Completed as of FY 08	Remaining (Life-cycle)
Nuclear	0	1
Radiological	10	1
Industrial	0	0



Energy Technology Engineering Center (ETEC) D&D Project

Santa Susana Field Laboratory (SSFL)

Eastern Ventura County, CA



As the United States supported the development of nuclear energy, there was a need to develop the technology related to the use of sodium and other liquid metals. The Liquid Metals Information Center (LMIC) was established in the late 1950s by the U.S. Department of Energy (DOE) predecessor agency, the Atomic Energy Commission (AEC), as a center of excellence for liquid metals technology.

As the LMIC mission evolved, it's name was changed to the Energy Technology Engineering Center (ETEC). The activities conducted at ETEC mostly involved the development and testing of components used in metallic sodium systems. Much of the liquid metal-related research conducted at ETEC supported the development of nuclear reactors at other locations.

In 1998, DOE decided to close the remaining ETEC operations. With the closing of DOE operations, the focus turned towards to the disposition of government property, cleanup of facilities, the investigation and remediation of soil and groundwater, demolition of facilities and site restoration. The Closure Project includes remediation of facilities involved in nuclear energy research.

Since the ETEC D&D project is not among the “Top 25,” the following sheets provide a summary discussion of the project.

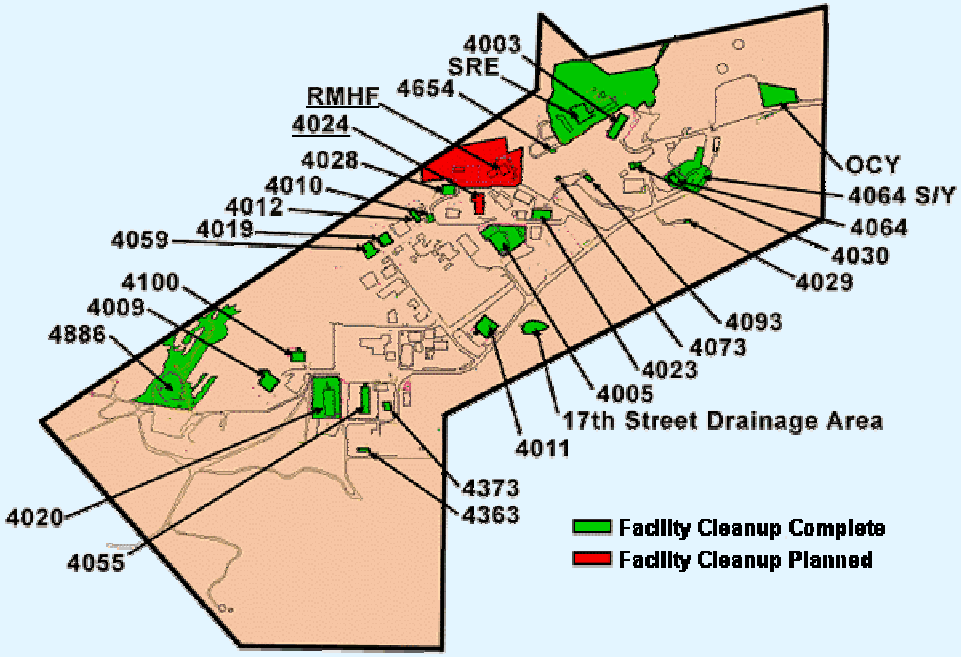
Energy Technology Engineering Center (ETEC) D&D

