

Los Alamos National Laboratory

Operated by the University of California
for the U.S. Department of Energy

State of the Laboratory

John C. Browne

February 17, 1999

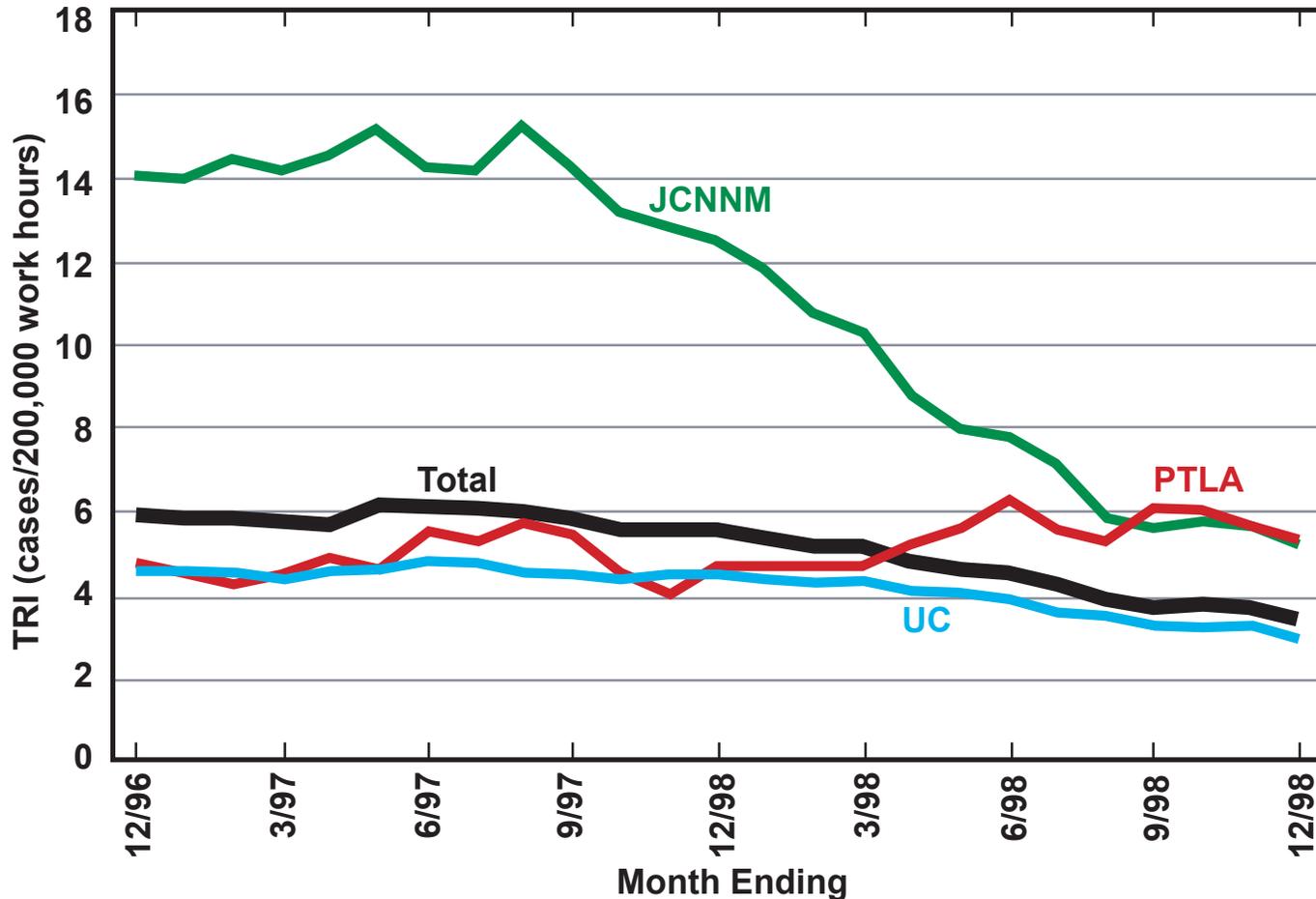
Safety is First at Los Alamos

We will never compromise safety for operational needs.

We are committed to achieving excellence in environment, safety and health performance ... Los Alamos will strive to have:

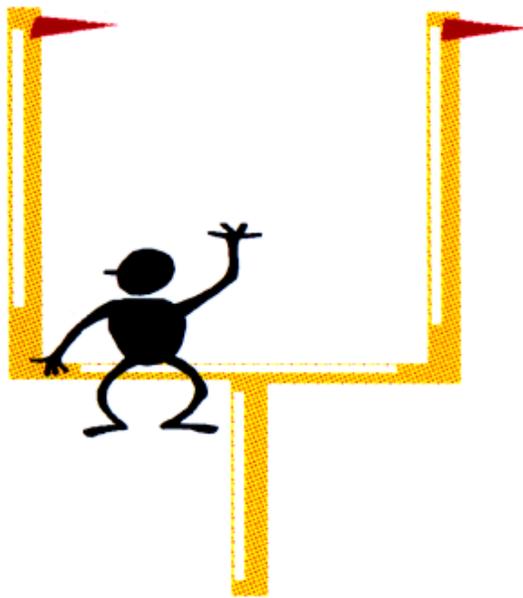
- **ZERO injuries and illnesses on the job**
- **ZERO injuries and illnesses off the job**
- **ZERO environmental incidents**
- **ZERO ethics incidents**
- **ZERO people mistreatment incidents**
- **ZERO safeguards and security violations**

Total Reportable Incidents (TRI) 12 month running average

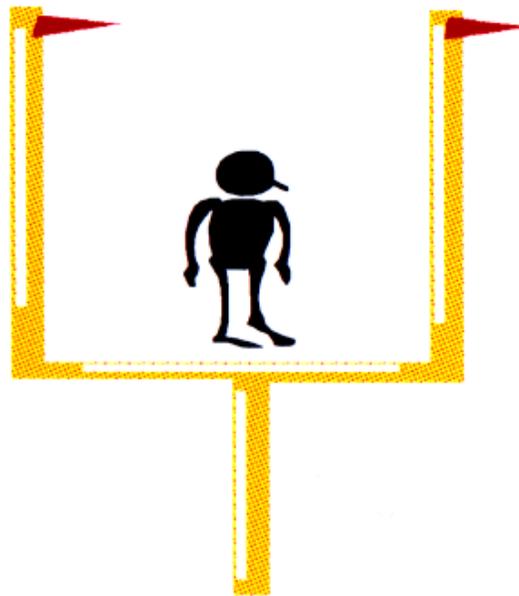


169 organizations (groups, division offices, program offices, etc.) of 275 had no TRIs last year

DOE assessment of Special Provisions progress



**Environment,
Safety and Health**



**Environmental
Management**



**Regional
Involvement**

FY99 Budget and FY00 Presidents Budget

- **Budget**

	<u>FY99</u>	<u>FY00</u>
Operating	1,247M	1,273M
Capital equipment	73M	78M
Construction	131M	178M
Total	1,451M	1,529M

- **FTEs**

UC-FTEs (1/1/99)	7,355	~7,400
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Post-Cold War changes



- Economic and political stability
- Large nuclear weapons enterprise
- Large amounts of nuclear material

**“CONCERN RAISED ON RUSSIAN NUKES”
– AP (7/16/98)**

- Lab-Lab programs
- Nuclear cities initiative

**“India Sets Off Nuclear Devices; Blasts
Create Shockwaves for US Policy” –
Washington Post (5/12/98)**



Emerging threats



“IRAQ HALTS ALL WORK BY UN INSPECTORS” - Washington Post (11/1/98)



