Savannah River National Laboratory™

OPERATED BY SAVANNAH RIVER NUCLEAR SOLUTIONS

We put science to work.™

Update on the Environmental Management National Laboratory

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Laboratory Director

CAB Strategic and Legacy Management Subcommittee

June 23, 2014

Savannah River NUCLEAR SOLUTIONS™

FLUOR • NEWPORT NEWS NUCLEAR • HONEYWELL

Purpose

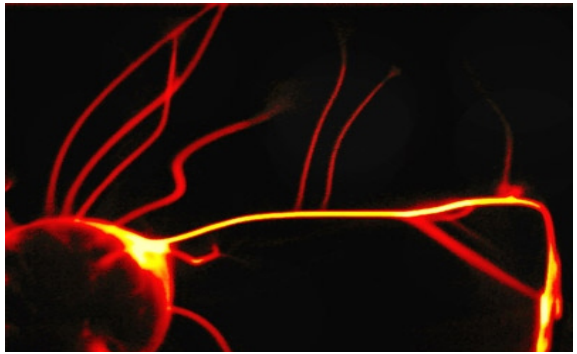
To Satisfy Strategic and Legacy Management Committee Work Plan by:

- Providing periodic update to CAB on SRNL business status / direction in response to recommendation 316

Celebrating Ten Years as a National Lab

What is a National Lab?

- Single purpose facilities
- Smaller staff size
- Budget range of $30 million and up



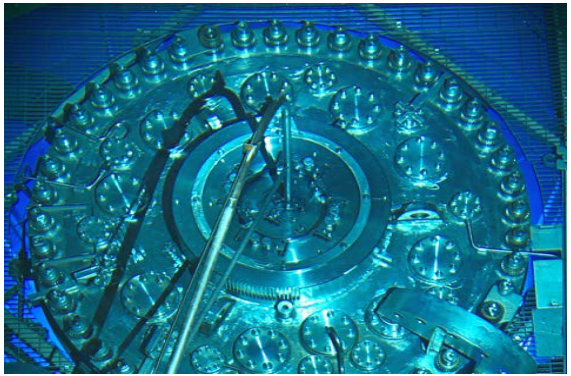
PPPL
PRINCETON PLASMA PHYSICS LABORATORY

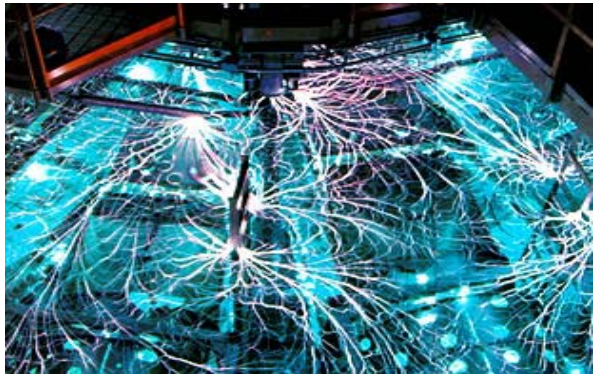
AMES LABORATORY
United States Department of Energy

SLAC NATIONAL ACCELERATOR LABORATORY

What is a National Lab?

- Multi-program “MegaLabs”
- Annual budgets $1 billion and up
- Regional economic engines





Pacific Northwest NATIONAL LABORATORY
Proudly Operated by **Battelle** *Since 1965*