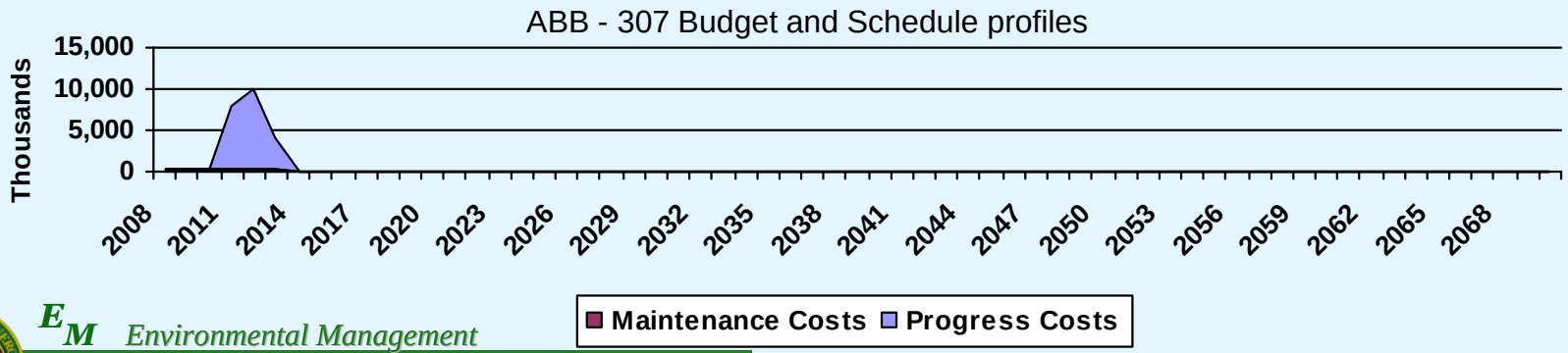
Project Summary Table

Location Description:	
Site/Area Description	Santa Susana Field Laboratory; ETEC
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Radiological
No. Buildings	Two
Construction	Steel and Concrete Vaults
Current Facility State	Defunct & vacant facility. Deactivation in progress.
Brief Background	Radioactive Materials Handling Facility (RMHF) was constructed in 1959 built to handle new and irradiated nuclear fuel. Building 4022 is a tall building with a large bridge crane above and seven concrete shielded vaults below. The vaults were used for the dry storage of nuclear fuel. The facility is being deactivated.
Source Term	Uranium, TRU, Pu
Project Description:	
Gross Estimated Cost	$22 million
Projected End-State	Demolish, Brownfield
Project Start and End Dates	2011 - 2014
Contractor	TBD
Identifiers	ABB – 307

Energy Technology Engineering Center (ETEC) D&D

Project Discussion





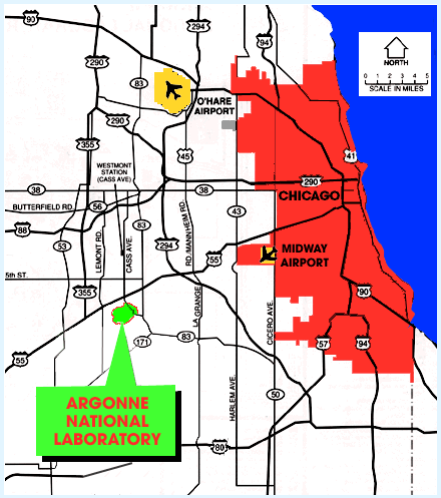
Argonne Building 301 Hot Cells D&D Project,

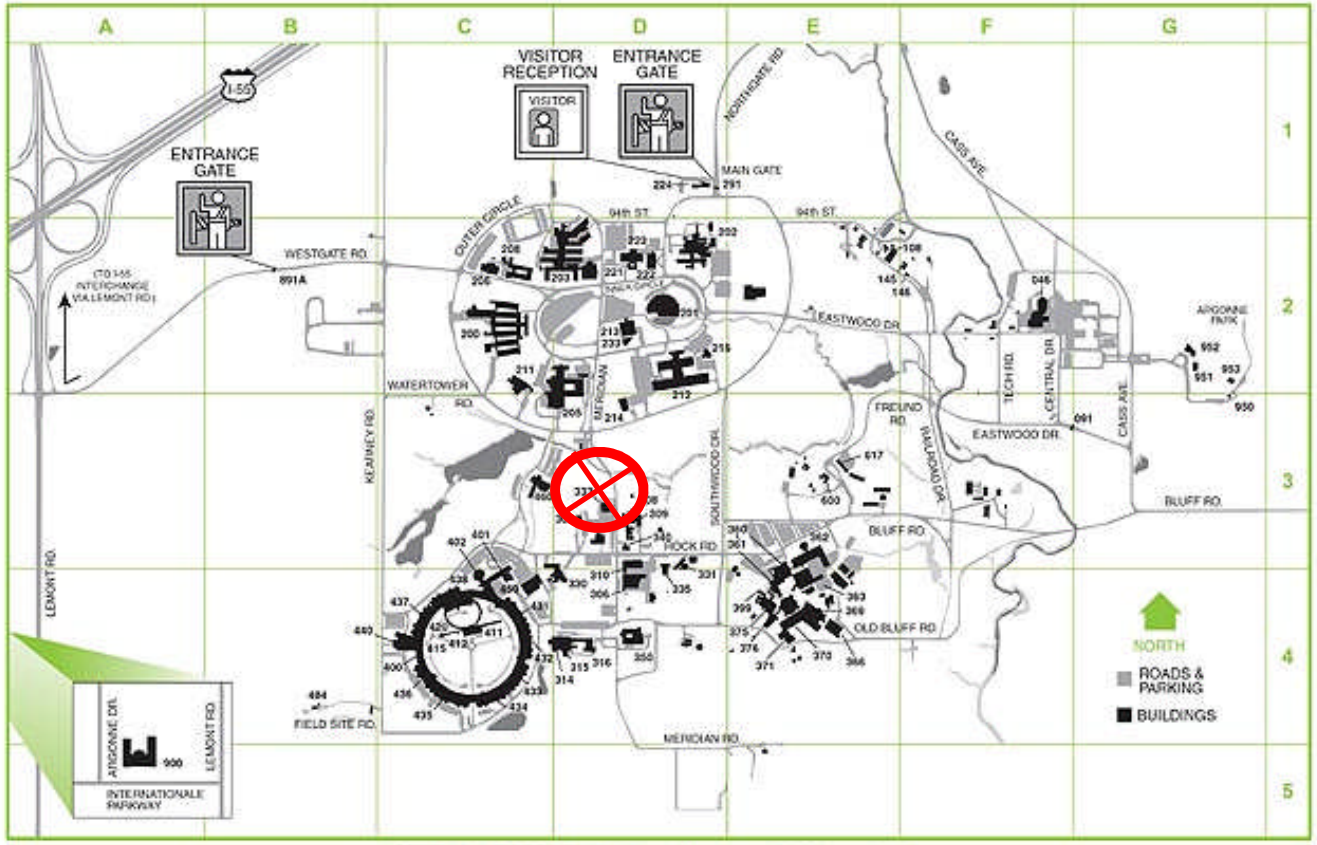
Argonne National Laboratory, Chicago, IL