- Terrorist groups
- Infrastructure threats - Y2K
- Treaty verification



“IRANIANS, BIOWEAPONS IN MIND, LURE NEEDY EX-SOVIET SCIENTISTS” - NYT (12/8/98)

21st Century Issues



- Global warming – Kyoto Accord
- Nuclear waste
- Traffic gridlock

“Earth Temperature in 1998 is Reported at Record High” – NYT (12/18/98)

- Bacterial strains – E. coli
- Emerging pathogens
- Technology and health



“AIDS is Slashing Africa’s Populations, UN Survey Finds” – NYT (10/28/98)

Our Mission

- **Who we are**
 - **Department of Energy Laboratory operated by the University of California**
- **What we do**
 - **Enhance global security by**
 - ◆ ensuring the safety and reliability of the US nuclear weapons stockpile
 - ◆ reducing threats to US security with a focus on WMD
 - ◆ cleaning up the legacy of the cold war
 - ◆ providing technical solutions to energy, environment, infrastructure and health security problems

Stockpile Stewardship

Certify the safety and reliability of the US nuclear weapons stockpile



Goals:

- Increase the focus on the US stockpile
- Increase our science focus in our program
- Pursue two major “magnet” facilities: SCC and LANSCE/AHF
- Create a long-range plan for our nuclear facilities

B61-11 Team



ASCI Blue Mountain



- **LANL, SGI, JCNM team built Blue Mountain on time, within budget**
- **Achieved world record speed within two weeks**
- **Four ASCI codes scaled to >6000 processors**
- **Now doing relevant stockpile computing problems**
- **Developed visualization system >100 times better than previous weapons codes**

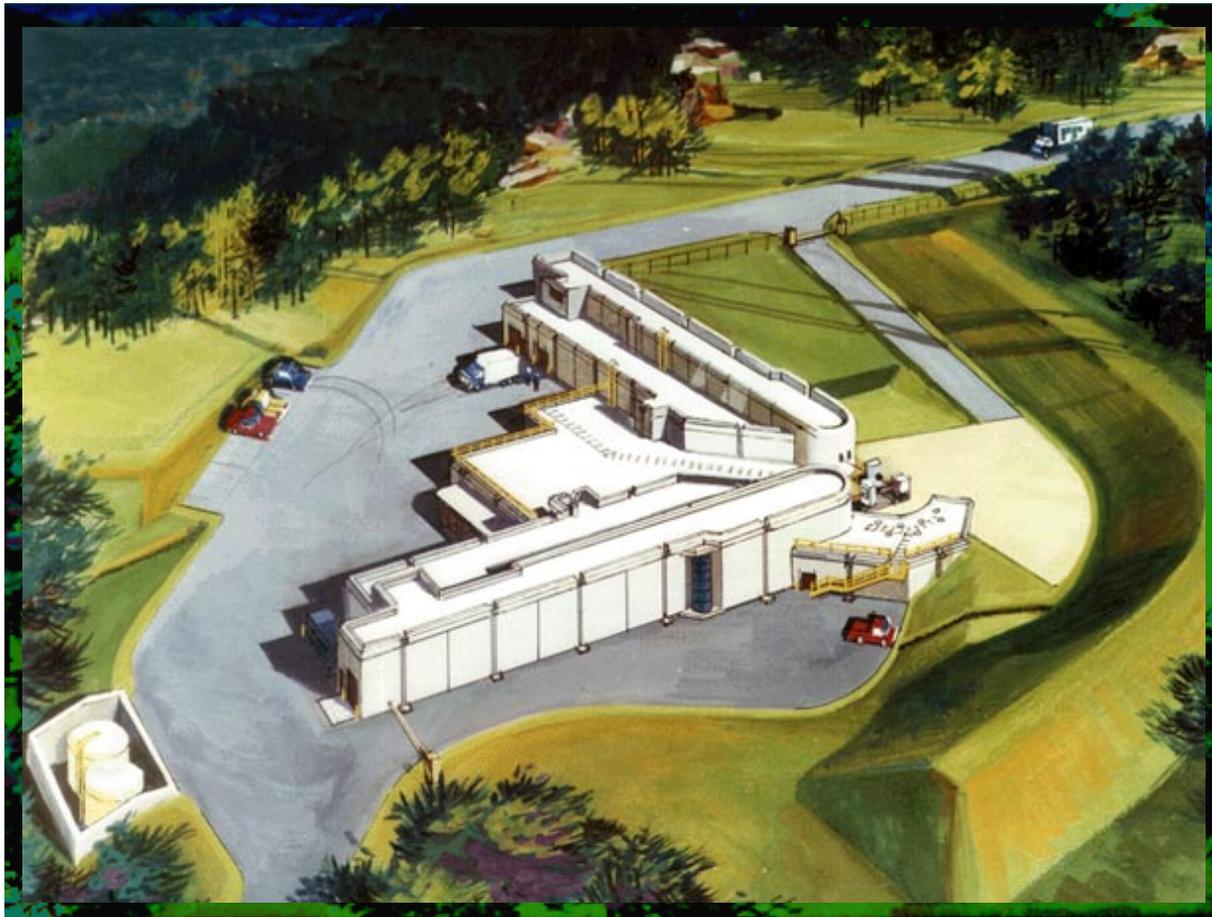
Blue Mountain Team



Strategic Computing Complex (SCC)



DARHT will provide radiographic assessment of primary pre-boost initial conditions

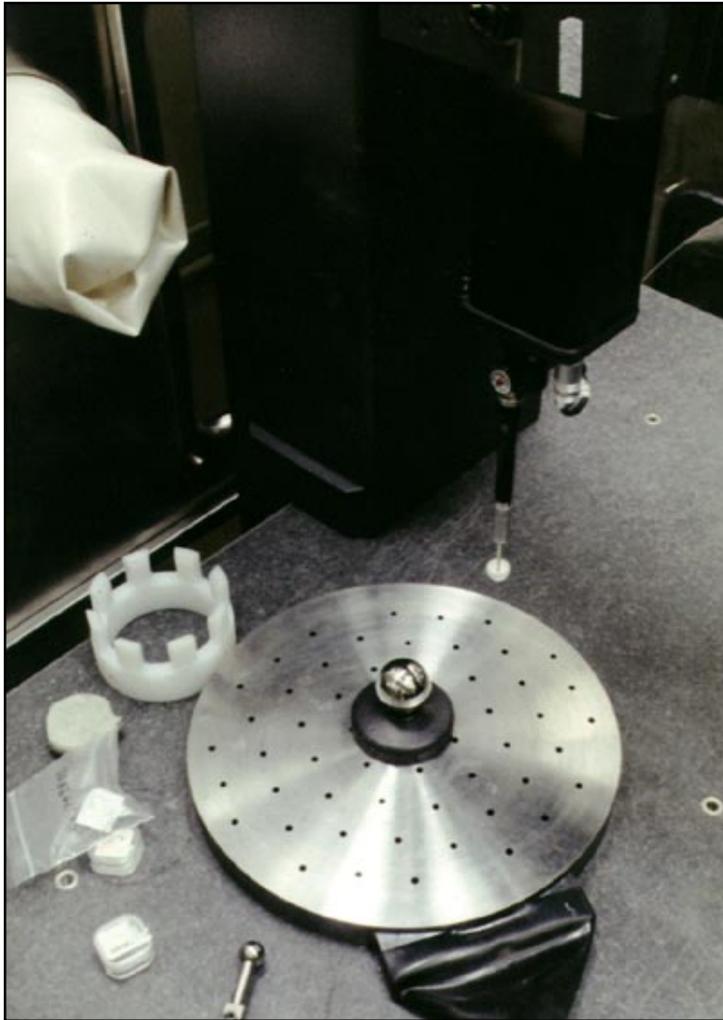


- **First electron beam to be delivered February 22, 1999**
- **First axis to be fully operational June 30, 1999**

