



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

SRS Spent Nuclear Fuel Program Overview and Status Update

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Presented to the Nuclear Materials Committee
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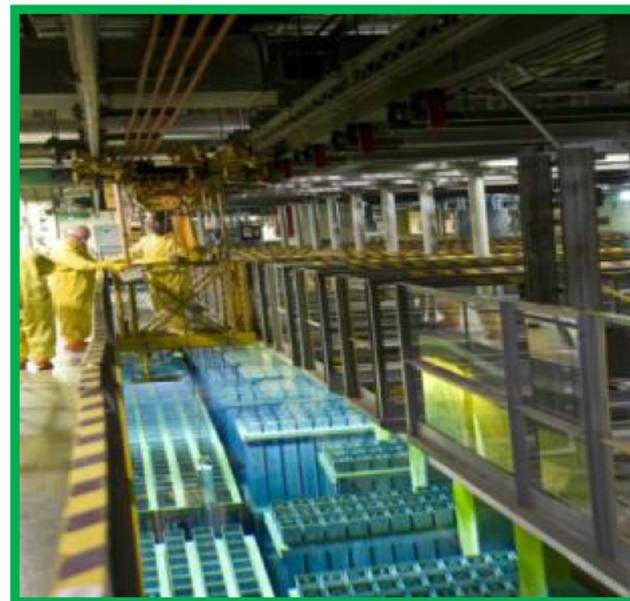
Nuclear Materials Committee requested a 2017 Work Plan topic on Spent Nuclear Fuel:

- Provide an overview of Spent Nuclear Fuel
 - ❑ Status of L-Basin Capacity - Storage
 - ❑ Status of Shipments to H-Canyon - Processing

