Legislation, Interim Storage, and Alternatives to Yucca Mountain

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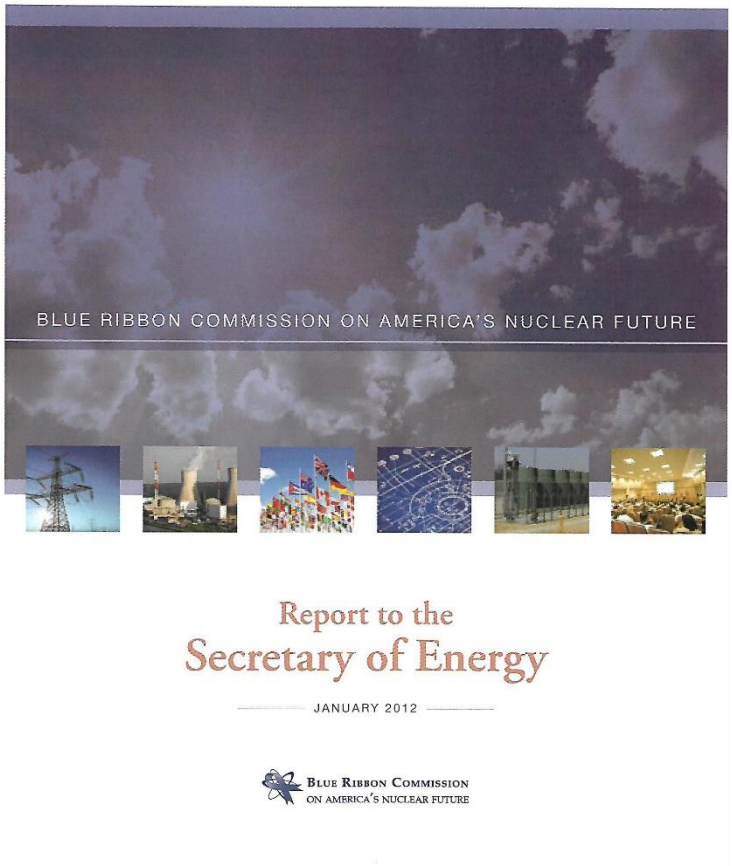
Documentation at
http://www.state.nv.us/nucwaste/

US Nuclear Waste Policy Overview

- 1957 - National Academy of Sciences proposes geologic disposal in deep salt formation
- 1972 – Lyons, Kansas salt project abandoned
- 1982 - Nuclear Waste Policy Act directs DOE to study many sites and construct 2 repositories (East & West)
- 1986 – DOE decision to drop Eastern site selection
- 1987 - Nuclear Waste Policy Amendments Act directs DOE to study Yucca Mountain only
- 2012 - Blue Ribbon Commission on America's Nuclear Future recommends consent-based siting, new agency, other major changes in waste program

Blue Ribbon Commission (BRC) on America's Nuclear Future



- Bipartisan Experts
- Replace DOE
- Consent in Siting
- Interim Storage
- Nuclear Waste Fund
- Transportation
- No opinion on Yucca Mountain site suitability or resumed licensing

Nuclear Waste Informed Consent Act

- S. 95 (Heller & Cortez Masto): January 2017
- H.R. 456 (Titus, Kihuen, & Rosen): January 2017
- Written consent agreement before Nuclear Waste Fund can be used for repository construction
- Secretary of Energy and (1) Governor of the host State; (2) host unit of local government; (3)each contiguous local government affected by transportation; and (4) each affected Indian tribe

Available on-line at: https://www.congress.gov/bill/115th-congress/senate-bill/95
Available on-line: https://www.congress.gov/bill/115th-congress/house-bill/456

Nuclear Waste Administration Act

U.S. Senate, Energy and Natural Resources Committee

- S. 854, introduced March 2015, Bipartisan support (Alexander, Murkowski, Feinstein, and Cantwell)
- Generally follows BRC except NWA would be independent federal agency
- Would continue Yucca Mountain
- Expect bill to be reintroduced later in 2017