DARHT Team



Pit fabrication at TA-55

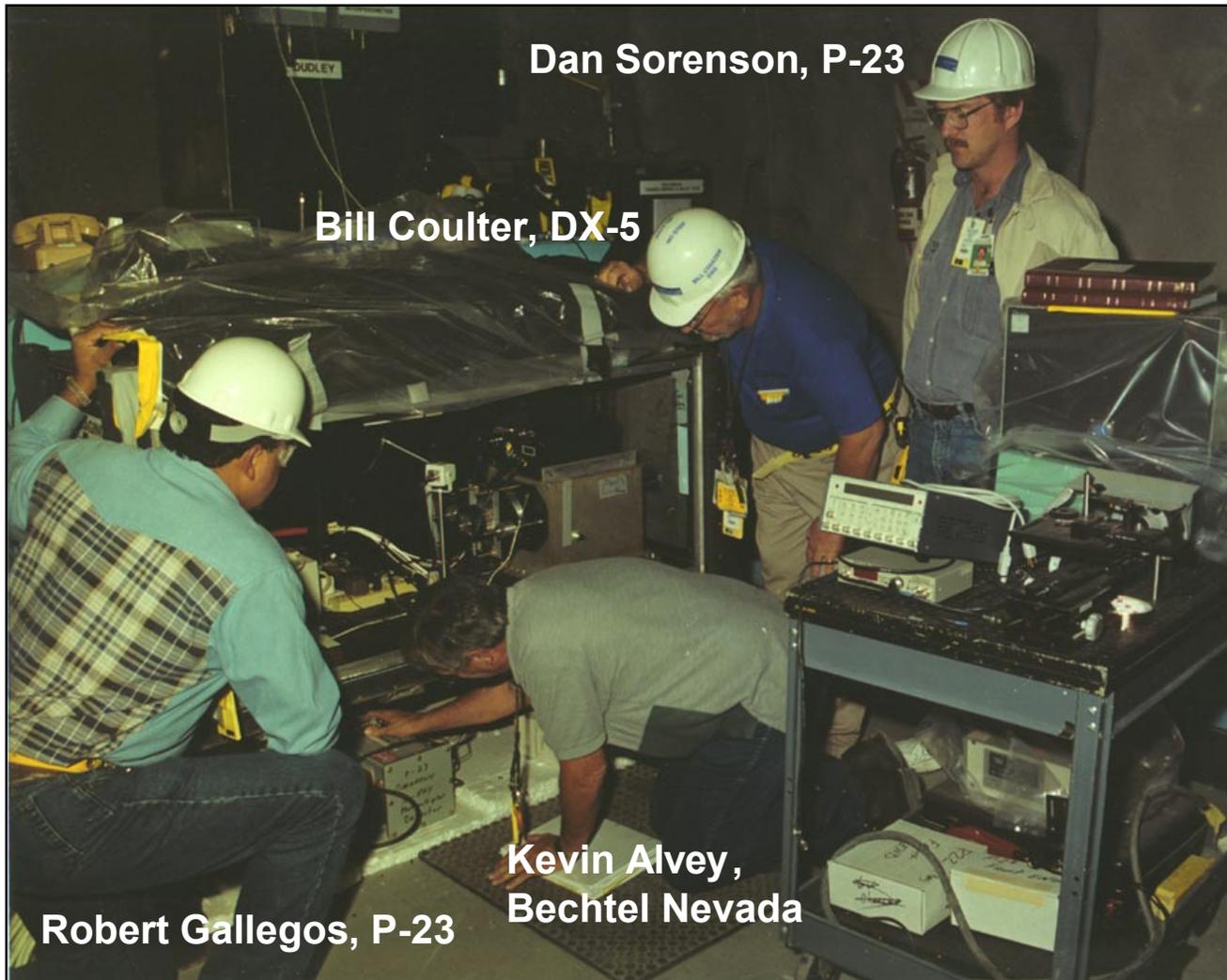


A plutonium “button”



**A coordinate-measuring machine
measures a plutonium component
for surveillance and fabrication**

Cimarron subcritical experiment



Accelerator Production of Tritium (APT) Low Energy Demonstration Accelerator (LEDA)



LEDA Accelerator



LEDA Injector

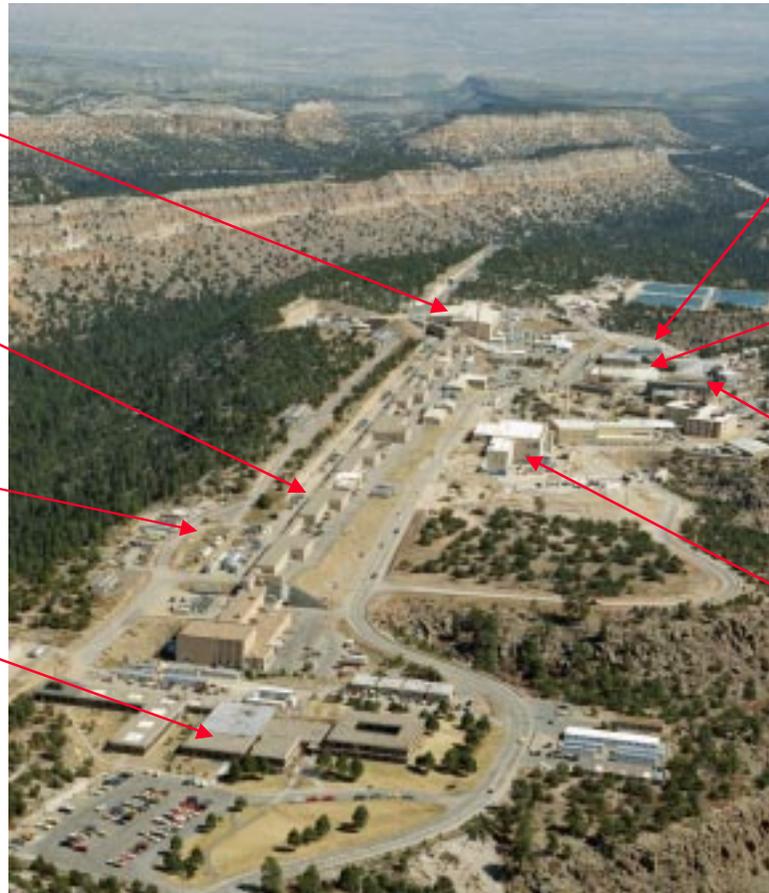
Los Alamos Neutron Science Center (LANSCE)