L-Area



Spent Fuel Project



Spent Nuclear Fuel Storage
in L-Basin

Al –clad – Aluminum clad

AROD – Amended Record of Decision

CFR – Code of Federal Regulations

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

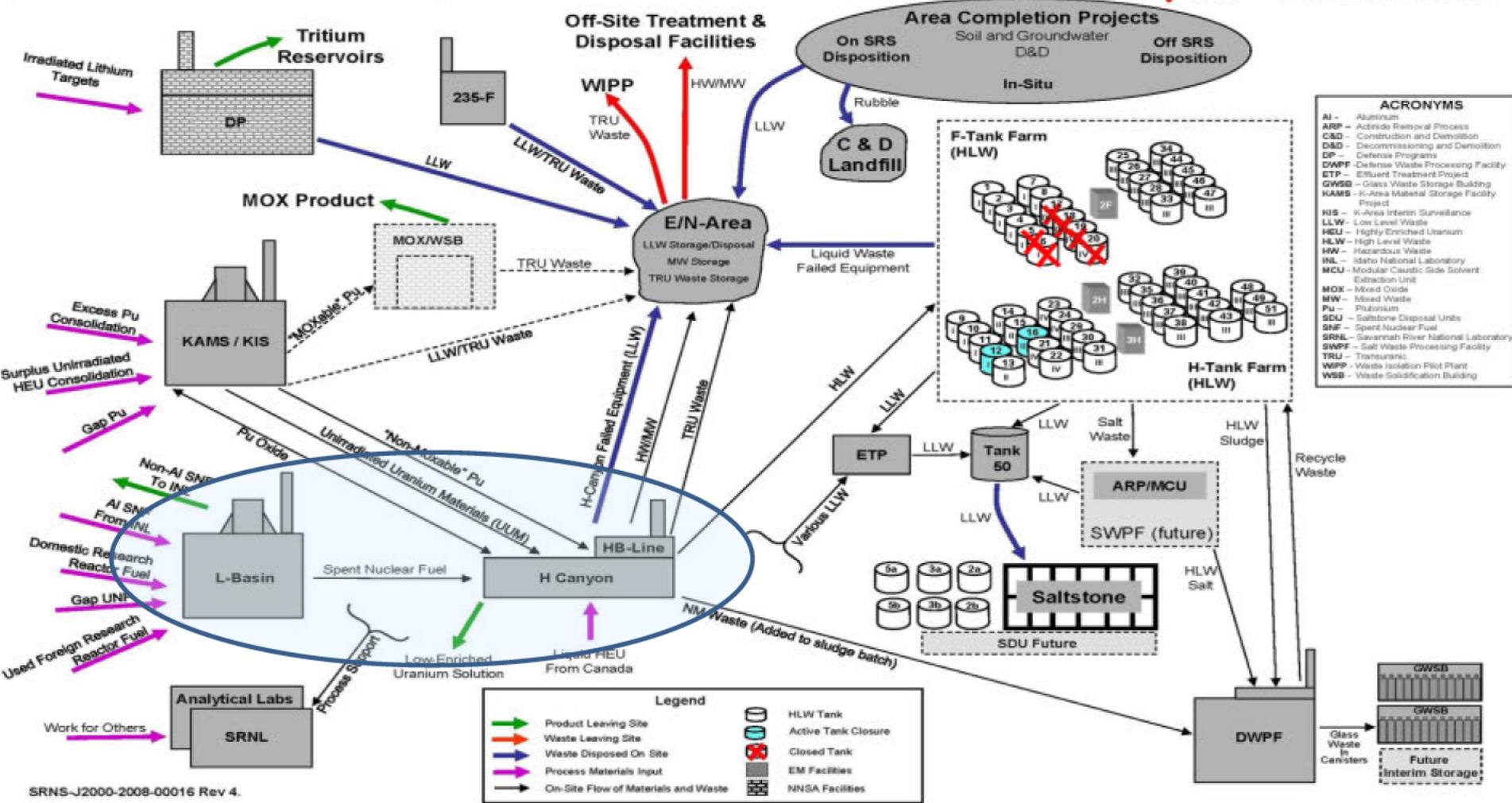
STS – Shielded Transfer System

Savannah River Site Waste and Material Flow Path

Areas specific to the presentation

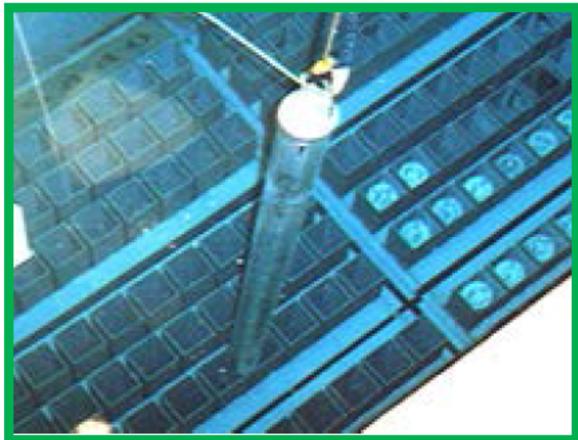
This depiction of SRS activities shows only the general scope of the major facilities and missions. It does not represent all processes or all materials flow.

Off-Site Disposal
e.g., Clive, Utah,
Three Rivers Landfill

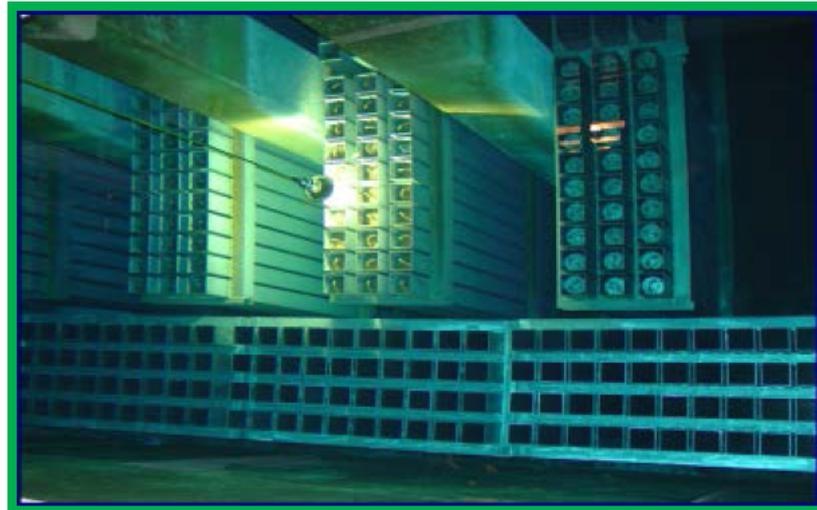


Overview of L-Basin

- L-Basin capacity 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 a 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
 - Capacity = 3650 bundles
 - Current inventory = ~3000 bundles (~80% full)
 - Amended Record of Decision (AROD) processing decision eliminates need for new racks in the future

