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LANL: Weapons Infrastructure

Frances Chadwick

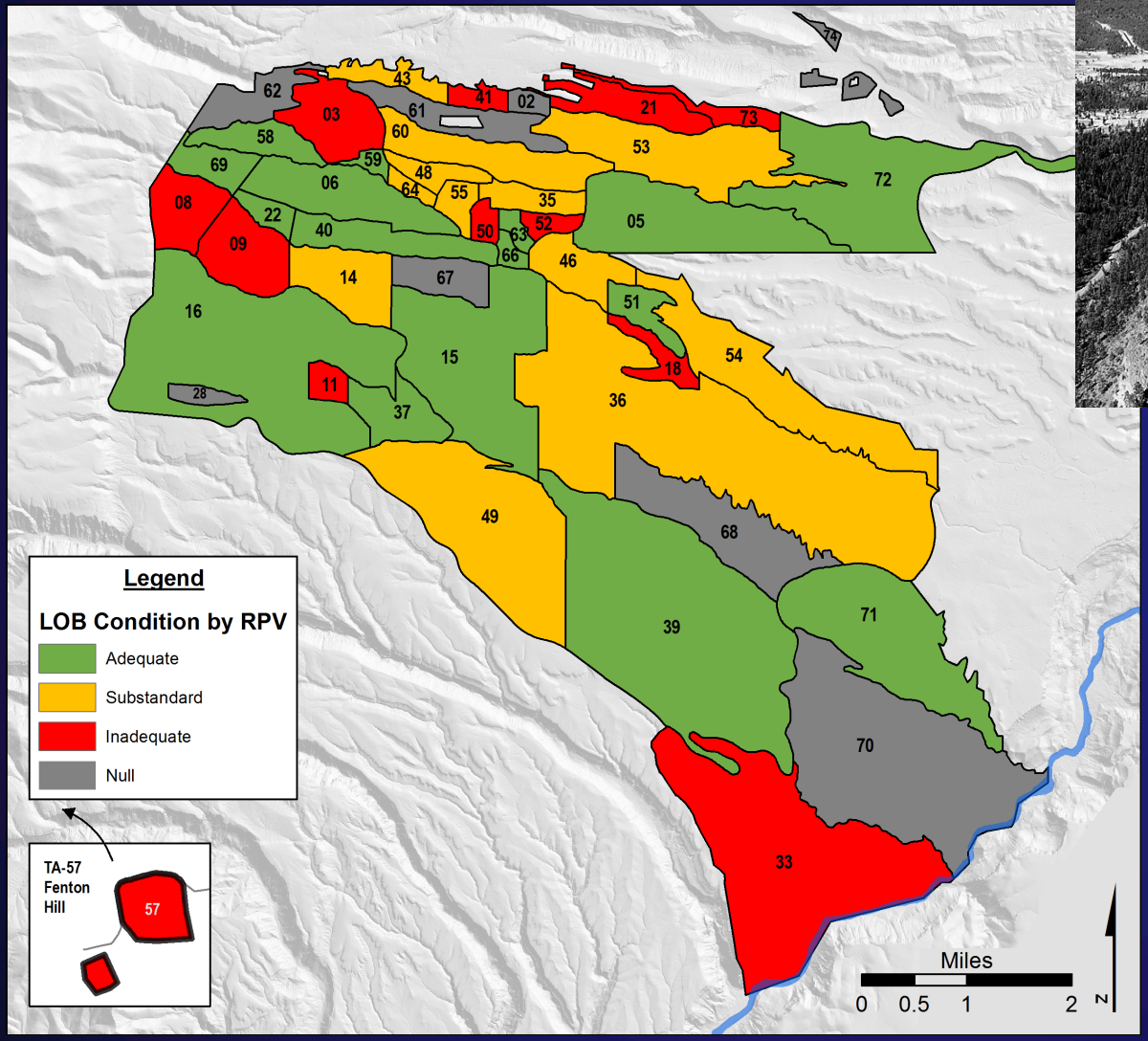
Program Director, Weapons Infrastructure, PADWP

