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L-Area: Spent Fuel Project (SFP) Overview

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Current Mission

Mission – *One of only two operating facilities in the nation, for the safe receipt, storage, handling, and shipment of Spent Nuclear Fuel (SNF) and other Special Nuclear Material (SNM).*

Offsite Fuel Receipt

Safe Storage

Transfer to H-Canyon for processing

Current Mission: Safe Storage

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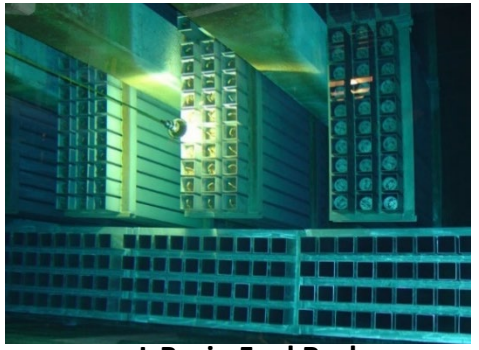
- L Area Material Storage Facility:
  - The disassembly Basin is a 3.4-million gallon basin with depths from 17 feet to 50 feet.
  - Capable of handling wide variety of fuel sizes, shapes, enrichments and fuel conditions
  - Limited Dry storage
  - Rail or Trailer Access for Casks



L Basin Fuel Racks

- L Area Inventory (SNF)

Fuel Clad	Storage Containers (approx.)	Fuel Assemblies (approx.)	MTHM	H-Canyon Disposition Pathway	Additional Handling
Aluminum Clad	3000	13000	9.2	Chemical Dissolver	None
Non-Aluminum Clad	395	2000	20	Electrolytic Dissolver	Repackage

  - Storage Capacity
    - MTR: 84% (full)
    - HFIR 56% (full)

Dry stored fuel

- Heavy Water
  - Heavy water stored at SRS was used in the five production reactors built and operated onsite
  - ≈ 6,800 Stainless Steel Drums
  - ≈350,000 gallons (1.32 x 106liters)
  - ≈ 140,000 gallons (530,000 liters) in C & K Area storage tanks
  - Average H-3 activity of all heavy water is 1,800 µCi/ml

Heavy Water in drums

Current Mission: Safe Storage

- Inventory (as of 08/07/24)

Storage Type	Total Approved Positions	Positions Filled	Positions Available	Percent Filled (rounded)	Comments
L-Area Slug Vault TTR Drum Storage	16	16	0	100%	
Oversized Can Racks	42	23	19	55%	
Dry Fuel	23	23	0	100%	
Storage Area					
Bucket Racks	4	4	0	100%	4 Approved Positions Contain RHF Cores
Bucket Row Storage	39	26	13	66%	
Dry Cave	150	0	150	0%	
VTS	3500	3068	432	87%	
HFIR (Cores)	120	68	52	56%	

Current Mission: Safe Storage

Basin Chemistry

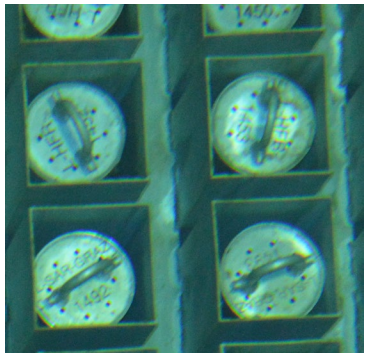
L-Area Facility TSR Administrative Program established to control/monitor basin water activity and minimize the potential for corrosion of fuel and equipment stored in the L-Area Disassembly Basin.

- Water Sampling
  - Monitored Weekly: Cs-137, Conductivity, pH, Temperature
  - Monitored Monthly: Alpha
  - Monitored Quarterly: Disassembly Basin Bubblers (Tritium), Chloride, L-Area and K-Area +148 Level Stacks, C-Area Tritium Bubblers
  - Monitored Biannually: Metals (Cu, Fe, Hg, Al), Tritium (Basin Water), Total Organic Carbon (TOC), Microbials (corrosion monitoring)
- Corrosion monitoring done by periodic analysis of aluminum and stainless-steel corrosion coupons (aluminum and stainless steel simulate material of fuel storage racks and equipment in L Basin)

Microbial Growth

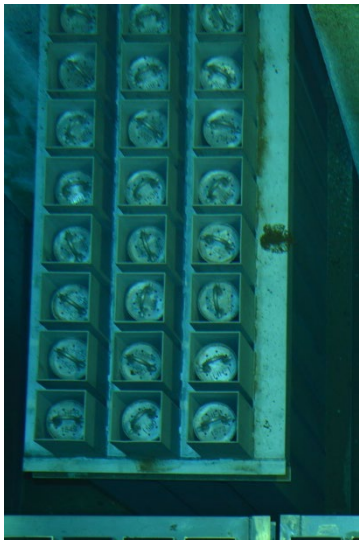
- Monitor growth through annual Inspection of fuel storage positions
- Periodic sampling of microbial growth
- Vacuum storage racks based on Engineering recommendations

