

# Savannah River National Laboratory

## Dry Storage of Used Nuclear Fuel

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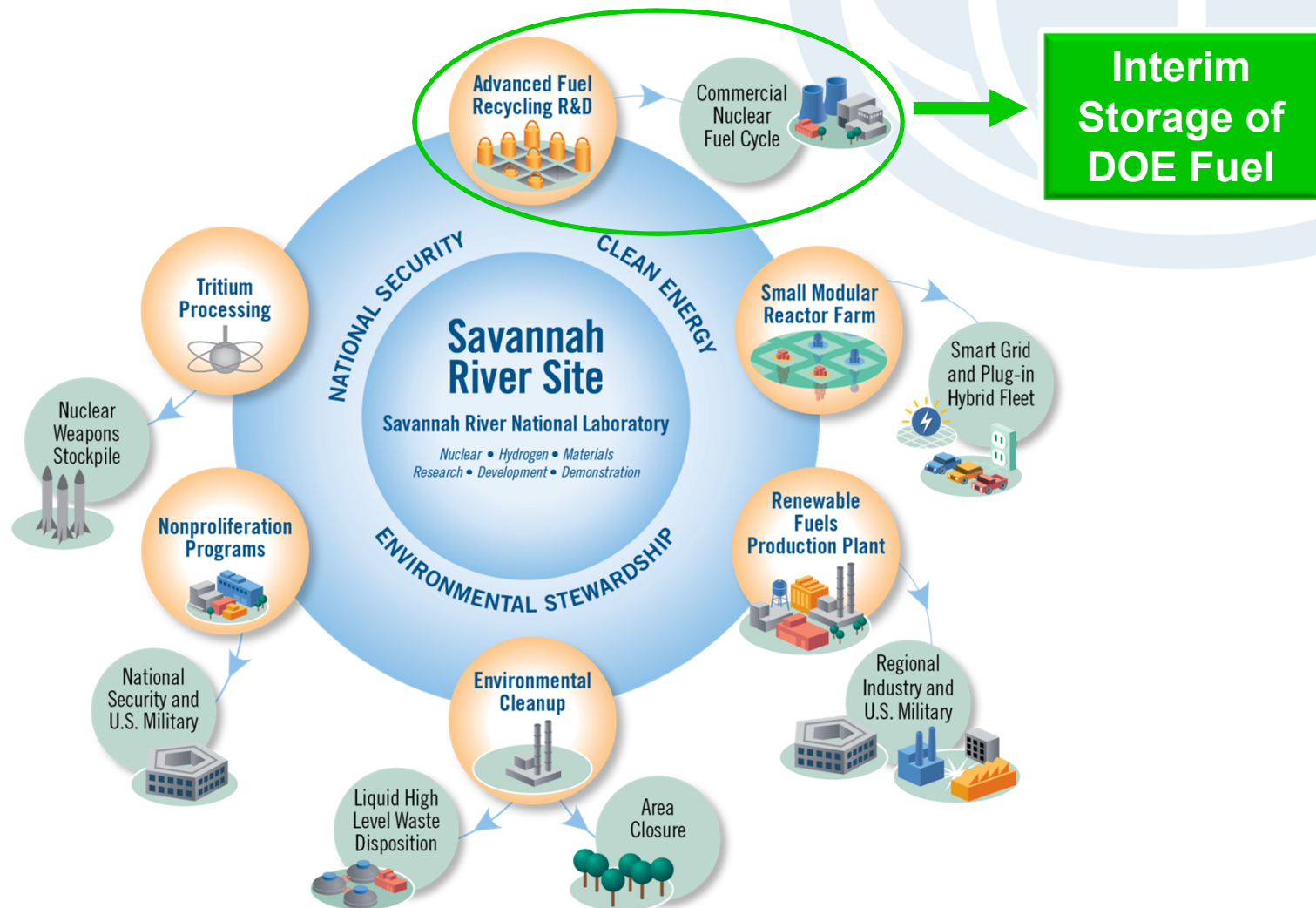
Citizens Advisory Board – Combined Committees Meeting

