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Title:	The Los Alamos Plutonium Enterprise
Author(s):	David Costa
Intended for:	Energy, Technology and Environment Business Association

Los Alamos
NATIONAL LABORATORY
EST. 1943

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Form 836 (7/06)

Presentation Abstract

The Los Alamos Plutonium Enterprise

Presented to the

Energy, Technology and Environment Business Association

This presentation will include an overview suitable to the general public and the technical business community of plutonium operations and opportunities at Los Alamos, primarily focused on the operations at TA-55.

The Los Alamos Plutonium Enterprise

presented to the

Energy, Technology and Environment Business Association
Annual Golf Tournament and Banquet
May 6, 2011

David A. Costa

Nuclear Process Infrastructure
Plutonium Manufacturing and Science

The Beginning

1943 - Los Alamos National Laboratory was created as part of the Manhattan Project

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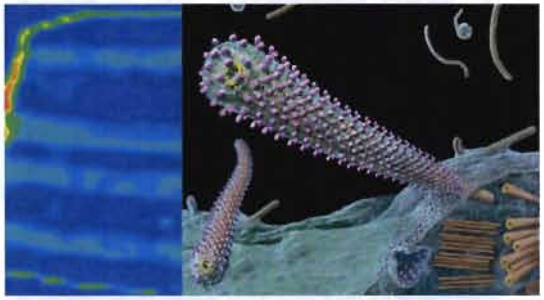
Today's Mission



Our mission is to reduce the global nuclear danger by

- Ensuring the safety and reliability of the U.S. Nuclear deterrent.
- Reducing the global threat of weapons of mass destruction.
- Providing technical solutions to energy, environment, infrastructure, and health security problems.

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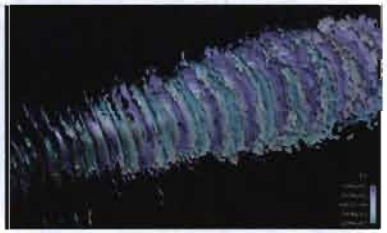
NNSA

Today's Mission

Stewardship

Program Areas

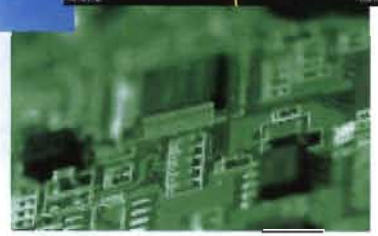
- Maintaining the Stockpile
- Science Supporting the Weapons Program
- Plutonium



Global Security

Program Areas

- Cyber & Space Systems
- Nuclear Materials Detection
- Intel



Energy

Program Areas

- Demand and Impact
- Nuclear
- Materials for Clean Energy

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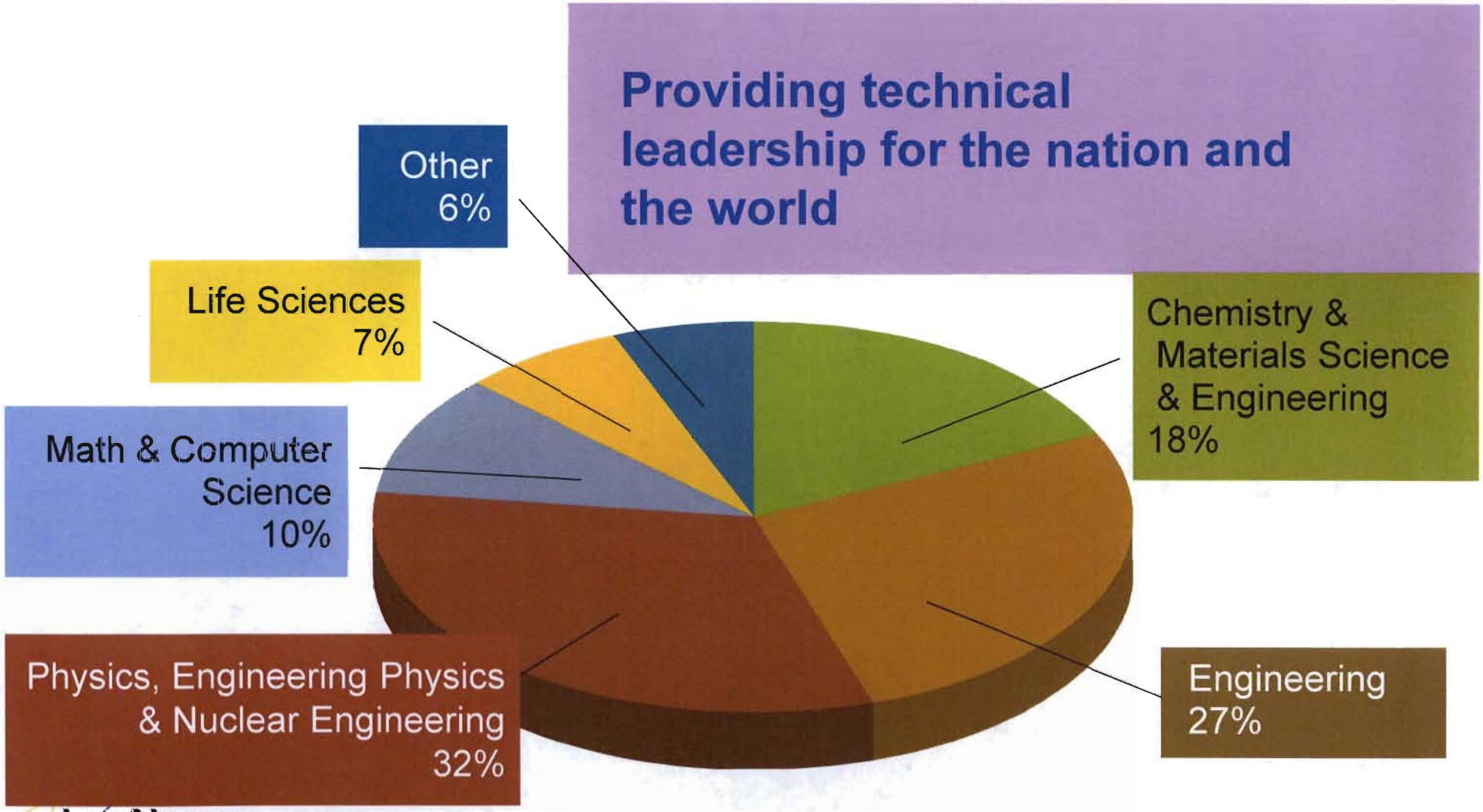
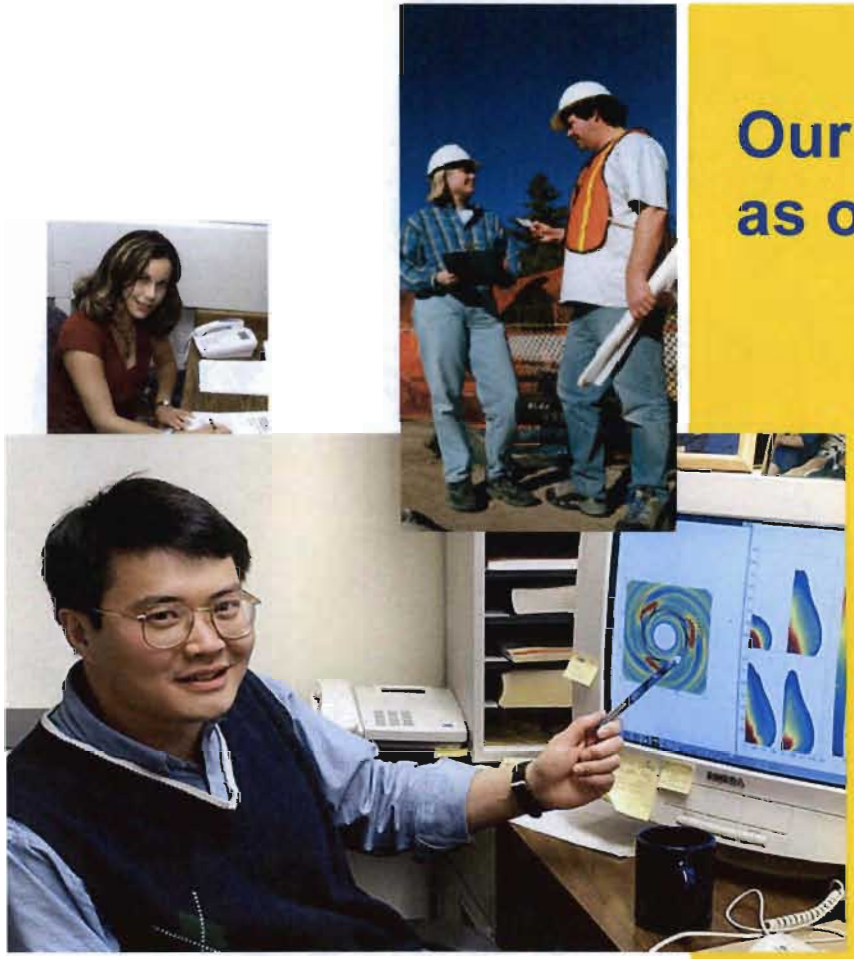
NNSA