Before



After

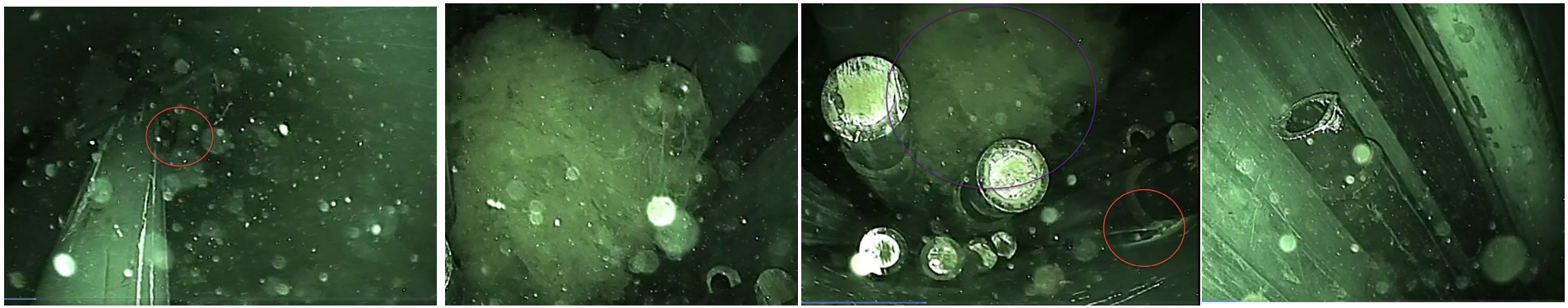
Before



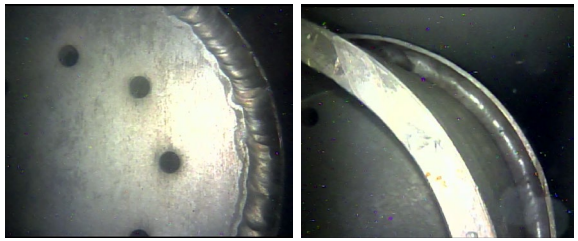
After

Current Mission: Safe Storage

- AMCAP (Augmented Monitoring and Condition Assessment Program
  - Monitors and verifies the condition of materials required for the successful long-term storage of SNM in L Basin (including the following)
  - Analysis of L Basin concrete structure
  - Inspection of Al-clad SNF stored in EBS bundles
    - Inspection table located in Machine Basin allows for video inspection of Al-clad SNF in a controllable environment
    - Used to monitor corrosion of SNF previously stored in FRRs prior to receipt in L Basin
  - Inspection of containers used to store non-Al-clad SNF
    - Includes in-situ visual examinations of outer surfaces of aluminum bundles containing non-aluminum fuel and boroscope camera inspections of the inside of bundles



Thru-lid inspection of ERR GP Tube Bundle



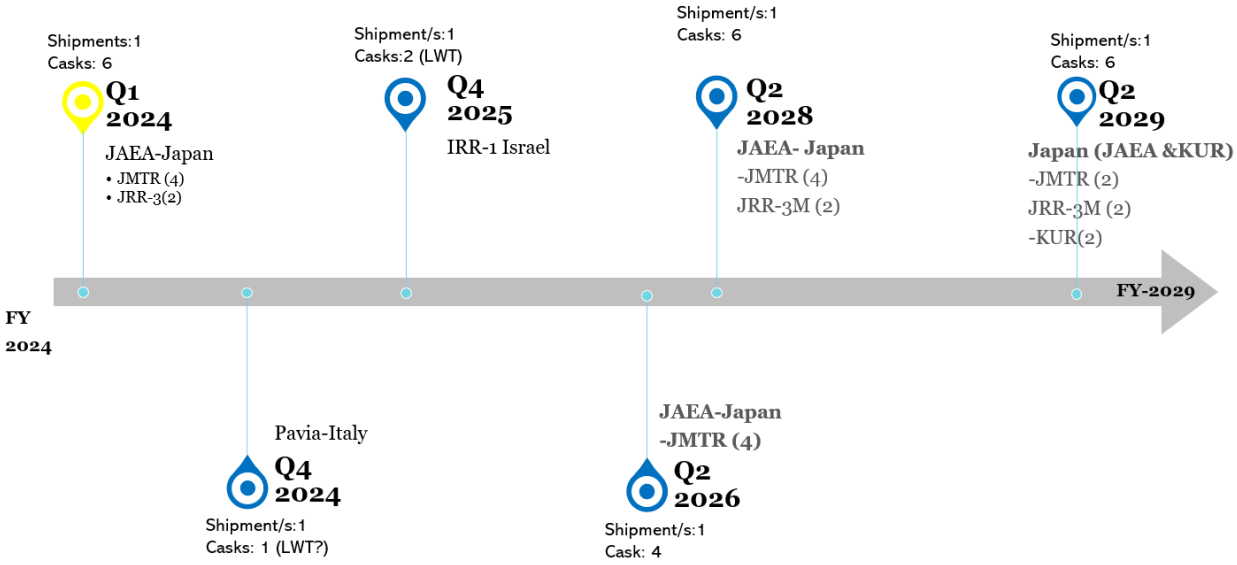
In-situ, bundle bottom inspection

Current Mission: Offsite Fuel Receipts

Foreign Research Reactor Receipts

- Total FRR receipts
  - Number of Shipments to date: 120
  - Transportation casks: 310
  - SNF Assemblies: 9358
  - Countries: 27 + Taiwan