OAK RIDGE National Laboratory

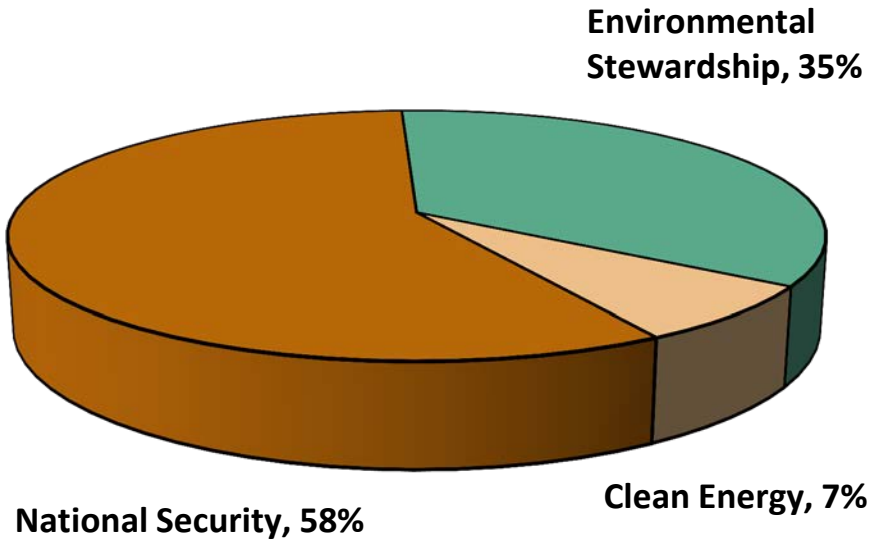
Sandia National Laboratories

SRNL: A Multi-Program Lab Supporting National Needs

The value of SRNL is measured every day by the investments of its federal clients and private sector partners.

SRNL at a Glance

- ~ 825 Staff
- ~ $214M (FY13 work performed)
- ~ 300 Discrete Work Activities
- Multi-Program Laboratory
  - >65% of funding from non-SRS customers

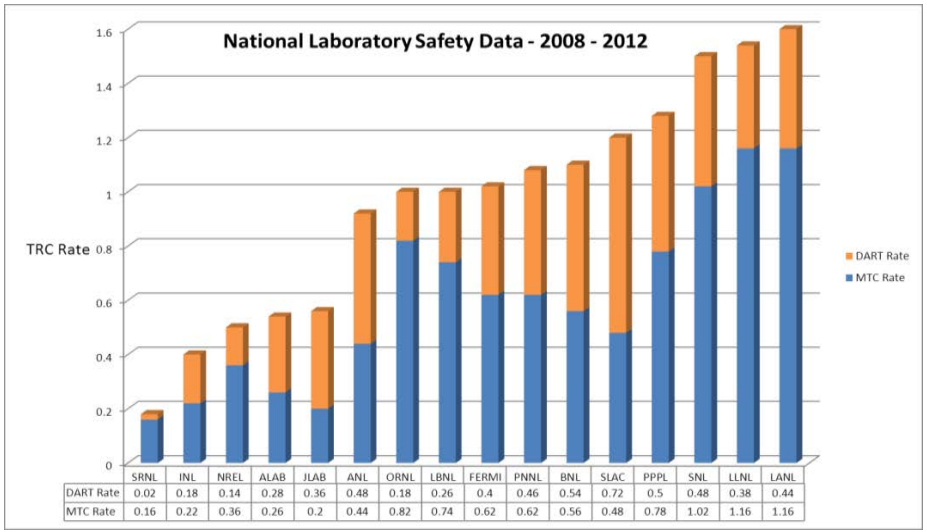


SRNL FY13 Execution

Core Nuclear Capabilities

- **Environmental Remediation and Risk Reduction**
- **Nuclear Materials Processing and Disposition**
- **Nuclear Detection, Characterization and Assessments**
- **Gas Processing, Storage and Transfer Systems**

Safest National Laboratory



	SRNL	INL	NREL	ALAB	JLAB	ANL	ORNL	LBNL	FERMI	PNNL	BNL	SLAC	PPPL	SNL	LLNL	LANL
DART Rate	0.02	0.18	0.14	0.28	0.36	0.48	0.18	0.26	0.4	0.46	0.54	0.72	0.5	0.48	0.38	0.44
MTC Rate	0.16	0.22	0.36	0.26	0.2	0.44	0.82	0.74	0.62	0.62	0.56	0.48	0.78	1.02	1.16	1.16

Some of Our Facilities

Main Campus

Aiken County's
Savannah River
Research Campus

Unique Facilities for Managing Radioactive Materials

Intermediate-Level Cells

Shielded Cells

Gloveboxes

Radiological Hoods

Variety of Facilities for Non-Radioactive Work

Engineering Development Laboratory

Biotechnology Laboratories

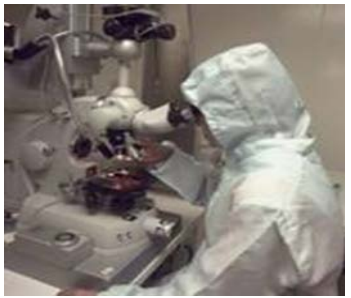
Nonradioactive Laboratories

Atmospheric Technologies Center

Glass Development Laboratory

High Pressure Laboratory

Hydrogen Laboratories

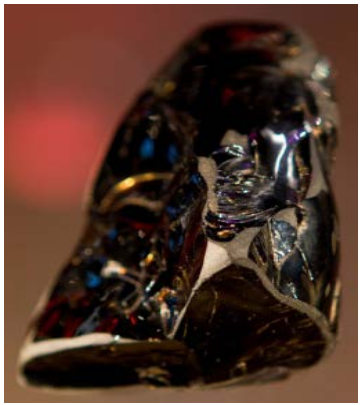


Ultra-clean Room

Underground Low-level Counting Facility

SRNL is Critical to DOE Success and has a Worldwide Reputation

- Strategic partner at other DOE Sites
- Over $5 billion in projected savings in past five years



