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Title: Los Alamos Neutron Science Center

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Los Alamos Neutron Science Center

Terry C. Wallace, Janet A. Mercer-Smith, and Alex H. Lacerda

The Laboratory addresses important science questions for energy, global security, and stockpile stewardship. The Los Alamos Neutron Science Center provides a key facility to support the Laboratory's missions areas. The d LINAC risk mitigation strategy and investments ensure that LANSCE reliably operates to meet our national research needs well into the 21st century. Project execution strategy for risk mitigation will be presented.

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Los Alamos Neutron Science Center

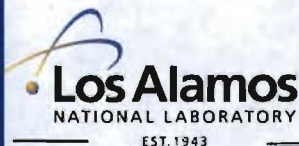
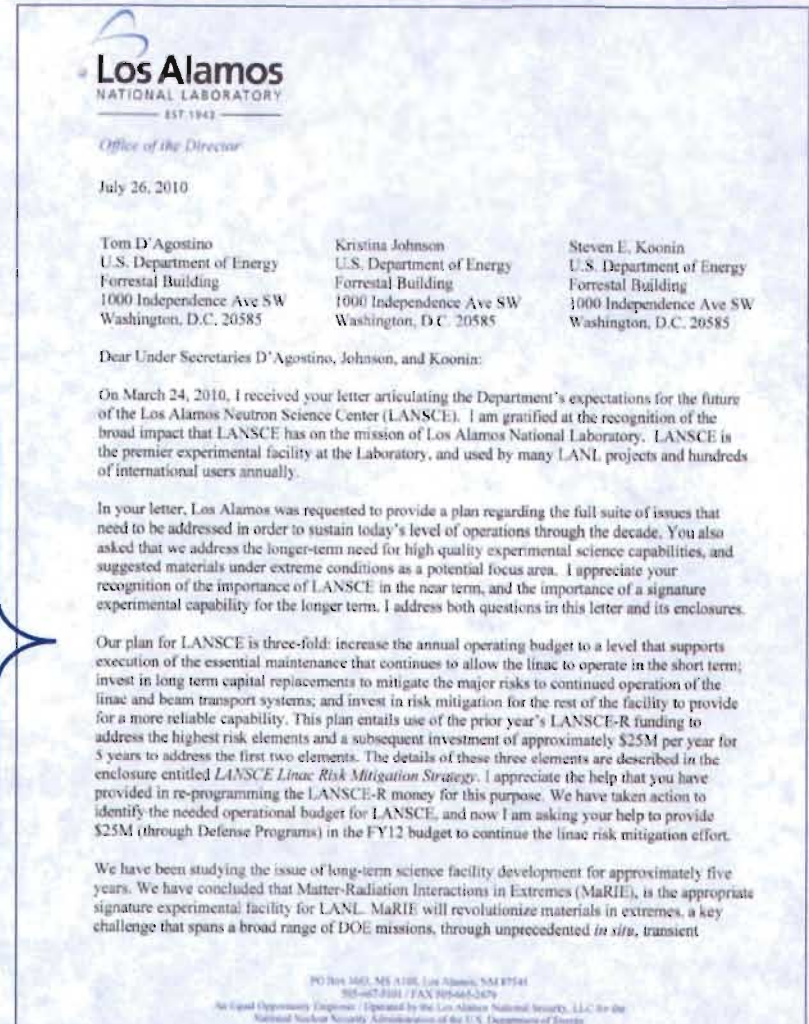
Terry C. Wallace

Principal Associate Director for
Science, Technology and Engineering

LANSCCE Risk Mitigation Strategy is discussed in the Laboratory response to the 3 Undersecretaries letter.

Our plan is three fold:

- 1) **Increase the annual operating budget to a level that supports execution of the essential maintenance to allow the linac to operate in the short-term**
- 2) **Invest in long-term capital replacements to mitigate the major risks to continued operation of the linac and beam transport systems**
- 3) **Invest in risk mitigation for the rest of the facility to provide for a more reliable capability**