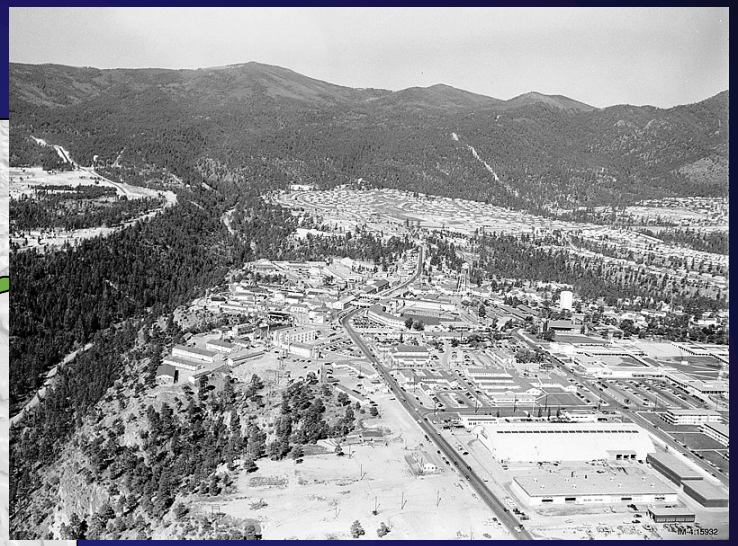
Briefing to Naval Reactors

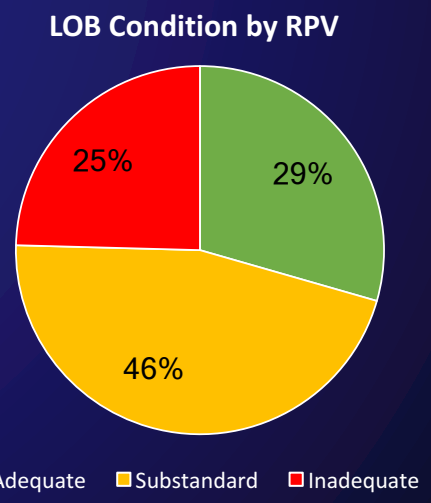
July 18, 2017

The laboratory comprises various “Technical Areas” spread across mesas of volcanic rock in the Jemez Mountains

Site Map by LOB Condition







Source: FIMS 2015 Snapshot Data

The Laboratory infrastructure supports hundreds of high hazard, complex operations daily

- ~ 40 square miles
- 49 technical areas
- ~ 1,000 buildings with 8.7M sq. feet
  - 18 nuclear facilities
  - 117 radiological facilities
  - 200+ high explosive facilities
  - 40% are 40+ years old
- 268 miles of roads
- RPV of $14B

LANL is comparable in size to DC

LANL's unique science and engineering infrastructure is critical to delivering on our mission

Metropolis Center for Modeling & Simulation

High Explosive laboratories

Los Alamos Neutron Science Center

Plutonium Processing Facility

Chemistry and Metallurgy Building

Dual Axis Radiographic Hydrotest Facility

SIGMA Building

Supercomputing Center

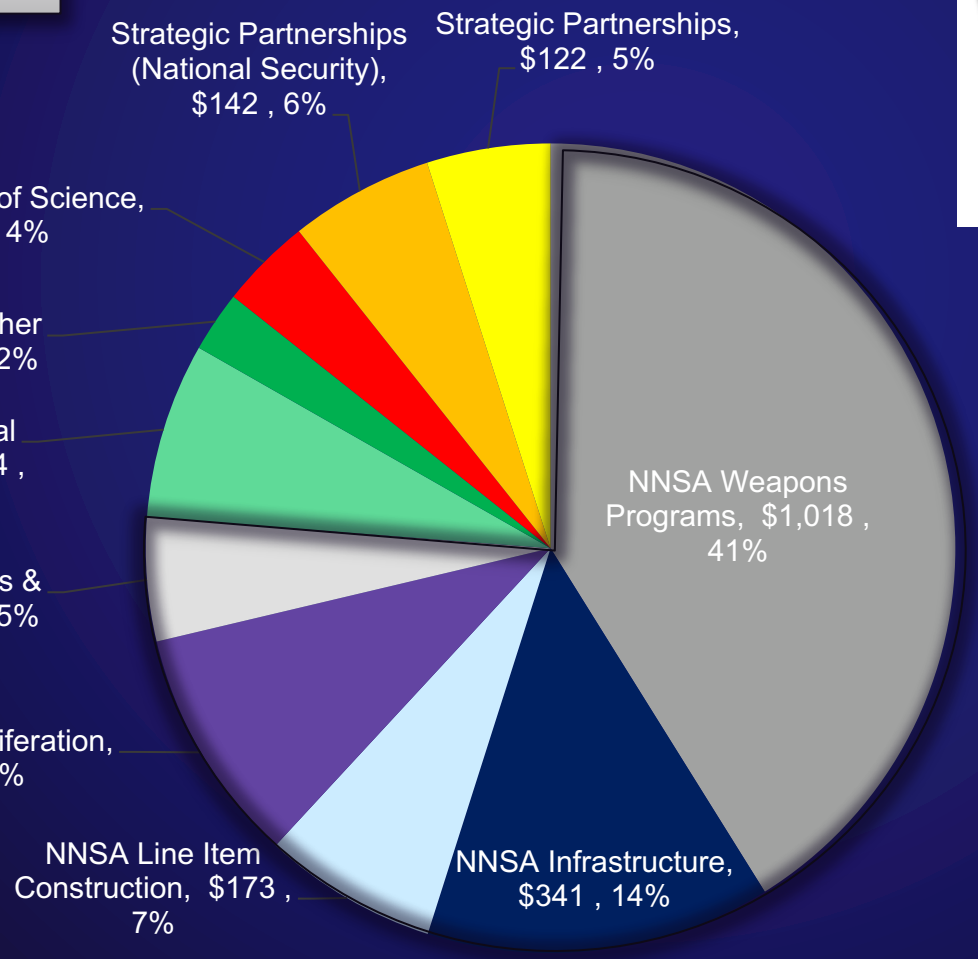
Chemistry & Metallurgy Research Replacement (RLUOB)