- High Flux Isotope Reactor (HFIR) Fuel Racks
 - 100% full
 - 120 Cores
 - AROD processing decision eliminates need for new racks; expected to start by 9/30/2017

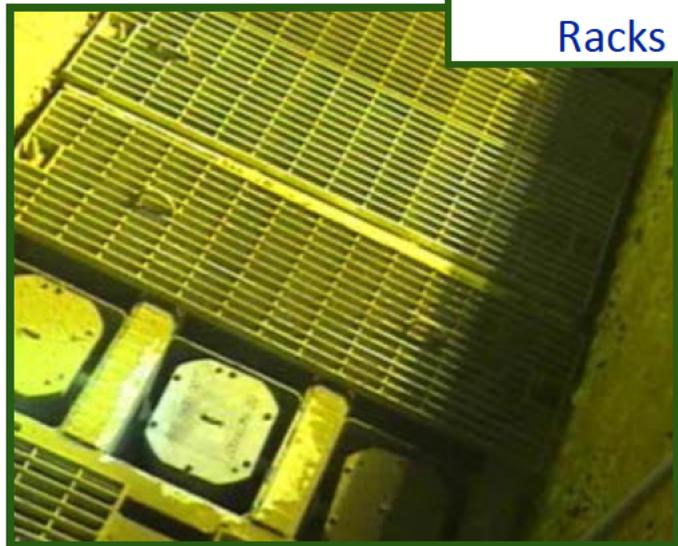


HFIR Fuel

- Over 400 individual isolation cans stored in 12 oversized cans



Isolation Can
and Storage
Racks



70 Ton Cask and railcar used
for onsite transfers
Removal from rail car in
Transfer Bay



Receipt Cask Handling in L-Basin



**Receive Cask/
Removed Impact Limiters**



Cask Placed Under Water



Lid Removed



Cask with fuel ready for verification



**Fuel Removal & placed in bucket for
transfer to Basin from Transfer Bay**



**Decon, Reassembly &
Ship Empty Cask**

Casks Handled in L-Basin



Processing in H-Canyon

- Provides a method to recover the uranium for reuse and eliminates potential issues with stability of the fuel form after long term storage
- Amended Record of Decision (AROD) allows :
 - Processing up to 1000 bundles and 200 High Flux Isotope Cores
- Current status of AROD campaign:
 - 60 bundles shipped to H-Canyon thus far in FY2017
 - 180 bundles shipped to H-Canyon since the beginning of the AROD campaign
 - 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)

Dry Storage

- Removes fuel from wet storage and places into a dried container awaiting a final repository
- Technical questions exist on how long to dry and how dry is dry for aluminum clad fuel need to be addressed

