U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

Enterprise•SRS
Nuclear Material Strategic Initiatives

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enterprise·srs

Purpose

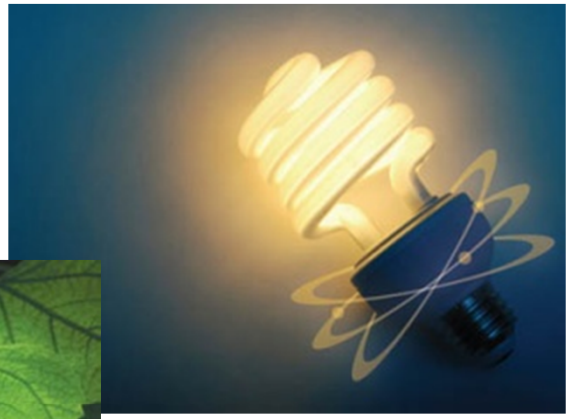
- Briefly describe Enterprise SRS
- Provide information related to Nuclear Material Strategic Initiatives
- Meet expectations described in the 2012 Work Plan

Acronyms

- BRC – Blue Ribbon Commission
- CANMPER – Center for Applied Nuclear Material Engineering and Research
- DOE – Department of Energy
- DWPF – Defense Waste Processing Facility
- LEU – Low Enriched Uranium
- MFFF – Mixed-Oxide Fuel Fabrication Facility
- R&D – Research and Development
- SMR – Small Modular Reactor
- SNF – Spent Nuclear Fuel
- SRS – Savannah River Site
- SWPF – Salt Waste Processing Facility
- TRIM – Tritium Responsive Infrastructure Modifications
- TRU – Transuranic
- TVA – Tennessee Valley Authority
- UNF – Used Nuclear Fuel

Enterprise SRS: Nuclear Knowledge for the Nation

Environmental Stewardship



Clean Energy

National Security

Enterprise SRS: Goals and Objectives

Environmental Stewardship

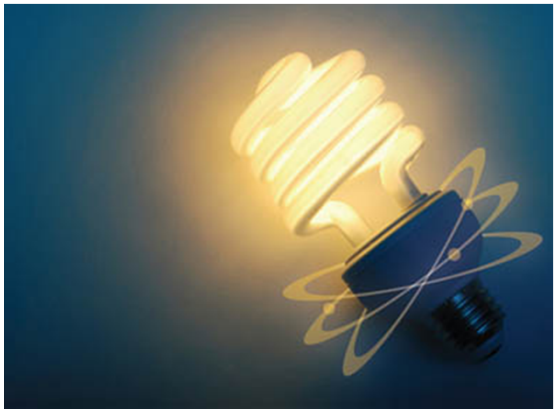
Transform liabilities to assets

to reduce the environmental legacy of nuclear materials and radioactive waste at SRS to provide innovative approaches that advance and improve SRS processing leverages solutions to other DOE sites and customers

- *Lead development, validation and assessment of breakthrough technologies to accelerate current DOE national cleanup priorities*
- *Capitalize SRS competencies to solve the nation's nuclear materials disposition issues*

Enterprise SRS: Goals and Objectives

Clean Energy



Accelerate the deployment of nuclear energy through public and private partnerships that solve critical nuclear material storage, processing and disposition challenges, utilizing the Site's expansive expertise to support regional energy sustainability

- *Accelerate deployment of small modular nuclear reactor technology*
- *Demonstrate clean energy systems*
- *Develop and lead the nation's used nuclear fuel cycle initiatives*

Enterprise SRS: Goals and Objectives

National Security

Enhance national security
by applying unique SRS technology and systems assets to global nuclear nonproliferation, deterrence and threat reduction challenges

- *Lead proliferant materials disposition*
- *Lead global nuclear nonproliferation and threat reduction systems solutions through R&D, analysis, forensics and demonstrations*
- *Lead national deterrence programs, including R&D and management of tritium and helium-3 for the nation*

What are the 12 Enterprise SRS Initiatives?

- Deliver Disposition Paths for Nuclear Materials
- Develop Solutions to Close and Better Secure the Nuclear Fuel Cycle
- Accelerate Deployment of Small Modular Reactors
- Establish Center for Applied Nuclear Materials Processing and Engineering Research
- Leverage and Revitalize Site Assets to Solve National and Regional Issues
- Lead Research and Development of Transformational Waste Disposal Technologies
- Increase Helium-3 Supply to Aid Nuclear Nonproliferation
- Reduce Greenhouse Gas Emission via Clean Alternative Energy Projects
- Develop and Deploy Next Generation Cleanup Technologies
- Establish Advanced Center for Nuclear Forensics and Attribution
- Post-TRIM Tritium Technologies
- Expand Reach and Impact of National Center for Radioecology

Deliver Disposition Paths for Nuclear Materials

Strategic Initiative Summary:

- Deliver storage, processing, beneficial reuse and disposal opportunities for a wide variety of Savannah River, National and International Nuclear Materials

Objectives:

- Recover assets such as isotopes and fuel grade materials for beneficial reuse
- Develop disposition paths for all excess and surplus nuclear materials
- Process materials and ship waste to final disposal repositories
- Consolidate excess materials awaiting disposition
- Secure international materials and deliver disposition paths