LANL FY17 Budget & Workforce

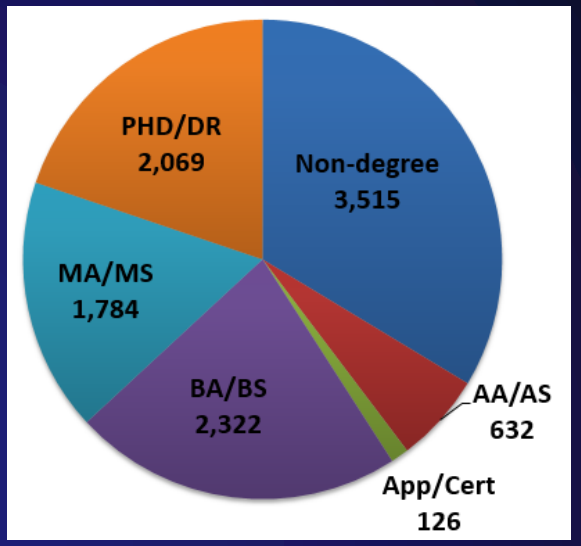
FY17 LANL Budget Authority: $2.5B

NNSA: 76% of LANL budget

All in $M



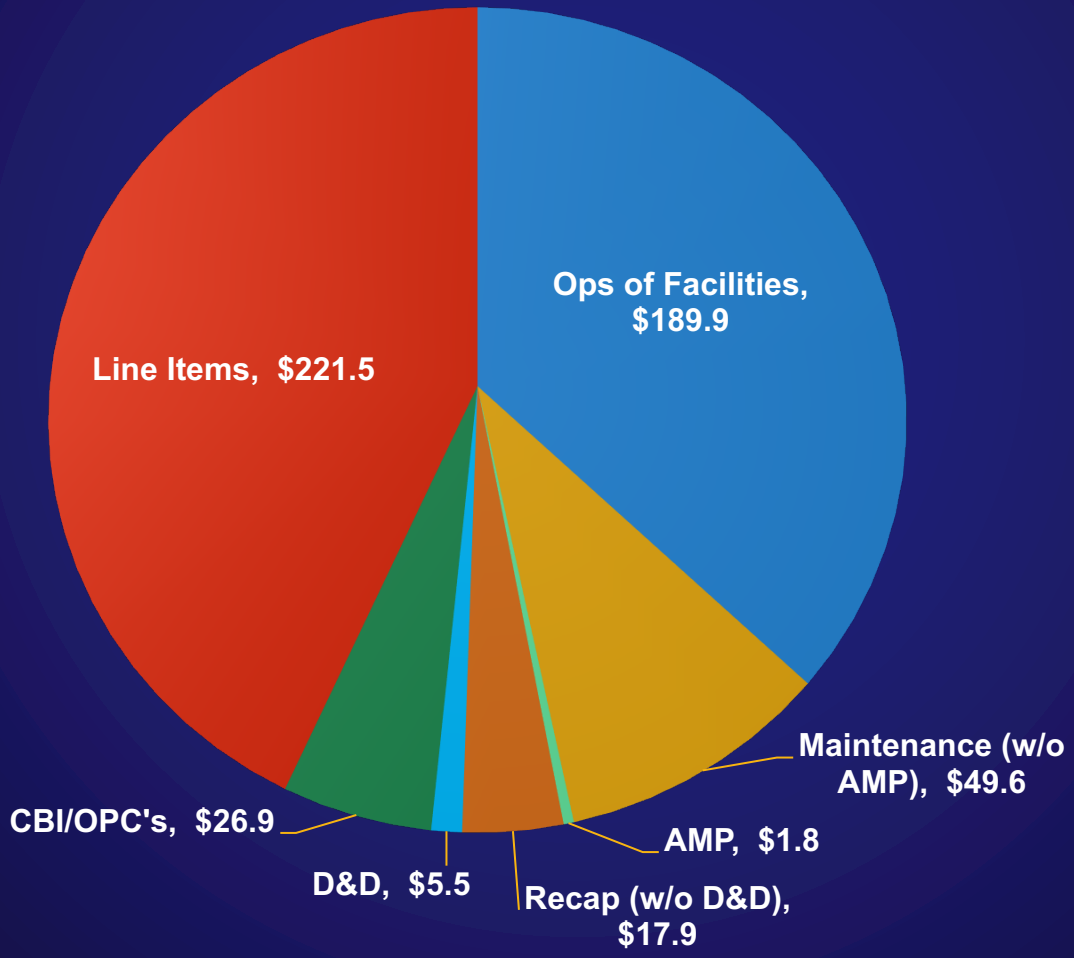
Laboratory Workforce snapshot



Infrastructure investment = significant and critical part of our scope

Direct-Funded Infrastructure Accounts

Infrastructure & Safety, CBI & Line Items - FY16 BA ($M)



LANL Org Chart

Director's Office

Charlie McMillan
Director

Rick Kacich
Deputy Director

Dave Lyons
Executive Director

Principal Associate Directors (PADs)

Science, Technology, and Engineering

Alan Bishop

Weapons Programs

Bob Webster

Global Security

Terry Wallace

Operations and Business

Craig Leasure

Capital Projects

Larry Simmons

Associate Directors (ADs)

