U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

SRS L-Basin Spent Nuclear Fuel Program Update

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Presented to the Nuclear Materials Committee
October 14, 2015

Purpose

Nuclear Materials Committee requested a 2015 Work Plan topic on L Area:

- Provide an update on L Area Operations
  - ❑ Status of Receipts
  - ❑ Status of Shipments to H-Canyon

Spent Nuclear Fuel Storage

Acronyms

Al –clad – Aluminum clad

AROD – Amended Record of Decision

CNLL – Canada Nuclear Laboratories Limited

DRR – Domestic Research Reactor

DSA – Documented Safety Analysis

FY – Fiscal Year

FRR- Foreign Research Reactor

HEU – Highly Enriched Uranium

HFIR – High Flux Isotope Reactor

IAEA – International Atomic Energy Agency

ISO – International Standards Organization

LWT – Legal Weight Truck

MTR – Material Test Reactor

NRU – National Research Universal

NRX – National Research Experimental

NNSA – National Nuclear Security Administration

PBS 11C- Performance Baseline Summary for Nuclear Material Stabilization and Disposition

PBS 12 – Performance Baseline Summary for SNF Stabilization and Disposition

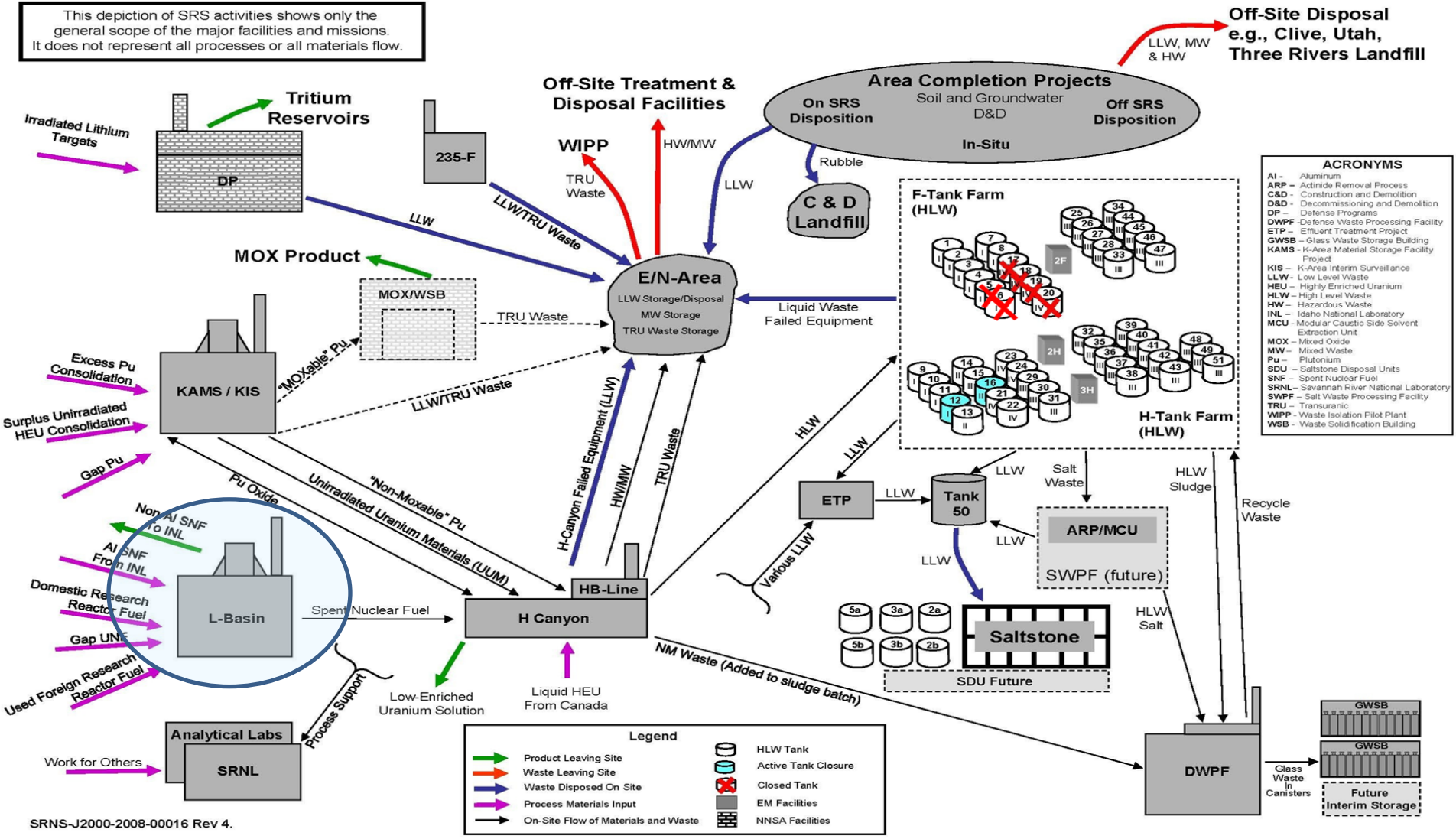
SNF – Spent Nuclear Fuel

SRE – Sodium Reactor Experiment

STS – Shielded Transfer System