SRNL-STI-2012-00351

# Purpose

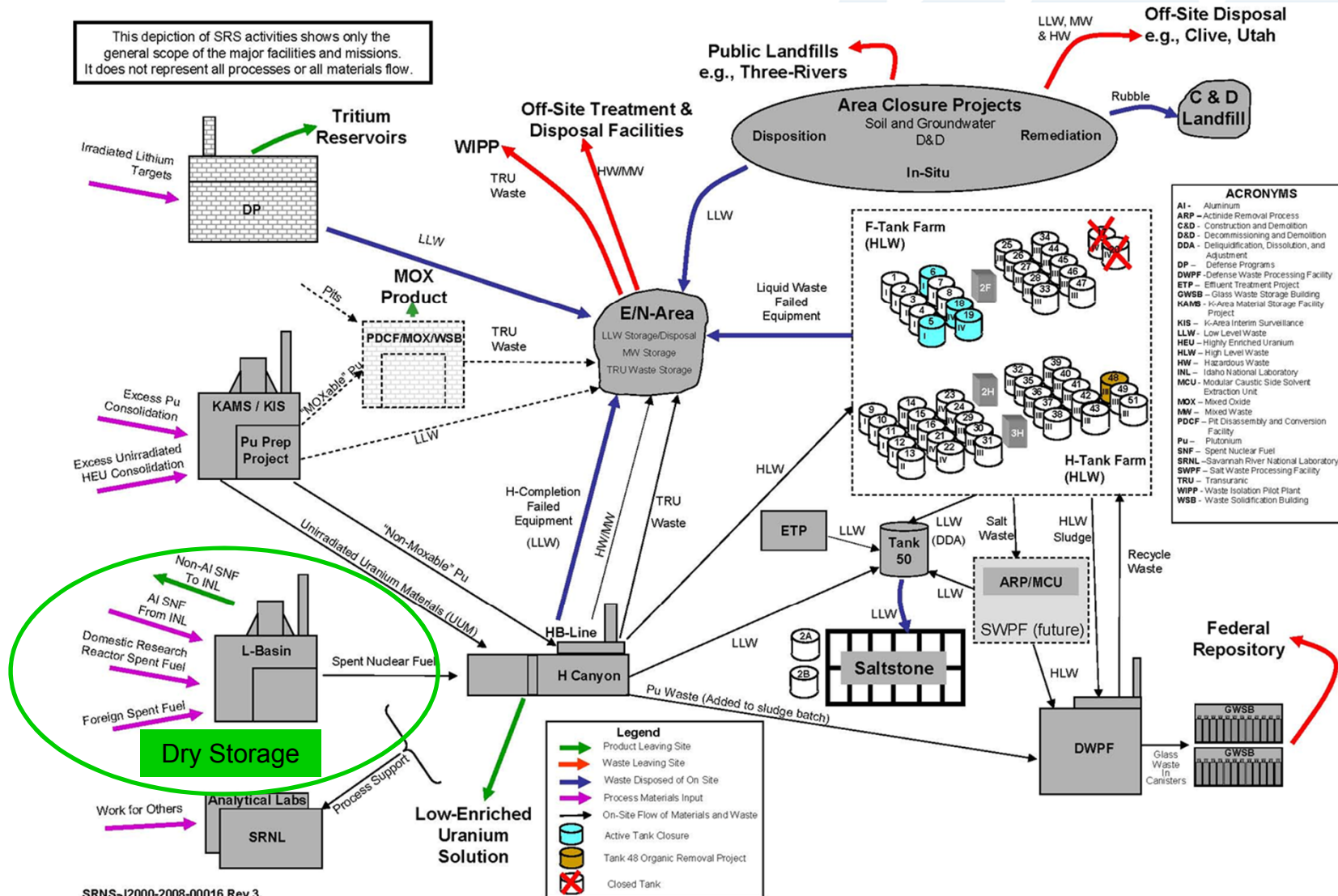
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- **To fulfill Nuclear Materials Committee 2012 Work Plan topic**