Nan Sauer
Chemistry, Life, & Earth Sciences

Steve Girrens
Engineering Sciences

Mary Hockaday
Experimental Physical Sciences

John Sarrao
Theory, Simulation, & Computation

Jeff Yarbrough
Plutonium Science and Manufacturing

John Benner
Weapons Engineering & Experiments

Michael Bernardin
Weapons Physics

Direct Infr $ managed here

Nancy Jo Nicholas
Threat Identification and Response

Carolyn Zerkle
Business Innovation

Michael Brandt
Environment, Safety, & Health

Cheryl Cabbil
Nuclear & High Hazard Operations

Mike Lansing
Security, Safeguards, & Emergency Response

Indirect Infr $ managed here

Randy Erickson
Environmental Programs

Kim Cassara
Project Management

Line Items executed here

Weapons Infrastructure Program Office

Blue = not a direct report

Bob Webster

Weapons Programs

Frances Chadwick
Program Director

Jeanette Gray
Administrative Support

Project Controls &
Project Management:
Karen Borovina
Bethany Boumann

CFO: Jeremy Valdez
Elena Wright

Judy Eglin
ADCLES Facilities/CMR

Deb Lewis
Recapitalization, CBI
ADW Facilities, Planning

Rae Anne Tate
Maintenance, D&D, Data Analysis
ADEPS/LANSCE Facilities

Angie Thomas
CHAMP, ADE Facilities

Vicente Quintana
Recapitalization,
Data Analysis & Support

Jayson Blanchard
ADPSM/TA-55 Facilities

Bob Putnam
Line Item Construction,
PADWP

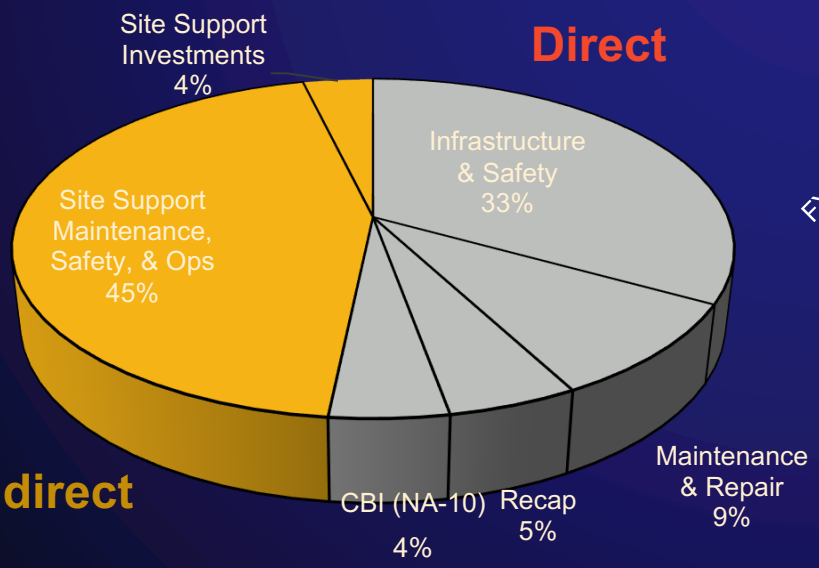
Bill Schwettmann
RLWTF, LLW, TLW

Tri Tran
Executive Advisor, PADWP

The Laboratory's infrastructure relies on both Direct and Indirect funding

- **Integration of both Direct and Indirect dollars leverages maximum infrastructure benefit with available funding**
- **Significant Indirect dollars have been invested (even during periods of declining budgets) over the past 10 years, totaling approximately $285M**
- **Direct dollars are matched with Indirect investments, creating measurable progress**

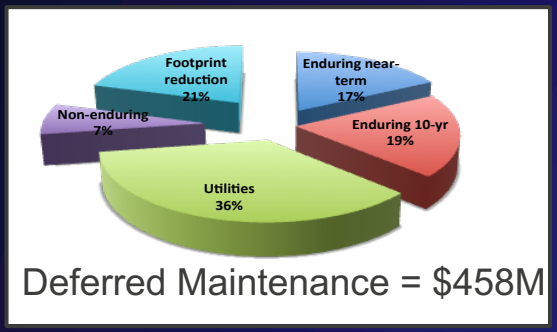
FY2016 Infrastructure Budgets ~$675M



Site Support Indirect Budget Commitment to Infrastructure Recapitalization and Deferred Maintenance (DM) Reduction

The Laboratory arrested the growth of DM in FY2012, and has 4 years of continuing DM decline

NA-50's Operating, Maintenance & Recapitalization funding is critical to the execution of the mission

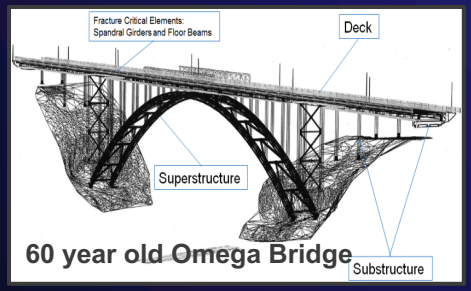


Deferred Maintenance = $458M

Investing in maintenance and DM buy-down

Recapitalizing, consolidating, and modernizing existing facilities and equipment

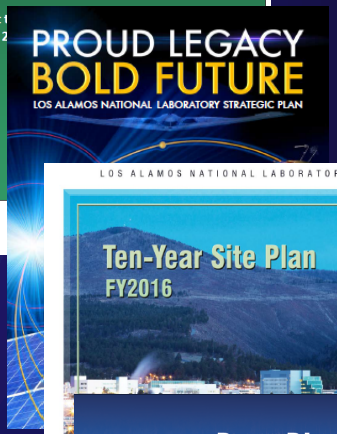
Operating experimental facilities in support of stockpile mission