Today's Workforce



Laboratory Talent



Our workforce is as diverse as our science

Total Career Employees	7600
3800 Technical Staff (Scientists & Engineers)	
1800 Technicians	
2000 Operational/Administrative Support	
Total Collaborative Support	5000
3200 Visitors& Guests	
300 PostDocs	
1500 Students	
Total Temporary Staff	4700

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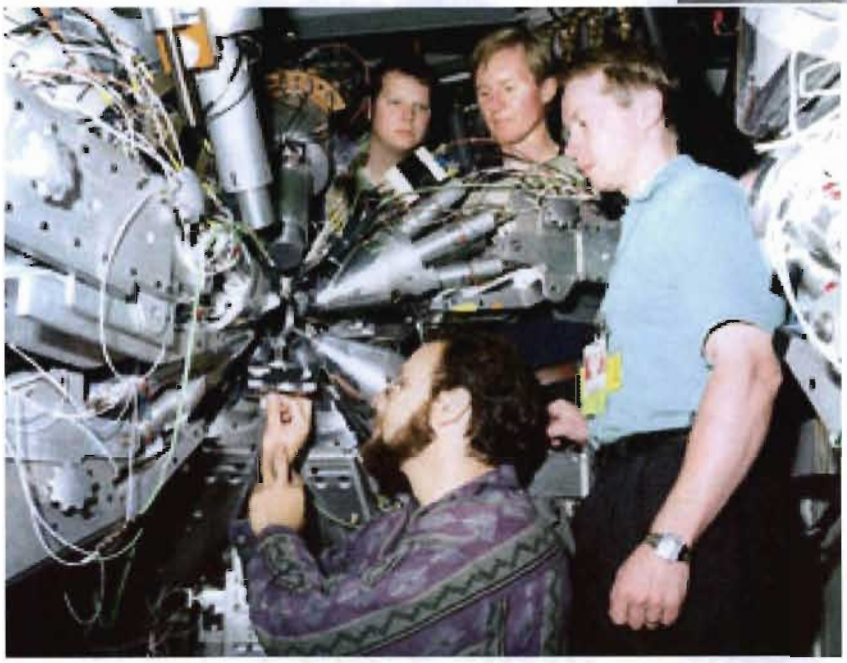
Career Opportunities



Technical staff
Professional staff
Technicians
Administrative support staff

Direct / UC
Contract

www.lanl.gov

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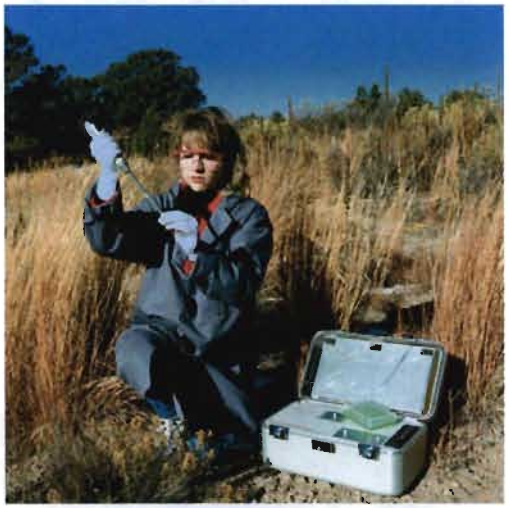
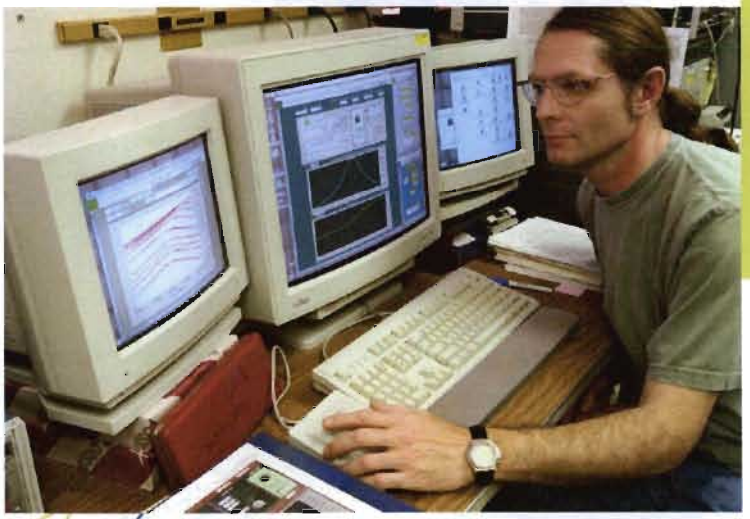
NNSA

