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SRNL™ SAVANNAH RIVER NATIONAL LABORATORY
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Savannah River National Laboratory

Dry Storage of Used Nuclear Fuel

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Citizens Advisory Board - Nuclear Materials Committee

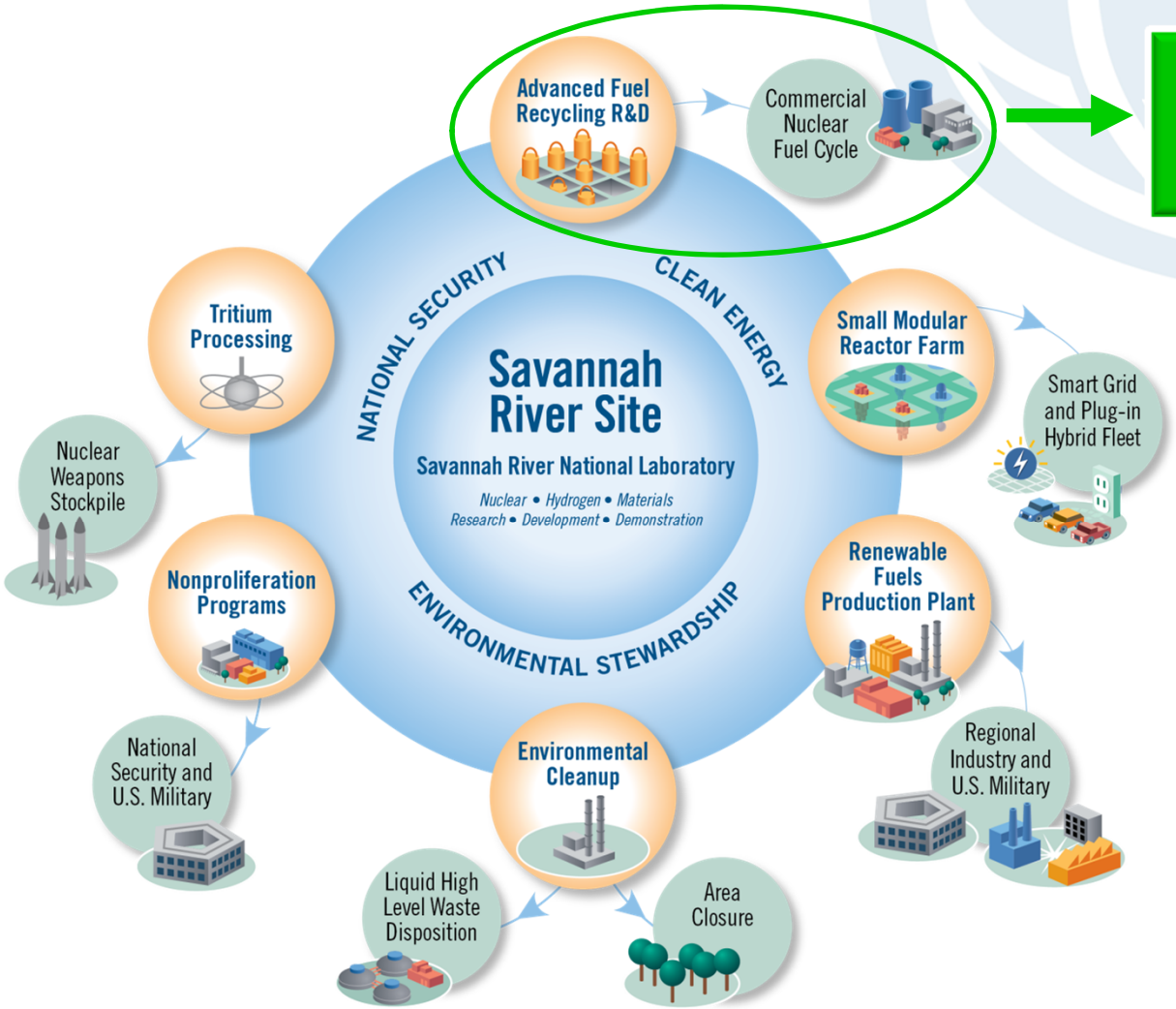
SRNL-STI-2012-00351

U.S. DEPARTMENT OF ENERGY

Purpose

- **To fulfill Nuclear Materials Committee 2012 Work Plan topic**

enterprise·srs



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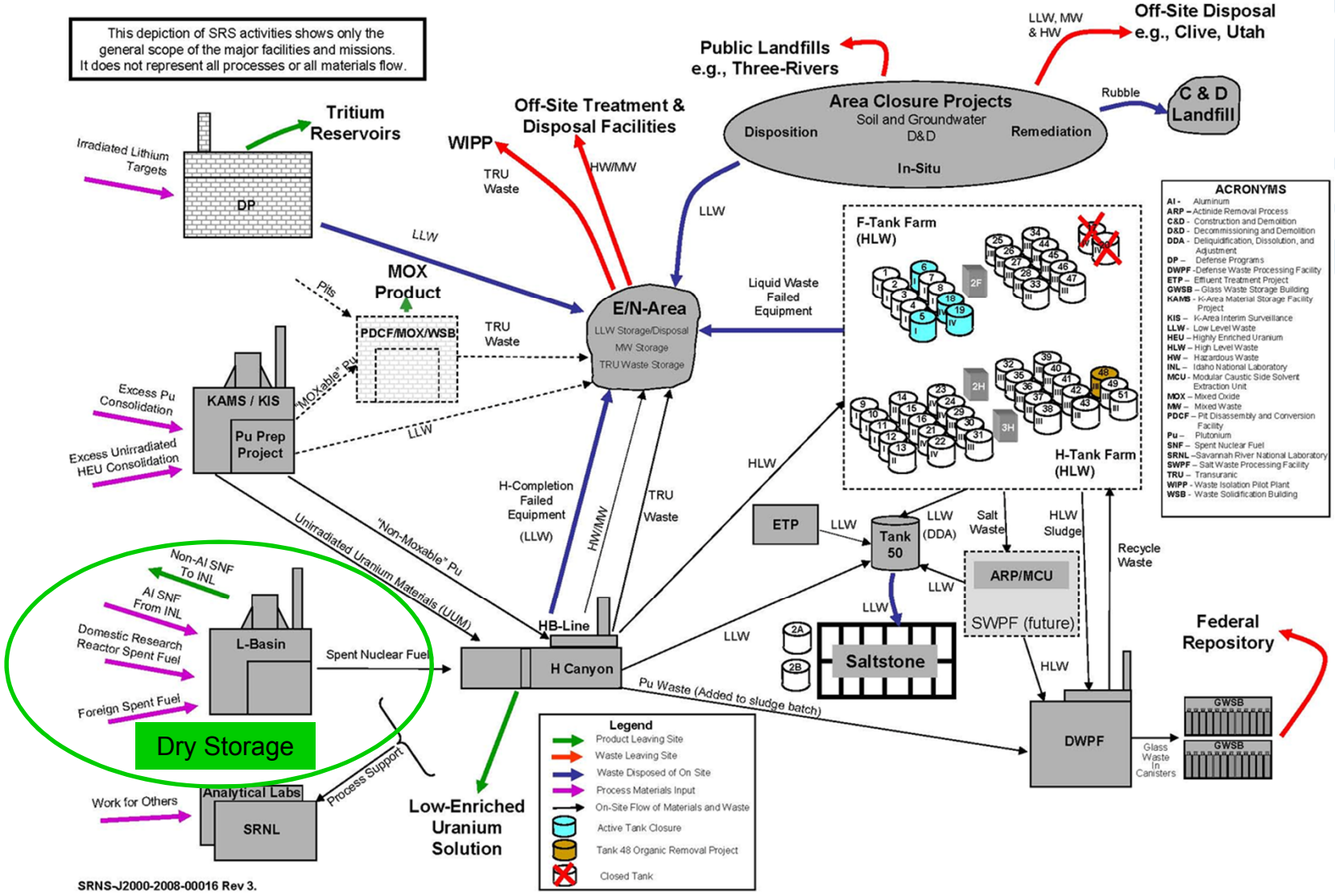
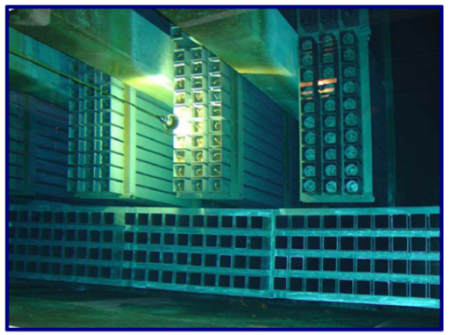
Savannah River Site
Waste and Material Flow Path



SRNS-J2000-2008-00016 Rev 3.