- FRR Program will end in FY-29, receipts from Japan is expected to continue beyond 2029



FRR Projected Receipts

Current Mission: Offsite Fuel Receipts

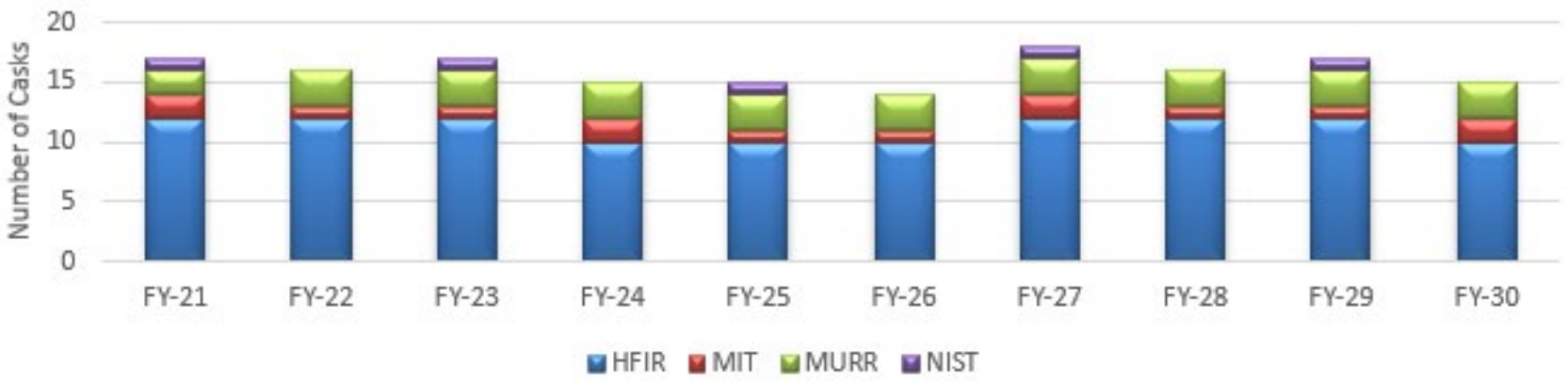
Domestic Research Reactor Receipts

- Domestic Reactor Receipts

  Support reactor operations by continuous

  - Support of Reactor Operations to produce therapeutic and diagnostic isotopes to the Nuclear Medicine community (MURR)
  - Advance Science in dynamics of matter, applied research, industrial, and research isotope production. (HFIR)
  - Support nuclear materials and in-core research programs to support advanced power reactors (MURR, MIT, NIST)
  - Domestic receipts are planned till FY-32, all domestic reactors are working on LEU conversion and may continue to ship spent fuel to SRS.

DRR Receipt Sites



DRR Projected Receipts

Current Mission: Future Receipts

	Enrich	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032
HFIR	HEU	12	9	5	6	6	6	6	6
MIT	HEU	8	8	16	8	8	16	8	8
MURR	HEU	24	24	24	24	24	24	24	24
NIST	HEU	0	42		42		42	0	0
RINSC	LEU	0	0	0	8	0	0	0	0
DRR TOTAL ASSEMBLIES		**44**	**83**	**45**	**88**	**38**	**88**	**38**	**38**
Israel: IRR-1	HEU		51						
Japan: JMTR	LEU		120		119	60			
Japan: JRR	LEU/HEU		80		80	50			
Japan: KUR	LEU/HEU					60			
Canada NRX	HEU								
Italy	HEU		6						
FRR TOTAL ASSEMBLIES		**0**	**257**	**0**	**199**	**170**	**0**	**0**	**0**
TOTAL ASSEMBLIES		**44**	**340**	**45**	**287**	**208**	**88**	**38**	**38**
		FY2025	**FY2026**	**FY2027**	**FY2028**	**FY2029**	**FY2030**	**FY2031**	**FY2032**
HFIR	HEU	12	9	5	6	6	6	6	6
MIT	HEU	2	2	4	2	2	4	2	2
MURR	HEU	6	6	6	6	6	6	6	6
NIST	HEU	0	11	0	11	0	11	0	0
RINSC	LEU	0	0	0	0	0	0	0	0
DRR TOTAL BUNDLES		**20**	**28**	**15**	**25**	**14**	**27**	**14**	**14**
Israel: IRR-1	HEU		17						
Japan: JMTR	LEU	0	30	0	30	15			
Japan: JRR	LEU	0	20	0	20	13			
Japan: KUR	LEU					15			
Canada NRX	HEU								
Italy	HEU		3						
FRR TOTAL BUNDLES		**0**	**70**	**0**	**50**	**43**	**0**	**0**	**0**
Total Bundles In		**8**	**89**	**10**	**68**	**51**	**21**	**8**	**8**
HFIR Cores In		**12**	**9**	**5**	**6**	**6**	**6**	**6**	**6**
Bundles with non dissolvables		**6**	**36**	**6**	**36**	**21**	**6**	**6**	**6**