# Savannah River Site

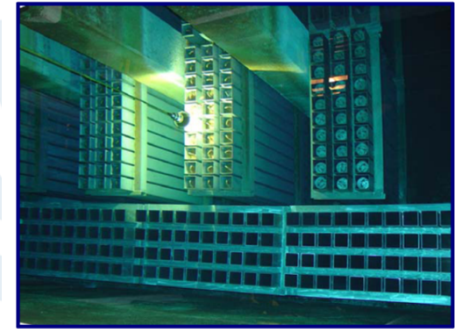
## Waste and Material Flow Path





# 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

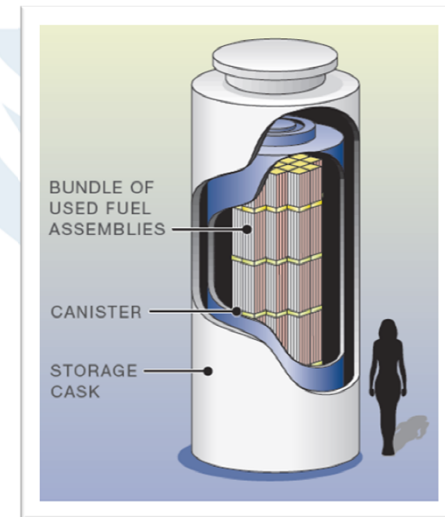
\*DOE is currently reviewing the final BRC recommendations and will reply to Congress later this year

# 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

**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”*



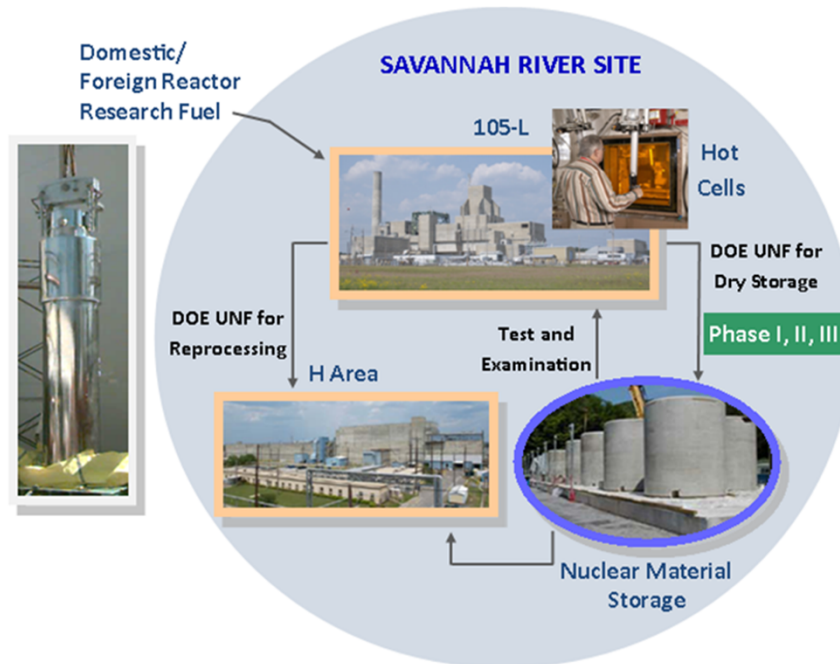
**Dry Storage System**



**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 (equivalent) 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**

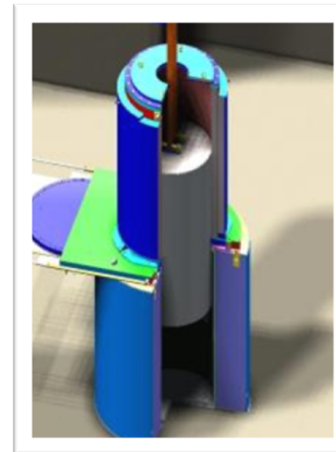
The program demonstrates the scientific basis for extended storage and establishes safe, secure pad storage of fuel in a “road-ready” condition for a range of DOE nuclear materials

# 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

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- **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**