D & D Best Practices Demolition of a Research Facility Building 431

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October 3, 2005

EFCOG Infrastructure Management Working Group
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D&D Best Practices
Demolition of a Research Facility
Building 431

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EFCOG – Infrastructure Management Working Group
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Overview of best practices

• Single program supports planning and facility disposition
• Facility information gathering leads to comprehensive PEP
• Clearly defined scope
• Resource loaded schedule allows tracking of earned value
• Design-demo Acquisition results in best schedule and cost
• Integrated Project Team avoids problems
• Risk factors retired
• Continuous Environment, Safety & Health oversight
• Comprehensive UG utility location prevents incidents
• Color coding of systems communicates hazards
• Field execution photos
Facility disposition supports strategic objectives

One Integrated Program for both Institutional S&M and D&D

1. Provide facility management for buildings that are surplus or excess to Program needs.
   • Manage the process to transition facilities from an operating condition into an inactive status

2. Plan and execute facility disposition in support of strategic objectives.
   • The Space Action Team (SAT) is an integrated multi-disciplinary, multi-directorate, cross-trained team with diverse talents and skills dedicated to execute facility projects

3. This approach increases flexibility and value
   • Supports programs through relief of unneeded facilities
   • Provides flexibility in establishing project priorities
   • Utilizes S&M as a precursor to disposition
   • Establishes a balance to optimize utilization of surplus facilities
The Laboratory’s flexible approach to manage its disposition program begins with the end in mind.

RTI

- Reduce S&M
  - Deactivate
  - Reassign
- Eliminate Maintenance
  - Decommission
  - Redeploy
- Reduce Hazards
  - Decontaminate
  - Revitalize
- Eliminate Legacy
  - Demolish
  - Land Reuse

Goal is met...

Goal is met...
Stabilizing & Removing Excess/Surplus Facilities is a Key Element to Strategic Facility Planning

- Single program responsibility supports “Dual Purpose” planning
- Provides a framework for decision making and priority setting
- Supports “End Point Planning” starting at initiation of transfer
- B431 is a good example of this efficiency

Institution “owns” 50 buildings, ~800k SF excess/re-assignable space.

Recycle stats:
- Concrete – 22,000 Tons
- Metal – 2,400 Tons
- Freon – 1,300 lbs
- Wood – 180 CY

160 Real Property Structures
~ 410k GSF (+ 90k SF yard space)
~ 500k GSF to completion…
Facility information process for D&D
The facility status and historical data supports a successful PEP and is archived with a project closeout report.
• Constructed 1950
• Material Test Accelerator program
• Mirror Fusion Test Facility
• ETA-II, a non-nuclear facility, remains operational
basement pit to be backfilled

Facility remains
Scope of work

• Isolation and reroute of utilities to minimize neighborhood impact
  — Temporary re-routing of 13.8 KV circuit and removal inside pit
  — Replace transformer and re-route main feeders to ETA
  — Reroute elec circuits and piping feeding nearby buildings
• Remove concrete shield block (35T) Depleted Uranium target wall
• Abate Asbestos Containing Material (e.g., exterior siding, flooring, lead paint, thermal system insulation, etc.)
• Remove and dispose of interior and exterior equipment
• Demolish steel structure – 100’ hibay roof, 50T crane, 4 story structure
• Demolish North concrete shield wall and foundation to grade level
• Backfill pit
• Rebuild and weatherproof South roof and siding

Alternatives evaluated and various reviews conducted throughout the life of a project.
Building 431
- Constructed 1950
- Material Test Accelerator program
- Mirror Fusion Test Facility
- ETA-II, a non-nuclear facility, remains operational
Management systems, controls and planning

- Once Authorized, the Integrated Project Team plans, manages and controls the project using a tailored approach of DOE Order 413.3 and the Project Management Manual, DOE M413.3-1.
- The LLNL Space Action Team has management responsibility for the day-to-day work execution

- Implementing documents
  - NNSA FIRP(1) Program Execution Plan
  - LLNL FIRP Program Management Plan
  - LLNL ISMS Implementation Plan
  - Building 431 Project Execution Plan

- Special project reviews
  - Independent Project Review at Critical Decision 0
  - External Independent Review at Critical Decision 1/2/3
  - Value Engineering “Red Team” led by a certified Project Management Professional (PMP)

- Resource loaded schedule used to track work scheduled and performed, and compared to actual costs to establish monthly earned value

- Monthly schedule and cost performance is tracked at Division Level (WBS Level 2) and reported externally to NNSA at Level 1

- NNSA Livermore Site Office (LSO) oversight

Good communication eliminates surprises.
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**Project performance reporting**

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**Project Start:** 8/4/03  
**Project End:** 7/21/06

**Cost Variance Detail:** 1.00  
Cost variance satisfactory. Value represents slightly lower than expected costs for preparation and procurement activities.

**Cost Variance Recovery Plan:**  
None required.

**Schedule Variance Detail:** 1.00  
Schedule variance satisfactory. Two week late finish of utility deactivation and late start of demolition contractor offset by CES sampling approximately $80k ahead of plan.