Table 1: Expected DRR and FRR receipts, HFIR cores and Bundles

Current Mission: Future Receipts

	Enrich	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	FY2032
HFIR	HEU	12	9	5	6	6	6	6	6
MIT	HEU	1	1	2	1	1	2	1	1
MURR	HEU	3	3	3	3	3	3	3	3
NIST	HEU	0	1		1		1	0	0
RINSC	LEU	0	0	0	1	0	0	0	0
DRR TOTAL CASKS		**16**	**14**	**10**	**12**	**10**	**12**	**10**	**10**
Israel: IRR-1	HEU		2						
Japan: JMTR	LEU		4		4	2			
Japan: JRR	LEU/HEU		2		2	4			
Japan: KUR	LEU/HEU					2			
Canada NRX	HEU								
Italy	HEU		1						
FRR TOTAL CASKS		**0**	**9**	**0**	**6**	**8**	**0**	**0**	**0**
TOTAL CASKS		**16**	**23**	**10**	**18**	**18**	**12**	**10**	**10**

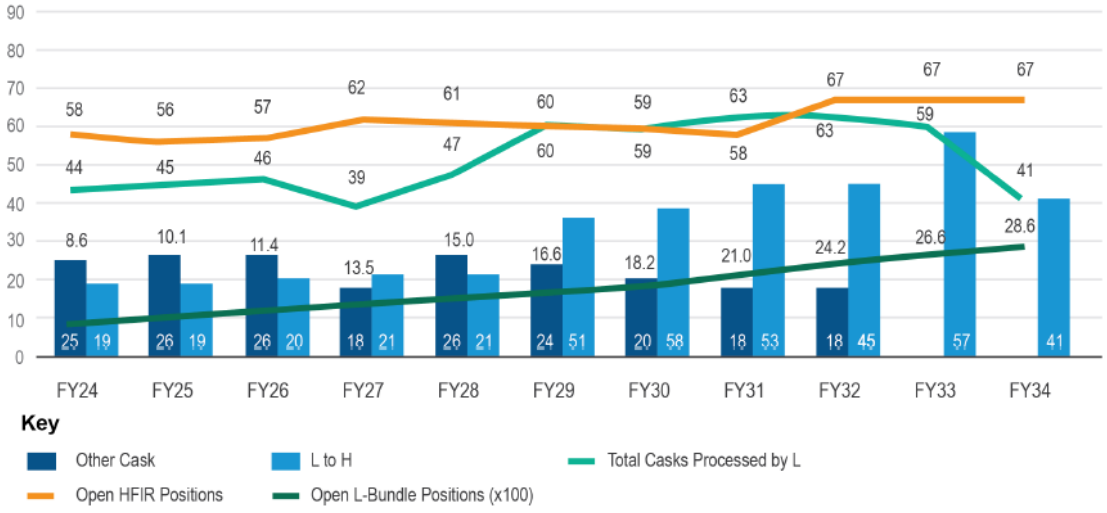
In-bound Casks

Current Mission: Transfer to H Canyon

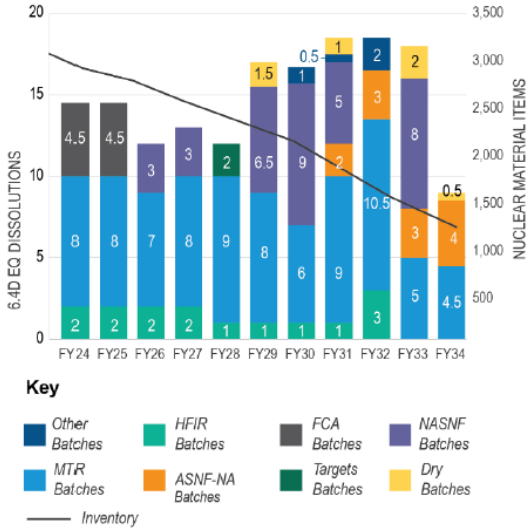
L-Area ABD Transition

The Department has transitioned to Accelerated Basin De-inventory(ABD), to expedite L Area SNF shipments to H-Canyon for dissolution and disposal. In support of ABD, an increase in operational tempo is expected in L Area. This level of activity will result in increased:

- Fuel Handling
- Re-packaging/Re-Bundling of Non-Aluminum SNF
- Crane operations
- 70-Ton cask loading and shipments to H-Canyon