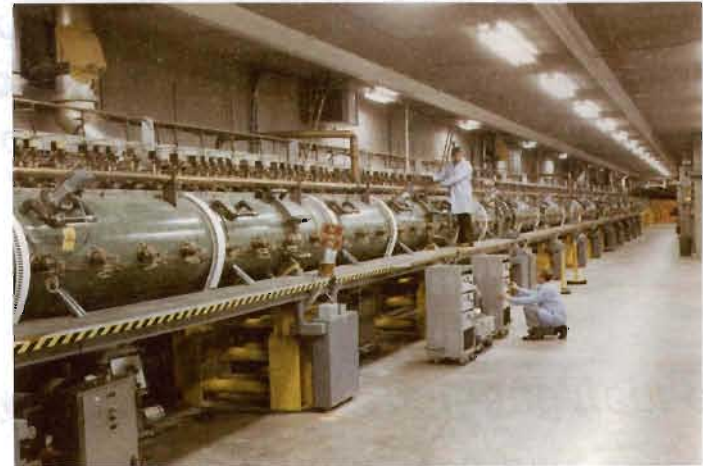


LANSCCE provides Nuclear Weapons Stewardship and unique National Scientific Capabilities.

With proper investment and maintenance, the LANSCE has no practical lifetime limit.



The beam is produced by an injector and accelerated to 0.75 MeV



A Drift-Tube LINAC increases the energy to 100 MeV



A Side-Coupled LINAC further increases the energy to 800 MeV



Control Room

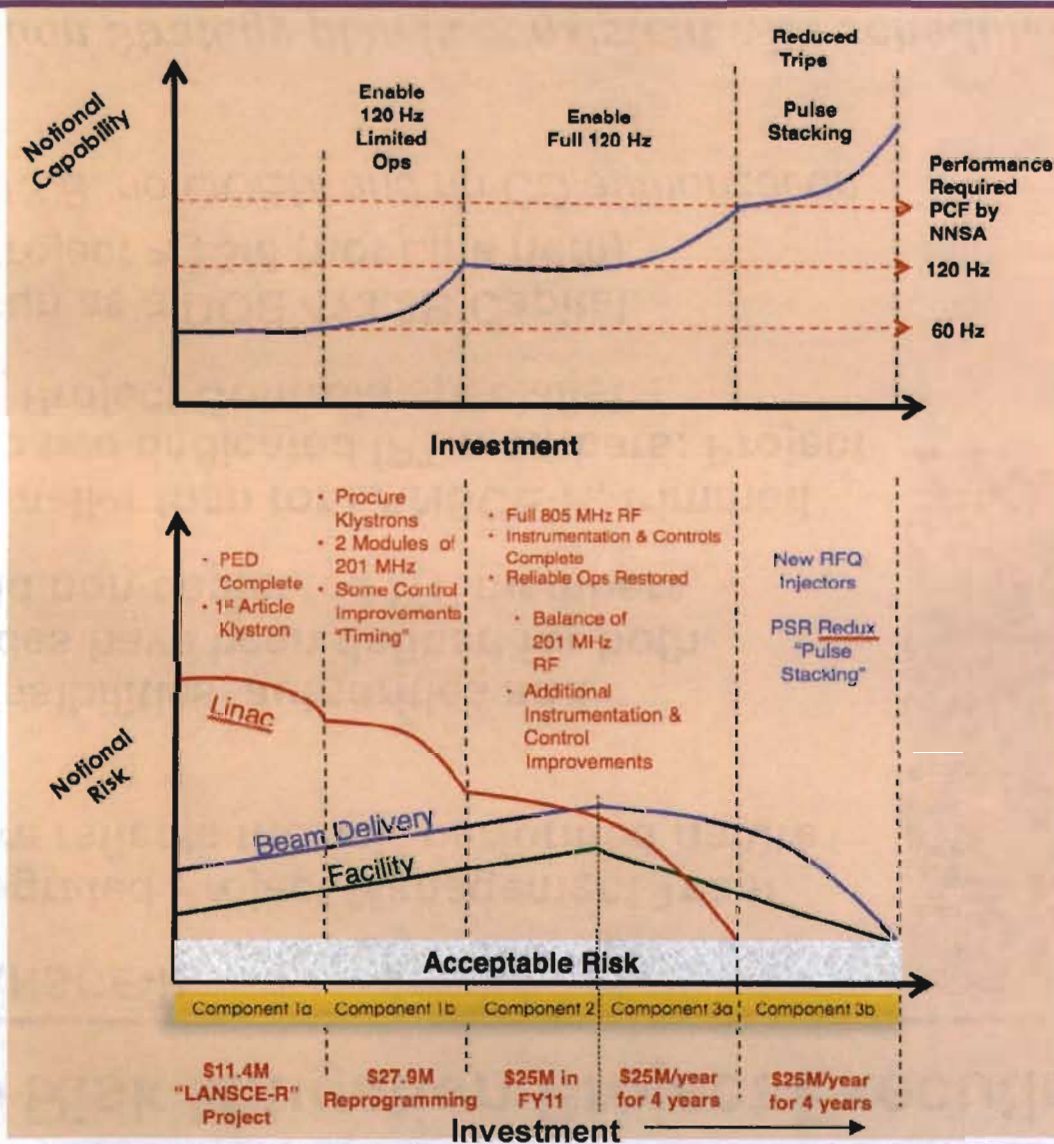
LINAC risk mitigation investments ensure that LANSCE reliably operates to meet our national research needs well into the 21st century.



