



U.S. DEPARTMENT OF
ENERGY

H-Canyon and HB-Line Future Options
Presentation to the Savannah River Site Citizens
Advisory Board
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EM *Environmental Management*
safety ❖ performance ❖ cleanup ❖ closure

Congressional Briefing

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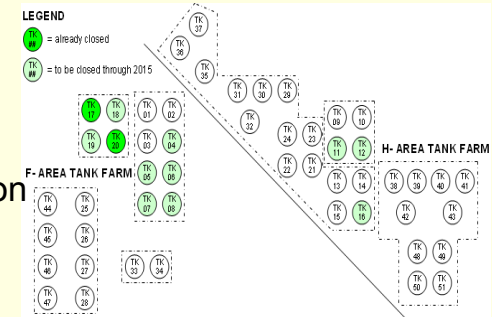
Date: February 22, 2011

Savannah River's 2015 Cleanup Vision

SR's 2015 Cleanup Vision

Building on the ARRA momentum, the Savannah River team will:

- ✓ Reduce Savannah River tank waste treatment mission by up to 6 years and \$3.2Billion in life-cycle costs:
 - ✓ Rotary Microfiltration and Small Column Ion Exchange fabrication, installation and operations,
 - ✓ ARP/MCU equipment/process life extension and extended operations with next generation extractant,
 - ✓ Salt Waste Processing Facility (SWPF) performance enhancement,
 - ✓ Saltstone enhancements
- ✓ Continue construction of Salt Waste Processing Facility: Complete SWPF CD-4. Currently negotiating with regulators to set startup completion milestone at end of October 2015. Project current early finish is September 2013
- ✓ Disposition 100% of Legacy TRU waste by end of CY2012: Continue transuranic (TRU) waste retrieval, treating for disposal, and shipping TRU waste to the Waste Isolation Pilot Plant. Disposition of legacy TRU waste is about 70% complete (about 9,800 m3 retrieved of about 14,000 m3). The Savannah River Site is on track to complete retrieval and disposal of 100% of this waste by end of CY2012
- ✓ Initiate activities in H-Canyon/HB-Line to establish the Savannah River Site as the center for Advanced Fuel Cycle unit operations testing/demonstration:
 - ✓ Commence modifications to H-Canyon to demonstrate proof-of-concept or pilot-scale operations while retaining current capabilities
 - ✓ Used Nuclear Fuel processing not precluded
- ✓ Shrink the active footprint by 90%: Complete clean-up of 90% of the Savannah River Site's 310 square miles (279 square miles). Work includes remediation of waste units and D&D of excess facilities. Continue to expedite remediation through the use of early and removal actions



Potential New Mission for H Canyon / HB-Line

- Continue R&D on Vacuum Salt Distillation in HB-Line for removal of chlorides and fluoride in Non-MOXable plutonium
- Fuel Cycle Proof-of-Concept Demonstration
 - Provided an initial proposal to Office of Nuclear Energy
 - Office Nuclear Energy is interested
 - Workshop planned mid-March detail discussions on SR's proposal
- Pu-238 Campaign
 - DOE NE-43 visited H-Canyon/HB-Line the week of 2/14 to discuss interest in SRS Pu-238 processing capabilities
 - Anticipating needs for NASA - Outer Planet Flagship Mission to Jupiter System/Europa (proposed launch date: 2020)
 - Requires purification/cleaning of approximately 40 kg of domestic and Russian high assay plutonium-238 as oxide for use in deep space Radioisotope Thermal Generators (RTG) by 2017
- Private Companies Interested in Demonstrating Recycling UNF
 - Several private companies (AREVA, Energy Solutions, GE-Hitachi) have expressed a commercial interest in recycling UNF in the United States.
 - In the case of AREVA and Energy Solutions, the proposed recycling approach is to adapt a PUREX-based flowsheet to meet the regulatory requirements in the US for both emissions and proliferation-resistance.
 - As part of their association with DOE-NE, both AREVA and Energy Solutions have developed technology development plans to demonstrate technologies or regulatory approaches to adapt their flowsheets to US requirements.
 - Since any commercial UNF recycling facility will be licensed by the US Nuclear Regulatory Commission (NRC), demonstrating compliance will likely require development of data using both prototype materials (i.e., real UNF) and equipment.
 - H-Canyon is the only facility in the US capable of performing such testing.

Current and Future Operations of H Canyon

- Savannah River will process and down blend HEU material in H Canyon to meet commitments to TVA
- Continue use of H Canyon to remove organics, poison, and neutralize SRNL and F Area lab returns prior to transfer to liquid waste system.
- Proof-of-Concept demonstration for Fuel Cycle R&D
- Develop integrated project of stabilization and/or disposition of UNF that is reactive or difficult to place in dry storage as warranted
- Continue demonstration of vacuum salt distillation on non-MOXable plutonium for transform as potential feed to MOX

Disposition Non-MOXable Pu to WIPP

- Evaluating utilizing HB-Line
 - Utilize existing three HB-Line glovebox lines and ventilation system
 - Blend the plutonium oxide to less than 10% plutonium
 - Oxidize plutonium metal as required
 - Package into Pipe Overpack Containers
 - Ship to E Area for WIPP certification and loading into TRUPAC II container

- Initial Campaign
 - Utilize one of three gloveboxes
 - Expect to prepare 2 shipments this fiscal year
 - Revise Interim Action to allow disposition of initial ~ 70 kgs 3013 surveillance material

- Full Campaign
 - Utilize all three gloveboxes
 - Process approximately 600 – 700 kgs Pu per year
 - Total Campaign would take 4 – 6 years
 - Complete the Plutonium Disposition Supplemental Environmental Impact Statement for remainder of campaign