L Area Cask Handling



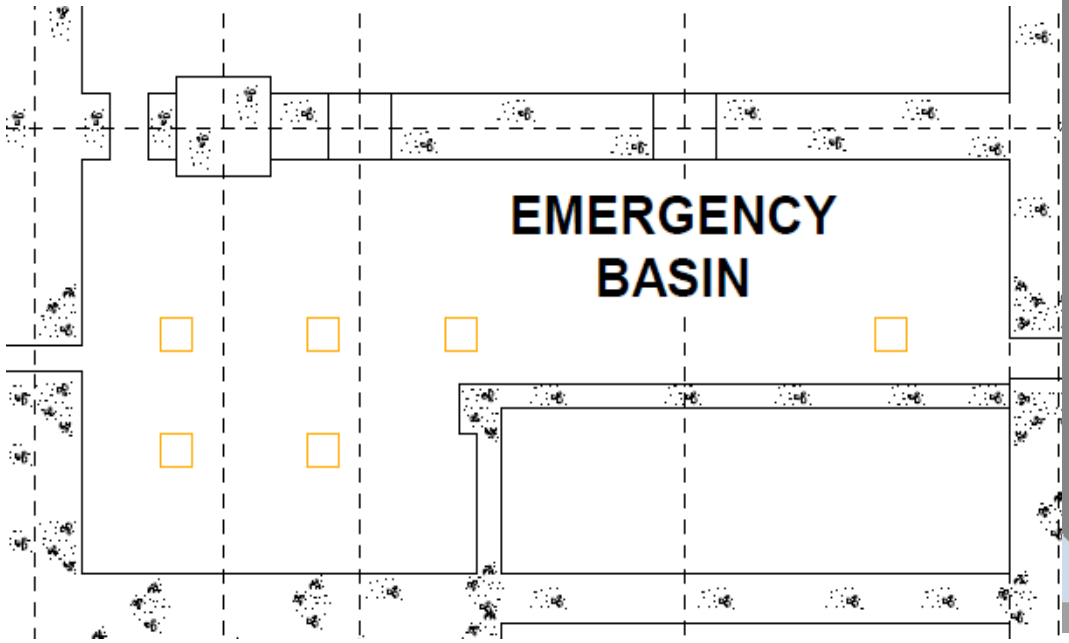
H Canyon Material Processing

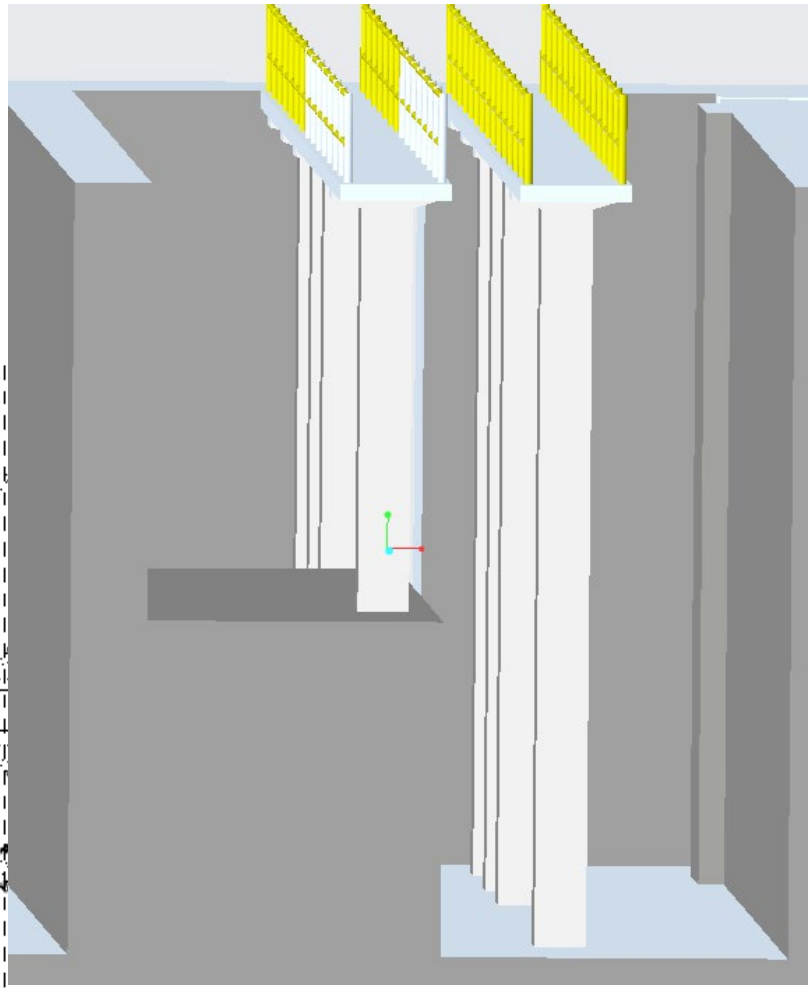
ABD: L Area ABD Transition

Emergency Basin Rebundling Capability Development

Emergency Basin Overview:

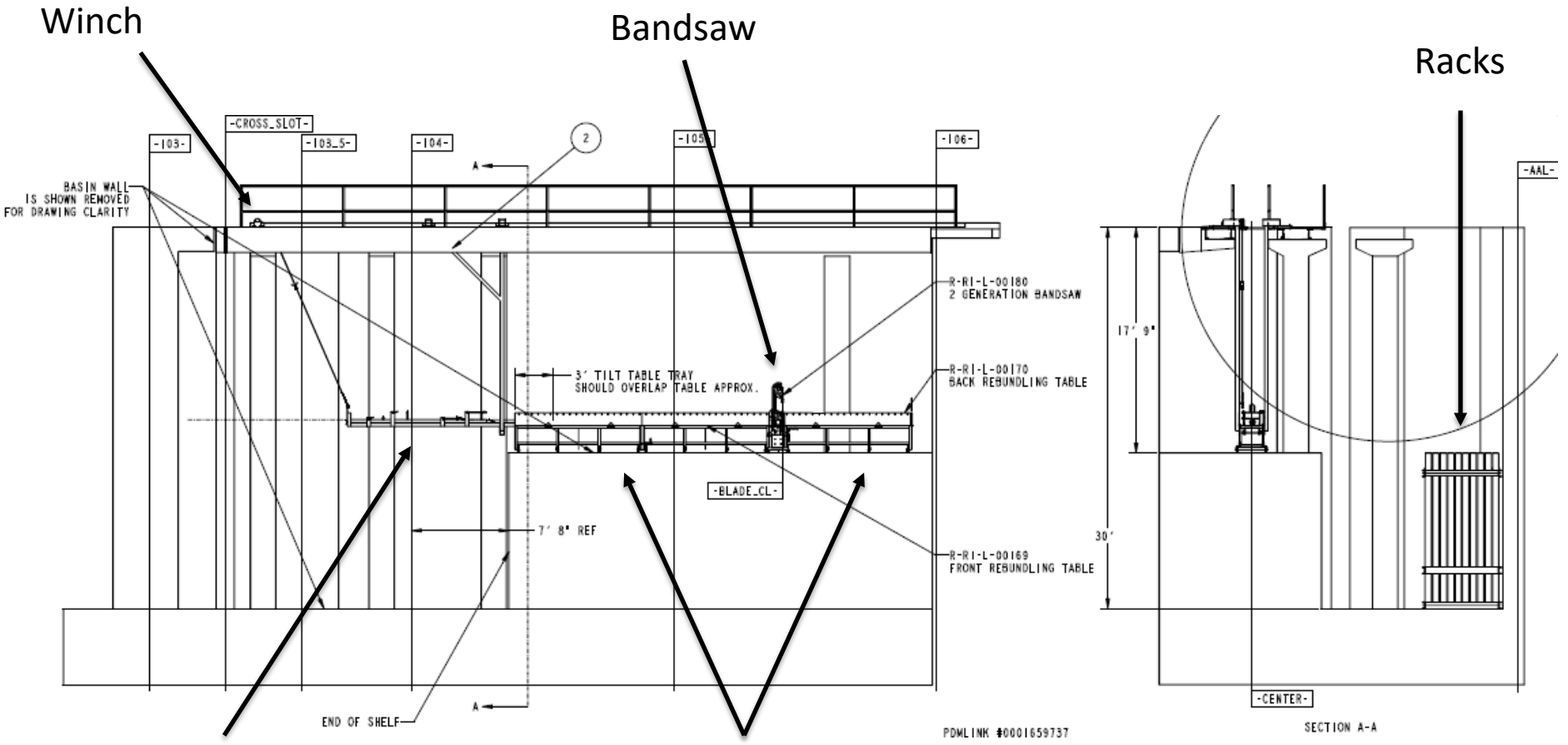
- Two levels
  - 17’9”
  - 30’
- Isolation for Concurrent Operation





ABD: L Area ABD Transition

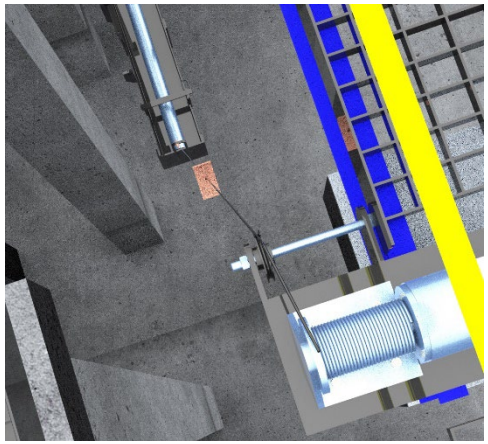
Emergency Basin Rebundling Capability Development: Layout

