Spent Fuel Project Overview

Nuclear Material System Plan

Kela Lofton
Spent Fuel Project Manager
Savannah River Nuclear Solutions

The SRS Citizen's Advisory Board (CAB)
March 26, 2019

Spent Fuel Project – L Area

L Area (105-L)-History

- L-Reactor was a production reactor that was used for the safe production of special nuclear material.
- It began operating in the 50s and was shutdown in 1968 when production capability was no longer needed.
- The Reactor restarted in 1985 and shutdown again in 1988. The restart led to the choice of the Phoenix as the area's symbol
- The building is approximately 350 ft. long x 275 ft. wide. It extends 40 ft. below grade and 149 ft. above grade

Spent Fuel Project (SPF) - Current Missions

Non-Proliferation

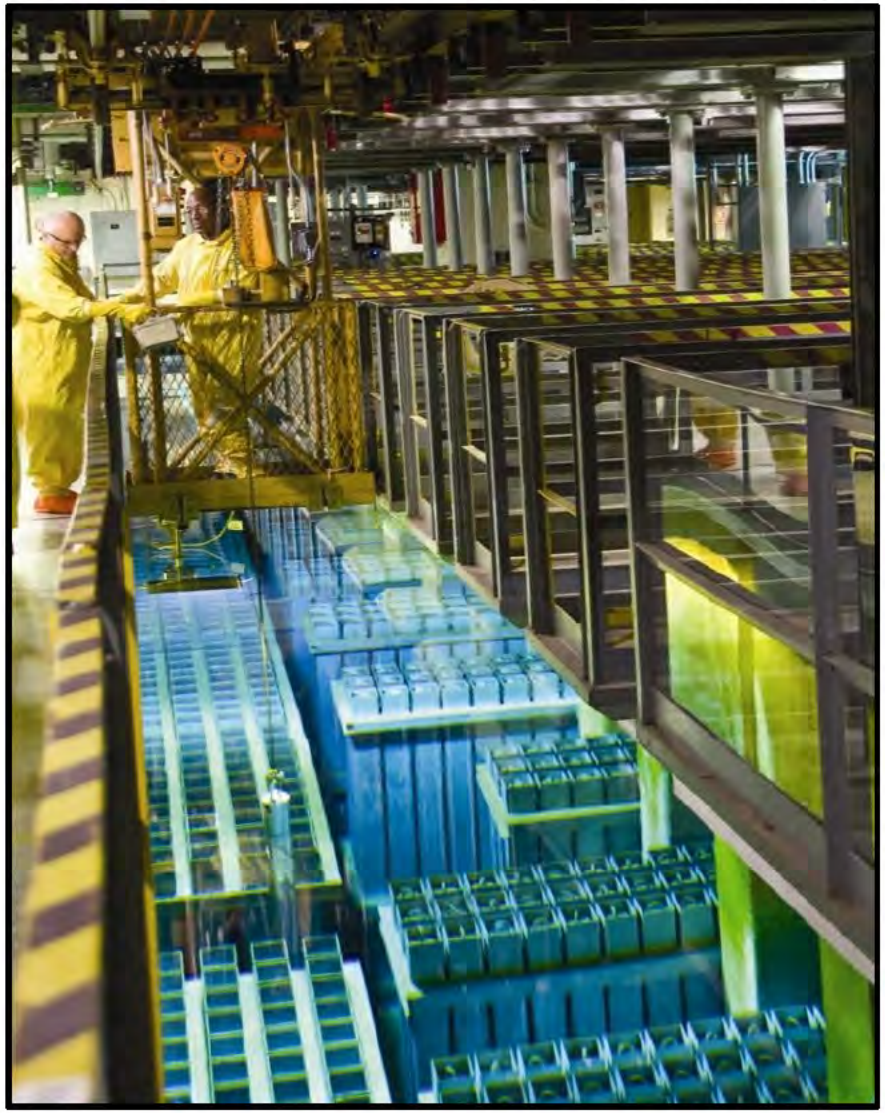
– Receive and store aluminum-based spent nuclear fuel from Domestic Research Reactors (DRR) and Foreign Research Reactors (FRR) from civilian sites

- *Spent Nuclear Fuel stored in L Area basin*

Support disposition of Spent Nuclear Fuel

- *Package and ship High Flux Isotope Reactor (HFIR) and Material Test Reactor (MTR) fuel to H Canyon for dissolution*

