



Mark-18A Target Material Recovery Program:

Preserving Materials Critical to National Security

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Overview



Mark-18A Target Material Recovery Program

“No other isotopic material can perform the unique function of ^{244}Pu in high accuracy measurements of plutonium...”

-2001 Memo signed by then Undersecretary Moniz

- **Recover & preserve Pu-244 from remaining 65 Mark-18A Targets currently stored at Savannah River Site (SRS) L Basin**
- **Capitalizes on existing capabilities & capacity at SRS & Savannah River National Laboratory (SRNL) to execute program at lowest possible cost**
- **Separated material will be packaged for shipment to Oak Ridge National Laboratory (ORNL) for dry storage at the Radiochemical Engineering Development Center (REDC) pending future processing (i.e. isotopic separation)**



Mark-18A Target History



- **1960's – 1990's**
 - 1970's – 86 Targets irradiated in SRS K Reactor
 - 21 targets processed at ORNL to recover the Cf-252, heavy Cm, & approx. 9g of Pu-244
 - The 65 unprocessed targets remain in storage at SRS L-Basin
- **2000's**
 - Scientists at DOE Laboratories, NIST, IAEA, & other international laboratories become concerned with limited availability of separated Pu-244
 - Need for more Pu-244 became clear
 - Strong case develops for preservation of Mk-18A targets
- **2013-14**
 - NNSA's Office of Nuclear Materials Integration (ONMI) initiates action
 - ORNL/SRNL developed Program Management Plan
- **2015**
 - ONMI establishes project in cooperation with SRNL & ORNL
 - Targets to be processed in hot cell facility on site at SRNL





Recoverable Isotopes



■ Target Isotopic Content

- Major quantities identified when processing the original 21 targets
- Pu-240, 242, & 244
- Heavy Cm
- Other mixed fission products

■ Demand & Use

- Pu-244 used in High-Precision Sample Analysis in Nuclear Forensics & International Safeguards¹
- Current supplies of Pu-244 are limited - Stocks held closely by U.S. laboratories
- Heavy Cm critical to the production of Cf & many other heavy isotopes²



“If the Mark-18A Targets were to be disposed of without separation & recovery of Pu-244, the United States would risk losing measurement capabilities that are essential to maintaining an active safeguards posture in current & future world affairs”

- (Moniz, 2001)

1. Moniz, Excess Material Disposition Decision Memorandum No. 3, 2001
2. NNSA, Material Specific Management Plan For Californium 2015



Program Details

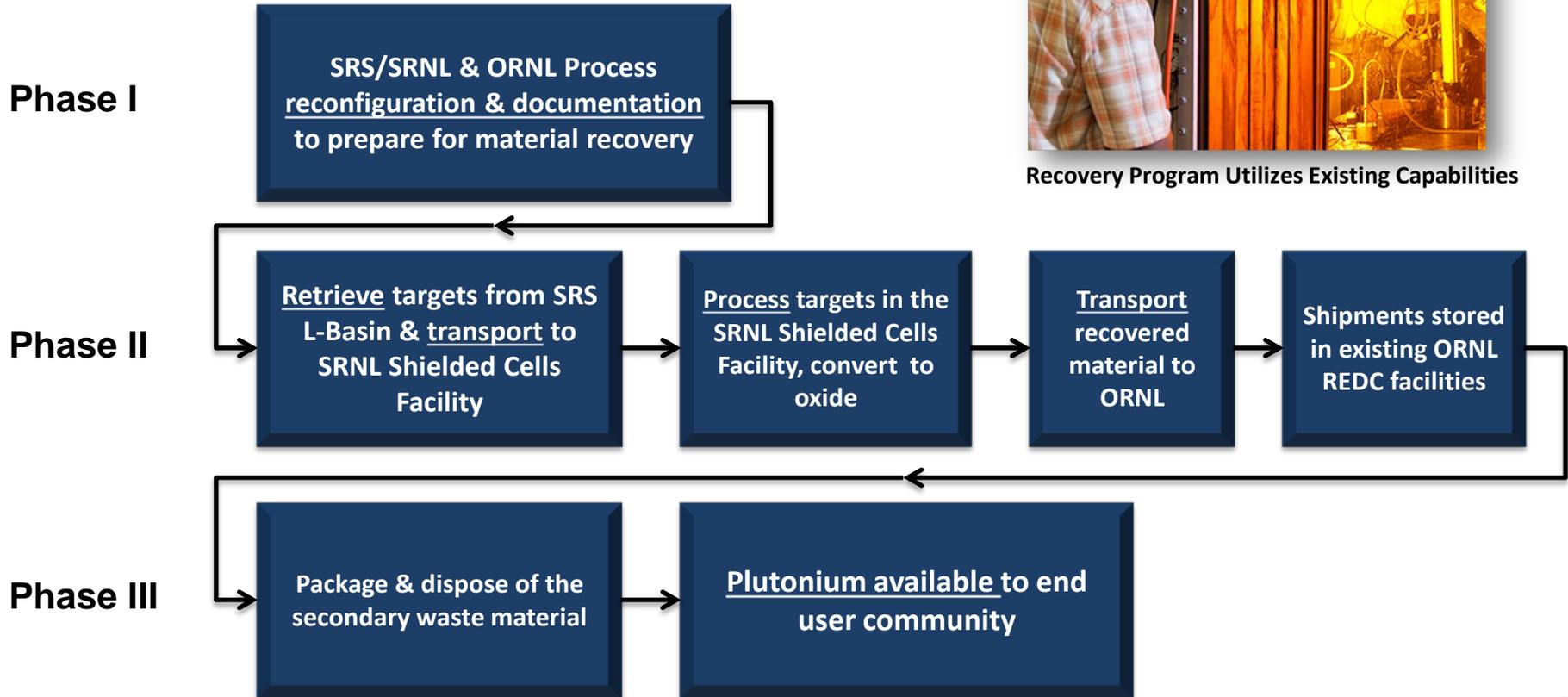


Project Objective: Preserve Pu-244, & other materials of interest as identified in the Mark-18A targets, for future use.

Project Approach:



Recovery Program Utilizes Existing Capabilities





Program Details (cont.)



- **NNSA Baseline funding: ~ \$4.2 M/yr**
- **Program Management**
 - ONMI Program Manager oversees recovery program
 - Work executed by Sites
 - ORNL Heavy Isotopes Lead Materials Management Organization (LMMO) supports ONMI by integrating all aspects of program; tracks & reports integrated schedules & deliverables

- **Schedule**

Year	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29
SRS/SRNL Program Site Work													
	Program/Process Planning												
	Facility Process Prep												
					Target Processing/Repackaging Operations								
	Secondary Waste Disposal Operations												
ORNL Program Site Work													
	Program/Process Planning												
			Facility Prep										
					Transport & Storage Operations								

- **Recent Milestones**

- Program Execution Plan & Risk Register developed
- Design for transportation cask nearly complete
- Preliminary Hazards Analysis Package complete
- Computer simulation on target material is complete - Non destructive assay validation scheduled for this year



Questions?