H-Canyon Spent Nuclear Fuel Processing

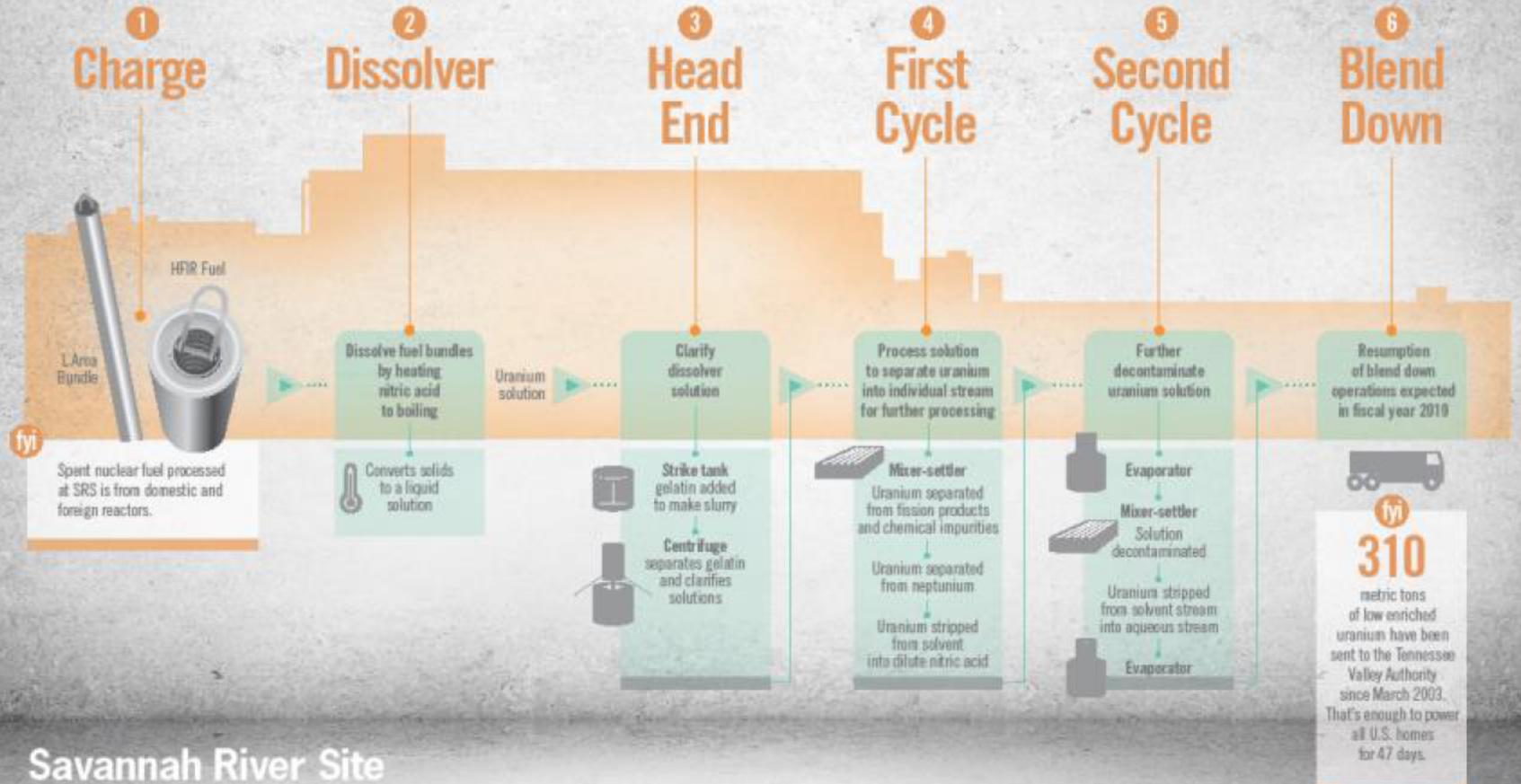
- H-Canyon is the only hardened nuclear chemical separations plant still in operation in the United States.
- H-Canyon processes spent nuclear fuel to recover the highly enriched uranium and blend it to low enriched uranium for the Tennessee Valley Authority, who turns it into fuel for electricity production
 - Current Spent Fuel processing campaign for recovery of uranium began in September 2014
 - Dissolving, Head End, 1st cycle, and 2nd Cycle are all operational
 - Blend-down to Low Enriched Uranium is expected to begin in FY 2019