L Area Spent Fuel Basin



- 3.4 million gallon basin with depths of 17 feet to 50 feet
- Standard storage configuration for spent fuel
  - Expanded Basin Storage (EBS) racks store MTR Fuel
  - HFIR racks store HFIR Fuel

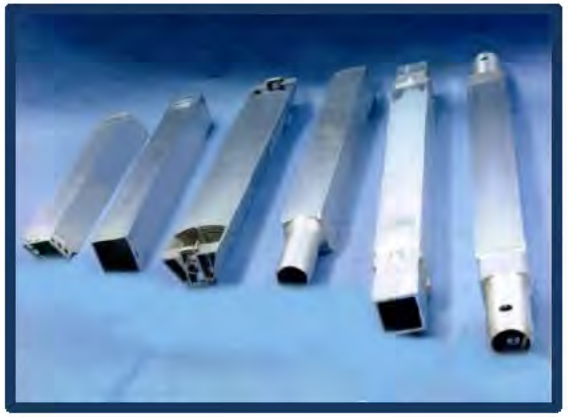
Safety

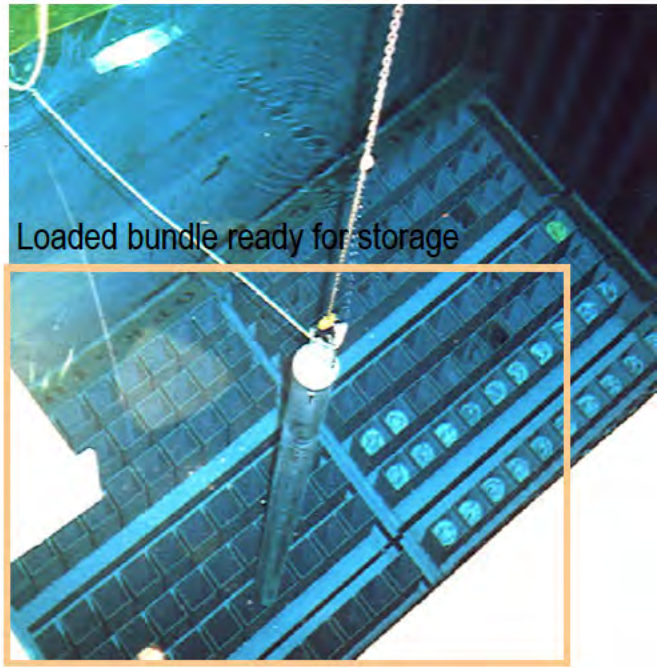
- ✓ Fixed geometry for criticality control
- ✓ Racks seismically qualified for design basis seismic event
- ✓ No active cooling required

L Area Spent Fuel Basin Storage

Storage Type	Total Approved Positions	Positions Filled	Positions Available	Percent Filled (rounded)
Dry Fuel Storage 1	16	16	0	100%
Dry Fuel Storage 2	27	23	4	85%
Oversized Can Racks	42	23	19	55%
Bucket Racks	4	4	0	100%
Bucket Row Storage	33	17	16	52%
EBS	3650	3231	419	89%
HFIR (Cores)	120	102	18	85%

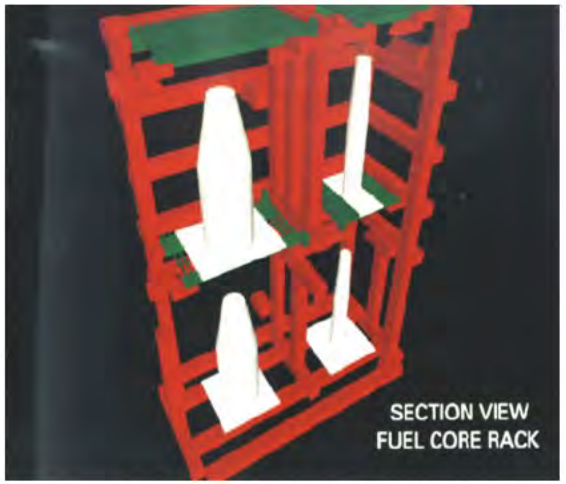
Fuel assemblies





Loaded bundle ready for storage

HFIR Core



3-D photo of HFIR racks

Forecast Future Fuel Receipts

- **Foreign Research Reactors (FRR)**
  - Authorized by the National Environmental Policy Act (NEPA) through May 2019
  - DOE processing Amended Record of Decision (AROD) hardship extension through 2029 for Japan
    - Approximately 250 bundles
    - Approximately 30 casks