Site of proposed
Long-Pulse
Spallation Source

800-MeV Linear
Accelerator

Site of planned
Isotope Production
Facility

LANSCE
Visitor's Center



Manuel Lujan Jr.
Neutron Scattering
Center

Proton Storage
Ring

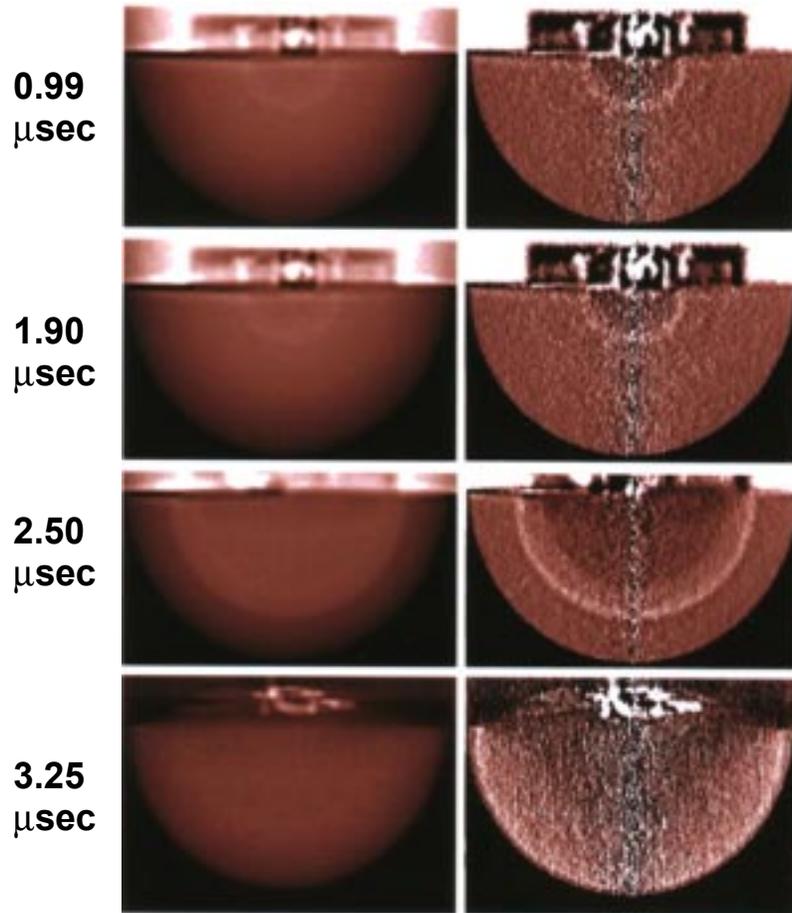
Weapons Neutron
Research Facility

APT
Low Energy
Demonstration
Accelerator

Recent major accomplishments

- new proton radiography tool used in B61 certification process
- upgrade to 100 μA achieved (LRIP)

Proton Radiography



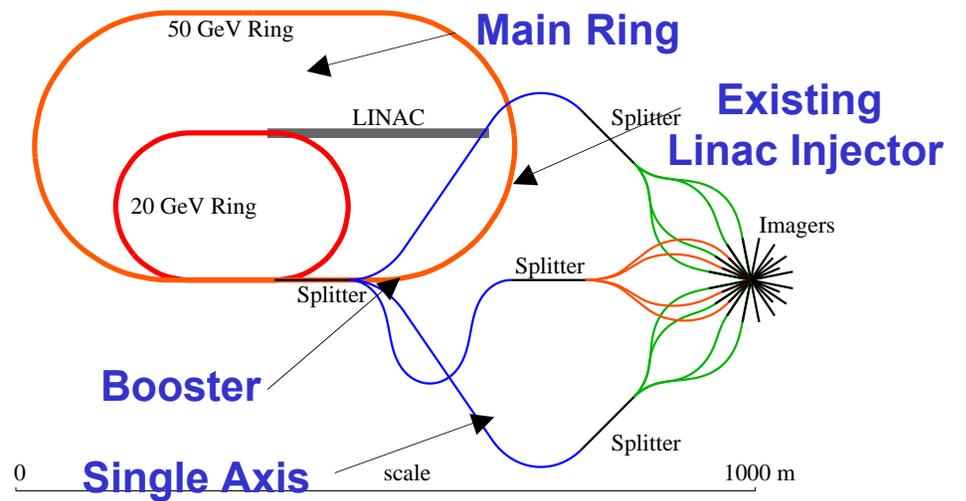
Radiograph

Density Reconstruction

Detonation wave from a high explosives assembly



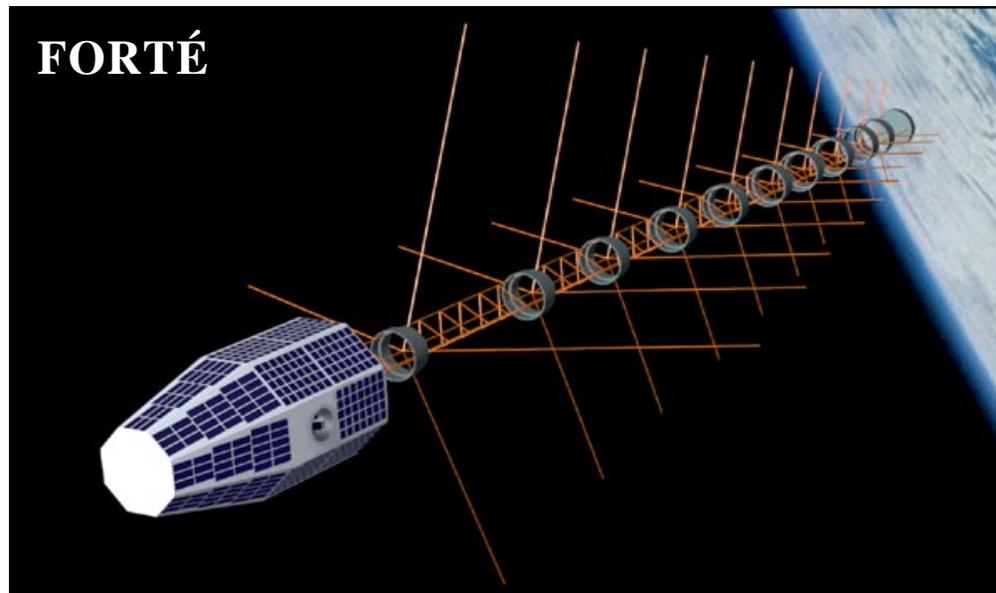
Chris Morris and Tom Mottershead



Proposed 12-axis Advanced Hydrotest Facility (AHF)

Threat Reduction

Reduce threats to US security with a focus on weapons of mass destruction



Goals:

- Focus our international programs on Russia; emphasize global nuclear materials management
- Focus on advanced detection technologies (in space)
- Improve our connections to the DoD, intelligence and law enforcement communities
- Continue multi-disciplinary approach to CBW defense
- Ensure prompt and cost-effective construction of NISC

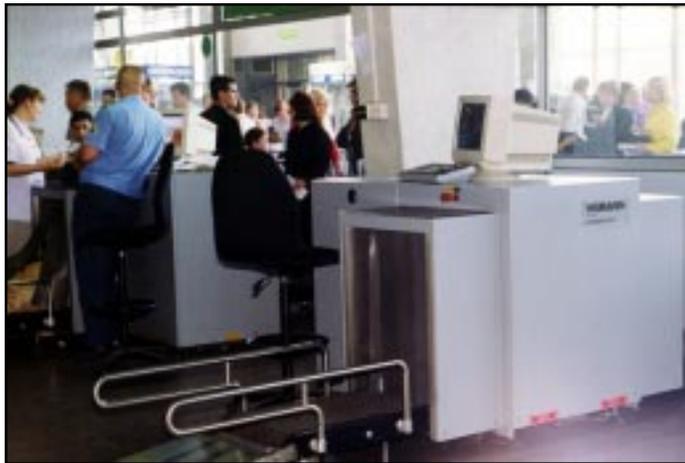
Cooperative programs in the FSU reducing the nuclear danger