Increasing investment in utilities and site support infrastructure

Eliminating beyond-service facilities and preparing for disposition

Planning for the future



Los Alamos is currently executing several concurrent Line Item projects

Big focus on Pu future and associated waste

Transuranic Waste Facility (TWF)

Low-Level Liquid Waste (LLW), to be followed by TLW (Tru Liquid Waste)

TA-55 Reinvestment Project for PF-4 (TRPII)

Uninterruptible Power Supply Building

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Energy Savings Performance Contracts (ESPCs)

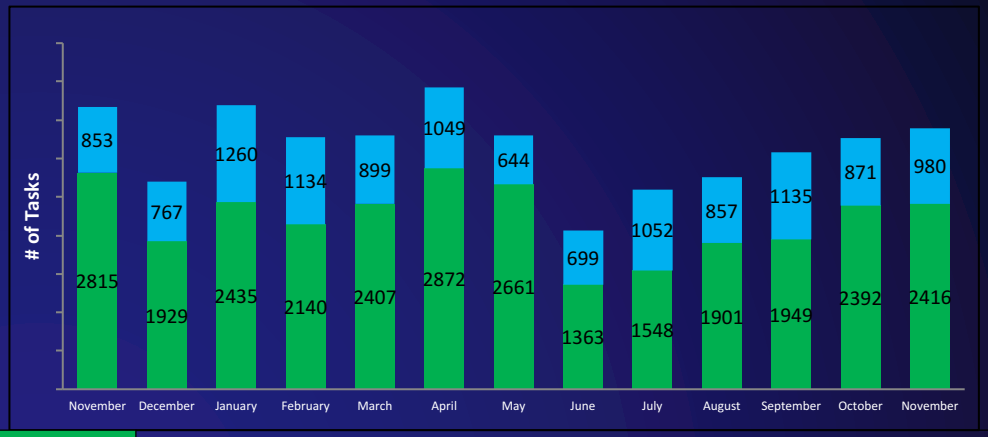
Working on an ESPC Steam Plant replacement

Chemistry and Metallurgy Research Replacement Project (CMRR) & Modules

Maintenance @ LANL

- Maintain >1,000 buildings
- Maintain utility systems (all indirect-funded)
  - 26 miles of115 kV lines
  - 113 miles of 13.2 kV lines
  - 58 miles of gas lines
  - 90 miles of water lines
- Almost 1,000 craft employees
- 45,000 training plans
- Use Asset Suite/CMMS
- Implementing BUILDER at LANL, 100% of condition assessments complete
- Nov 2016: LANL hosted a 2-day workshop on interface between various site systems and BUILDER
- LANL hosted 2 annual maintenance workshops, LLNL just hosted a third.

LANL Maintenance averages around 4,000 work packages per month.
~45% preventive, 55% corrective, ~1/3 low hazard, ~2/3 high-hazard



Green	**Total number of Completed Work Packages**
Blue	**Total number of Completed Expedited Work Packages**

"Mobile Work Package" Initiative, supported by NA-50

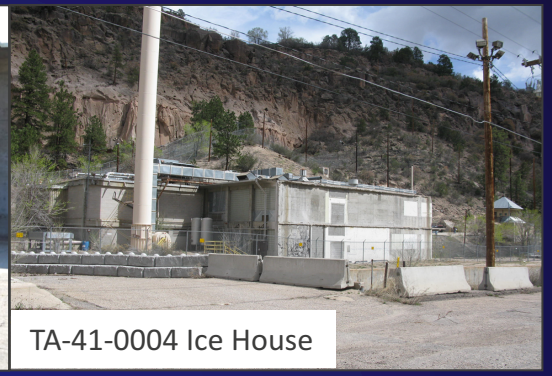
Converts paper-based procedures into all-electronic process for planning, approving, executing and archiving work orders.
➡ *Improved workforce productivity and data quality.*