Argonne National Laboratory is managed by the DOE Office of Science.

Bldg 301 was used in the early 1950s to perform a variety of radiological research and development experiments for the U.S. DOE on nuclear reactor fuel components and materials. The eight caves contained within the hot cell facility were phased out in 1971 because they were obsolete and deteriorating.

Since the Argonne D&D project is not among the "Top 25," the following sheets provide a summary discussion of the project.





BUILDING LOCATOR (Building Number – Grid Location)

East Area	100 Area	200 Area			300 Area					400 Area				600 Area	OFFSITE	
046 – F2	108 – E2	200 – C2	206 – C2	221 – D2	302 – D3	310 – D4	333 – D3	360 – E4	370 – E4	400 – C4	412 – C4	433 – C4	438 – C4	600 – E3	900 Area	951 – G2
091 – G3	145 – F2	201 – D2	208 – C2	222 – D2	306 – D4	314 – D4	335 – D4	361 – E4	371 – E4	401 – C4	415 – C4	434 – C4	440 – C4	617 – E3	900 – A5	952 – G2
	146 – F2	202 – D2	211 – C2	223 – D2	308 – D3	315 – D4	340 – D3	362 – E3	375 – E4	402 – C4	420 – C4	435 – C4	450 – C4		950 – G3	953 – G2
		203 – D2	212 – D2	224 – D1	309 – D3	316 – D4	350 – D4	363 – E4	376 – E4	411 – C4	431 – C4	436 – C4	460 – C3	800 Area		
		205 – D2, D3	213 – D2	233 – D2		331 – D4		366 – E4	399 – E4		432 – C4	437 – C4	484 – B4	891 – B2		
			214 – D3	291 – D1				369 – E4								
			215 – D2													

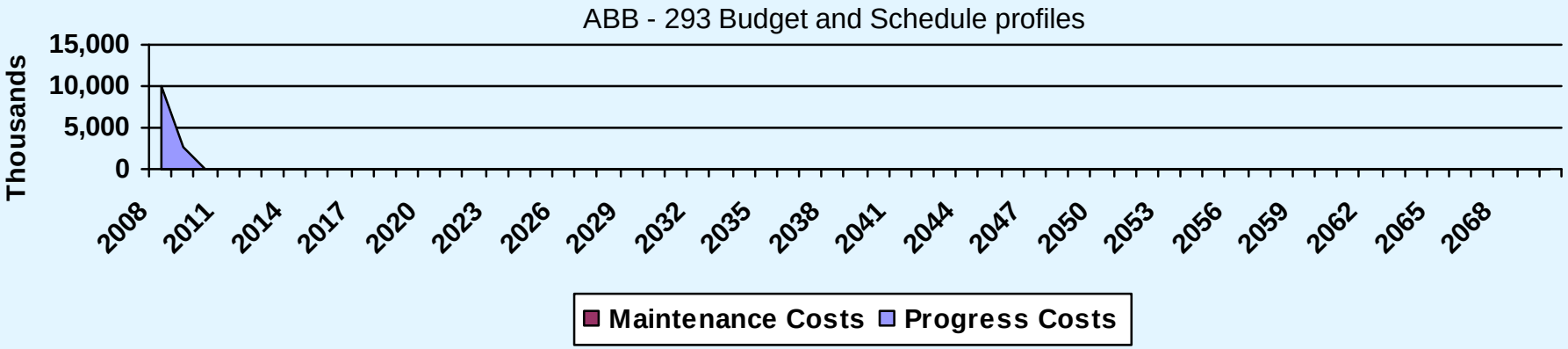
ANL Building 301 D&D
Project Summary Table