Plutonium Storage at K-Area

Isotope Use in Space Exploration

Deliver Disposition Paths for Nuclear Materials

Path Forward (2012)

- Complete legacy TRU Waste Disposition
- Initiate plutonium production for Mixed Oxide Fuel Fabrication Facility
- Complete plans to process vulnerable Spent Nuclear Fuel
- Continue Research Reactor Fuel Receipts
- Demonstrate Vacuum Salt Distillation

Research Reactor Fuel Storage

LEU Shipment to TVA

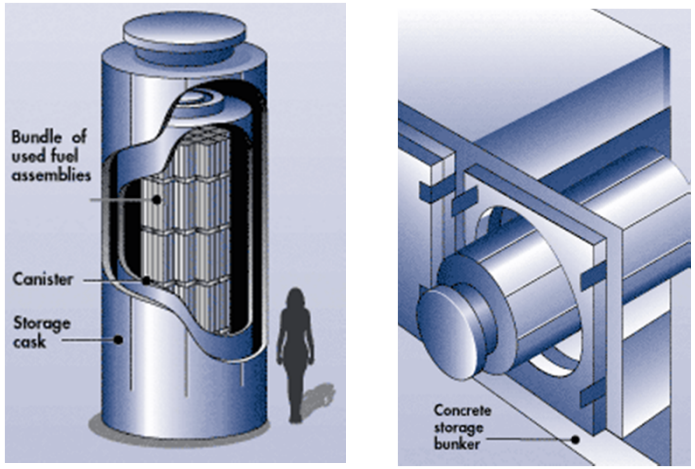
Develop Solutions to Close & Better Secure the Nuclear Fuel Cycle

Strategic Initiative Summary:

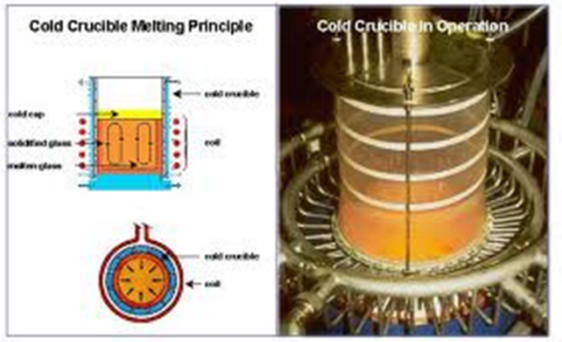
- Develop solutions with what to do with spent fuel once it is discharged from a nuclear reactor

Objectives:

- Conduct an integrated demonstration of dry storage of L-Area fuel
- Develop safe technological solutions for processing spent fuel and recovering useful constituents for beneficial reuse
- Develop capability for treatment of reprocessing waste independent of the Tank Farms, DWPF and SWPF



Dry Fuel Storage Casks



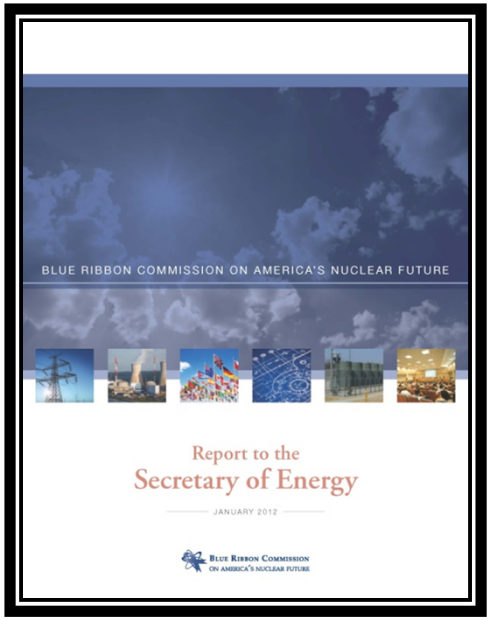
Cold Crucible Melter Diagram

Develop Solutions to Close & Better Secure the Nuclear Fuel Cycle

Path Forward (2012)

- Develop business case and pre-conceptual design package for dry fuel storage of L-Area fuel
- Begin pursuing partnerships with Office of Nuclear Energy and Office of Science
- Evaluate Blue Ribbon Commission Report for opportunities to support America's Nuclear Future