NA-50 is helping us to address D&D needs

Recently hosted EM to visit high-risk sites

TA-03-0016 Ion Beam

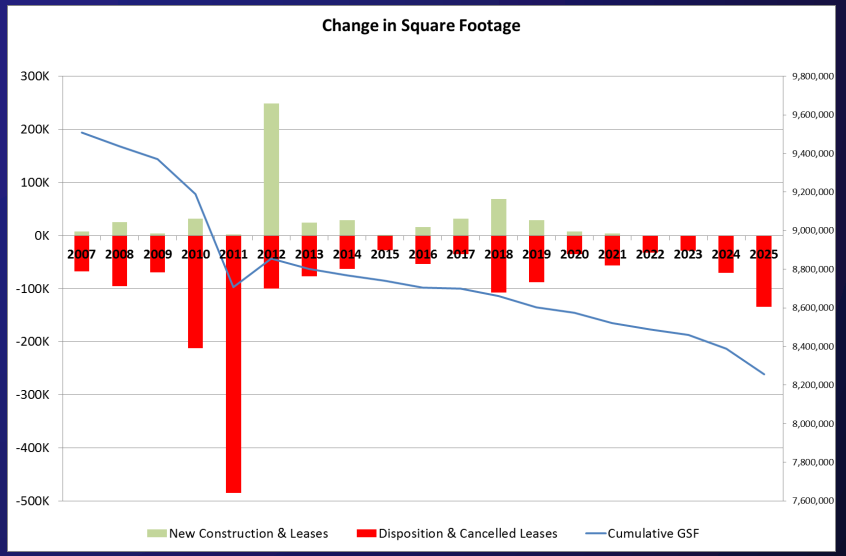
TA-16-0280 Complex



TA-41-0004 Ice House

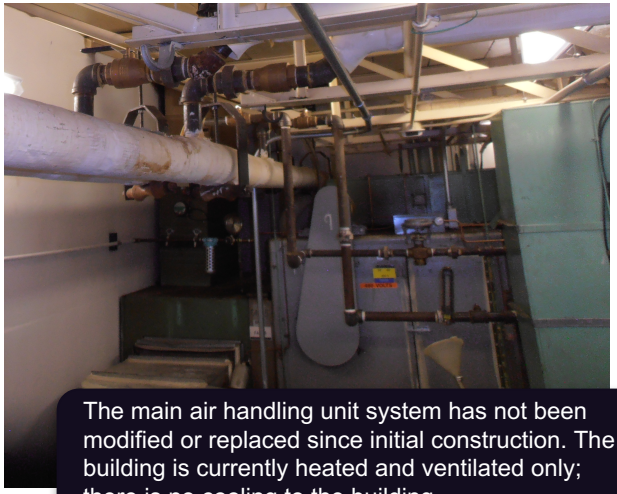
NA-50 visit to TA-18, Nov 2016
(TA-18 = criticality testing site)

D&D effort funded by both Indirect & Direct



We are executing a CHAMP Pilot Project at LANL

TA-22-0052 (Shops Bldg)
Constructed: 1954
MDI: 3.56
LOB: Adequate
HVAC issues result in periodic down time and programmatic delays



The main air handling unit system has not been modified or replaced since initial construction. The building is currently heated and ventilated only; there is no cooling to the building.

Current Building Issues/Challenges:

- Temporary evaporative cooling utilized in the summer results in corrosion of parts & equipment
- System does not meet needs to maintain tight temperature requirements for the machines, requiring machine operators to frequently recalibrate equipment.
- System is old and not energy efficient, resulting in added expense run and maintain it

Advantages of CHAMP Process:

- A-E contract structure is more efficient and cost effective, enabling us to get more "bang for the buck"
- Program is designed not just to replace in kind, but to upgrade and modernize equipment to meet current needs
- Pilot program is allowing LANL to try a more streamlined design review process
- New A-E firm with different experience compels LANL to consider design and construction methods and products we might otherwise not consider

Custom engineered air dispersion systems (DuctSox) will be installed in the shop area where ducting currently does not exist. This will be the first installation of this product at LANL.

Facility Improvements:

- New HVAC system will enable tight temperature controls for equipment and more comfortable working conditions for employees
- DuctSox air dispersion system is much quicker and more cost effective to install than traditional ducting, and allows for easier and cheaper cleaning
- Building Automation System will provide controls tied to the existing network
- "Night setback" in the office areas will allow for reduced energy consumption during off hours

G2 = Main Tool for Program Management

Financial Reporting:

***Direct actual costs** (fiscal year cumulative-to-date) and fully-burdened commitments (rolling cumulative balance) are uploaded monthly.*

Provided at a WBS level that correlates to groups of working facilities (i.e. PF-4, CMR, DARHT) for Operations & Maintenance, and down to an individual project level for Recap/CBI Projects.

Provided down to elements of direct costs (i.e. Direct Labor & Fringe, Travel, Materials & Supplies, Subcontracts, Overhead, etc.)

Facility Maintenance differentiated between Maintenance Management, Preventative, & Corrective.

***Indirect actual costs** (fiscal year cumulative-to-date) are uploaded monthly.*

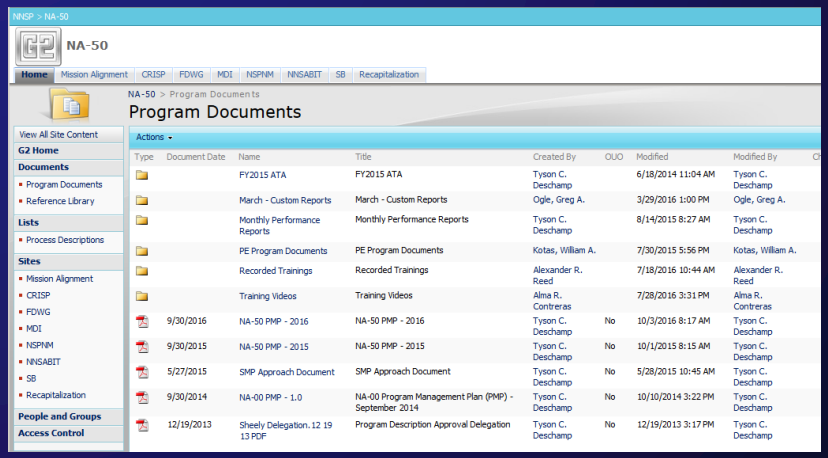
Facility Operations Provided at a WBS level that correlates to Operations, Utilities, Leases/Rents, ESH&Q, and Waste Management.