Nuclear Waste Policy Amendments Act of 2017

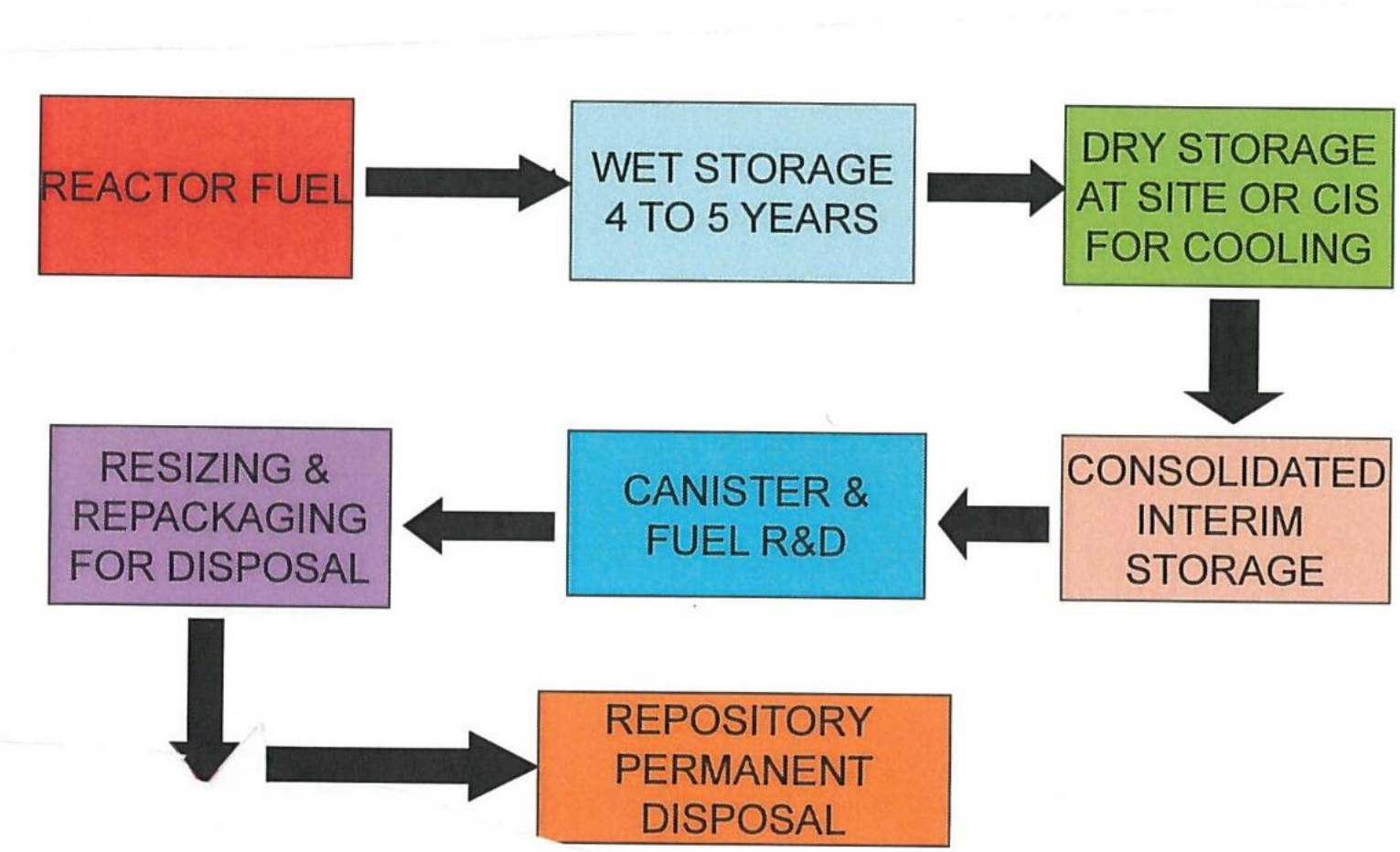
U.S. House of Representatives, Energy and Commerce Committee

- H.R. 3053, reported by committee June 2017, Bipartisan support (Shimkus and 100+ co-sponsors)
- Directs DOE, NRC to expedite Yucca Mountain
- Directs DOE start interim storage program
- Offers benefits to Nevada and storage state(s)
- Expect bill to be voted on in October 2017

Congressional Appropriations for FY 2018
(October 1, 2017 – September 30, 2018)

- Current continuing resolution through December 2017 provides no Yucca Mountain funding
- House passed bill in July (235-192) providing $120 million to DOE and $30 million to NRC mainly for Yucca Mountain
- Senate Appropriations Committee in July passed bill (30-1) providing no funding for Yucca Mountain but funding for interim storage
- Outlook for January – September 2018 is uncertain

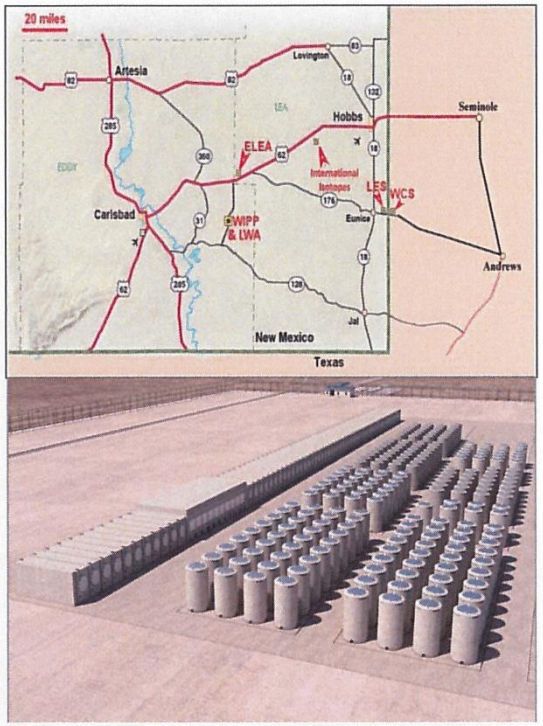
Consolidated Interim Storage



CIS Proposals in NM & TX

New CISF Proposed in Texas and New Mexico

- Both Holtec International and Waste Control Specialists LLC (WCS) have submitted license applications to construct and operate a CISF to the NRC.
- Both local communities strongly support the construction and operation of a CISF.
- Both locations have been extensively studied by federal agencies and located in arid and geologically stable lands.
- Each location is accessible by rail.



