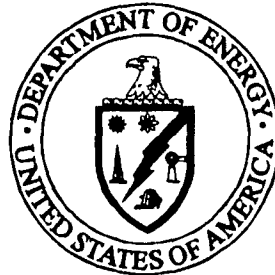


PROGRAM OVERVIEW FOR THE US NWTRB



THE OFFICE OF FISSILE MATERIALS DISPOSITION

Bill Danker

U.S. DEPARTMENT OF ENERGY

JANUARY 11, 1996



Background

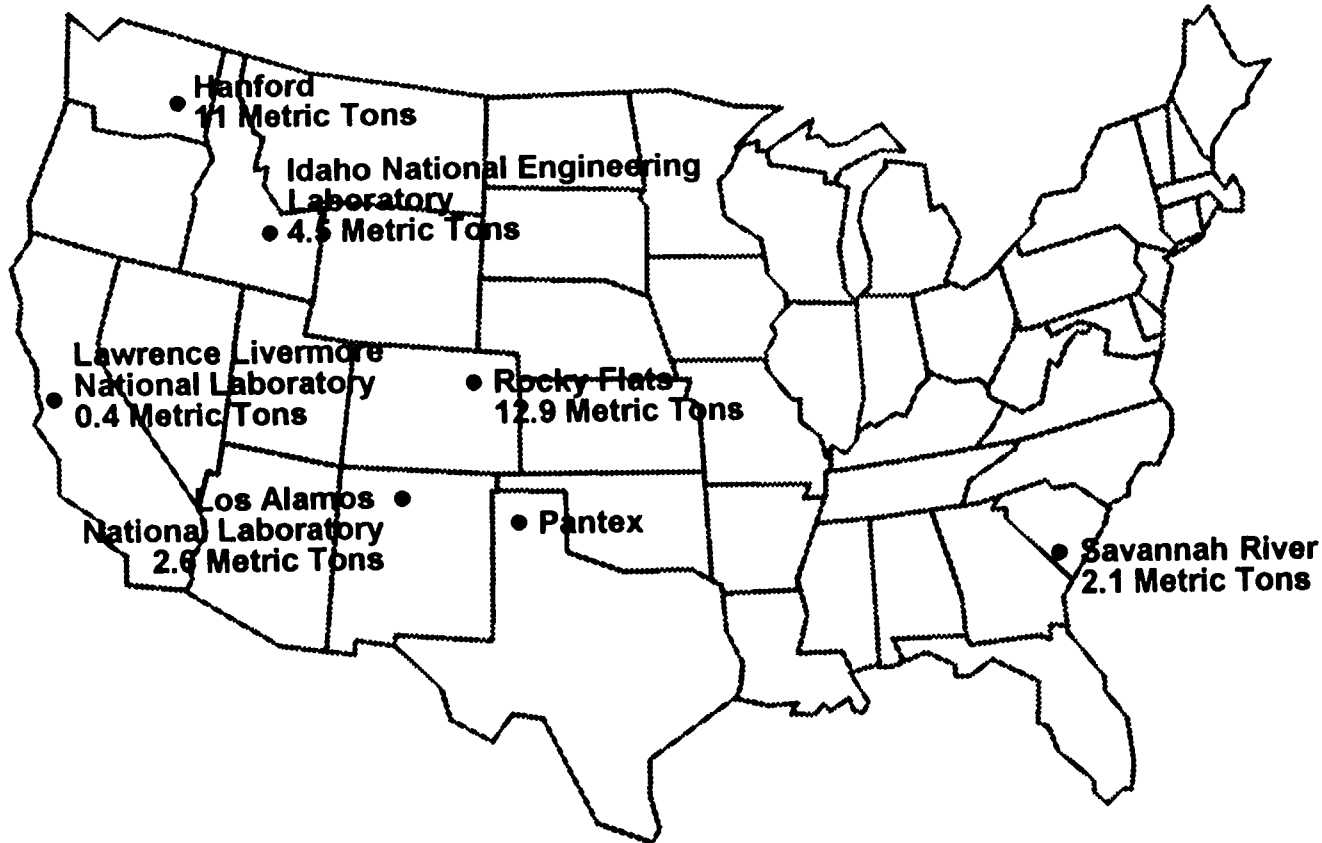
..... *Office of Fissile Materials Disposition*

- **End of the Cold War**
 - Weapons Production Ends
 - Uncertain Future for Surplus Fissile Materials
- **Presidential Nonproliferation Initiative**
 - Comprehensive Policy for Control and Disposition of Surplus Fissile Materials
 - U.S./Russian Summit Agreement
- **Organizing to Meet the Challenge**
 - Project Established January 1994
 - Permanent Office Established September 1994