Nuclear material scanners at a nuclear production facility



Nuclear weapons facility converted for industrial applications



Nuclear materials scanner at Moscow Airport



Workshop on nuclear materials monitoring for warhead dismantlement

Global nuclear materials management

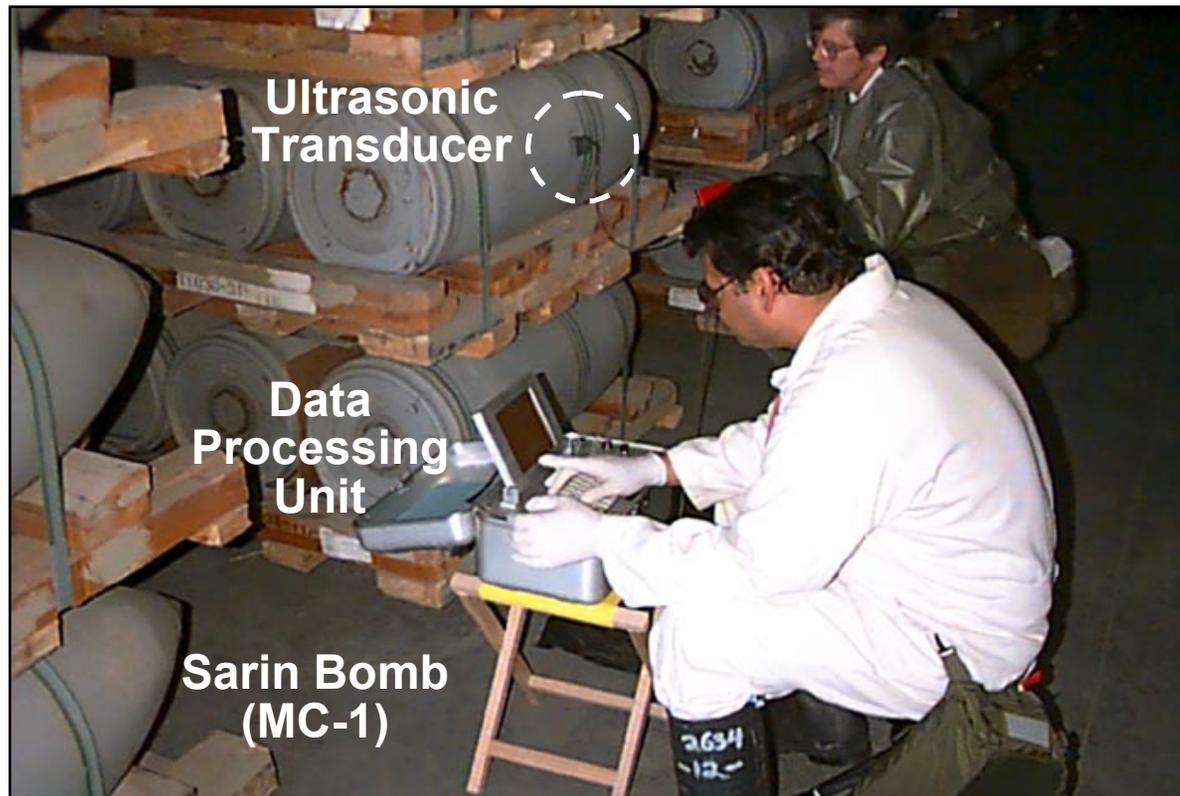


**Sig Hecker, Boris Litvinov (Snezhinsk, Chelyabinsk-70 chief designer for some 30 years),
Jim Toevs – aeroshell for largest nuclear weapon ever detonated**

Secretary Richardson dedicates ARIES



Non-Intrusive Detection of CW Agents using ultrasound techniques



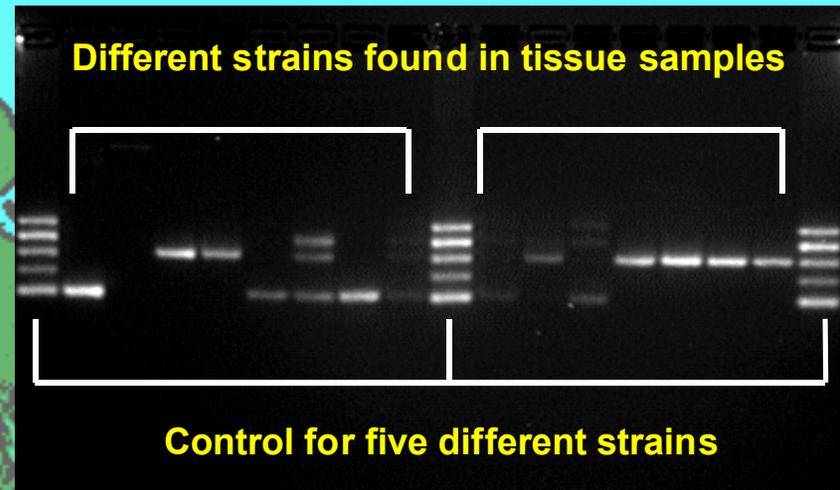
- **Non-intrusive identification of specific chemicals**
- **Extensive data base of CW agents, precursors and industrial chemicals has been established for comparison**
- **Militarized, automatic, and portable**

Advanced characterization of biological agents

Tissue samples from Russian anthrax victims



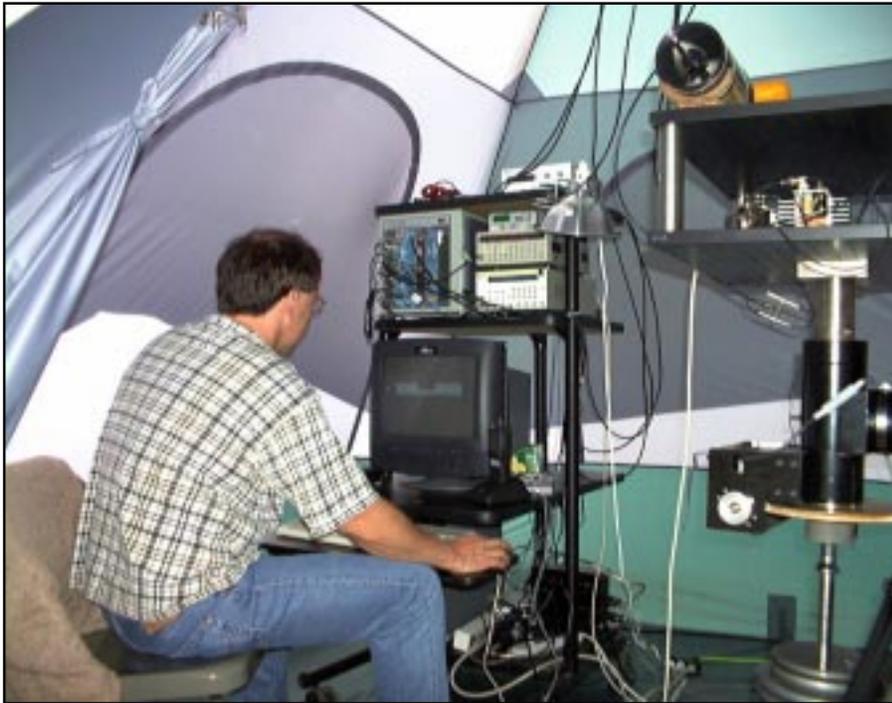
Detection of multiple strains of *Bacillus anthracis*