Possible Sites for Repository in Salt

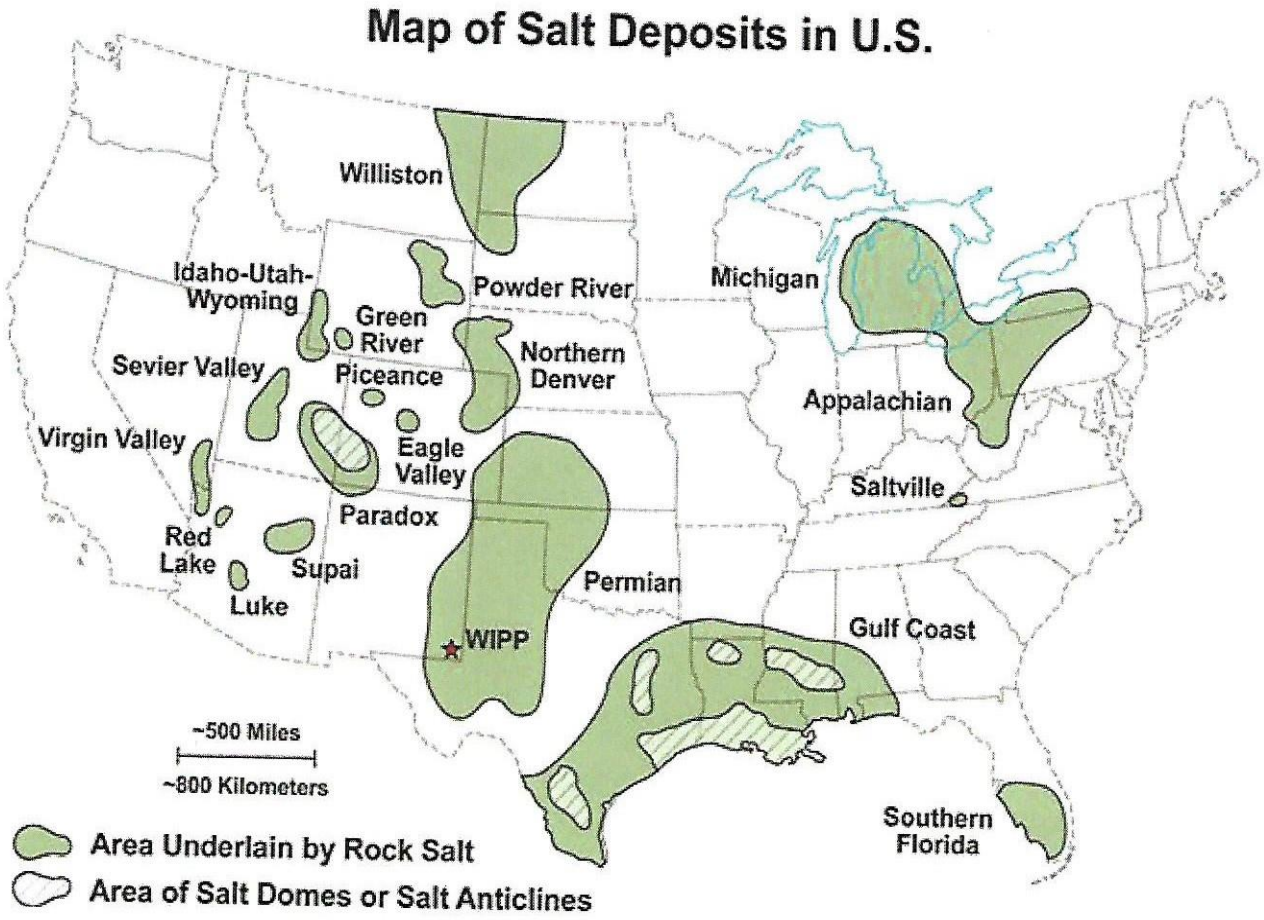


Figure 1. Salt deposits in the United States (Johnson and Gonzales 1978).

Waste Isolation Pilot Plant (WIPP)

Near Carlsbad, New Mexico

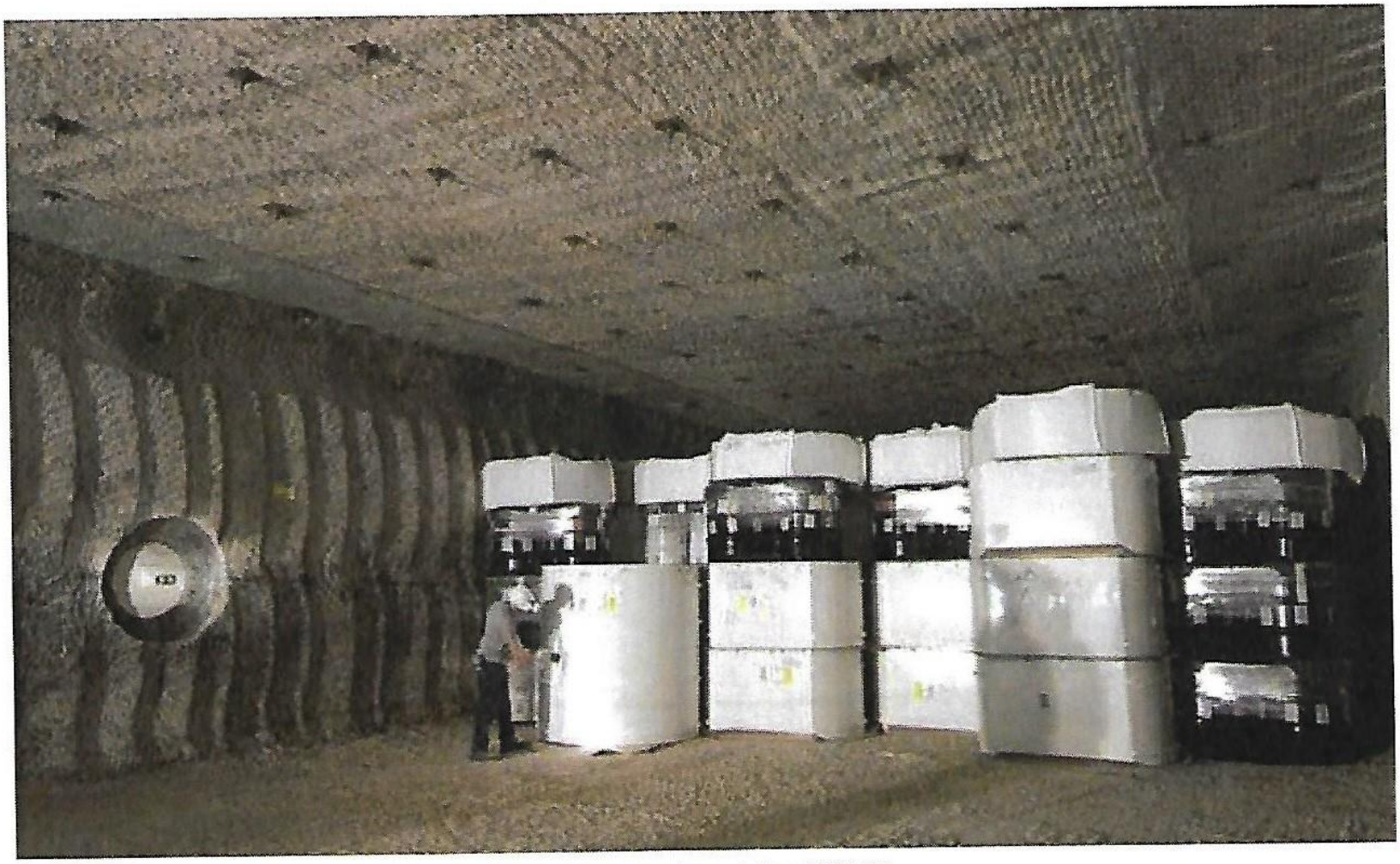
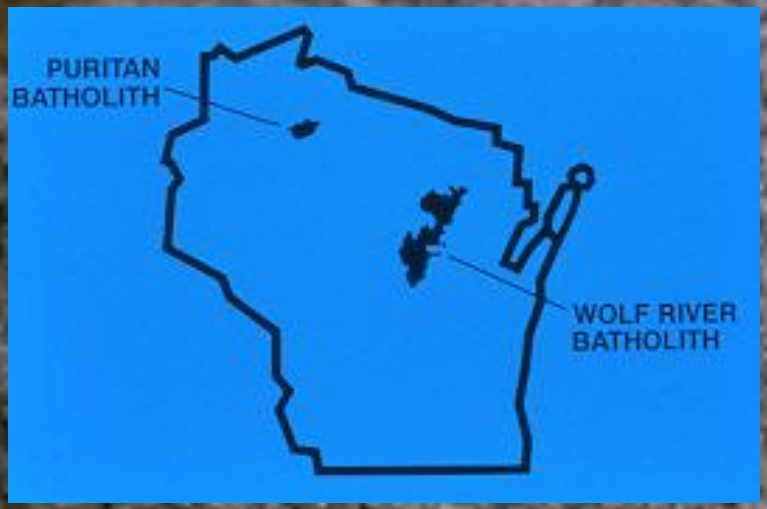