Facility Maintenance differentiated between Maintenance Management, Preventative, & Corrective Maintenance.

Milestone Reporting:

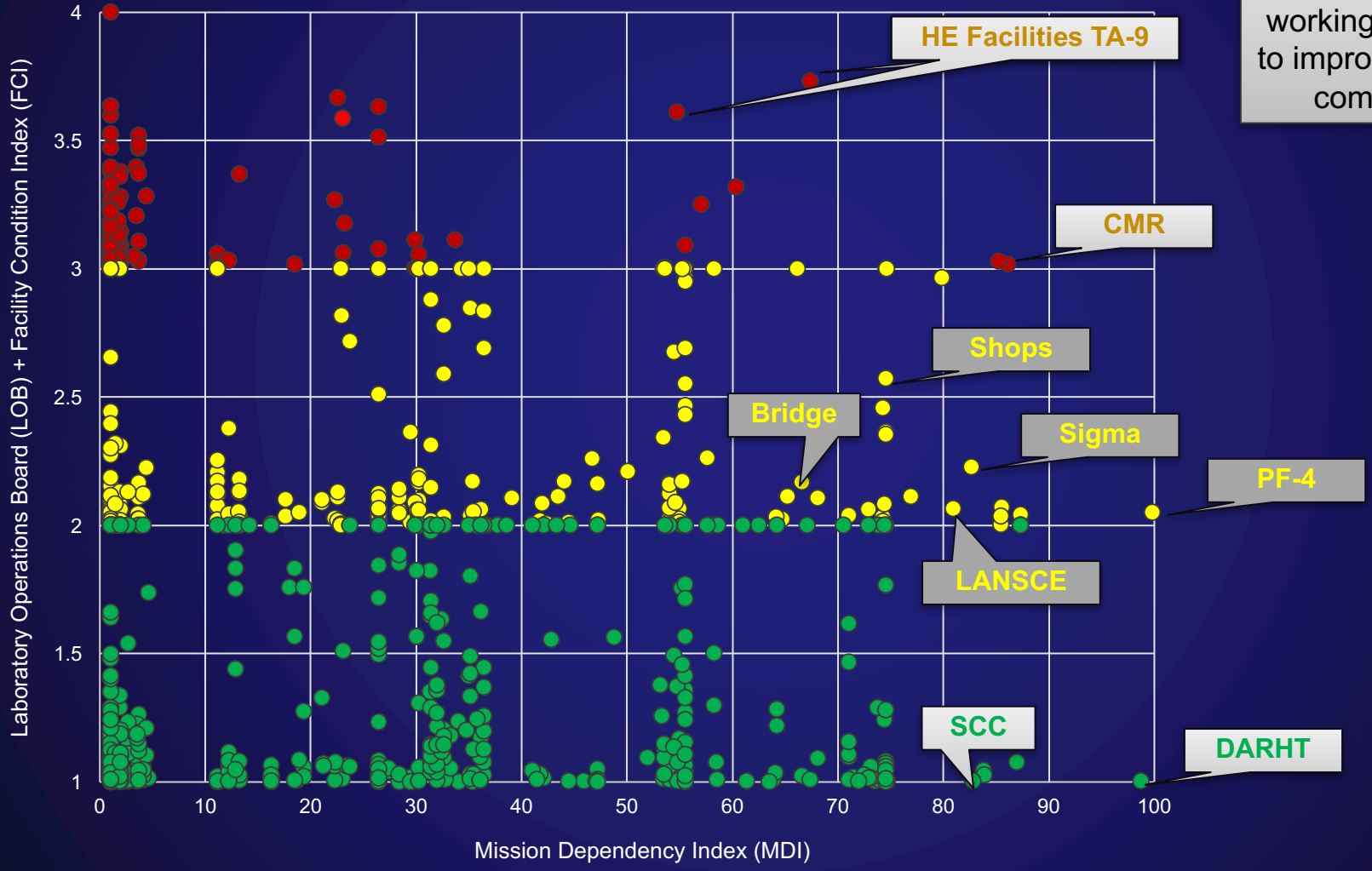
Schedule/Performance Updates:

- *Once a Recap project is identified for funding, LANL will create the schedule baseline in G2 using the standard milestone template provided by the NA-50 PMP.*
- *Once project status has begun for a project, the updates are required until the last milestone is completed or the project is cancelled.*
- *Updates are due every month by the 10th, reporting for the previous month.*
- *Updates include providing current information for the task scheduled dates and the task status. Scheduled dates can be changed through a baseline change request, or marked complete. The task status consists of a concise statement providing current project accomplishments and/or concerns relating to the project.*