Four different strains of anthrax found in Jekaterinburg victims

Quantum cryptography for secure communication

Transmitter



Receiver



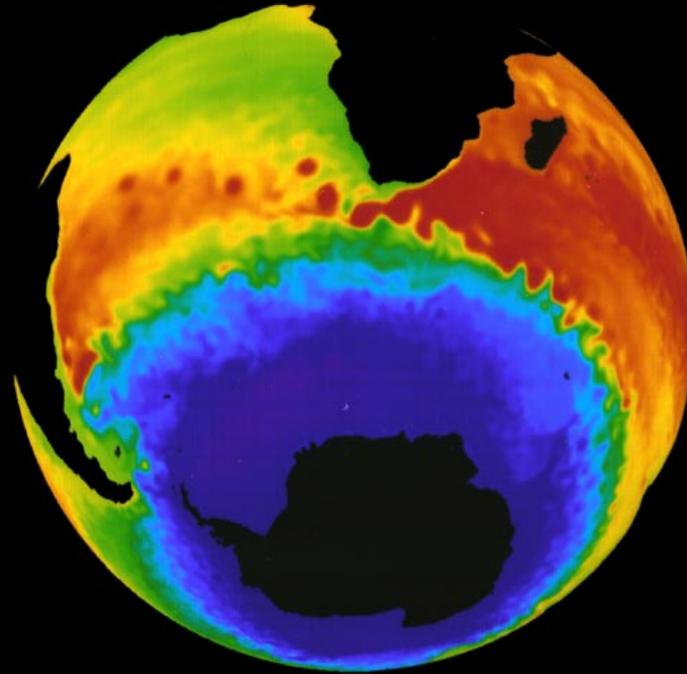
- Encrypted communications require a shared, secret “key” (random numbers) which is used to lock/unlock encryption process
- Quantum cryptography in optical fibers – demonstrated over 48km range
- Free-space quantum cryptography – demonstrated outdoors over 1km range

Nonproliferation and International Security Center (NISC)



Strategic Research

Assisting the nation and the world in the 21st century



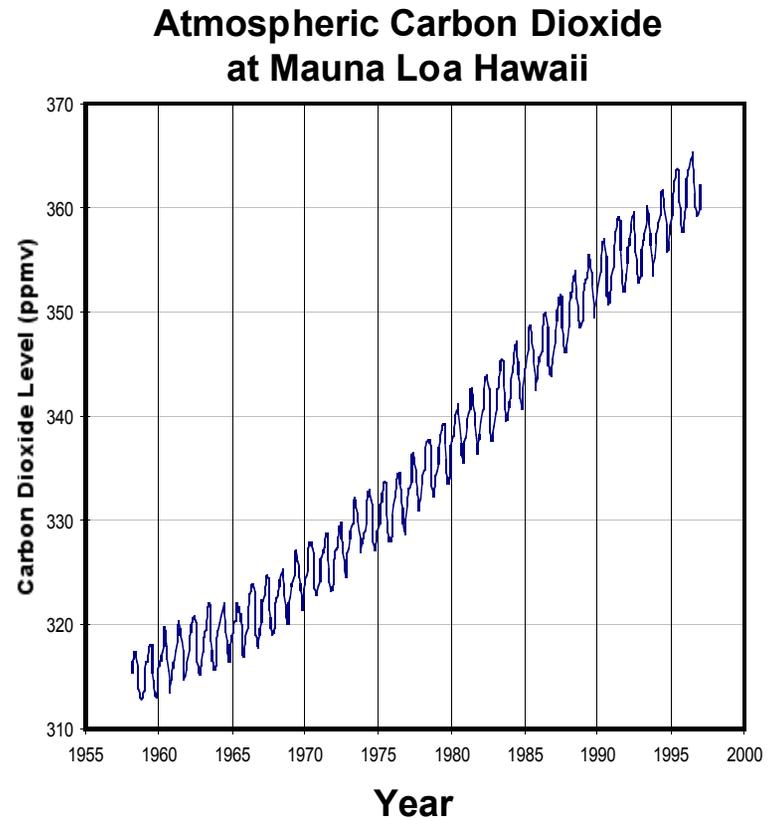
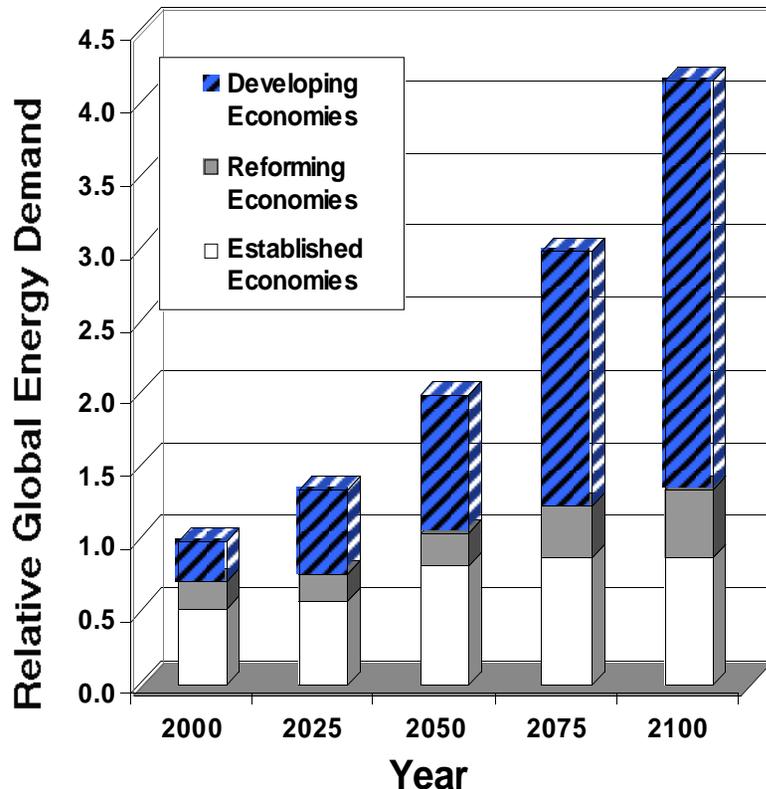
Goals:

- **Build on core capabilities to address national needs in**
 - Global climate – M&S and carbon management
 - Advanced nuclear systems
 - Health-related research
- **Ensure success of LANSCE user program and SNS project**