Student and PostDoc Programs





Students and PostDocs are valuable members of our research teams

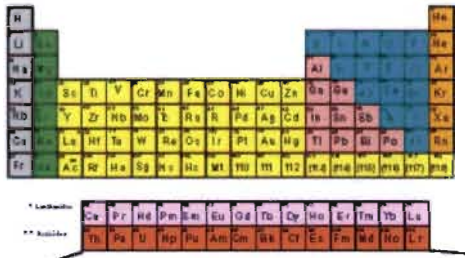
- Undergraduate Students
- Graduate Research Assistants
- Postdoctoral Research Associates

www.lanl.gov

Actinide Science Mission and National Policy

- NNSA Record of Decision Dec. 2008 for the Complex Transformation SPEIS, "Los Alamos would provide a consolidated plutonium research, development, and manufacturing capability within TA-55 enabled by the construction and operation of the Chemistry and Metallurgy Research Replacement – Nuclear Facility (CMRR-NF)."
- The Nuclear Posture Review and the Perry-Schlesinger Report (Final Report of the Congressional Commission on the Strategic Posture of the United States) support the modernization of the NNSA complex and the need to maintain a highly trained workforce.
- Radiological Laboratory and Utility Office Building (CMRR phase 1)

Lanthanides, Actinides & Transactinides



- 25% of Periodic Table
- highly specialized science (unique facilities - Actinides)
- of great importance to national defense, energy, environment (Actinides)

* Lanthanides	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
**Actinides	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