Figure 3. Disposal operations for TRU waste at the WIPP

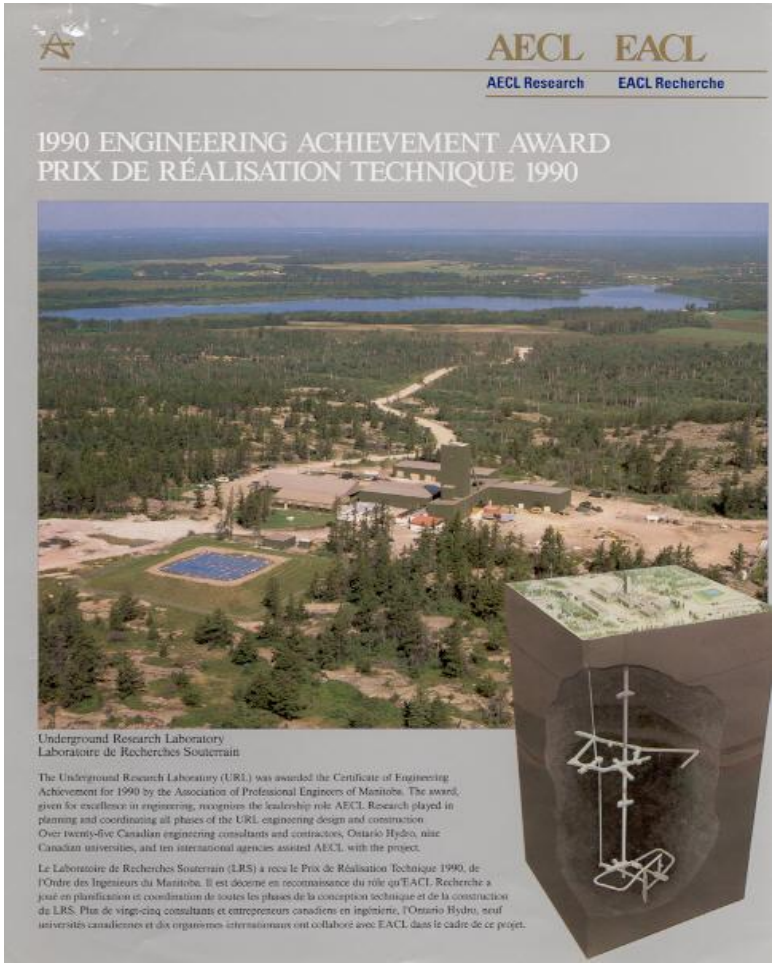
Possible Sites for Repository in Crystalline Rock