Dry Fuel Storage Casks

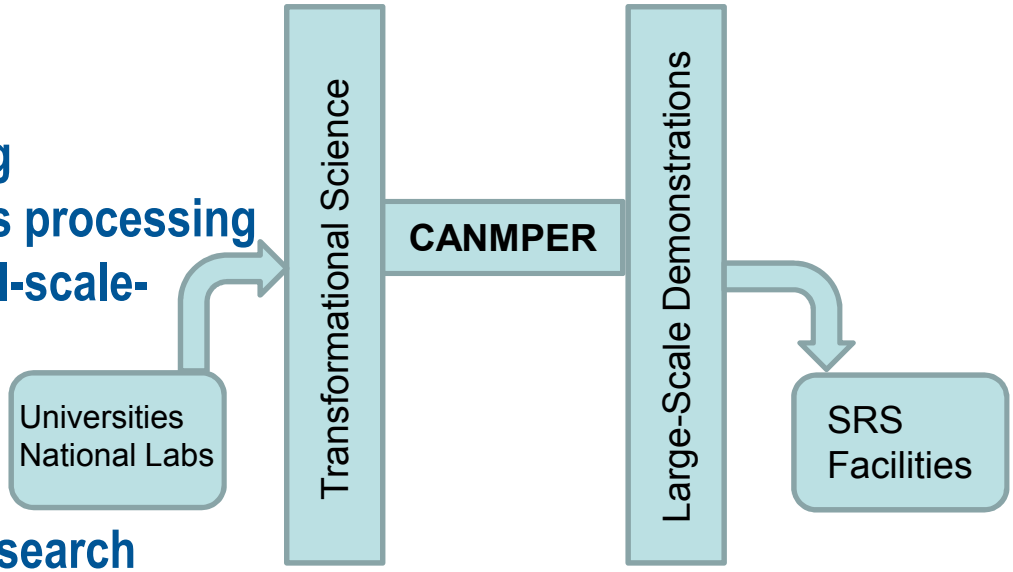


BRC Report

Center for Applied NM Processing & Engineering Research

Strategic Initiative Summary:

- Bridge the gap between promising transformational nuclear materials processing discoveries and large, commercial-scale-technology deployment



Objectives:

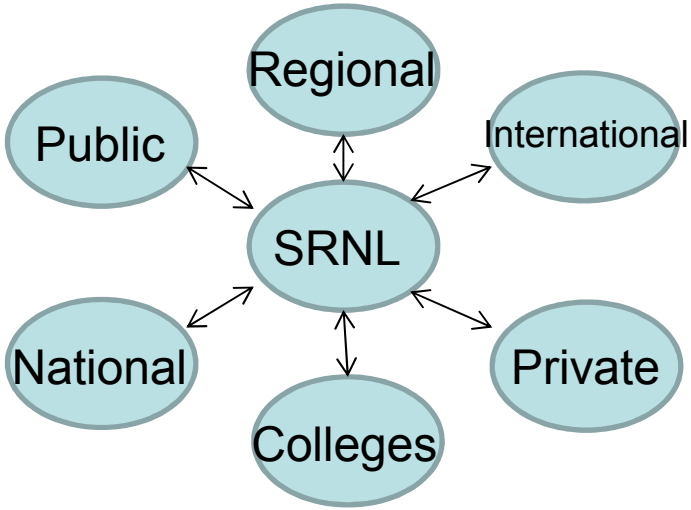
- Maximize use of SRS assets as research demonstration facilities
- Integrate existing DOE Programs
- Build collaborations with public and private entities for missions related to nuclear material activities
- Develop nuclear materials knowledge and personnel development within SRS, local community, nationally and internationally

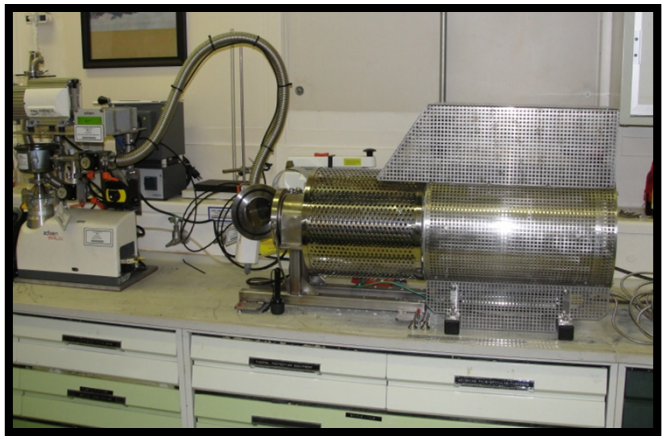
H Canyon Facilities

Center for Applied NM Processing & Engineering Research

Path Forward (2012)

- **Develop multi-institutional partnerships**
  - Public and Private
  - Colleges and Universities
  - Regional, National and International
- **Develop Governance Plan**
- **Identify initial demonstration for H-Canyon (Vacuum Salt Distillation)**



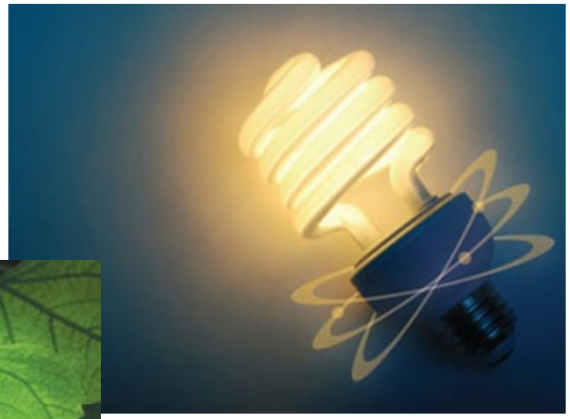


Vacuum Salt Distillation Unit

Summary

Nuclear Material Strategic Initiatives are integral for achieving the goals of Enterprise SRS

Environmental Stewardship



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