Location Description:	
Site/Area Description	Argonne National Laboratory
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Nuclear
Construction	Concrete Hot Cell shield walls
Current Facility State	Defunct & vacant facility
Brief Background	Used in the early 1950s to perform a variety of radiological research and development experiments that were phased out in 1971.
Source Term	Uranium, TRU
Project Description:	
Gross Estimated Cost	$13 million
Projected End-State	Demolish, Brownfield
Project Start and End Dates	2008 - 2009
Contractor	TBD
Identifiers	ABB – 293

Argonne National Laboratory Building 301 D&D

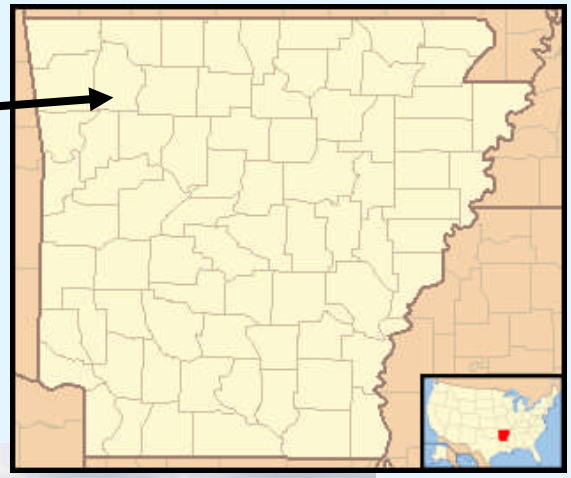
Project Discussion

- The interior of the caves received a preliminary cleanup, but significant levels of fixed contamination within the painted floor, walls, cells, and equipment remains spread throughout the facility. From 1971 until it was taken out of active use in 1992, the hot-cell facility was used for non-radiological experimentation.
- The scope of this project includes cleaning or dismantling radioactively contaminated equipment and disposing of it and the cave structures, retention tanks, and ventilation systems will be demolished. The Laboratory has determined that this building is surplus to the Laboratory's needs and will be a candidate for demolition.



D&D Southwest Exper. Fast Oxide Reactor (SEFOR),

University of Arkansas, Strickler, AR



The D&D of SEFOR was included in the approved Energy Policy Act of 2005, but money for cleaning up the site was not appropriated. The DOE has proposed demolishing the facility and cleaning up the site to return it to its natural state. However, there is no definite timetable for the decommissioning, which will cost approximately sixteen million dollars (based on a 10-year old estimate). The site contains residual radiation, asbestos, and chemicals.

SEFOR was completed in 1969 at the direction of the U.S. Atomic Energy Commission, to test the feasibility of MOX breeder reactors in the production of electricity. It closed in 1972, the nuclear material was removed from the site, and the University of Arkansas took over the site in 1975 and conducted research until 1986.

Since the SEFOR D&D project is not among the “Top 25,” the following sheets provide a summary discussion of the project.

D&D Southwest Experimental Fast Oxide Reactor (SEFOR)

Project Summary Table

Location Description:	
Site/Area Description	Univ. of Arkansas; Southwest Experimental Fast Oxide Reactor (SEFOR)
EM Field Office	Small Sites
Facility Description:	
Major Facility Type	Nuclear
No. Buildings	Two
Current Facility State	Defunct Reactor, Vacant facility.
Brief Background	Completed in 1969 and conducted research until 1986.
Source Term	uranium, sodium
Project Description:	
Gross Estimated Cost	$16 million
Projected End-State	TBD
Project Start and End Dates	TBD
Contractor	TBD
Identifiers	ABB – 318