- Fukushima support
- Technical underpinning for SRS missions

In National Security, Our Reach Extends Far Beyond SRS

- Port Security

- Tritium Expertise

- FBI Laboratory

- Nuclear Security – Mobile Plutonium Facility

SRNL is Essential to U.S. Nuclear Security Objectives

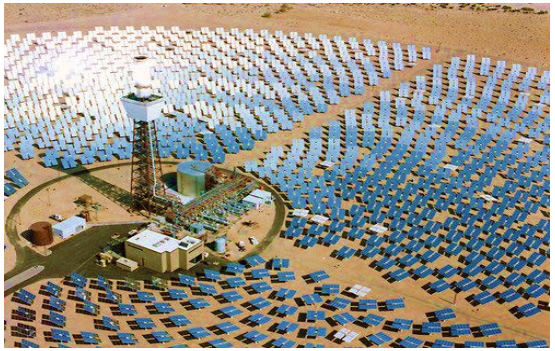
SRNL Contributes to Regional Clean Energy Initiatives

- Hydrogen Research

- Safe Nuclear Fuel

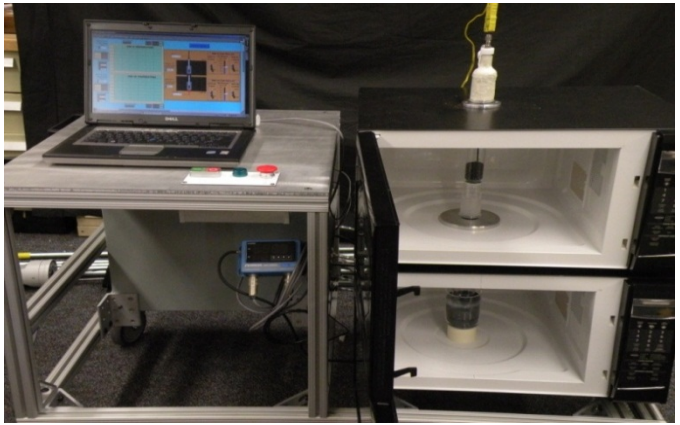
- Wind Energy

- Natural Gas



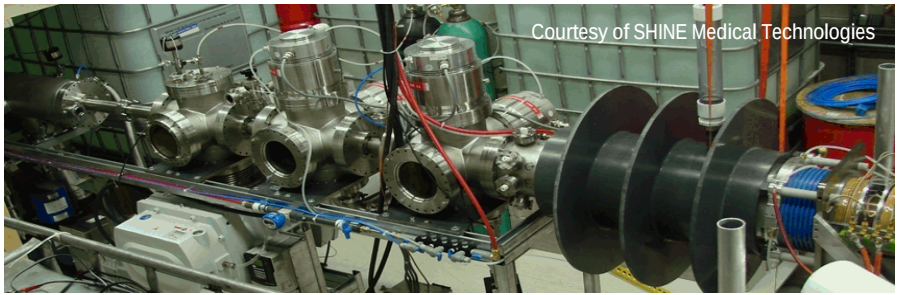
- Solar Research

SRNL Innovation Can Be an Economic Engine for Region

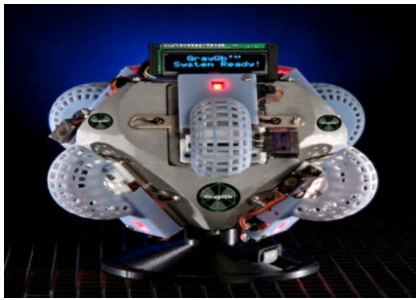


Hybrid Microwave System

SoundAnchor™



Medical Isotope Production



GrayQb™

SRNL Can Help Drive South Carolina Economic Growth

SRNL is a Catalyst for Future growth

- National and global outreach
- Innovations that drive new opportunities
- Strong partnerships with regional economic development and universities

Cold War Production

Environmental Restoration

Nuclear Security

Public / Private Partnerships

SRNL Technical Innovations Drive Program Success

Phased Remediation of Contaminated Soils:

- SRNL determined soil washing inadequate to clean shallow soils and sediments contaminated with depleted uranium at Lawrence Livermore National Laboratory Site 300
- SRNL recommended alternative phased remediation approach that included radiological surface survey, strategic excavation, and off-site disposal of highly contaminated material.