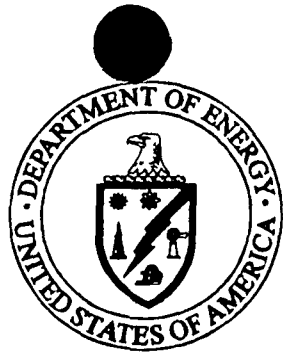
Pu Inventories Today

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Total Inventory: 33.5 MT (Excludes Classified Inventories)
U.S. Production: 89 MT Weapons Grade
13 MT Reactor Grade

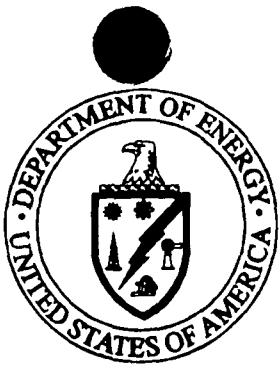
Source: December 7, 1993
Secretary O'Leary Openness Initiative



Goals of the Pu Disposition Program

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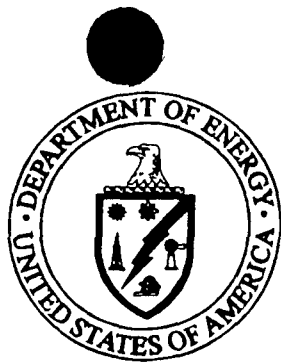
- The primary goal is to increase the proliferation-resistance of the Pu by making it meet the spent fuel standard. (Next Slide)
- It is desirable to commence the disposition process within 10 years and complete the mission within approximately 25 years.
- The criteria for selecting alternatives include cost, schedule, technical, non-proliferation, and policy considerations. (Second Slide)



Spent Fuel Standard (SFS)

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The spent fuel standard is the disposition standard whereby the residual fissile material is as unattractive and inaccessible for retrieval and weapons use as the residual plutonium in spent fuel from commercial reactors.



Disposition Selection Criteria

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Resistance to Theft and Diversion

Resistance to Retrieval by the Host Nation

Technical Viability

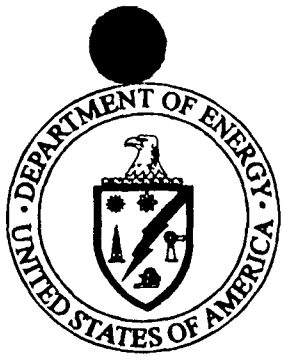
Environment, Safety and Health Compliance