National Transportation Network Analysis Capability

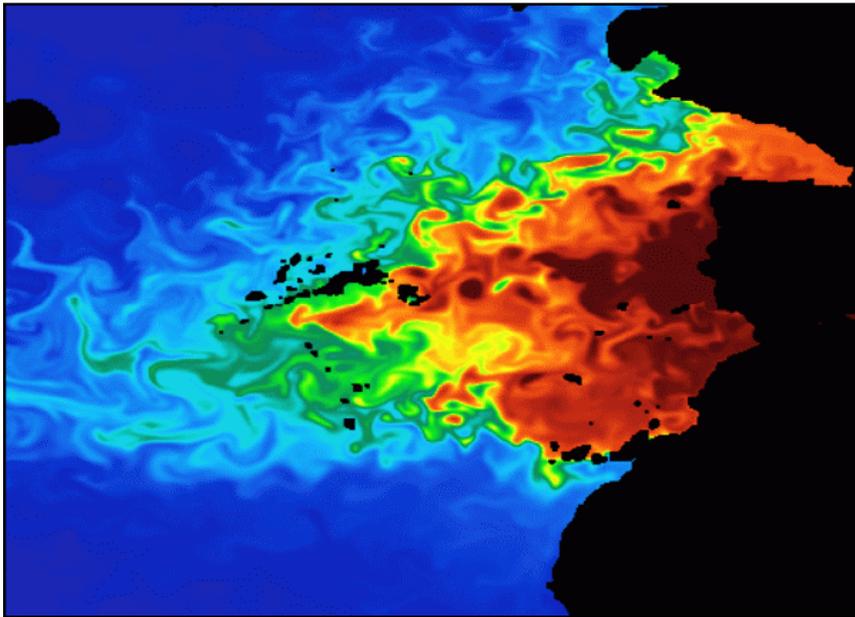


Energy growth projections – world demands *cheap, abundant, clean* energy



- Fossil fuels are abundant and low cost, *but* CO₂ is the cause of climate change
- Nuclear energy needs to be clean, safe and proliferation resistant at a *low cost*

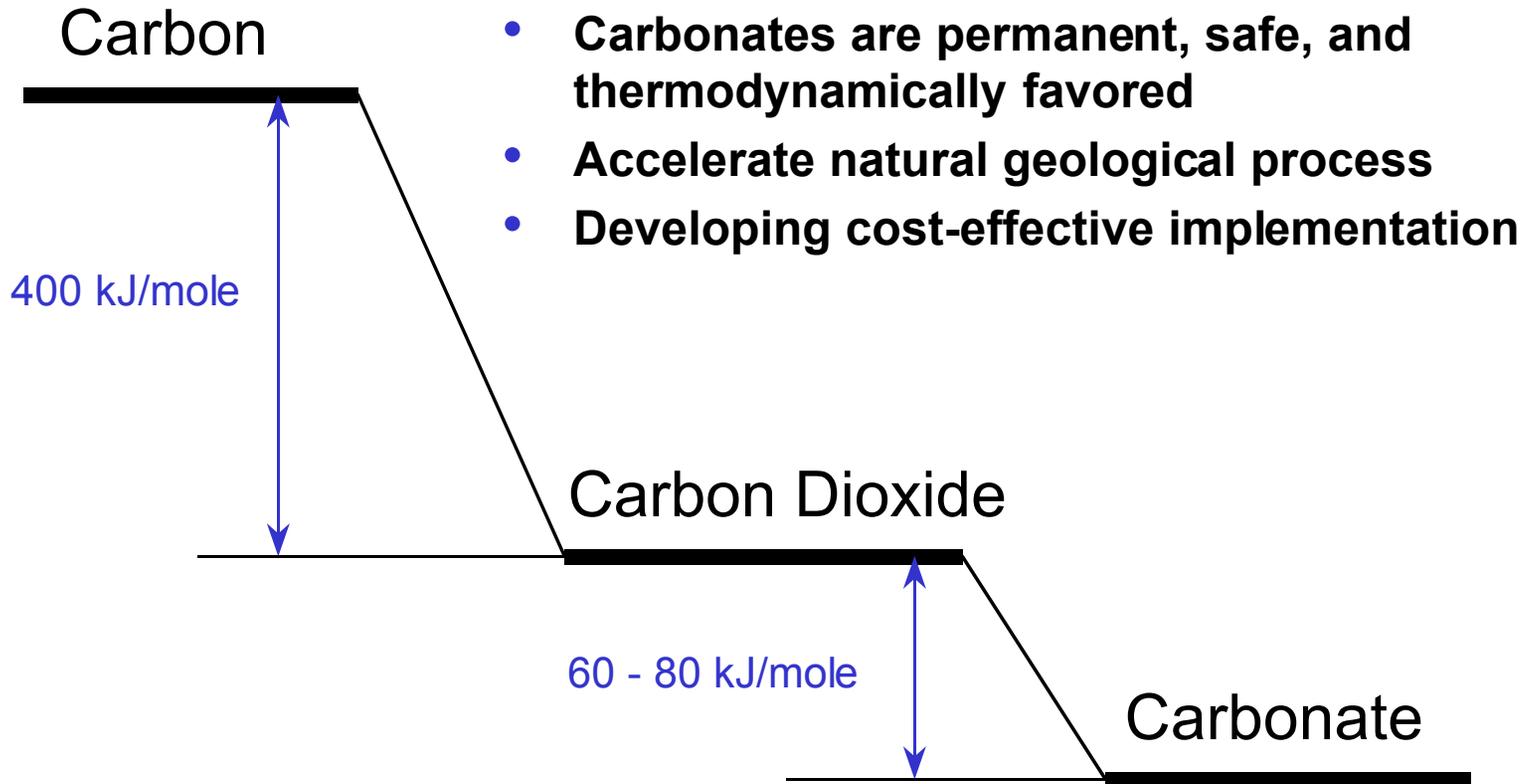
Global climate change builds on success in ocean modeling



**Water temperature at 1km below
sea level off the coast of Spain**

- **A new scientific thrust built on our global ocean studies**
- **Combined atmospheric and ocean modeling in a collaboration with the National Center for Atmospheric Research (NCAR)**
- **40 TeraOPS required in 2003 for the 2005 assessment by the Intergovernmental Panel on Climate Change (IPCC)**

Global carbon cycle – Binding CO₂ as stable mineral carbonates



Maintains access to vast fossil fuel reservoirs – 2000 times as large as annual consumption

High-Temperature Superconductivity



Steve Foltyn and Paul Arendt

Los Alamos
NATIONAL LABORATORY

National High Magnetic Field Laboratory (NHMFL) Team



Human Genome Center will lead us into the study of *functional genomics*

- Member of the DOE Joint Genome Institute (with LLNL and LBNL)
- Primarily involved in sequencing of human chromosome 16
- Surpassed assigned sequencing goals
- We will play a strong role in the next major initiative – *functional genomics*

Monthly DNA Sequencing Progress at the Los Alamos Genome Center (1998)



Operations

Goals:

- **ISM – stay the course!**
 - Engage employees
- **No RCRA violations**
- **Strengthen counter-intelligence program**
- **Manage all construction effectively**
- **Continue to improve safeguards and security**