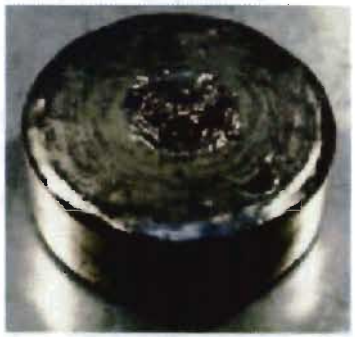
Defense

Energy

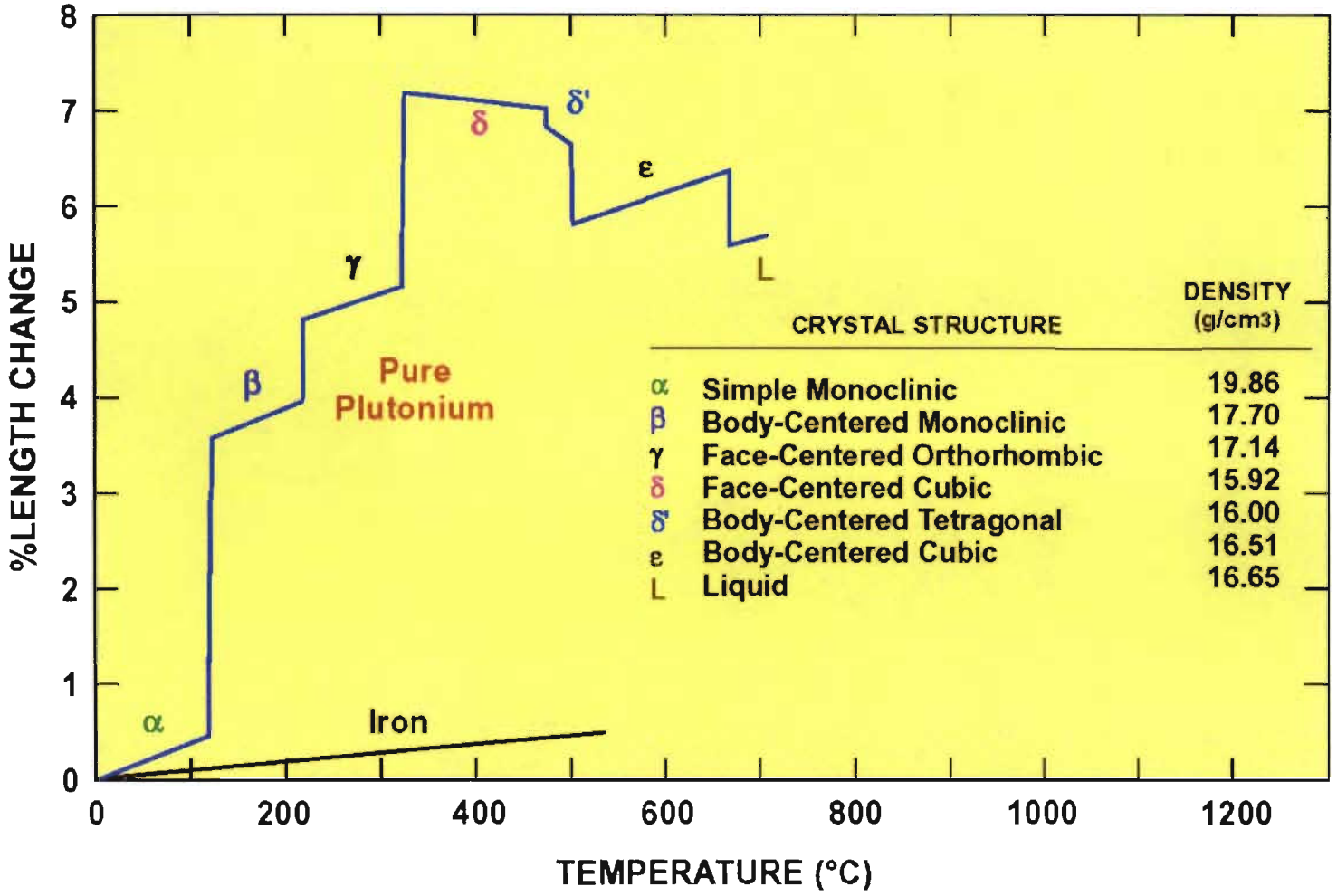
Environment

ITS
Los Alamos

Plutonium Science

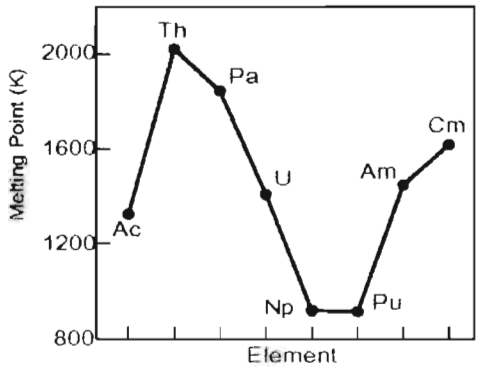


Weird Properties of Plutonium

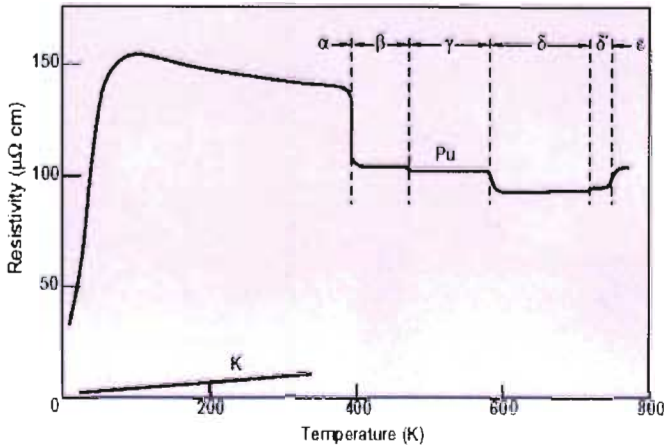


Weird Properties of Plutonium

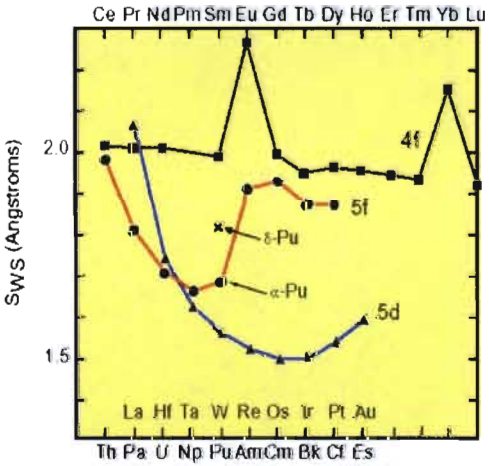
Melting Points



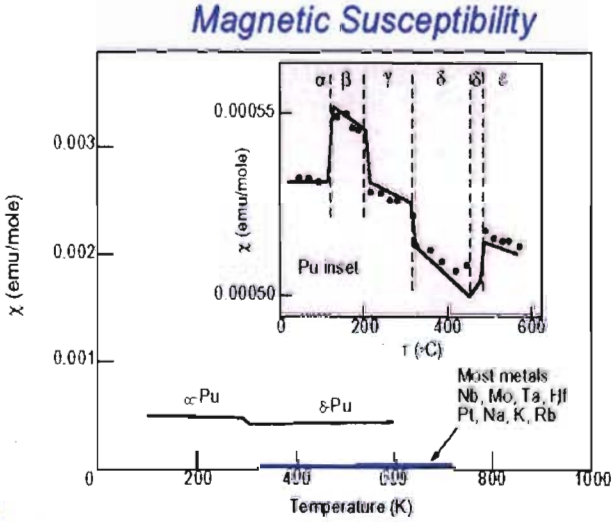
Resistivity



Wigner-Seitz Radius



Magnetic Susceptibility



ADSMS: owner of TA-55 and TA-50

Technical Advisor
Brett Kniss

Chief of Staff
Vacant

Safety Program Lead
Marilyn Peabody

Geraldine Barela
Executive Office Administrator

Associate Director
Carl Beard

Deputy Associate Director
Tim George

Support Services

Taylor Van Buren, Business Ops Mgr
Anika Lopez, Human Resources
Patrick Trujillo, Human Resources

Integrated Nuclear Planning

Program Direetor
Tim Nelson

Seaborg Institute

Center Leader
David Clark

Program Management

Dominick Palamara, DL
Debbie Trujillo, COS

PM-1
Program Management
C12, DSW, RTBF, ADAPT
Jim Ostic, PD

PM-2
Project Management
Pit Manufacturing
Bob Putnam, PD

PM-5
Production Planning
and Control
Stephen Boerigter, GL

Pu Manufacturing and Technology
Steve Schreiber, DL
Kirsty Archuleta, COS

PMT-2
Actinide Process Chemistry
Kent Abney, GL

PMT-3
Nuclear Materials Management
Tony Drypolcher, GL

PMT-9
Actinide Manufacturing & Technology
Craig Van Pelt, GL

PMT-10
Pit Disposition & Precision Fabrication
David Costa, GL

Weapons Component Manufacturing
David Mann, DL
Annie Vigil, COS

WCM-1
Weapons Component Manufacturing
Fawn Coriz, GL

WCM-2
Process Science and Technology
Doug Kautz, GL

WCM-3
Detonator Fabrication
Jeff Kinzer, GL

WCM-4
Surveillance and Engineering Support
Ted Cousins, GL

TA-55 Facility Operations

Director
Robert Mason
Stephanie Salazar, COS

Deputy Director
Stu McKernan

Deputy Division Leader
Tom McNaughton

Chief Engineer
Derek Gordon

ESH & QA Manager
Dianne Wilburn

MC&A Manager
Joseph Hickey

Operations Manager
Chuck Tesch

Rad Control Operations Manager
Steve Costigan

Security Manager
Kim Nelson

Waste Service Manager
Bob Dodge

TA-22 Facility Operations

Director
Reanna Sharp-Geiger

Deputy Director
Terry Priestely

Engineering Manager
Richard Hemphill

ESH & QA Manager
Stephanie Archuleta

HE Operations Manager
Chuck Tesch

Maintenance Manager
Stacy Howze

WF Operations Manager
Steve Westerhold

Security Manager
Doug Dick

Support Manager
Franco Sisneros

Environmental and Waste Services Manager
Randy Johnson

UCNI

Pu Facilities at LANL

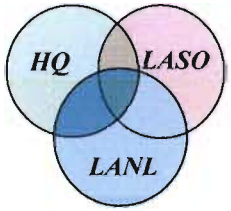
- Continue to support the Pu Infrastructure needed for the Nation that will enable reliable delivery of the Mission.
- Age/condition of facilities must be addressed- in some cases, major investments needed in Pu Infrastructure that include upgrades or replacement.
- In seeking the above, support Nuclear Facility Consolidation-collocation of Pu operations in an integrated manner that will lead to more cost effective and more efficient operations.

Plutonium Infrastructure – Key Initiatives Employed to Meet Challenges

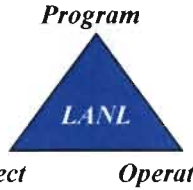
Infrastructure Management & Planning

Determine current/future infrastructure needs and how to get from here to there

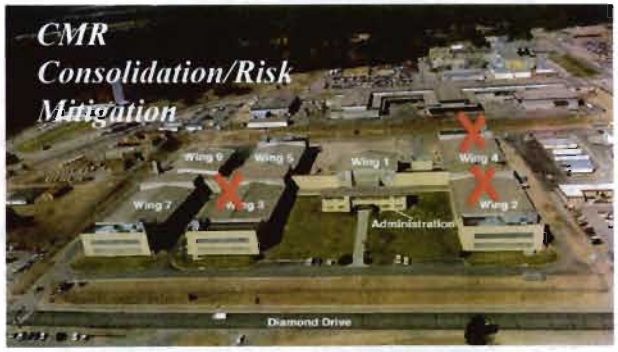
Integrated Nuclear Planning



Infrastructure Validation Team



Infrastructure Consolidation *Reduce/eliminate outdated/unnecessary infrastructure*