Cost Effectiveness

Timeliness

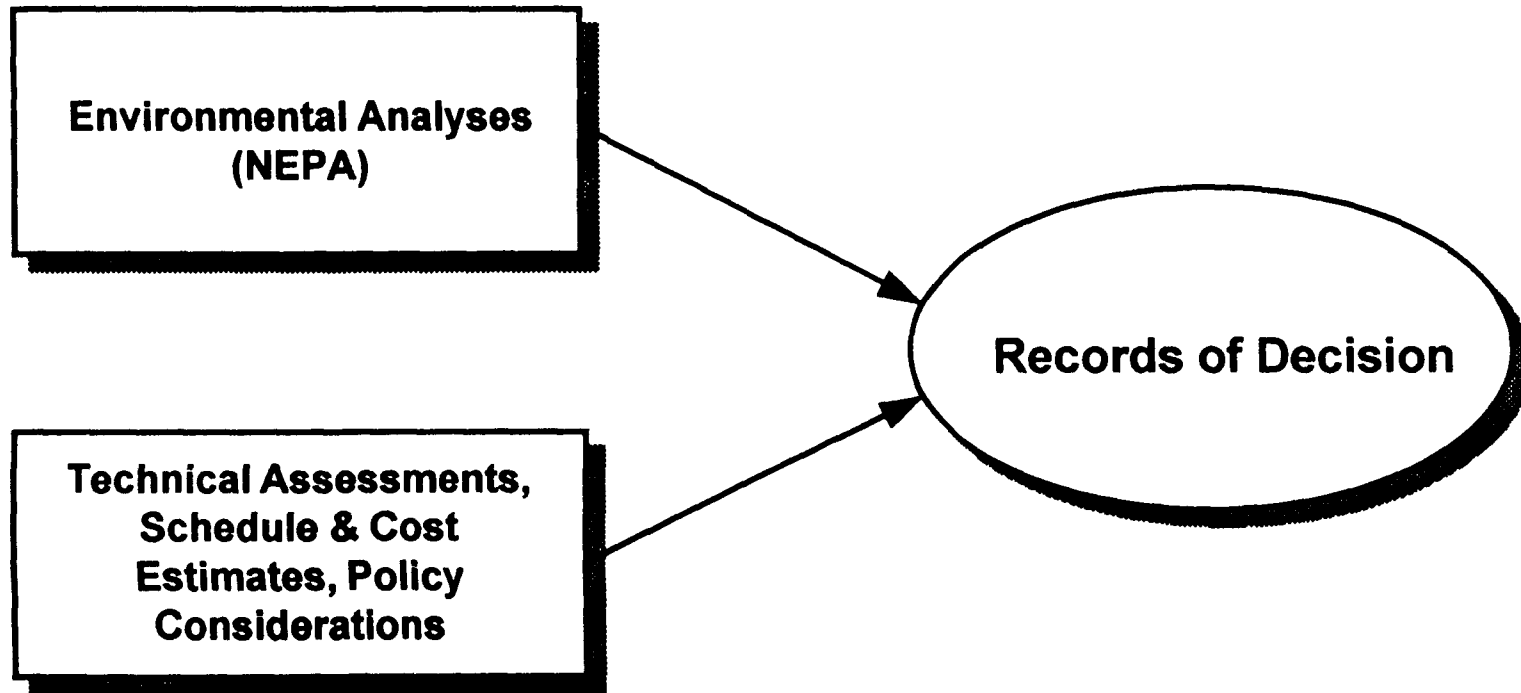
Fosters Progress with Russia and Others

Public and Institutional Acceptance



Making Decisions

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Disposition

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- Focus of Effort: Down-select Technologies;
Complete Evaluation of Environmental Impacts;
and *Implement* Disposition
- Plutonium Options
 - Reactors
 - Immobilization
 - Geologic Disposal
 - Continued Storage



Reasonable Alternatives

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Plutonium Disposition Options

- No Disposition Action (Continued Storage)
- Deep Borehole (Immobilization)
- Deep Borehole (Direct Emplacement)
- Borosilicate Glass Immobilization - 3 Options
- Ceramic Immobilization - 2 Options
- Electrometallurgical Treatment
- Euratom MOX Fabrication/Reactor Burning
- Existing Light Water Reactors (LWRS)
- Partially Completed LWRS
- Evolutionary or Advanced LWRS
- CANDU Heavy Water Reactors

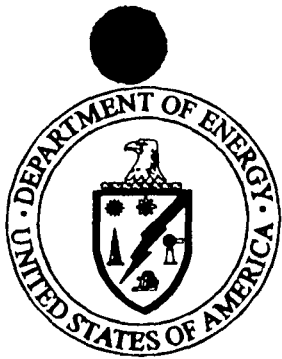


Environmental Analysis Schedule

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- Focus on Effort: Completion of Environmental Analyses to Support Record of Decision and Implementation

- | | |
|-----------------------|------------------|
| – Notice of Intent | June 1994 |
| – Implementation Plan | April 1995 |
| – Draft | February 1996 |
| – Final | Late Summer 1996 |
| – Record of Decision | Fall 1996 |



Technical Schedule

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- Screening was First Phase - Complete
 - Screening Report
- Second Phase - Technical, Economic, Nonproliferation and Schedule Analysis, and Experimental Work.
 - Basis of Down Selection of Alternatives to Produce Short List of Preferred Alternatives.
 - Early 1996
- Third Phase - In-depth Analysis, Experiments and Demonstrations to Support Decisions.
 - Summer 1996



Reactor Disposition Summary

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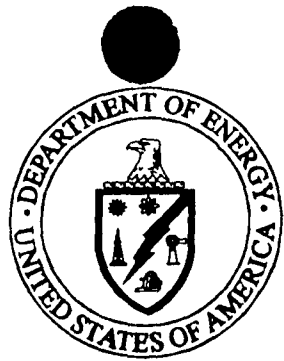
- MOX utilization is international fact-of-life
- Reactor-based Pu disposition approach
 - Provides proliferation resistance similar to commercial spent fuel
 - Viewed favorably by Russians
- Significant utility and private interest in mission
- No discrimination between reactor options based on S&S issues
- Involves no major technical risks
- Schedules dictated by availability of fuel
- Costs driven by facility ownership (LWR) and fuel design considerations (CANDU)



Non-Reactor Disposition Options

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- 1/94 NAS Report on Pu Disposition:
 - Immobilization in glass recommended as one of two key alternatives
 - Deep borehole was considered potentially faster and cheaper
- More than one disposition alternative may be needed to address the broad range of material forms



Non-Reactor Disposition Options

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Geologic disposition alternatives include:

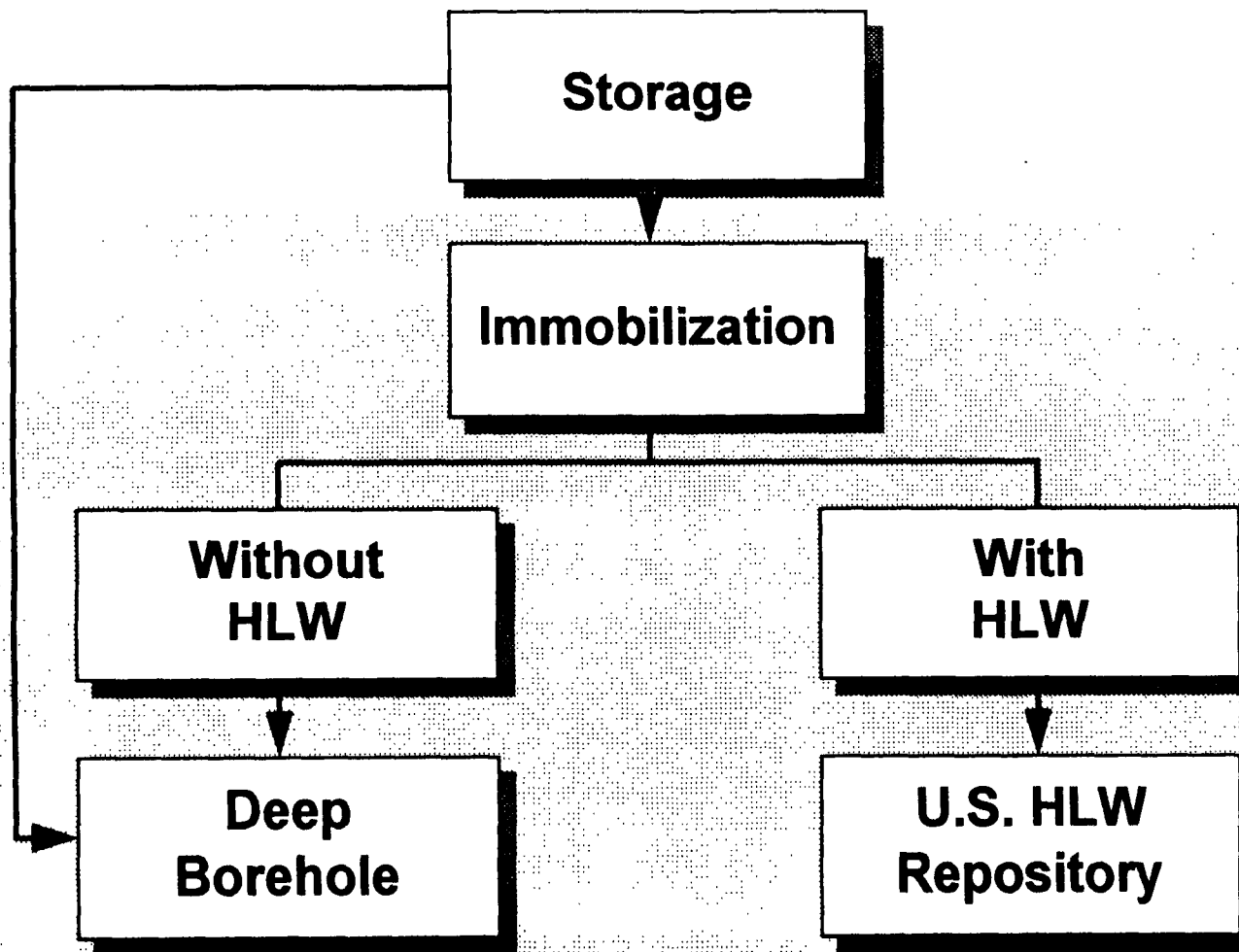
- Immobilized Pu spiked with HLW to U.S. high-level waste repository
 - Repository Impact Study underway by OCRWM
- Pu or immobilized Pu to custom geologic facility
 - No spiking with HLW
 - Deep borehole emplacement



Non-Reactor Disposition Options

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PEIS Non-Reactor Options





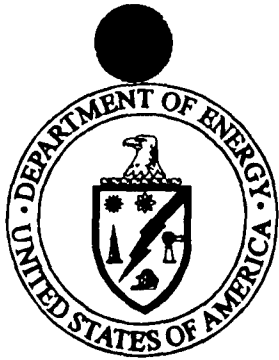
Candidate Immobilization Facilities

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- Vitrification (borosilicate glass)
 - Can-in-canister at Savannah River
 - Adjunct melter at Savannah River
 - New Facility (Greenfield)

- Crystalline ceramics
 - Existing facilities
 - > Can-in-canister at Savannah River
 - > ANL/West facilities
 - New facility

- Electrometallurgical treatment
 - ANL/West facilities



Can-in-Canister Demo

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- “Cold” demo of can-in-canister vitrification option for Pu disposition
- 8-can and 20-can canisters poured at DWPF last week
- Post-test radiography and destructive analyses planned to confirm initial positive indications