LANSCE LINAC

- **LINAC risk mitigation investments are designed to:**
 - *Refurbish the 201MHz and 805 MHz RF systems to regain reliable RF power system operation.*
 - *Restore 120 Hz linac operation.*
 - *Implement a modern, maintainable EPICS-based control system.*
 - *Refurbish beam transport and front-end injector systems (RFQs)*
- **Work is being integrated with operations to ensure continued programmatic research and a robust user program during project execution.**

LANSCCE Risk Mitigation Strategy and Investment



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LANSCCE - Risk Mitigation Project Execution

- Similar to LANSCE-R
- Project's Integrated Project Management Team (IPT) structure reflects the self-performed nature of project.
- Roles, responsibilities, authorities and accountabilities have been defined for both dedicated and non-dedicated ITP members.
- Core IPT is smaller than for LANSCE-R, trimmed from seven to two dedicated IPT members: Project Manager and Project Controls specialist.
- LRM will be run as a DOE 413.3B Capital Equipment Project > \$3M (not Line Item)
 - Tailored 413.B: no OCEM and no CD authorization required

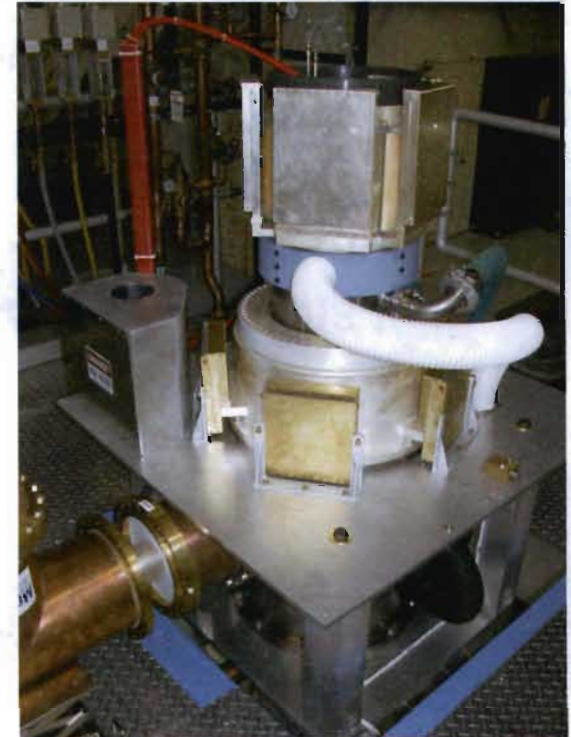


Risk Mitigation Strategy plan is consistent with scheduled operations to meet NNSA and DOE programmatic requirements.



Accomplished under the \$11.4 M LANSCE-R funding

- Network is on order and will be installed in coming outage.
- Prototypes for industrial controls, BPPMs, wire scanners, timing system, timed data system
- Prototype klystron on order due July 2011
- Prototype replacement 201 RF system currently under test (> 1.5 MW achieved)
- Parts for prototype replacement modulator delivered
- Preliminary designs for most all components of LANSCE-R