Savannah River Site
Waste and Material Flow Path

This depiction of SRS activities shows only the general scope of the major facilities and missions. It does not represent all processes or all materials flow.



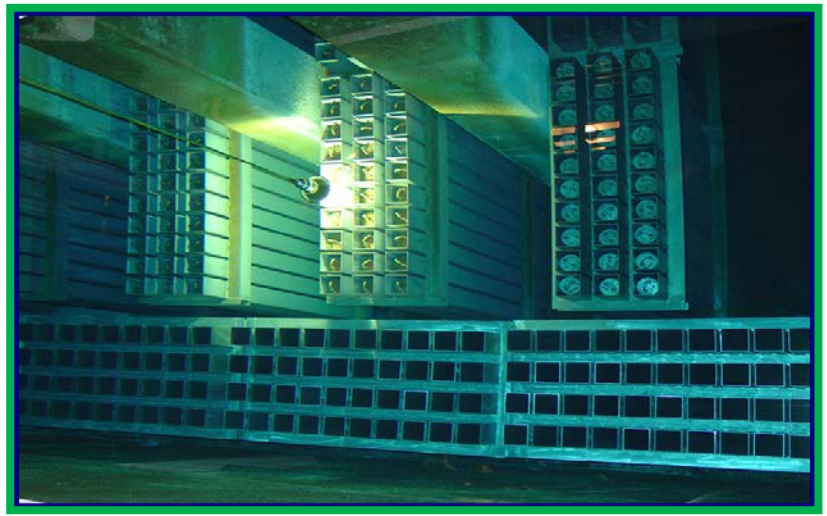
ACRONYMS

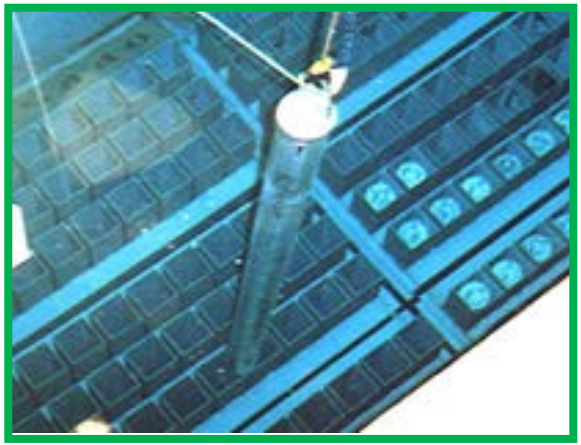
- **Al** - Aluminum
- **ARP** – Actinide Removal Process
- **C&D** - Construction and Demolition
- **D&D** - Decommissioning and Demolition
- **DP** – Defense Programs
- **DWPF** -Defense Waste Processing Facility
- **ETP** – Effluent Treatment Project
- **GWSB** – Glass Waste Storage Building
- **KAMS** - K-Area Material Storage Facility Project
- **KIS** – K-Area Interim Surveillance
- **LLW** - Low Level Waste
- **HEU** – Highly Enriched Uranium
- **HLW** – High Level Waste
- **HW** – Hazardous Waste
- **INL** – Idaho National Laboratory
- **MCU** - Modular Caustic Side Solvent Extraction Unit
- **MOX** – Mixed Oxide
- **MW** – Mixed Waste
- **Pu** – Plutonium
- **SDU** – Saltstone Disposal Units
- **SNF** – Spent Nuclear Fuel
- **SRNL** – Savannah River National Laboratory
- **SWPF** – Salt Waste Processing Facility
- **TRU** – Transuranic
- **WIPP** - Waste Isolation Pilot Plant
- **WSB** - Waste Solidification Building

SRNS-J2000-2008-00016 Rev 4.