Fuel Storage at SRS

- **The site has an inventory of DOE-owned fuel, primarily from research reactors, awaiting disposition**
  - Fuel is currently in wet storage at L-Basin
  - Includes both Al-clad and non-Al (stainless steel or Zr) clad fuels
  - Much of the fuel contains highly enriched uranium (up to 93% enrichment)



L-Basin

- **Potential strategies include combination of technologies**:*

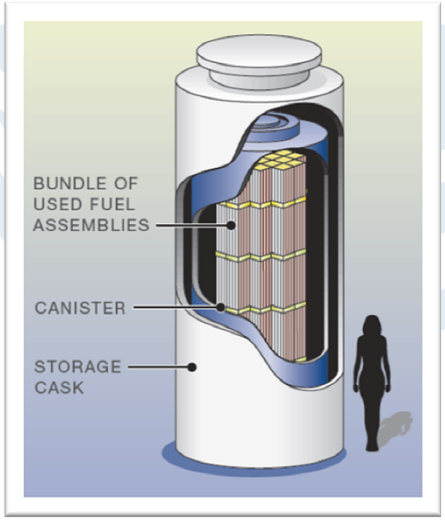
H Canyon

  - Melt & dilute for disposal in a geologic repository
  - On-site processing (H Canyon) of Al-clad fuel for uranium recovery, and shipment of non-Al clad fuel to Idaho National Laboratory
  - Construction of a new Dry Storage Facility for extended storage, and subsequent disposal