- **Domestic Research Reactors (DRR)**
  - Authorized by the NEPA through 2035
  - Approximately 15 bundles per year
  - Approximately 12 HFIR cores per year
  - Approximately 20 casks per year

Battelle Energy Alliance **R**esearch **R**eactor (BRR) Cask

Fuel Disposition – HEU Blenddown

Amended Record of Decision (AROD):

- Savannah River Site Spent Nuclear Fuel Management Environmental Impact Statement (EIS) amended March 2013

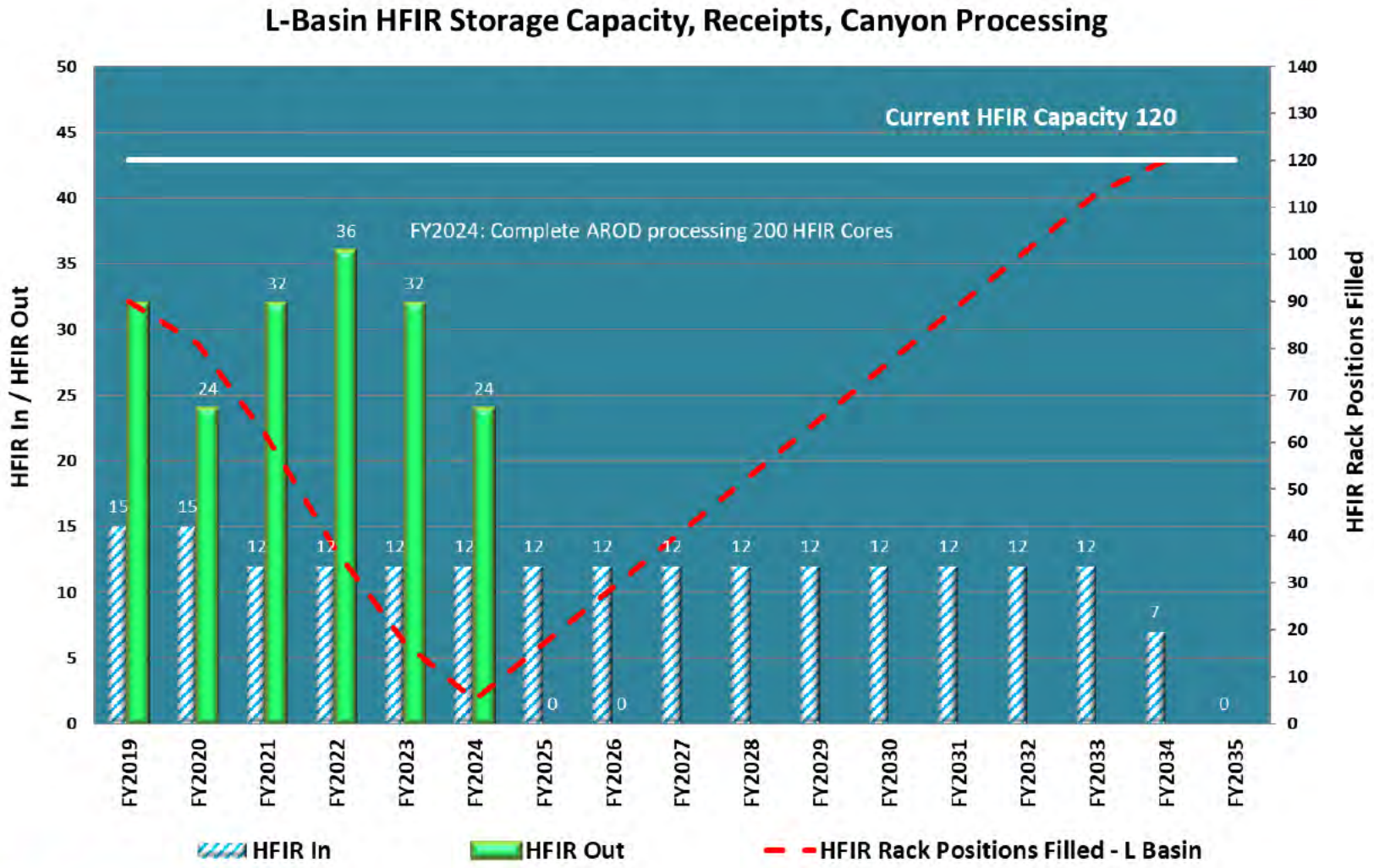
- Approximately 3.3 MTHM of aluminum based high enriched uranium (HEU) fuel to be processed in H Canyon
  - ❖Targeted completion FY2024
  - – Approximately 1000 fuel bundles (Approximately 250 Processed)
  - – Up to 200 HFIR cores (Approximately 25 Processed)