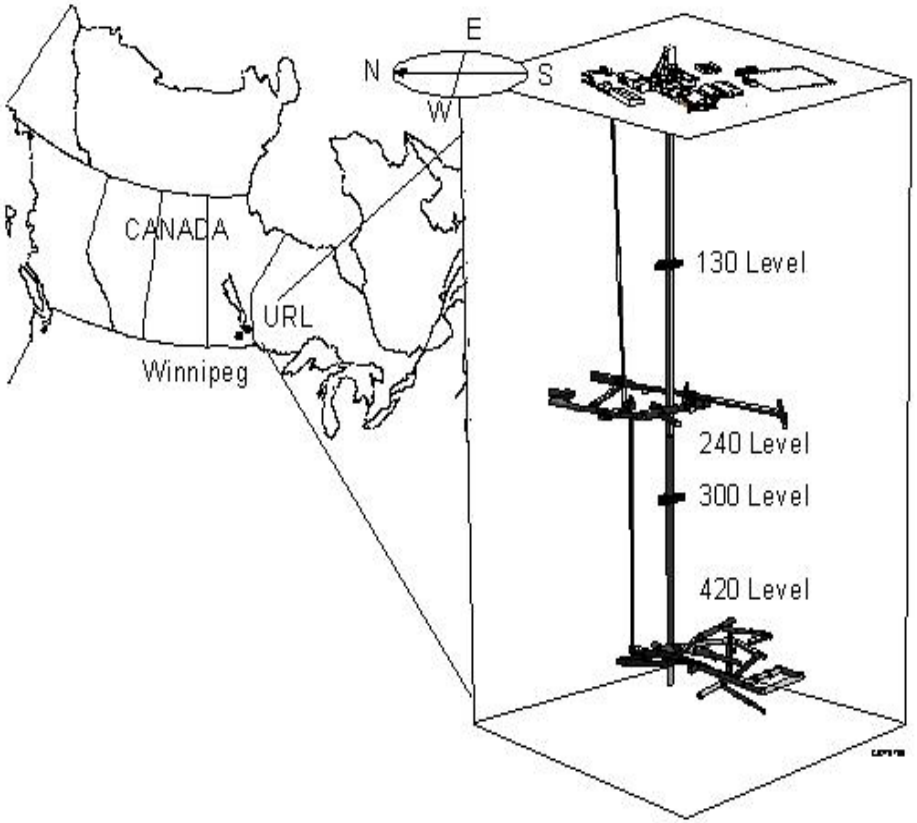
Repository Candidate Areas in Wisconsin - 1986