***DOE is currently reviewing the final BRC recommendations and will reply to Congress later this year**

Near-term Objectives

- **A program has been initiated to demonstrate and evaluate pad-based storage for a selected set of DOE fuels:**
  - Similar to commercial industry practice
  - Utilizes SRNL research to establish the technical basis for safe, long-term dry storage of Al-clad fuel
  - Provides a cost-effective alternative to a large, greenfield dry storage facility
  - Establishes dry storage at SRS, providing an alternative to long-term basin storage for DOE fuels



Dry Storage System

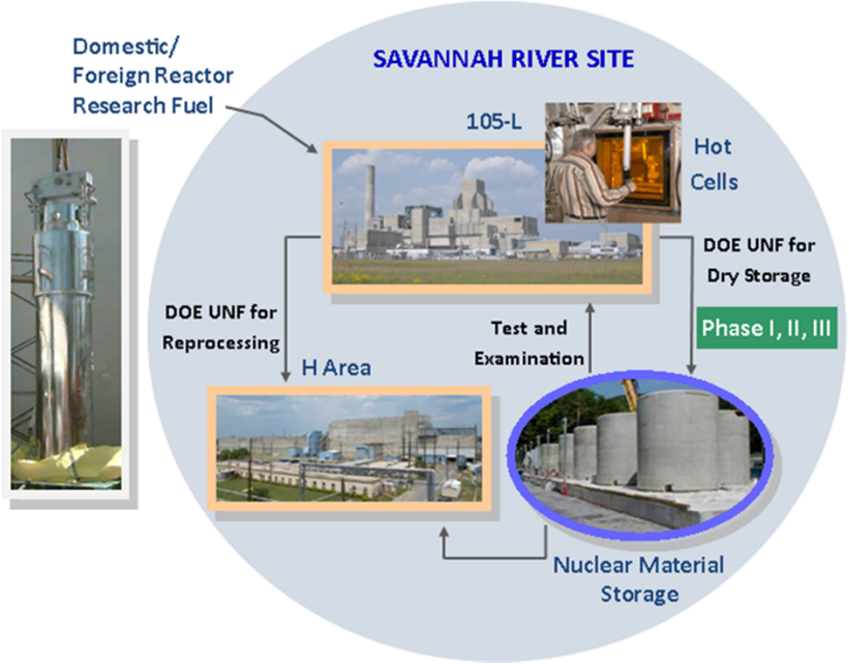
The Blue Ribbon Commission has recommended dry storage as a necessary and important element for extended storage of used nuclear fuel

"Meet high standards of safety and security for the multi-decade-long time periods that they are likely to be in use"

Dry Cask Storage Facility

Program Objectives

- **The program would provide a phased, optimized dry-storage approach for DOE used nuclear fuel**
  - Phase I: Dry Storage demonstration – DOE fuel in three casks
  - Phase II: Future receipts of DOE owned fuel from foreign and domestic research reactors
  - Phase III: DOE owned spent fuel currently stored in L-Basin



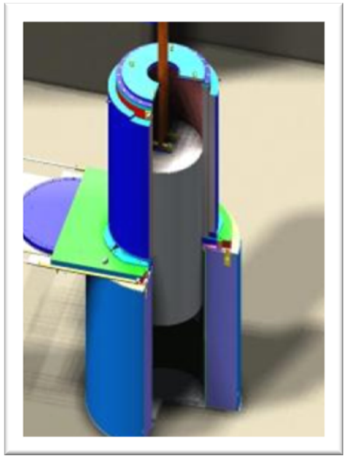
Casks Being Transported By Rail

The program demonstrates the scientific basis for extended storage and establishes safe, secure pad storage of fuel in a "road-ready" condition for a range of DOE nuclear materials

Where are we today?

- **Alternatives have been developed for preparation and transfer of selected fuels to dry storage**
  - Proposed equipment and operations will be integrated with current facility operations
- **Meetings held with industry representatives to describe the scope, test objectives, and challenges presented by fuels selected for the demonstration**
- **Soliciting vendor input to evaluate technical feasibility and use of standardized products to cost-effectively implement the demonstration**
- **Have launched the pre-project planning phase for a dry storage pilot project (Phase I)**

L Basin Shielded Transfer System



Commercial Transfer Cask

Next steps

- **Complete pre-conceptual design by October 2012 (FY12 funding)**
  - Estimate of scope, cost, and schedule
  - Acquisition plan
- **Evaluate synergy with similar project for extended storage of vitrified high level waste at the Defense Waste Processing Facility**