Infrastructure Investment

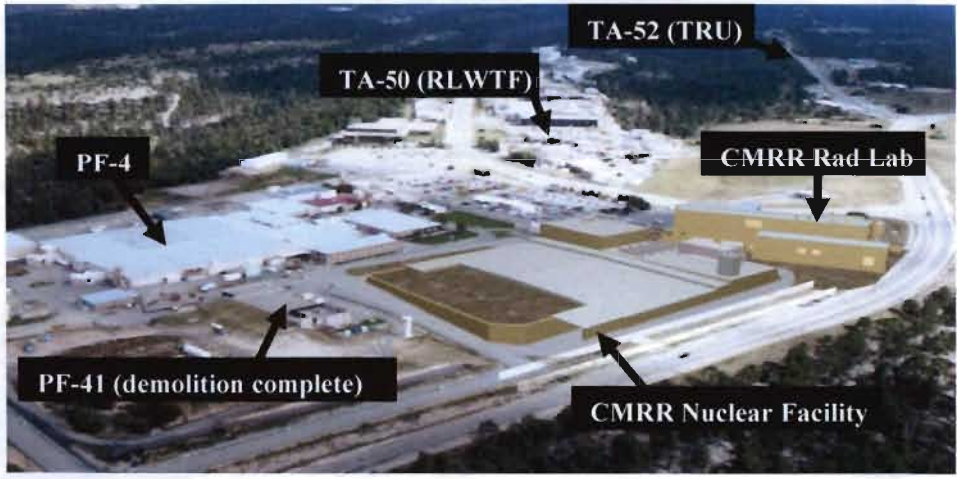
Improve/replace and then sustain required infrastructure

Facility/Infrastructure Transformation (FIT)

RLW Revitalization

Super VTR

Capital Construction Program



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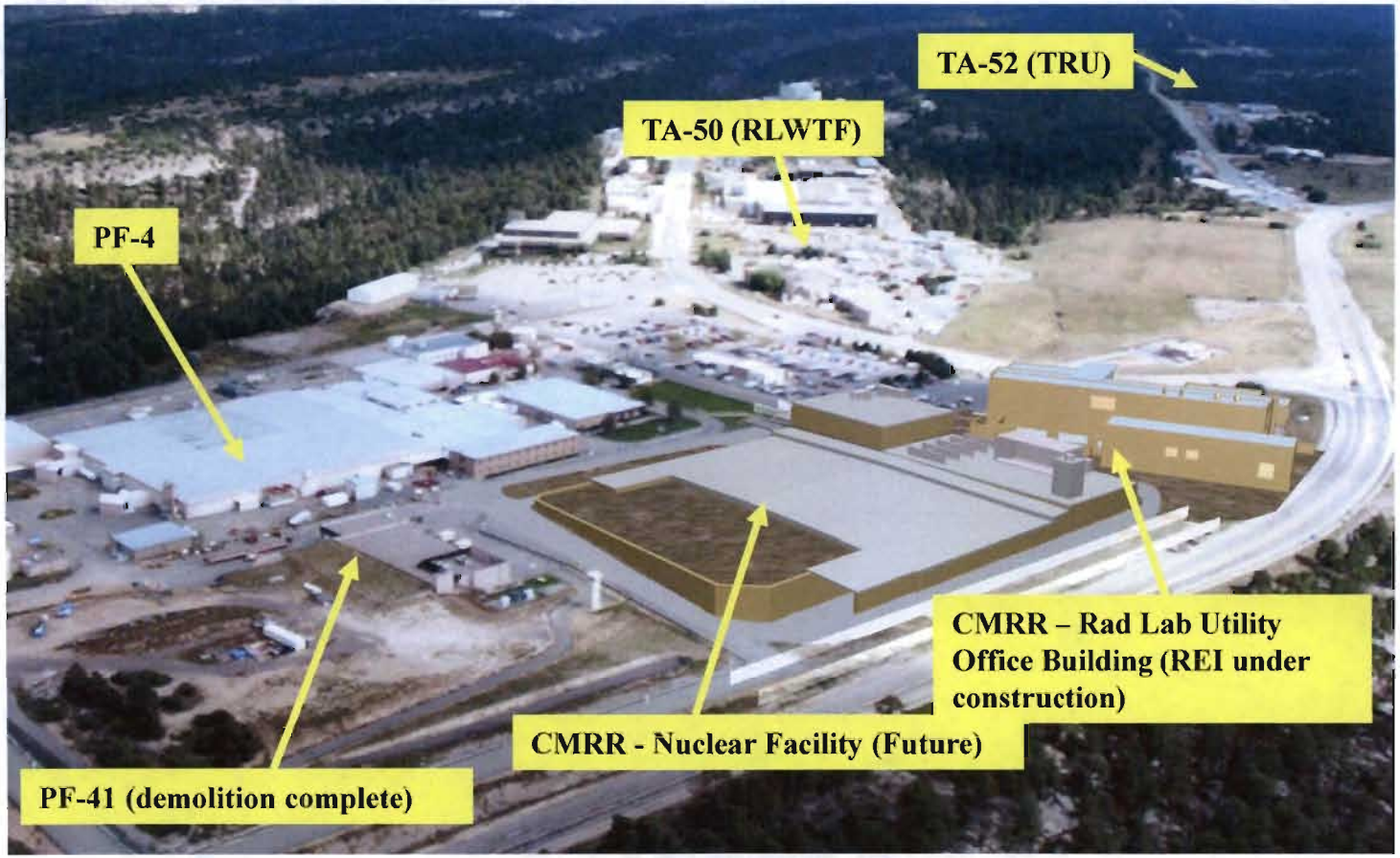
NNSA

Site Overview along Pajarito Corridor-Nuclear Facility Consolidation Activities



TRP I (Chillers and Cooling Towers) Construction Complete

Plutonium Facility Operations

PSM Objectives/Accomplishments

- Maintain a Safe and Secure working environment
- Deliver Quality Products on-time and within cost
- Strengthen the Technical Base for Science, Technology, and Engineering
- Operate and maintain SMS facilities-complete Integrated Project List installations and upgrades
- Implement Formality of Operations, Engineering, Maintenance, and Training
- Balance investments in strategic capabilities, tactical capabilities, and production capacity

  - Certified pit production capability established
  - Taken ownership of Radiological Liquid Waste Facilities at TA-50
  - Established Integrated Nuclear Planning Office within SMS
  - Established TA-55 Integrated Priority List to implement a risk-based infrastructure investment strategy at TA-55
  - Issued TA-55 Infrastructure Implementation Plan
  - Completing the implementation of the TA-55 DSA-submitted annual update with improved controls to reduce off-site dose.
  - TRP I Subprojects (chillers and cooling towers) construction complete

PSM Initiatives will Reduce Infrastructure Costs

Integrated Formality of Operations- become more compliant and operationally efficient

- Conduct of Operations
- Conduct of Maintenance
- Conduct of Training
- Conduct of Engineering

Infrastructure Centers – consolidation to become more cost efficient

- Warehousing and Procurement
  - Safety Class and Safety Significant Items-IPIP
- Business Processes
- Documents and Records
- Scheduling and Project Management
  - Integrated Priority List
- Quality Assurance

TA-55 Status

NNSA Complex Transformation Preferred Alternative: LANL designated as the NNSA Plutonium Center of Excellence. TA-55 Facilities are the heart of the Plutonium work at LANL.