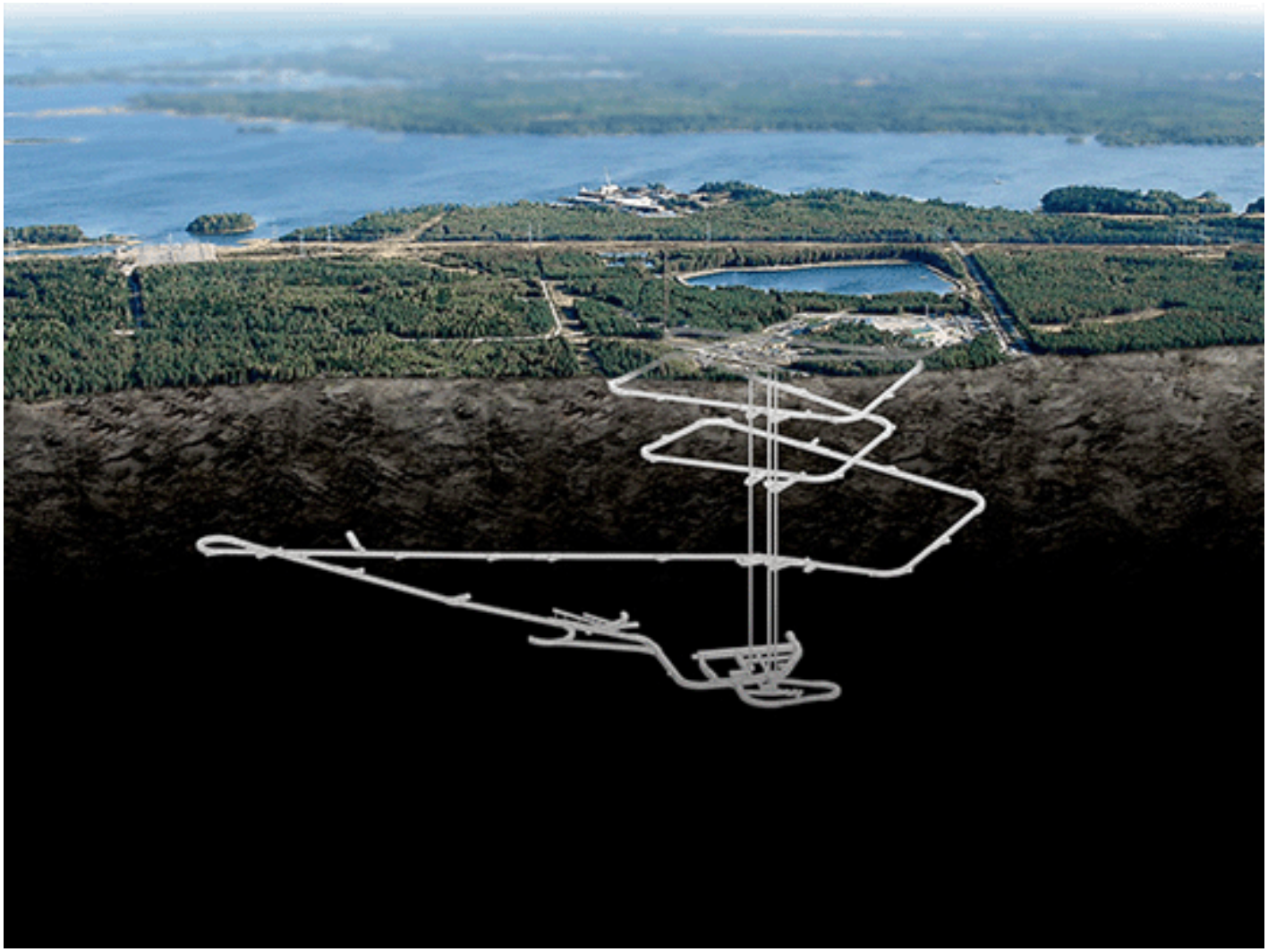
Canadian Research on Crystalline Rock

Canadian Underground Research Laboratory



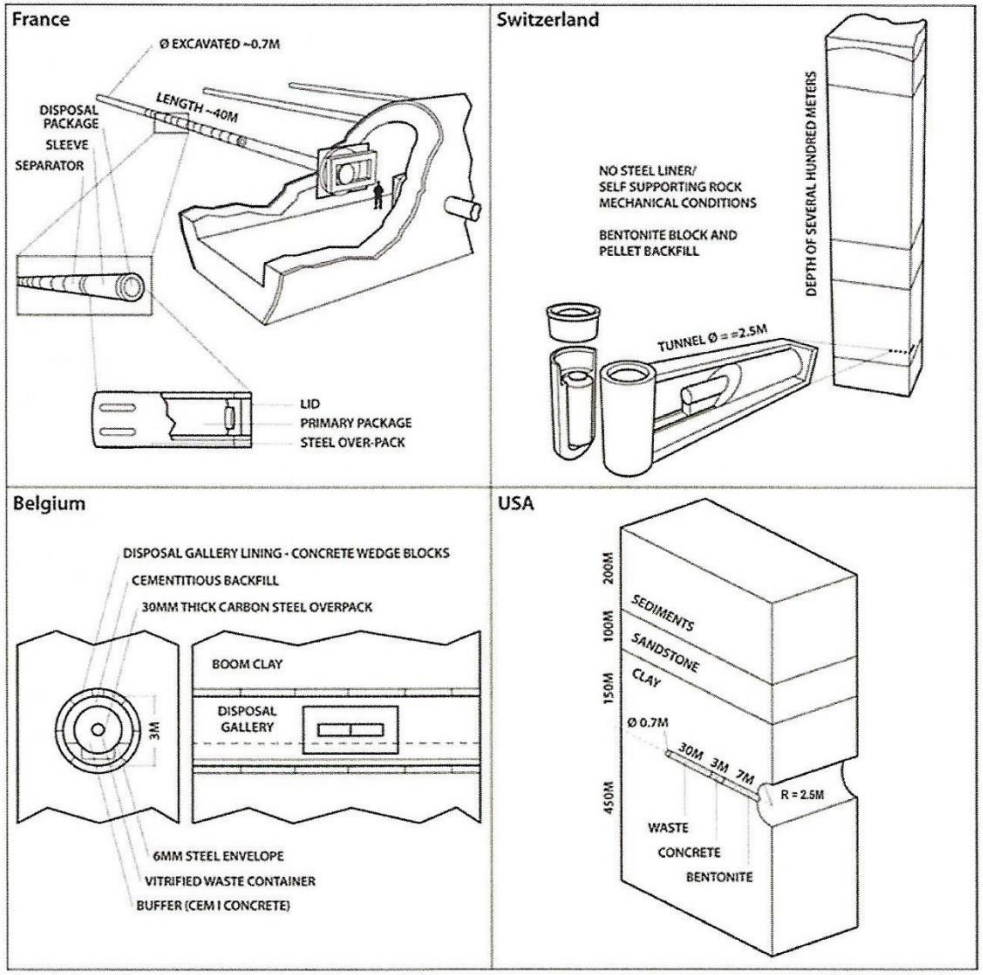