MDI: Future Investments are centered on facilities with a high Mission Dependency Index

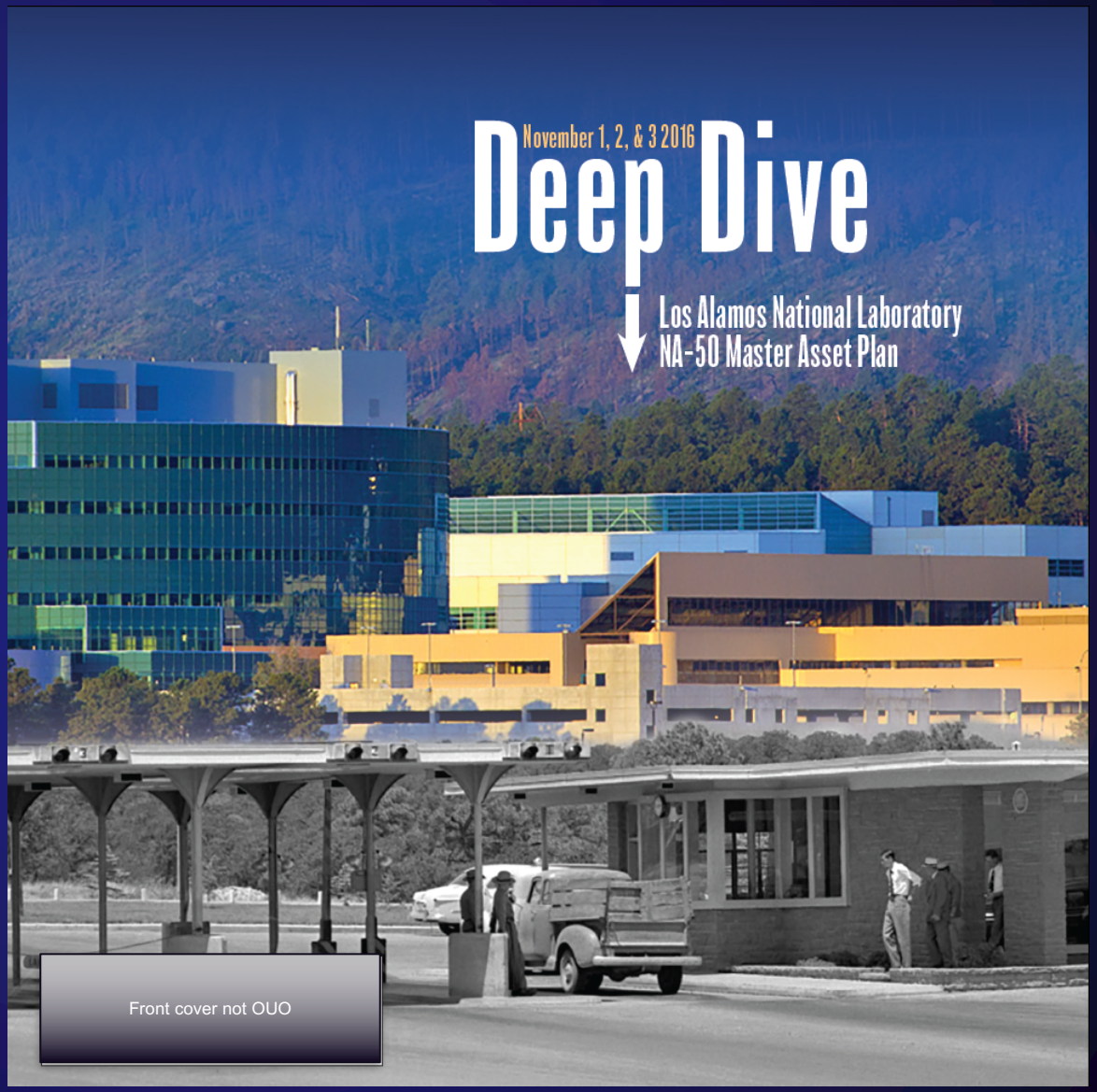
MDI approach should help validate decision-making; working on phase 2 to improve cross-site comparisons



Source: G2

Los Alamos hosted first “Deep Dive” in November 2016

- Review of all Laboratory capabilities and how infrastructure supports them
- Captures infrastructure gaps, risks, and investment strategies
- Comprehensive look at future needs and options



Safety, Infrastructure & Operations is one of the most important programs at LANL, and is foundational for our mission success

- Good communication between site and NA-50
- Appreciate clear guidance, direction and support (PMP, Programming…)
- Work closely with Los Alamos Field Office to successfully track and implement NA-50 initiatives and goals
- MDI capabilities and scoring need to evolve
- G2 implementation hasn't been perfect, but we're getting better at it!
- BUILDER implementation going well; incorporating utilities will be a challenge. Working on the functionality assessment portion.

"Safe, reliable and modern infrastructure at the NNSA's national laboratories and production plants is absolutely essential to the accomplishment of our vital national security missions…[There is] no obstacle that poses a bigger risk to the long-term success of the nuclear mission than this aging infrastructure."

Lt. Gen. Frank G. Klotz, Sept 2016, HASC Hearing on Infrastructure