Benefit: This strategy saved $40 million and reduced impacts to sensitive ecological habitats.

Remediation of Contaminated Groundwater:

SRNL identified efficiencies in characterization and remediation of industrial solvent contamination and associated large groundwater plume in complex geohydrologic setting at Paducah Gaseous Diffusion Plant, including

- improvements to source zone thermal treatment
- phased remediation to allow changes in strategy where performance is inefficient or ineffective.

Benefit: Cost savings are projected at $18 million with additional savings in the future resulting from natural attenuation science support.

SRNL Technical Innovations Drive Program Success

Improved High-level Waste Loading:
SRNL has increased waste loading of the Defense Waste Processing Facility glass high-level waste form by approximately 25% through employment of a tailored approach to frit composition.

Benefit: The improvement in waste loading has permanently reduced the number of canisters needed to contain vitrified high-level waste by 25%. Total reduction of approximately 1400 canisters over the life of DWPF.

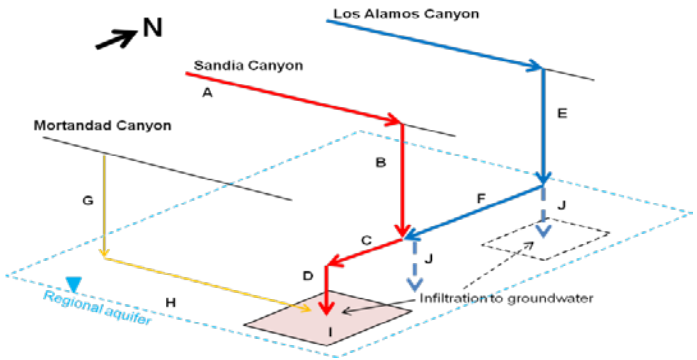
Specialized Grout for Tank Closure:
SRNL developed an all-in-one improved zero-bleed, flowable grout/ concrete, enabling the 2012 closure of the second pair of waste tanks in the DOE Complex.

Benefit: Largest risk reduction in the state of South Carolina since 1997, when Tanks 17 and 20 were operationally closed using 3 different grouts also developed by SRNL.

SRNL Technical Innovations Drive Program Success

Deep Groundwater Plume Contaminated with Metals Impinging the Los Alamos National Laboratory Site Boundary: SRNL identified technical strategies including treatment and hydraulic control options that provide pathways to address contamination and avoid implementation of costly pump-and-treat remedial strategy at the site boundary.

Benefit: Potential cost saving (>$10M) associated with elimination of large, marginally-effective treatment system at site boundary



A Better Treatment Option for Mercury Removal from Water: SRNL innovated a chemical reduction and air stripping technology to remove mercury from water and supported full-scale deployment of a 500 gpm treatment system.

Benefits: The operating treatment removes >95% of the mercury and meets emerging-stringent "part-per-trillion" water quality standards. The full-scale process protects the downstream ecosystem, has saved over $1.5 million in capital costs, and reduced operating and maintenance costs. Nationally the new technology will often be simpler and less expensive than traditional treatment processes.

SRNL is Demonstrating Leadership Worthy of a National Lab

- Expanded visibility at DOE-HQ via Laboratory Policy Council
- SRNL Liaison now established at Environmental Management Headquarters
- Leading vessel testing program for Hanford Waste Treatment Plant
- Leading tank vapor review at request of DOE-Office of River Protection
- Leadership role for WIPP Technical Assistance Team
- Assuming management of national Historically Black Colleges and Universities / Minority Serving Institution program at EM's request
- Providing world-class gas processing and storage competency; coordinating strategic activities for NNSA for Tritium and Gas Transfer systems

Future Targets

- Expanded Environmental Management business role, both in DOE complex and via international opportunities
- Innovative approaches for nuclear materials management
- Application of existing core competencies to targeted clean energy business opportunities (i.e., natural gas)
- Expanded support to national security customer base