Finland Repository Under Construction in Crystalline Rock



Clay/Shale Repository Concepts

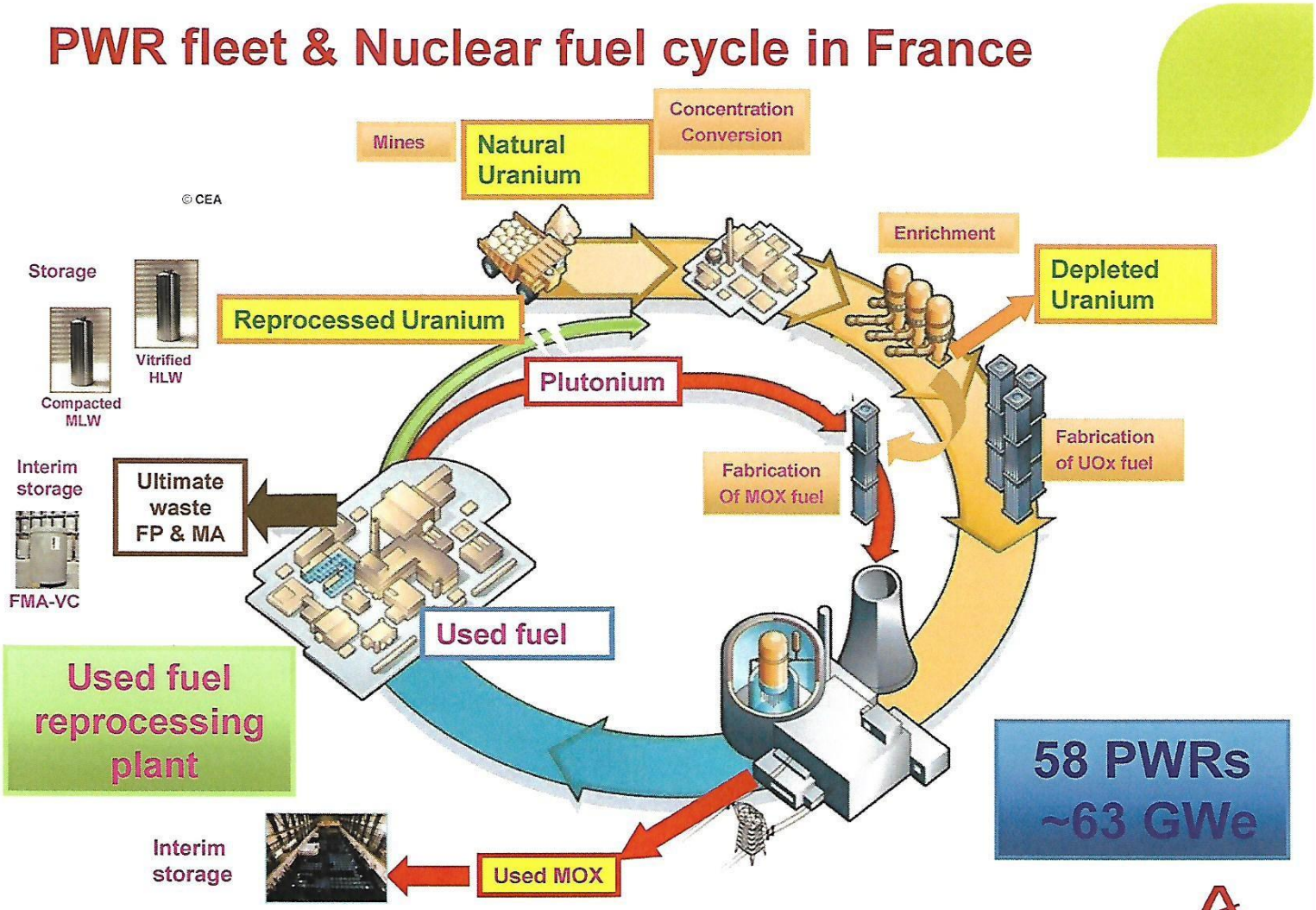
France, Belgium, Switzerland, U.S.