**Highlights and Lowlights:**

- LOGSE utility deactivation contractor substantially complete at 96%; life safety systems and punchlist remaining in Aug and temp power removal in Sep.
- ETA major electrical outage for refed of power successfully completed. ETA equipment back on-line.
- Continued site support activities: sampling of concrete for recycle and oil for waste disposal.
- Completed review of demolition subcontract (Evans Brothers Inc.) submittals, resubmit some items in response to comments.
- Abatement/Demo NTP granted July 21; EBI/Bayview mobilized July 28 and began abatement preparations.
- Abatement activities were started in July on removal of Galbestos siding. [Abatement Start Milestone]
- Two transformers with PCB oil need processed as hazardous waste; other oil needs pumped by approved waste hauler.
- Superblock security camera installation complete and cameras deactivated and removed from B431. NNSA granted approval for 48 property items to be disposed by the demo subcontractor; tags have been removed.
- Specs and procurement package for roof/wall restoration being delayed to review high construction estimate and evaluate alternate go-forward plan; no impact on critical path.
- Perspective of Roof Restoration completed.
- B431 SCR (describing two segments) has been signed by the AB group and PAT ADFM, then submitted to LSO for formal review.
- Developed Critical Lift Plan for removal of Depleted Uranium Shield Block. Final approval expected in September to execute work.

**Safety Minute:**

- Deactivation of all mechanical and electrical systems complete (except Life Safety) in preparation for demo.
- Some final color coding still needs worked by H&ST and Construction Inspector.

**Key Milestones:**

- Utility Deactivation Start: Jan-05
- Award Demolition Contract Start: May-05
- Abatement Start: Jul-05
- Demolition Start: Sep-05
- CD-4 Project Complete: Nov-06

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**Several reports help monitor performance.**
Acquisition Strategy

• Finalized after CD-0 and submitted per DOE M 413.3-1
• Combination of LLNL staff and competitive fixed-price procurements awarded by the University of California. Assumptions:
  — LLNL staff handles prep work, sampling, hazardous waste disposal, ES&H oversight and PM
  — LLNL Labor-only contractor (Davis-Bacon) performs utility isolation and re-routing
  — Design-build subcontract will be awarded for weatherproofing and repair/rebuild of the remaining roofing and siding.
• Detailed design-demolition specifications and detailed utility deactivation drawings and procedures prepared
• Design-demo subcontract strategy resulted in several different demolition approaches
  — Best value bid uses method not originally considered
  — Recycle value $250k and 85% of materials
• Best value evaluation: license & certifications, security, vibration, traffic, recycle, schedule, safety history (ERR & TRR), shield wall demo, similar projects, references and price.

Design-demo process results in best schedule and cost.
Integrated project team (IPT) involvement

- ETA-II, a non-nuclear facility, remains operational and continues experiments
- Computations server facility and archive records management facility B439
- High voltage routing through existing building
- Machine shop services facility B432
- Operational Security Plan due to the proximity to security area
  - Vehicle and personnel access
  - Staging of material and equipment
  - Restrictions on crane size, placement, accessibility and relocation
  - Security related work stoppages may impact the project
- ES&H Teams
- Representative personnel are on the project review team

*IPT participation avoids problems during execution.*
Risk and Contingency Management

• Risk Management Plan developed, risk assessment completed and a risk mitigation strategy prepared.
• The activities with the highest risks are Electrical & Mechanical Isolation, shield wall removal and Renovation.
• The high risk factors include:
  — Encountering stored energy
  — ETA II sensitivity to vibration
  — Difficulty with demolition of the shield wall due to its size
  — Schedule uncertainty due to uniqueness of shield wall demo, potential weather delays, impacts to nearby operational facilities, ETA operational status

Plan updated as risk factors retired.
Environmental, Safety and Health

• Environmental, Safety and Health incorporated into the planning
• Historical operational background reviews and surveys to determine likely hazards and contamination levels
• NEPA review performed and the project granted a categorically exclusion
• NHPA review performed and the building determined to be of no historical significance to the State of California.
• Confirmatory sampling performed for ACM in order to better bound the scope of abatement
• Integrated Safety Management System – DOE Seven Guiding Principles and Five Core Functions
  — Integrated Worksheet (IWS) defining scope, hazards, controls, training and authorizing the work
  — Subcontractor Site specific Health & Safety Plan and Corporate Injury & Illness Prevention Program

Continuous safety oversight and managed review of concerns.
Utility safety is best served by integrating historical information and active measurements.
Color Coding Best Practice

**Problem:** Decommissioning systems containing stored energy or contaminants is a communication challenge. Tracking materials from sample through resolution, protective of workers and the environment requires constant verification and documentation to properly control through release.

**Solution:** SAT uses a color code to identify the status of all Structures, Sub-systems, and Components (SSCs) during decommissioning through disposition.

- **Red:** Known hazard exists on or inside a SSC.
- **Yellow:** SSCs denoting caution.
- **Blue:** Controlled disposal to the Municipal Landfill
- **Green:** Free release - no issue.
- **Black:** Editorials and instructions
Field Execution

- Completed
  - Deactivation and reroute of utilities
  - Interior abatement
  - Demolition of 8,000 SF
Field Execution
Field Execution

- Working
  - Abatement/removal of Galbestos siding
  - Structural demo
  - Specs for Restoration design-build
Restoration planning for Design-build
D&D best practices

• Single program supports S&M and D&D
• Resourced schedule tracks performance
• Design-demo acquisition achieved best schedule/cost
• Integrated Project Team eliminates surprises
• Environment, Safety & Health team participation
• Comprehensive UG utility location - ZERO hits
• Color coding of systems clearly communicates hazards

Embracing best practices sustains team performance and achieves mission success.