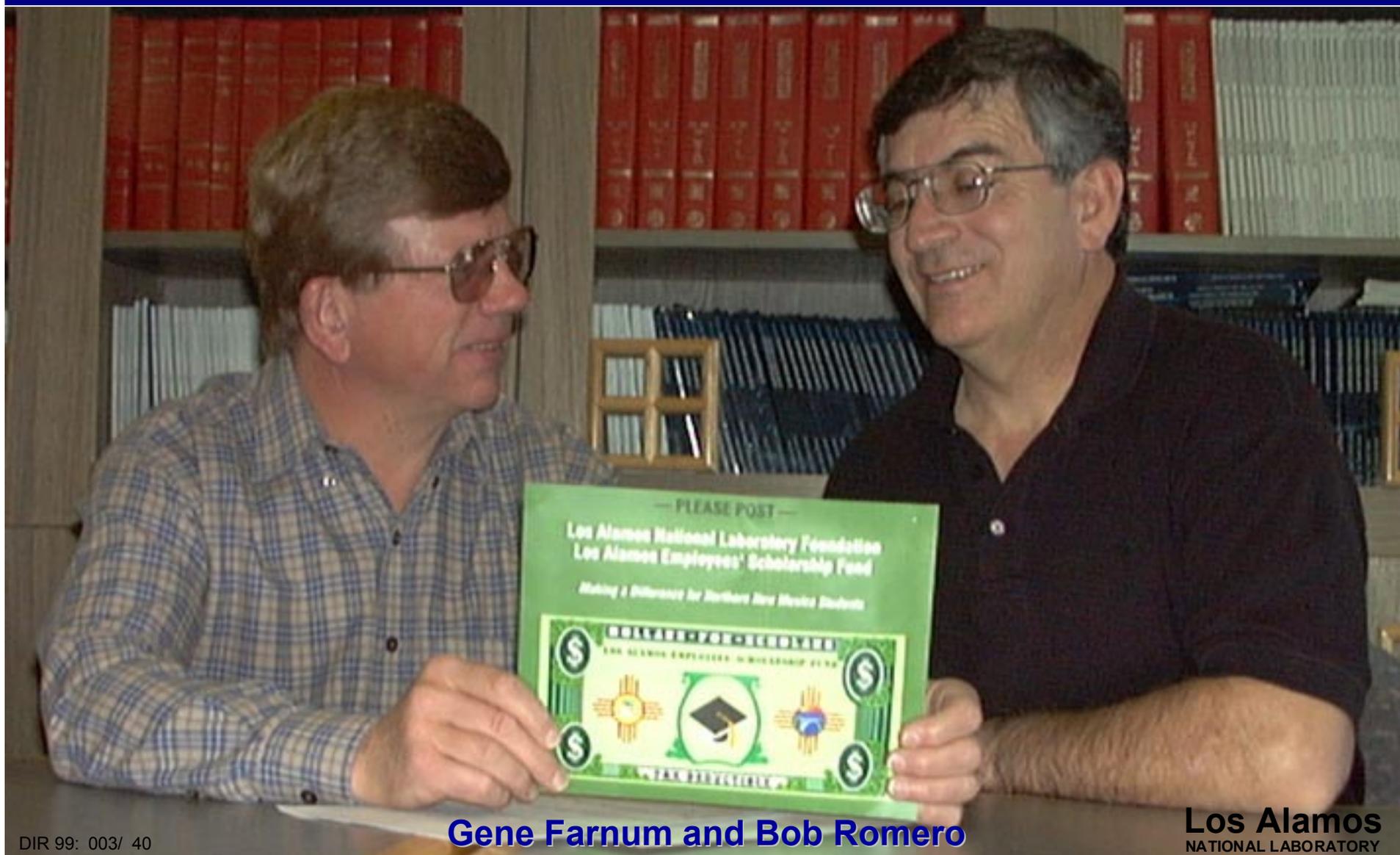


Being a good neighbor



**Los Alamos National Laboratory Foundation
Rocky Mountain Youth Corps**

LANL Foundation – Dollars for Scholars



Gene Farnum and Bob Romero

Regional Procurement



Don Carter's Machine Shop



Jona's Machining Shop

Technology Commercialization OutStanding InnOvation



Maxwell Sandford, Theodore Handel and Jonathan Bradley (not shown)

Distinguished Patent



**Tom Terwilliger
Distinguished Copyright**



**Duncan MacArthur
Distinguished License**

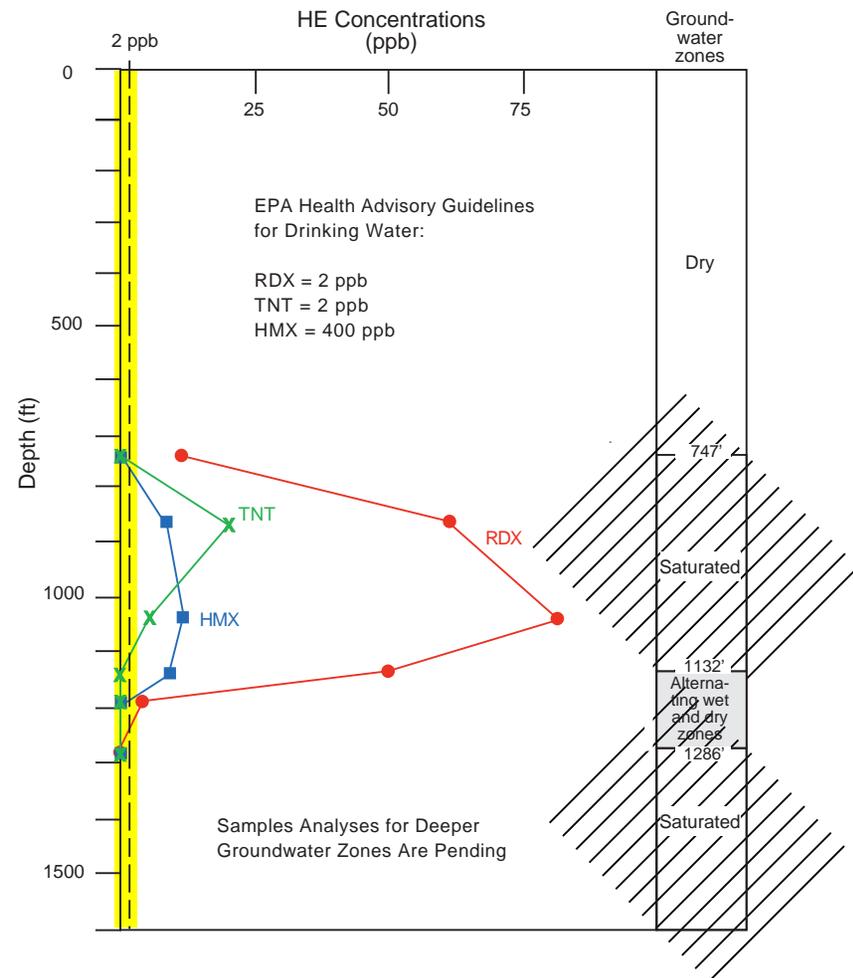
Protecting our environment



WIPP Team readies first shipment



Drilling the R25 Well at S-Site



High explosives found in water samples collected during drilling are higher than EPA Health Advisory Guidelines for RDX and TNT (vertical yellow line)

Revitalizing our site

SCC and NISC will be the cornerstones for Revitalization

Buildings constructed in the 1950's at TA-3

Los Alamos
NATIONAL LABORATORY

Los Alamos Research Park



Our workforce

- **I want to work with you to make this Lab the best place to work**
- **The Lab needs outstanding leadership at all levels in all areas**
- **It is important to recruit, retain and develop an outstanding workforce**

Los Alamos workforce – Policy development

- **Complaint Resolution Policy (spring 1999)**
- **Compensation – Salary Policy Committee (spring 1999)**
- **HEERA-like Policy (summer 1999)**

Salary Policy Subcommittees



**OS/GS Salary Review
Subcommittee**



**Tech Salary Review
Subcommittee**

**TSM Salary Review
Subcommittee now
being formed**



**SSM Salary Review
Subcommittee**

Los Alamos workforce – Quality of life initiatives

- **Diversity**
- **Improved employee communications**
- **Child care**
- **Modified work week**
- **Transportation**
- **Wellness**
- **High quality health care at an affordable cost**
- **Site beautification**

Our Vision for Los Alamos

- Be a key national resource for leading-edge science and technology to solve problems of national and global security
- Be the employer of choice

Celebrating Cinco de Mayo at TA-55