Sources: France: www.andra.fr; Switzerland: www.nagra.ch; Belgium: www.sckcen.be.

Figure 2.1-1 Schematic of Clay/Shale Disposal Concepts

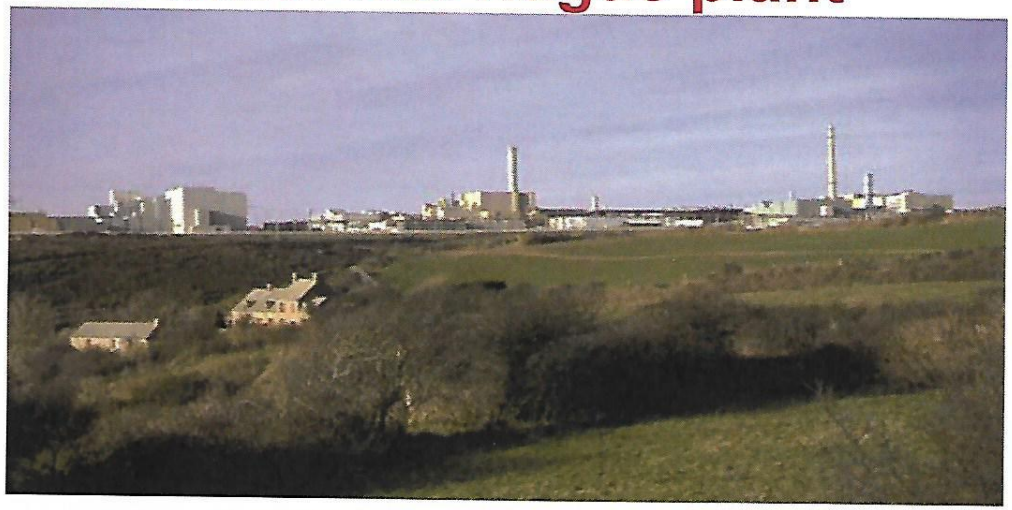
French Reprocessing Fuel Cycle

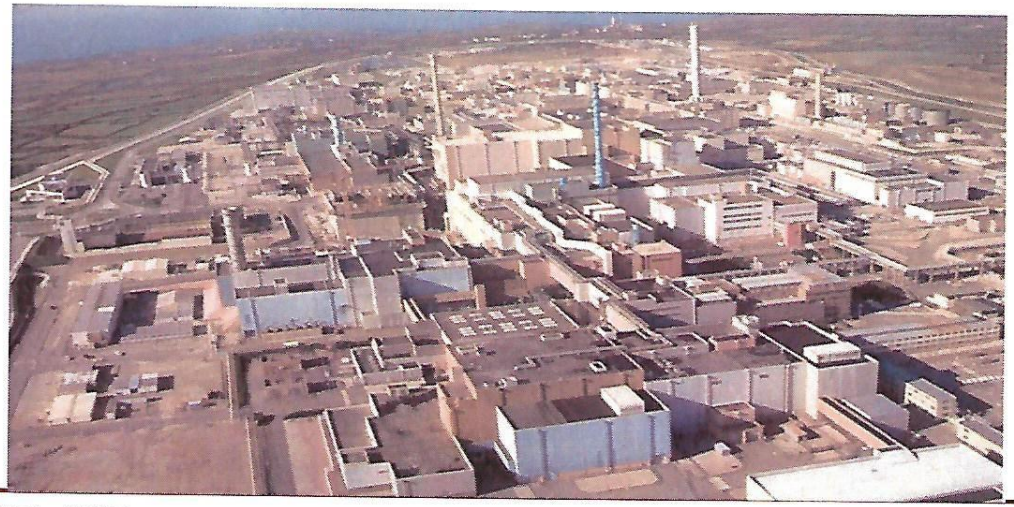


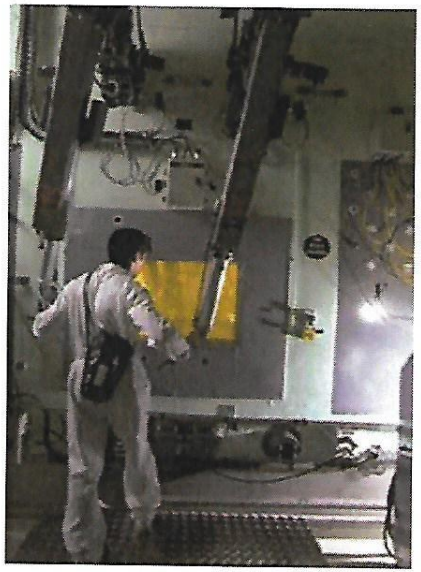
AREVA

French Reprocessing Facilitities

The AREVA La Hague plant

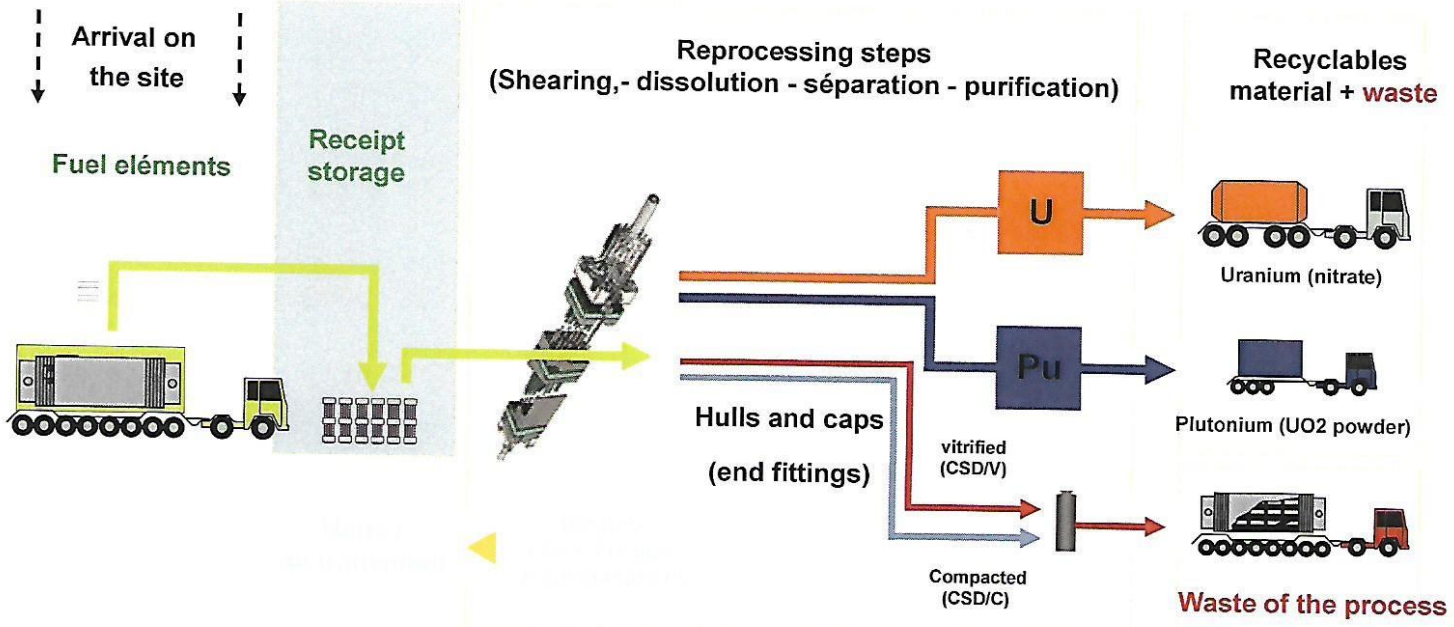






Steps in Reprocessing - AREVA

Main steps of reprocessing



- Each step has its own process
- There is a « nuclear material control an accounting » system (MC&A) at each step, under the control of EURATOM and IAEA
- Customers (utilities) keep the ownership of their nuclear materials and waste are sent back to the customers

World Commercial Reprocessing Capacity 2016 (World Nuclear Association)

(tonnes per year)		
LWR fuel	France, La Hague	1700
	UK, Sellafield (THORP)	600
	Russia, Ozersk (Mayak)	400
	Japan (Rokkasho)	800*
	Total LWR (approx)	3500
Other nuclear fuels	UK, Sellafield (Magnox)	1500
	India (PHWR, 4 plants)	330
	Japan, Tokai MOX	40
	Total other (approx)	1870
Total civil capacity		5370

** now expected to start operation in 2018*

Reprocessing Pro & Con

- Fuel recovery and reuse in reactors
- Isotopes for non-fuel uses
- Reduced volume, hazard, and cost of radioactive waste requiring geologic disposal
- National security technology considerations
- Capital cost for facilities and product cost compared to other sources of uranium
- Process hazards and environmental impacts
- Increased volume of total radioactive waste
- Proliferation of weapons and weapons technology

Yucca Mountain Site Unsuitable for Reprocessing

- No Rail Access – Reprocessing facility would require about 2,900 truck shipments per year, using routes through Las Vegas metro area; trucks would likely be required for shipping out recovered uranium/plutonium and/or new MOX fuel
- Inadequate Water Resources – Reprocessing facility would require 1,000 acre/feet per year or more; water resources would also constrain collocation of new fuel fabrication facilities
- Seismic Hazards to Surface Facilities – Major concern for NRC licensing and operation: 2008 USGS maps show moderate to high ground acceleration area; 10 miles from Little Skull Mountain (5.6 magnitude) earthquake epicenter; 10 – 30 miles from 3 active faults with potential earthquake magnitude of 6.5-7.9
- Lack of previous reprocessing experience - U.S. sites with past reprocessing experience would almost certainly compete for new facilities and be selected over Yucca Mountain