- Programs
  - Changes (Down/Up) in Pit Manufacturing-other established programmatic efforts
  - "New" programmatic efforts
- Facilities
  - We need to keep working against the 55 Implementation Plan at a balanced, sustainable pace.
    - Established the Integrated Priority List (IPL) Process-working
    - Established the 55 Infrastructure Implementation Plan-ongoing updates based on needs and resources
    - Developed TA-55 Facility Safety Strategy
- Projects
  - We're in construction/we're completing construction/we're in design-more to come.
    - Integration; sharing lessons learned

Documents of the Program of Record

- Umbrella Documents – Long Term Planning
  - Programmatic Environmental Impact Statements
  - Site-Wide Environmental Impact Statements **(SWEIS ROD-20 ppy manufacturing)**
  - Project Documents
    - Critical Decision Packages
    - Project Specific Environmental Impact Statements
- Near Term Planning
  - 5-year plans for budget
  - Annual plans for budget
- Other
  - NPR

NNSA Complex Transformation Preferred Alternative: LANL designated as the NNSA Plutonium Center of Excellence. TA-55 Facilities are the heart of the Plutonium work at LANL.

Projects-Reinvesting in TA-55 & TA-50

CMRR
- RLUOB Construction Complete
- REI CD-2/3-In Construction
- NF Design-seeking Final Design Authorization

SeaC Pro-Super VTR at 55 - In Construction

TA-55 Reinvestment Project (TRP)
- Phase I construction complete (CD-4 this FY)
- Phase II in design-construction in FY11
  - CD-2A Approved; CD-2B seeking approval
- Phase III subprojects review starting

NMSSUP II-In Construction (INP TOUR)

CMR Hazard Reduction and Consolidation
- Moving sample preparation to PF-4
- Moving 238 analysis to PF-4

WMRM-Complete

RLWTF-UP (preparing CD-2 package)

TRP I Cooling Tower Removal

PSM Challenges

- We have recently and are continuing significant reinvesting in the site; ramping up the TA-55 operations budget gets the site resources where they need to be, but doesn't represent significant facility reinvestment in the site; TRP and FIRP represent the significant facility investments in the site-we need all of these financial resources to reach our goal.
- We are balancing the changing programmatic needs within our functional and programmatic capabilities.
- New people take years to train and qualify-whether infrastructure or Pu handlers.

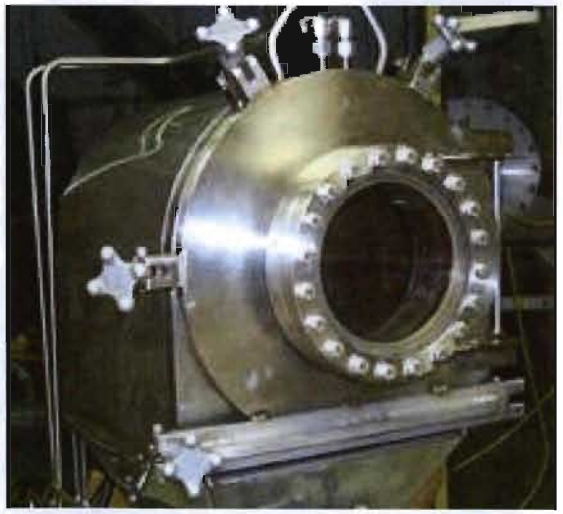
TA-55 and TA-50 Summary

- TA-55/TA-50 have an enduring mission into the foreseeable future.
- TA-55 includes the Security Category I, Hazard Category 2 operational Plutonium Facility that successfully produces for a large variety of programs for the DOE/NNSA and the Country
- The Pu Facility at TA-55 and other support facilities like TA-50 RLW are showing signs of age and are liable for new and increasing requirements implementation that require reinvestment or replacement.
- Resources, both financial and personnel, have been and will need to continue to be ramped up to support the increasing needs of the Facility (program needs are steady to increasing).
  - SMS and LANL are proactive in becoming more cost effective and operationally efficient, which will enable additional resources to be utilized where needed most.
  - SMS and LANL are increasing resources where there have been bottlenecks (systems engineers as an example) to support infrastructure.

We have begun transforming through a steady ramp up of resources the TA-55 infrastructure, which will reduce risks and ensure long-term viability- a sustained, continuous effort is needed.

Examples of TA-55 Plutonium Programs

- Stockpile Stewardship
  - Pit Manufacturing Program
  - Surveillance Program
  - Plutonium Experimental Program
  - Other Plutonium Programs
- Other Pu Programs-Activities
  - ARIES Disassembly
  - Plutonium Heat Sources-238 programs
  - Materials Recycle and Recovery
  - Milliwatt Generator Fabrication
  - Actinide Science
  - Nuclear Forensics
  - Advanced Nuclear Fuel Cycles
  - Support of LLNL Missions



End of the Cold War

June 4, 2000

US and Russia agree to agree to permanently dispose of 68 metric tons of weapons-grade plutonium (oxide or metal).

Most of the plutonium declared surplus is in the form of weapons components, or pits, whose design is classified

Potential PD&C Facility Siting

Hanford Site Fuels & Materials Examination Facility

Record of decision December 1999

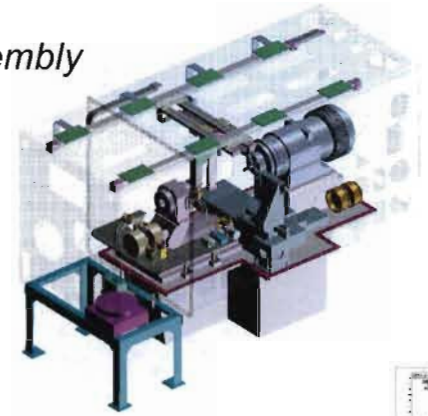
Pantex Plant "Fedfield"

Savannah River Site
P-Reactor
(Fuel Assembly Area)

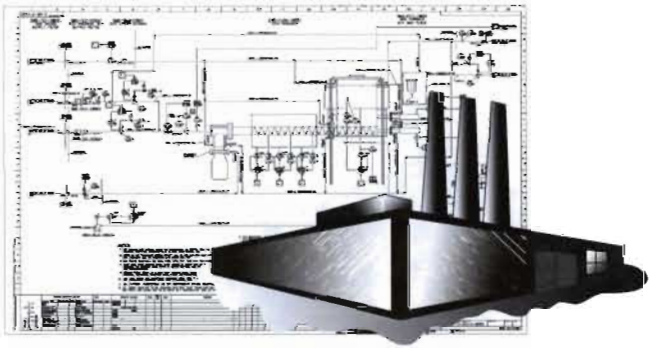
Idaho National Engineering Laboratory
Fuel Processing Facility