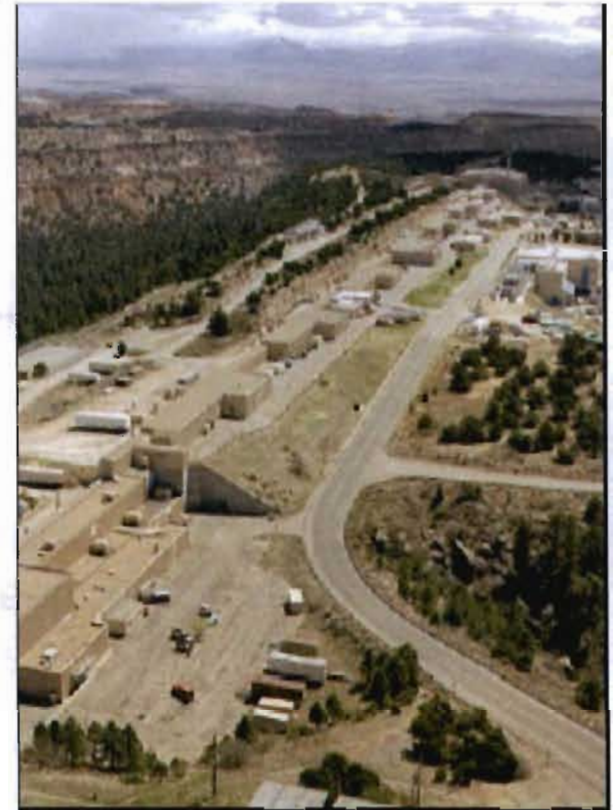
201 MHz Diacrode Test Stand

To Be Accomplished under the \$27.9M Component 1b

- First increment of the klystron production order
- New 201 MHz RF system on Module 2: procurement
- Design for the Sector A LLRF system and DTL Resonance Control Water System
- One Sector of New Timing Systems
- Assuming we can find good 7835s for Modules 3 and 4, this will enable 120 Hz operation at the end of the FY 13 outage to meet NNSA Level 2 milestones
- FY 11 LANSCE-RM funding increment will allow for the completion of the LLRF and DTL water system on Module 2.

Scope for the LANSCE-RM Funding Increment in FY 11 Component 2

- 201 MHz LLRF and DTL water system
- Final part of the production klystron order
- New IPA for Module 2
- Procurement for BPPMs, Wire Scanners, Control Infrastructure, and Timed Data Systems
- Spare drift tube procurements
- Another step toward the 201 MHz RF replacement



Conclusion: LANSCe is at the top of its scientific game, producing key basic and programmatic science

- Capabilities support, and are adapted to, US national security and science missions.
- Interplay of basic and national security missions is unique and provides unique opportunities for innovation in basic and applied science.
- The LANSCe User Facility is operating better than ever, supporting a broad range of fundamental and applied science based on three neutron sources, and producing medical radioisotopes for diagnostic imaging.
- The scientific portfolio is robust and diverse, utilizing neutrons that vary in energy by fifteen orders of magnitude.
- LINAC risk mitigation investments are moving us to future reliable operations.
- The LANSCe facility will form the foundation for a future signature science facility at LANL.



Cost share requirements in EPAct 2005: unintended consequences on Lab energy R&D

Issue:

- Cost sharing mandatory for most applied energy programs involving industry participation
- DOE interpretation requires 20%-50% industry cost share including portion of grants going to Labs and Universities

Unintended consequences:

- Applied energy programs at early market stage (e.g. fuel cells, solar, wind) have insufficient industry base for cost share
- Number of proposals involving partnerships between multiple Labs and universities has decreased sharply (hoarding industry partners)
- Industry is incentivized to do all R&D internally (maximum leverage for IP and cost share)

Resolution

- Waive cost-share requirements for portion of R&D performed at Labs/Universities
- Scale cost-share requirements to reflect market readiness and technology readiness (i.e. basic R&D in areas with minimal market penetration should have minimal cost-share requirements).

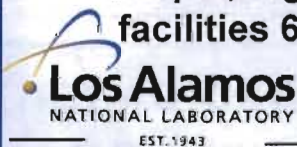


Backup Slides

LANSCCE provides the US and international research communities a diverse set of premier facilities.