- Avoids installation of additional fuel storage racks

- Supports anticipated future foreign & domestic fuel receipts

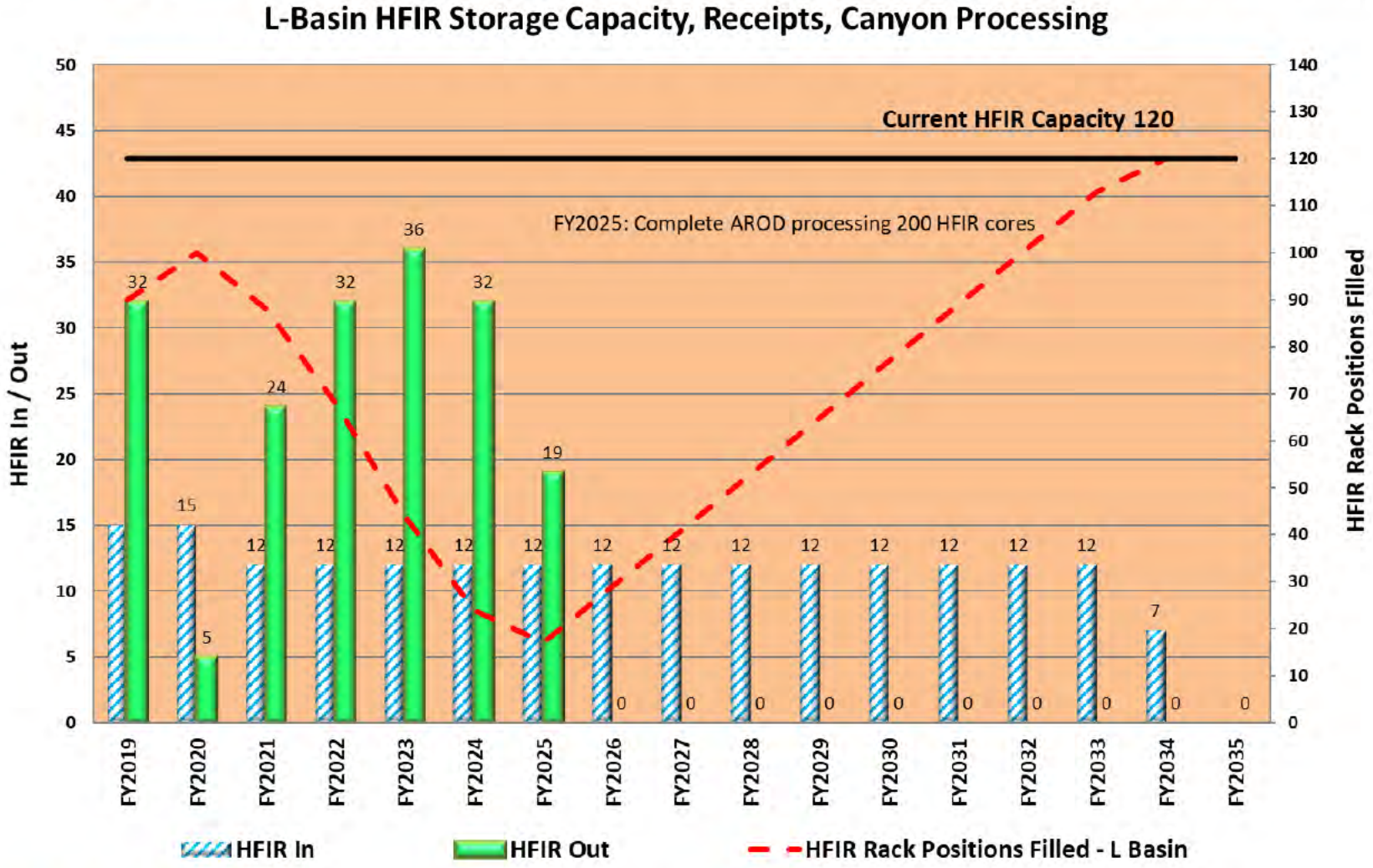
- Down blend HEU to LEU; available for use in commercial power reactors