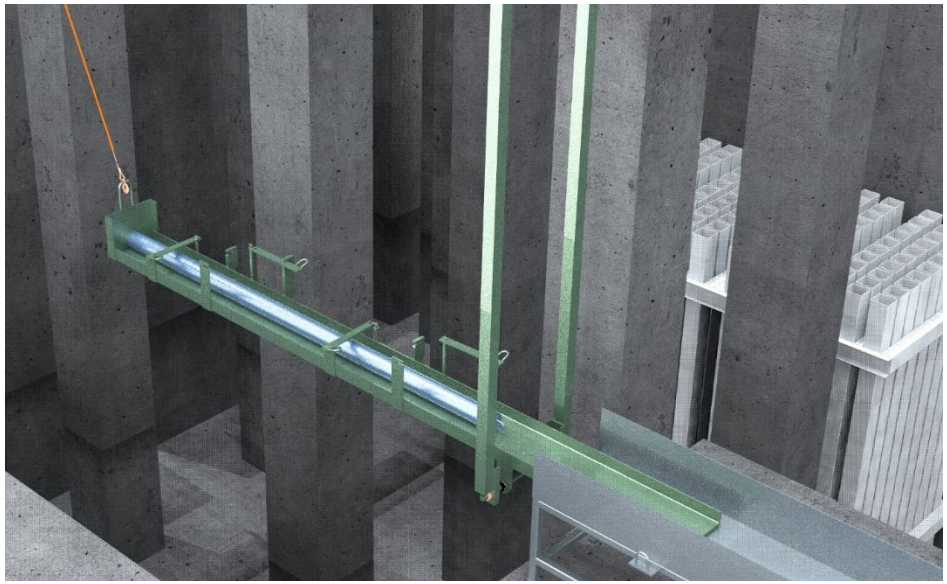


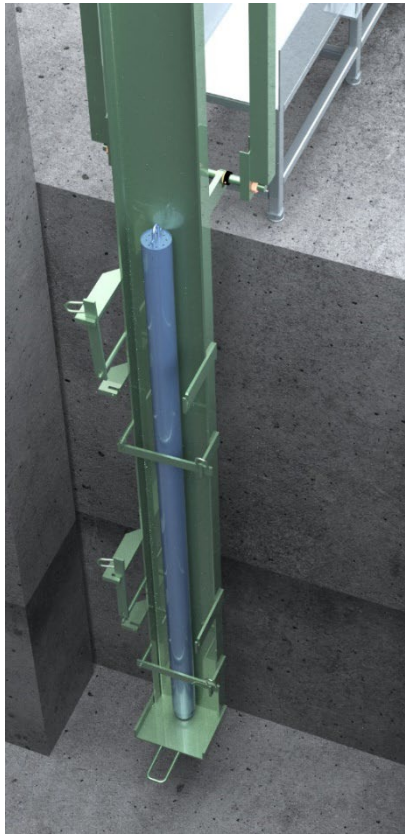
ABD: L Area ABD Transition

Emergency Basin Rebundling Capability Development: Tilt Table

Purpose: To take bundles from a vertical to a horizontal position and vice versa.
Design Features: Slotted Pivot Point, Different Size Latches & Overlapping Table







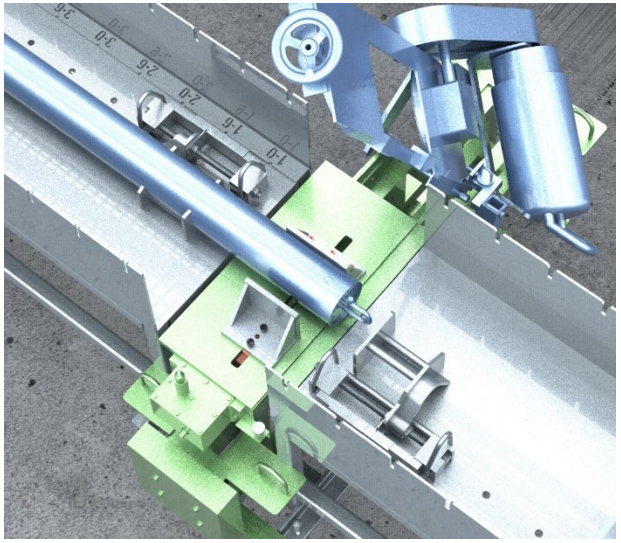
ABD: L Area ABD Transition

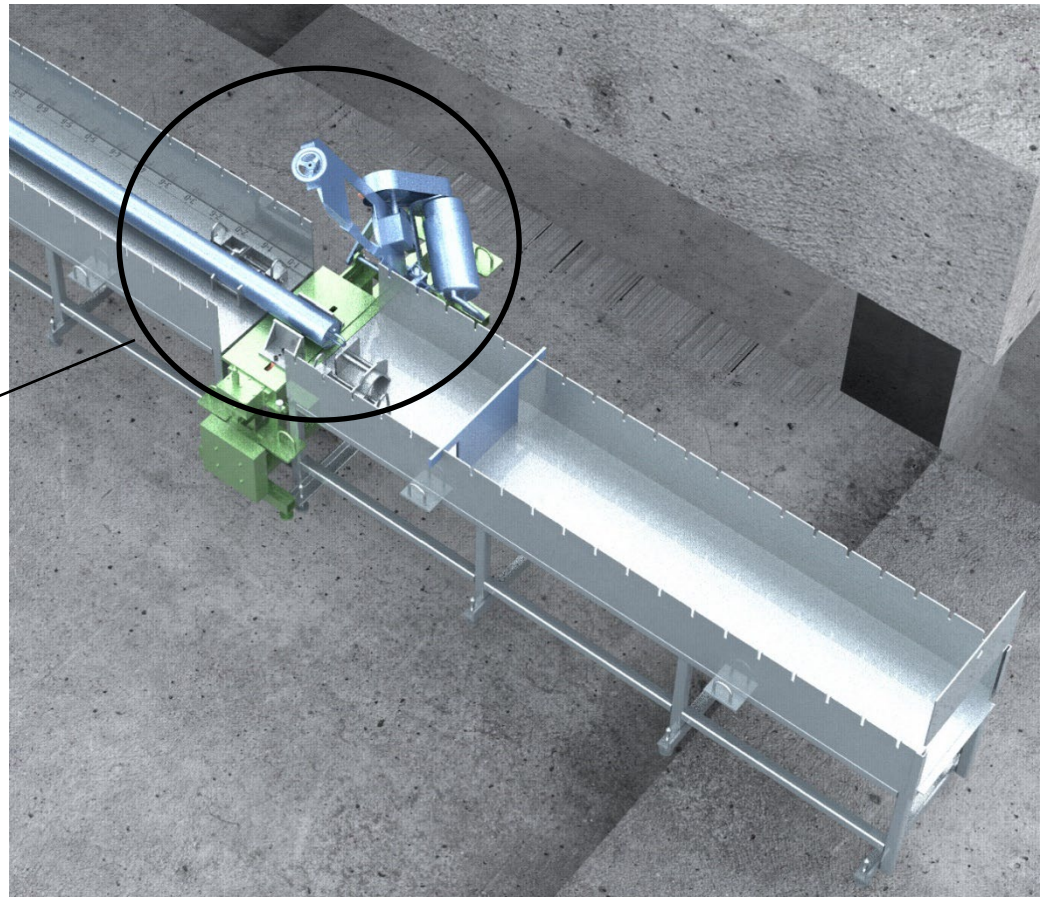
Emergency Basin Rebundling Capability Development: Rebundling Table and Bandsaw