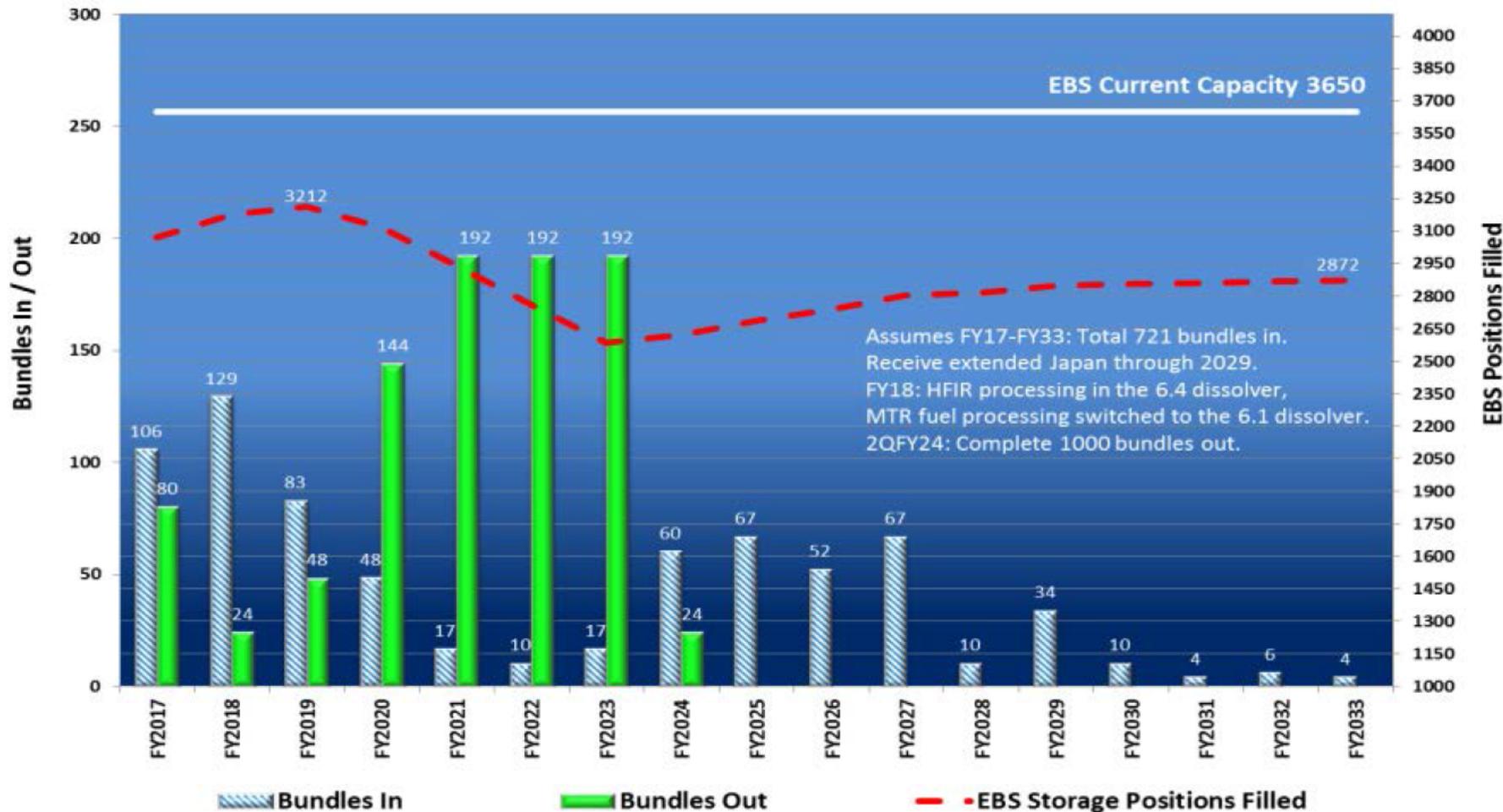
H Canyon

Highly enriched uranium process operations



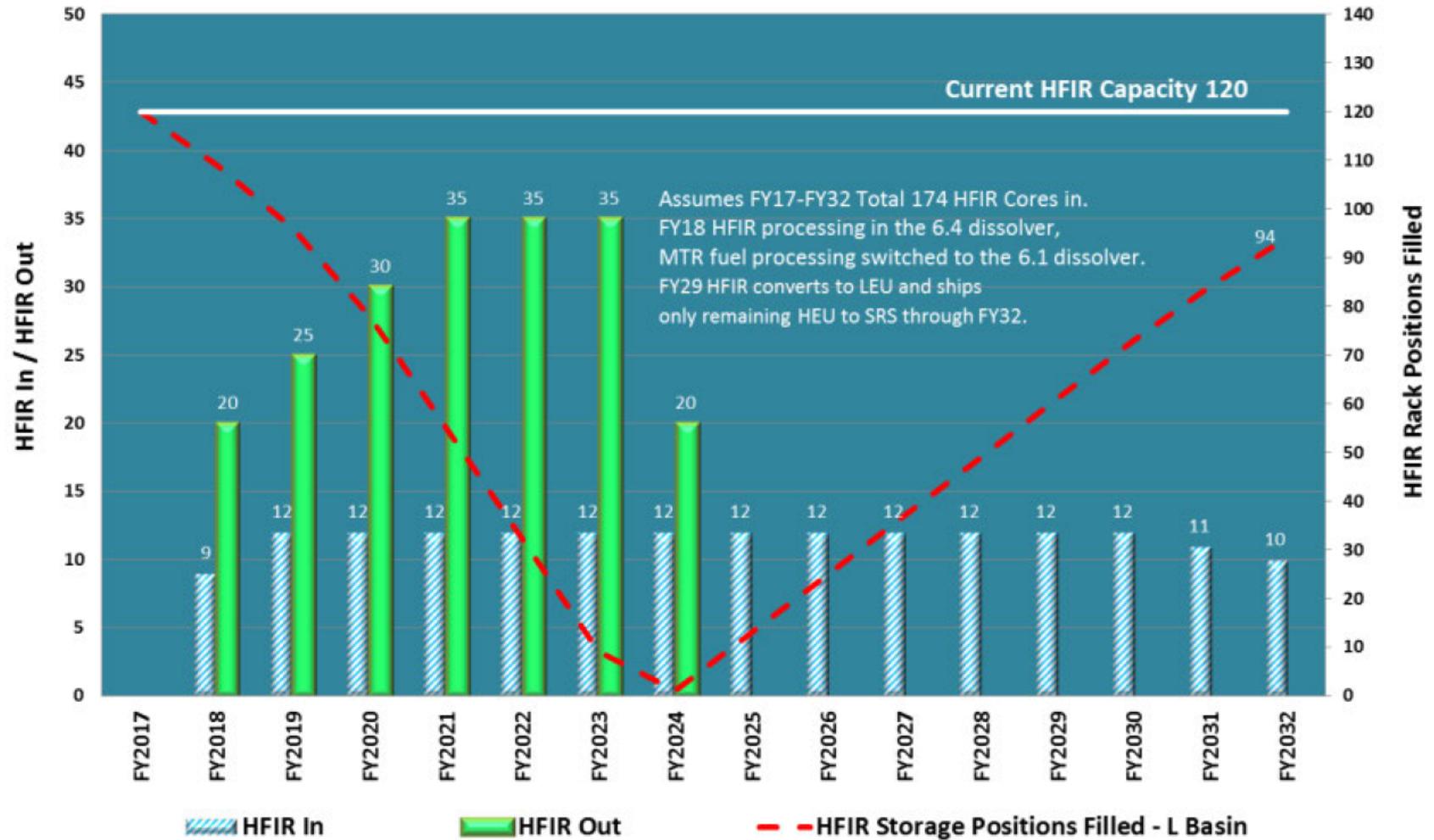
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L-Basin Expanded Basin Storage Capacity, Receipts, Canyon Processing



Data based on projections which are subject to change

L-Basin HFIR Storage Capacity, Receipts, Canyon Processing



Data based on projections which are subject to change

SNF Accomplishments in Fiscal Year 2017

- Received 5 FRR casks and 1 DRR cask through April 30, 2017
- Transferred 6 casks of SNF to H-Canyon for processing in FY17 as of April 30, 2017. Anticipating three more cask transfers of SNF to H-Canyon before the end of FY17
- Continued safe storage of SNF



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



Shielded Transfer System (STS)

- Fuel is safely stored in L-Basin
- SNF is being safely transported around the US and is governed by DOT and NRC. Regulations and safeguards are in place to ensure material remains contained even during hypothetical accident conditions.
- SNF processing is occurring in H-Canyon
- Departmental Decision is needed on future direction for SNF management (i.e., fuel storage versus processing)