Pit Disassembly and Conversion Program

Pit Disassembly

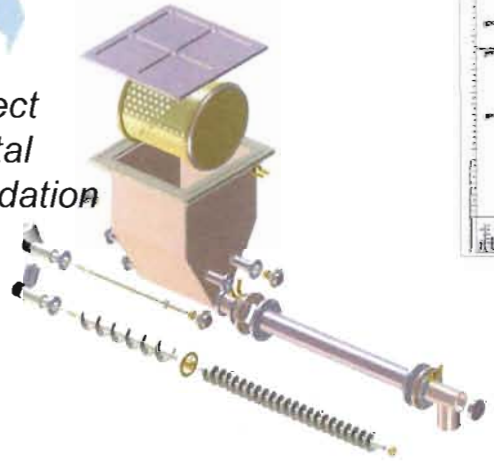


Non-destructive Assay



Pit Disassembly & Conversion Facility Design and Construction

Direct Metal Oxidation



Plutonium Packaging

Technology Development, Integrated Demonstration, Government Furnished Design

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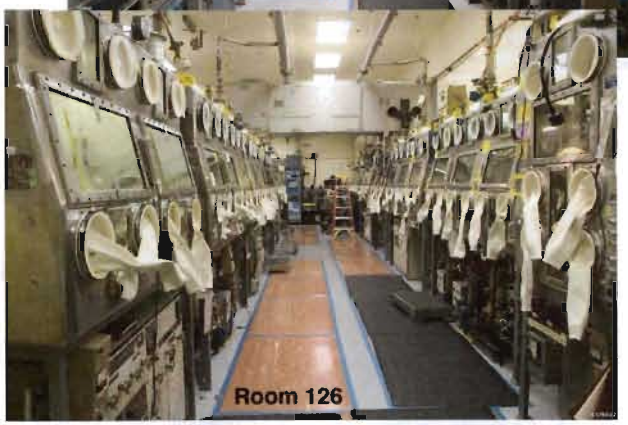
Typical U.S. Blended MOX Feedstock

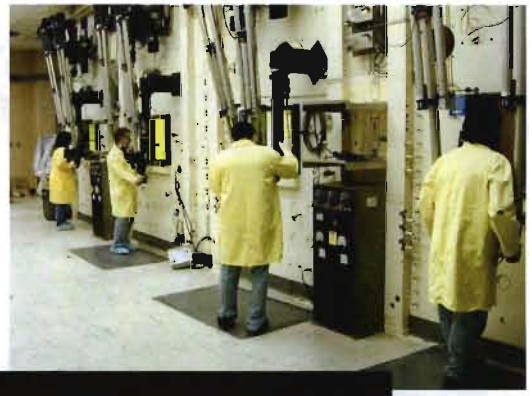
- Plutonium oxide produced by hydride-oxidation process
- This can contains 3 kilograms of mixed oxide, 3.1% plutonium
- Powder was prepressed and granulated

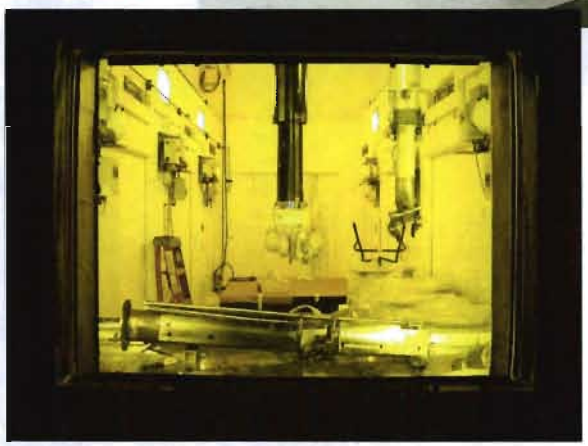
Los Alamos Nuclear Fuels Infrastructure

Los Alamos fuel infrastructure includes most of the system elements: modeling & design, cold labs, glovebox lines, characterization and hot cells

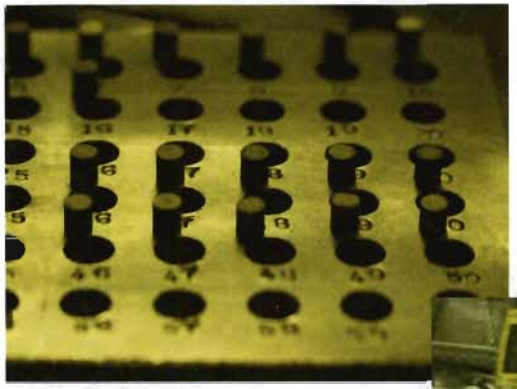


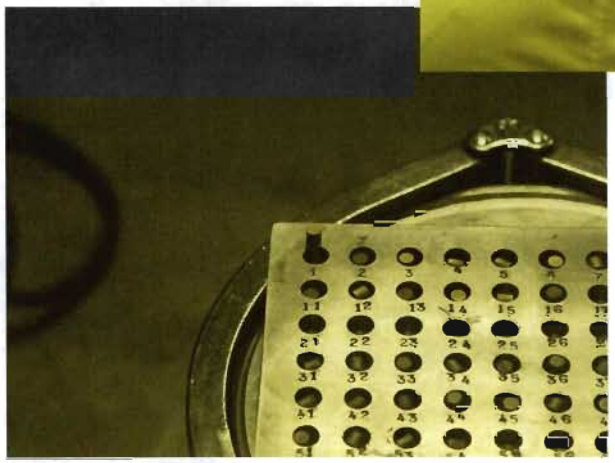
- Safety Basis
- Security
- Training
- Work Control
- Quality Control

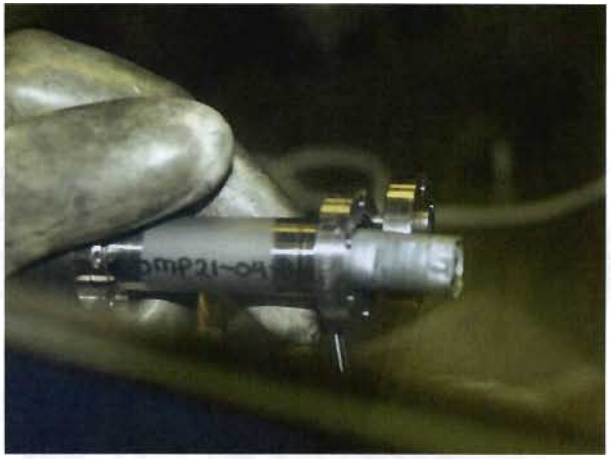




Ceramic Fuel Development







AFC 1G Actinide Nitride pellets

- COMP11-H: 12 pellets
- COMP11-L: 12 pellets
- COMP13: 11 pellets
- COMP21-H: 11 pellets
- COMP21-L: 11 pellets
- COMP23: 11 pellets

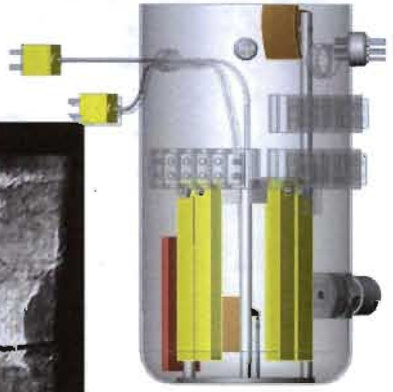
3013 Surveillance and Monitoring Program