Nuclear Materials Plan for HFIR



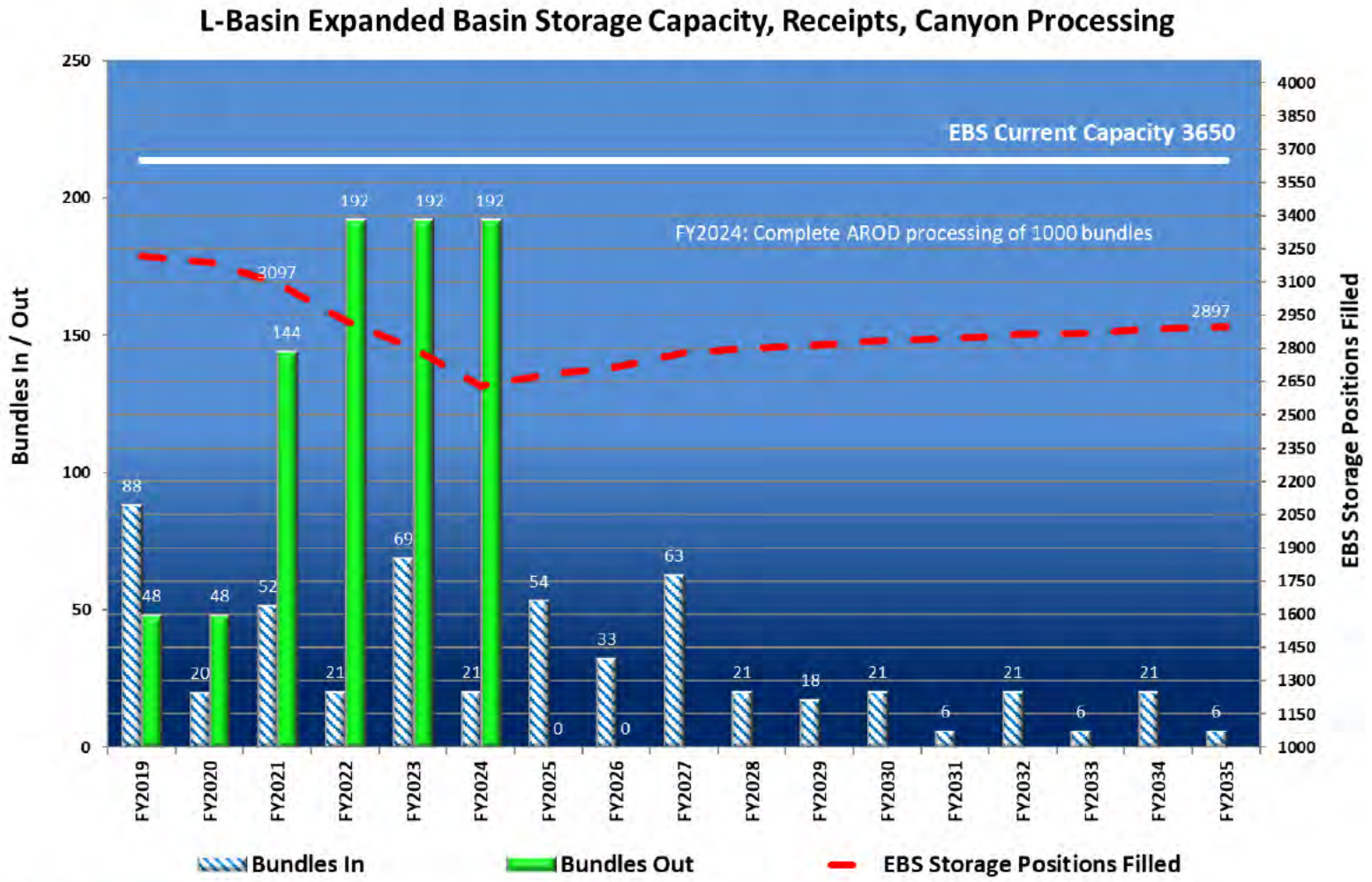
PRE-DECISIONAL DRAFT

FY2020 Funding Impact to Nuclear Materials Plan for HFIR



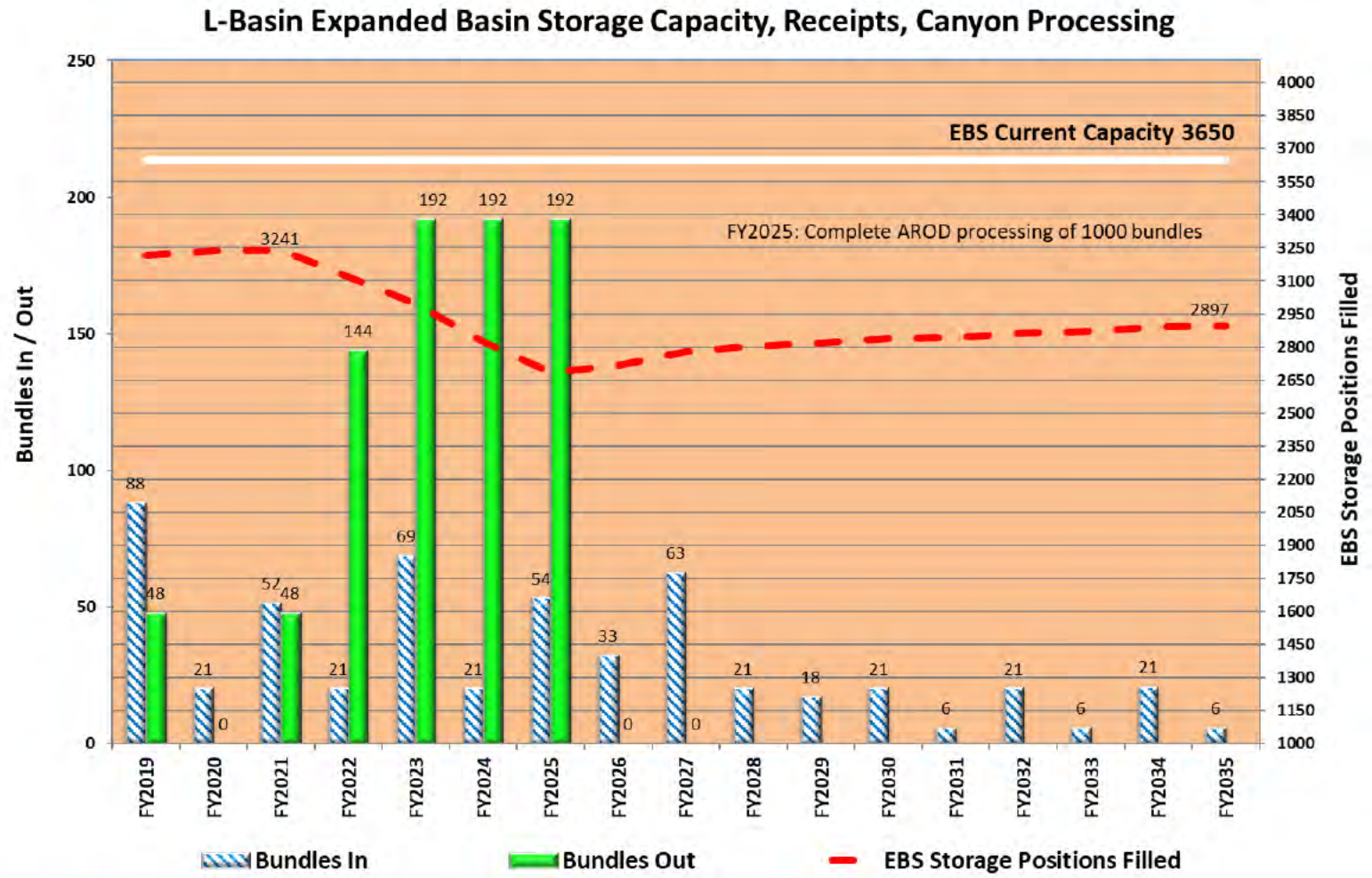
PRE-DECISIONAL DRAFT

Nuclear Materials Plan for MTR Fuel Bundles



PRE-DECISIONAL DRAFT

FY2020 Funding Impact to Nuclear Materials Plan for MTR Fuel Bundles



PRE-DECISIONAL DRAFT

FY2020 IMPACTS

Summary

- SRS continues to safely receive and store spent nuclear fuel to reduce global threat
- Foreign fuel receipts continue to 2029 (Pending AROD)
- Domestic fuel receipts continue to 2035 (Current NEPA)
- SNF inventory being dispositioned as directed by DOE-EM AROD
  - H Canyon processing to reduce risks, avoid costly storage expansion, beneficial reuse of U-235
  - Approximately 1000 MTR fuel bundles (approximately 250 processed)
  - Up to 200 HFIR cores (approximately25 processed)


Spent Fuel Project