Overview of L-Basin

- L-Basin was expanded from the original reactor basin in the 1990s
  - ~3.4 Million gallons of water
  - Pool Depth 17 to 50 feet
  - Receives typical Foreign Research Reactor (FRR) / Domestic Research Reactor (DRR) Material Test Reactor Fuel Assemblies
  - One transfer bay for receipts/shipments





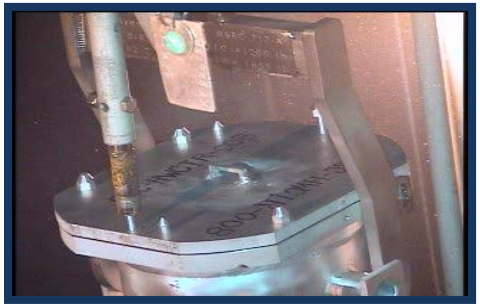
Suspended Fuel Bundle

- Spent Nuclear Fuel is Safely and Securely Stored in Reinforced Concrete Facility, Underwater Basin (L-Area)
- Continuous Surveillance and Maintenance is projected to achieve at least 50 additional years of safe storage

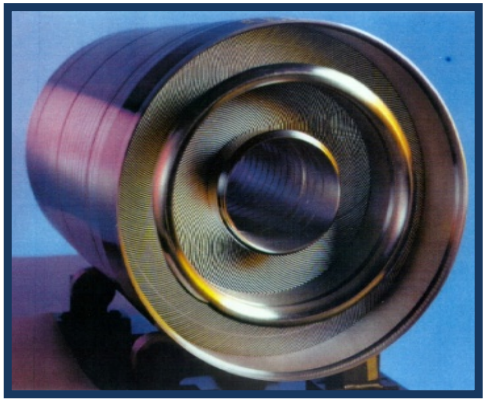
L-Basin Stored Fuels and Capacities

- L-Bundled fuel
  - Typical FRR/DRR Material Test Reactor Fuel Assemblies
  - ~85% full
  - ~2960 bundles
  - Amended Record of Decision (AROD) processing decision eliminates need for new racks
- High Flux Isotope Reactor (HFIR) Fuel Racks
  - 100% full
  - 120 Cores
  - AROD processing decision eliminates need for new racks
- Isolation Cans
  - Over 400 individual isolation cans stored in 12 oversized cans

International Standards Organization (ISO) Container containing a Legal Weight Truck (LWT) Cask



Isolation Can



HFIR Fuel

L-Area Accomplishments in Fiscal Year 2015

- Completed Shielded Transfer System Modifications
  - Allows receipt of the National Research Universal (NRU)/National Research Experimental (NRX) Canadian Fuels
- Received 4 FRR casks and 3 DRR casks in Fiscal Year 2015
- Made 11 70-ton cask transfers of SNF to H-Canyon for processing
- Continued safe storage of SNF and Heavy Water

70-ton Cask

Shielded Transfer System (STS)

Current Management Approach

- Continue Safe Wet Storage
- Continue to receive FRR and DRR fuels supporting the National Nuclear Security Administration (NNSA) nonproliferation program
- Process up to 1000 bundles and 200 High Flux Isotope Cores
- Continue Operations of L-Basin evaluated by Savannah River National Laboratory (SRNL) for safe usage of L-Basin up to at least an additional 50 years

Processing in H-Canyon

- Sodium Reactor Experiment (SRE) Campaign eliminated 149 Bundles from L-Basin
- Amended Record of Decision (AROD) allows :
  - Processing up to 1000 bundles and 200 High Flux Isotope Cores
  - 109 bundles shipped to H-Canyon through August 2015
  - Amount shipped and processed is dependent on funding amounts received
- H-Canyon continued processing of the L-Basin Aluminum Cladded Fuel past the AROD amounts is possible but no decision has been made to pursue this at this time
- H-Canyon currently cannot process the Stainless and Zircaloy cladded fuels stored in L-Basin (~ 10% of the inventory by volume)

Summary

- Fuel is Safely Stored in L-Basin
- Some processing of SNF is occurring in H-Canyon
- Departmental Decision needed on future direction of fuel storage versus processing