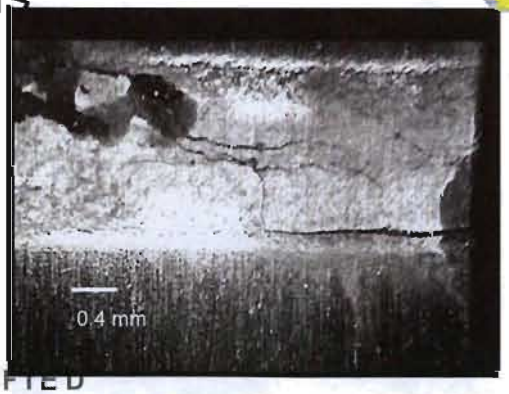
Overview of progress and future work

Gas generation and compositional changes

Corrosion observations and conditions for corrosion

Database evaluations of 3013 containers; database queries, NDE/DE selection; rebinning of 3013 containers; statistical review of data; prompt gamma analysis





Seaborg Institute for Transactinium Science

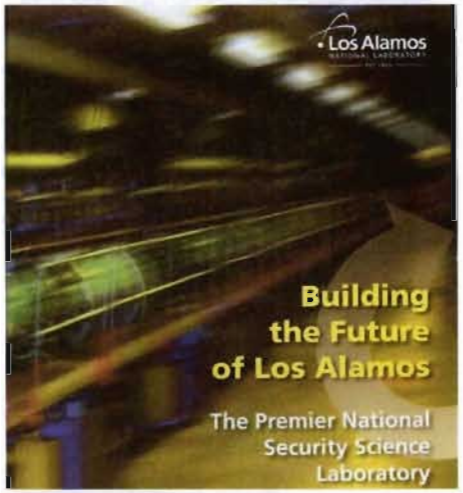
- Foster sustained excellence and enhanced external visibility in actinide science & technology
- Attract, retain, and revitalize the workforce of of actinide scientists and engineers needed to meet the challenging and changing needs of the Nation
- Maintain a national resource for education and training in actinide science
- Provide focus, integration and expert advice for actinide science in support of national missions

"Whatever the expense of improving education, it is an investment in the future we must make. Excellence costs, but in the long run mediocrity costs much more."

Glenn T. Seaborg - 1997

Los Alamos NATIONAL LABORATORY EST. 1943

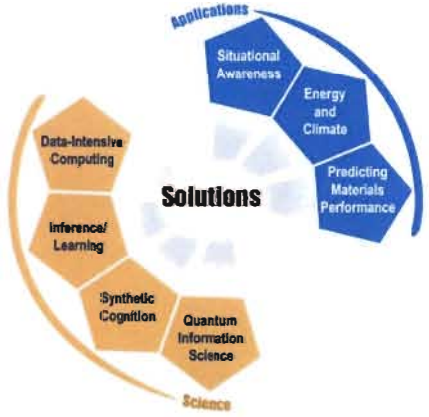
Science that Matters



- Experimental science focused on materials for the future
- Information science and technology enabling integrative and predictive science
- Science of Signatures for enduring national needs

Materials for the Future

Information Science and Technology for Integrative and Predictive Science



Science of Signatures

Science, Technology, and Engineering Capability

Controlled Functionality

LOS ALAMOS NATIONAL LABORATORY EST. 1943

NNSA

Centers and Institutes are vital to LANL's future.

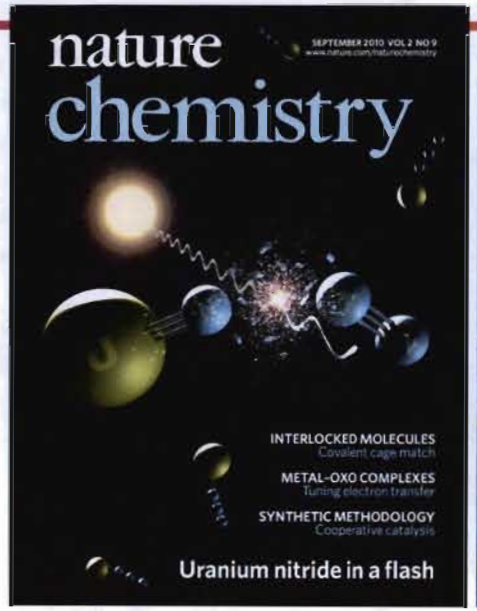
LANL invests in Centers and Institutes to underpin our science and engineering.

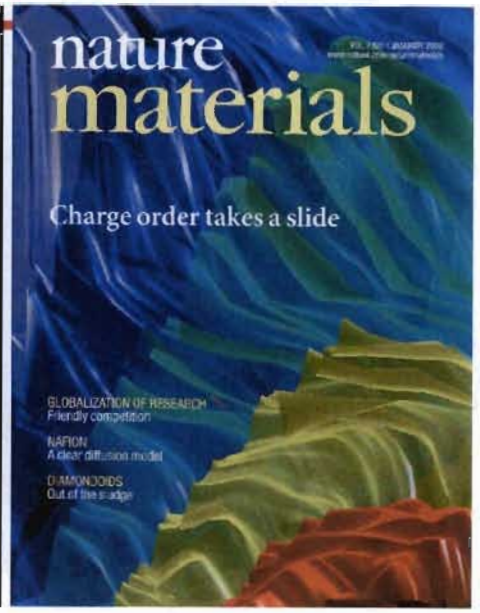
- Catalysts for developing and enabling emerging, cutting edge science and engineering at LANL.
- Agents to foster multi-disciplinary and multi-program research.
- "Centers of Excellence" with high national and international visibility.
- Premier mechanism for Laboratory recruiting and retention.
- Recognized for developing exceptional personnel in technical capabilities areas critical to our mission.
- Well integrated with Laboratory science and engineering through the line and program organizations.
- Cross-cut LANL missions.

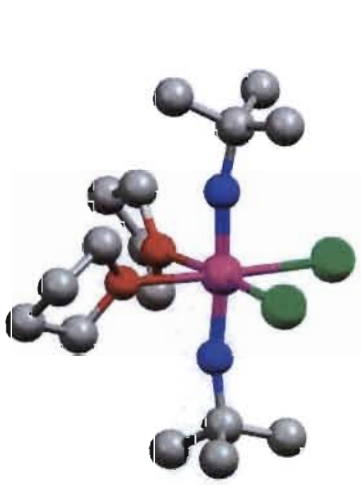
How are we doing?

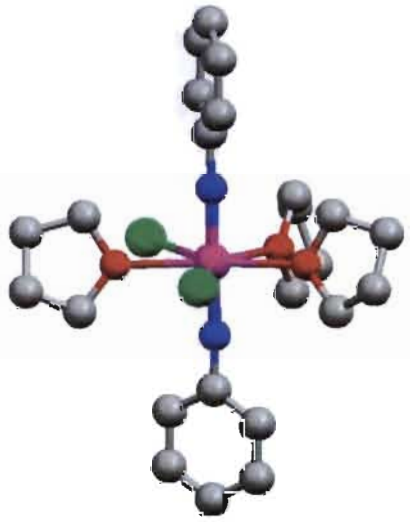
The program has produced to date:

- Currently 17 fellows (Feb. 2011)
- 54 fellows since inception
- 3 Reines Fellows
- 4 Director's Fellows
- 1 National Security Fellow
- 12 fellows have joined LANL staff
- 48 Seaborg Institute **lectures by fellows**
- **Lots of published actinide research**









$U(NR)_2I_2(THF)_{2,3}$