Purpose: To cut bundle lids in the event lid removal is unsuccessful in Tilt Table

Design Features

- Saw Clamp
- Submersible Pump Motor
- Variable Frequency Drive

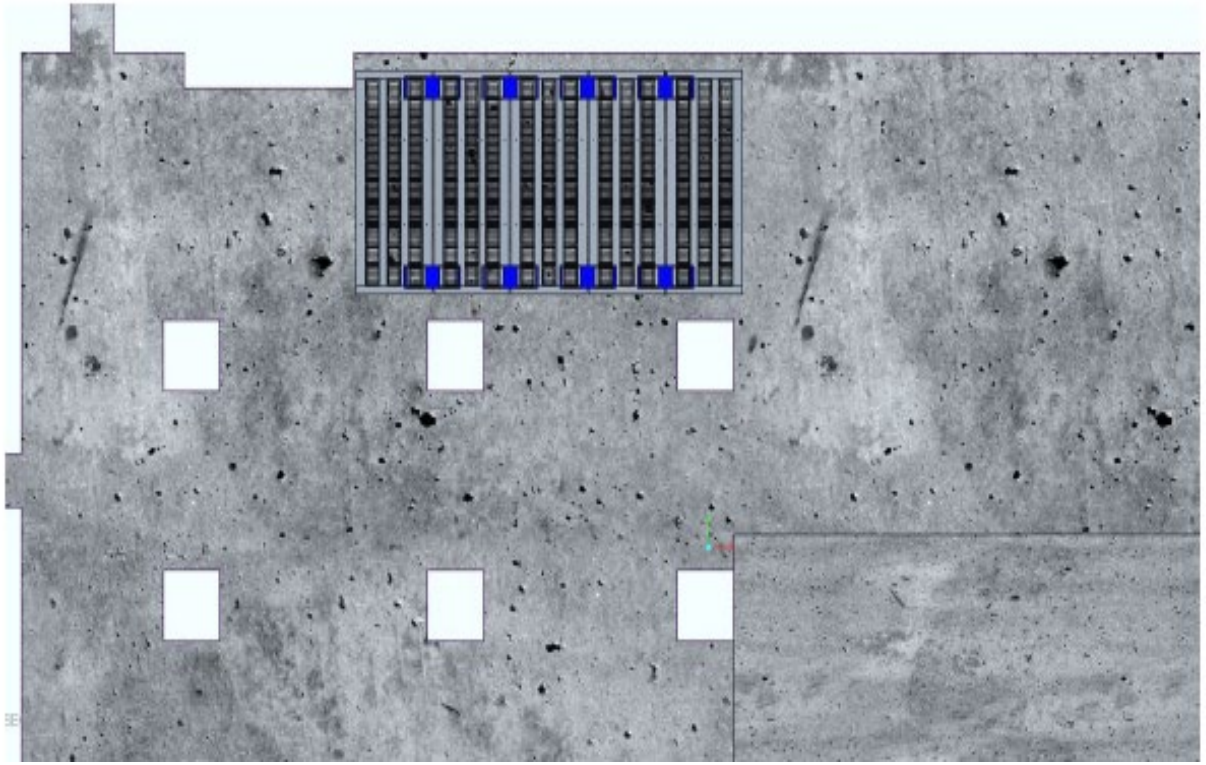




ABD: L Area ABD Transition

Emergency Basin Rebundling Capability Development

Purpose: To stage ABD bundles before loading in 70-Ton cask for shipment



Current Mission: Safe Storage

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- Inventory post ABD

Nuclear Material Category		# of Items	Nuclear Material Category		# of Items	Nuclear Material Category		# of Items
ASNF	MTR	344	ASNF-NA	ASNF-NA	93	NASNF	Groups 1 – 3	45
	Future Receipts of HFIR	53		Future Receipts of ASNF-NA	159		Groups 4 - 5	166
	Future Receipts of MTR	161						

- Storage Capacity
  - MTR: 27% (full) 968 bundles
  - HFIR 44% (full) 53 HFIR Cores

Summary

- Continue to Receive and store fuel from both Domestic and Foreign research reactors
- ABD mission ramp up
  - Increased transfers to H Canyon (Al-clad fuel)
  - Non-Aluminum clad campaign-1
  - Rebundling Capability for Non-Al clad material
- Infrastructure Upgrade
- Adaptability
  - Supporting Mk-18A Isotope Recovery
  - **HFIR drying demo in collaboration with SRNL**
  - Future mission to manage / stabilize Heavy Water
  - Infrastructure available for new missions


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