Unique, highly-flexible beam delivery to multiple facilities 6 mo/yr @ 24/7 with ~ 1200 user visits



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Lujan Center

- *Materials science and condensed matter research*
- *Bio-science*
- *Nuclear physics*
- *A National BES user facility*

WNR

- *Nuclear physics*
- *Semiconductor irradiation*

Ultra-cold Neutron Facility

- *Fundamental nuclear physics*

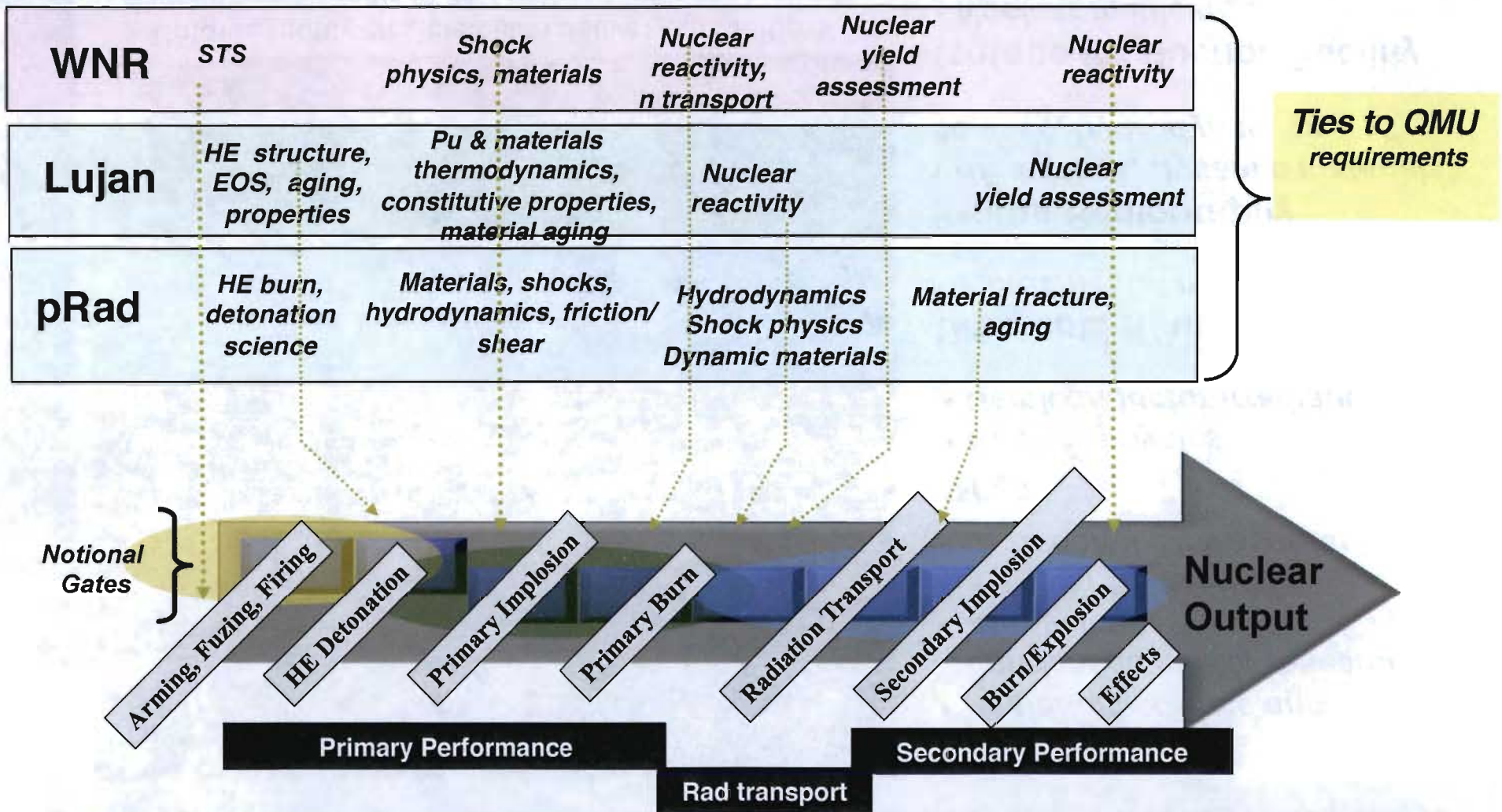
Proton Radiography

- *HE science, dynamic materials science, hydrodynamics*

Isotope Production Facility

- *Nuclear medicine*
- *Research isotope production*

LANSCCE facilities are unique and support the broad science-based predictive capabilities required for future certification.



Understanding the performance metrics drives the research requirements