Planned Shipments of UNF to L Basin

Existing Scope				
			Shipments	Casks
FY11	DRR	Tennessee, Missouri, and Massachusetts	10	10
	FRR	Canada and South Africa	2	3
			12	13
FY12	DRR	Maryland, Missouri, and Massachusetts	5	7
	FRR	Japan	1	6
			6	13
FY13	DRR	Tennessee, Missouri, and Massachusetts	16	16
	FRR	Japan, Germany, Israel, and Jamaica	4	11
			20	27
New Scope				
FY12	FRR	South Africa	2	13
FY13	FRR	Canada	3	9

L-Basin Proposed Capability Increases

Capacities in # of assemblies	Standard MTR racks	NRU/NRX racks	HFIR racks
Current capacity	15515	0	120
Currently filled	12540	0	117
Additional Baseline receipts	2514 SAFARI Gap	0	103
Additional proposed receipts	770	1100	0
Additional proposed capacity	1500	1100	100
Total proposed capacity	17015	1100	220

Canadian NRU/NRX

Additional 1100 storage locations

Additional Standard

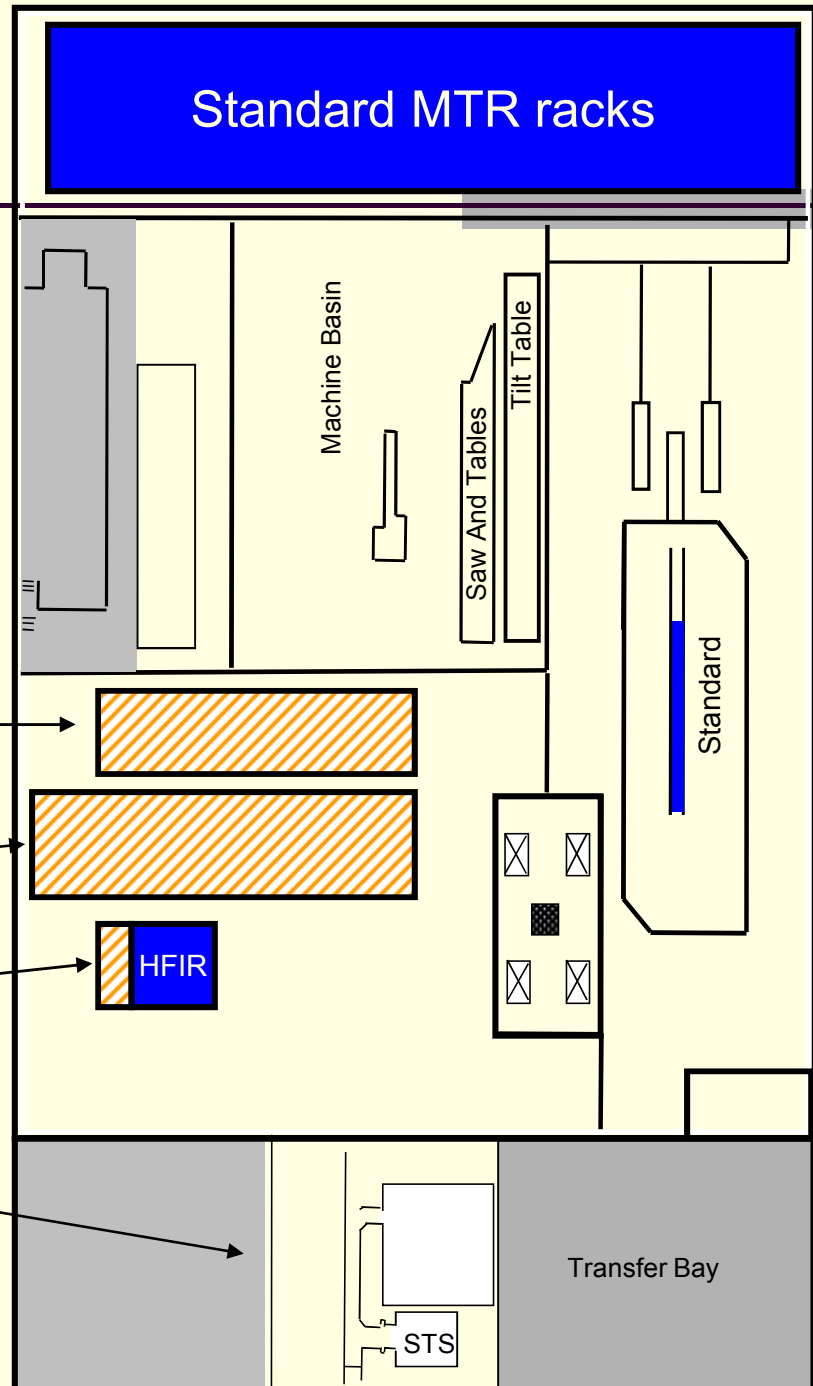
“Proposed Additional” allows for Baseline plus Gap – racks for an additional 3,500 assemblies would fit into this area

Additional HFIR

Current area would be modified for increased storage density. Allows for all expected HFIR HEU cores

Shielded Transfer System

Major system requiring modification to handle NRU/NRX UNF



Note: This sketch and footprint for each storage area shown are not to scale.

Summary

- High Level Waste Program is the site's highest disposition priority
- H Canyon/HB-Line are National Assets
- While not performing traditional missions, H Canyon/HB-Line will transition to embark on new missions of national importance
- Will ensure all nuclear materials are safely and securely stored during this transition period.