

Industry Perspective on Options for Integrated Used Fuel Management

February 2, 2012

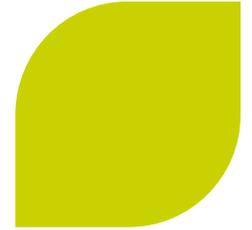
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Blue Ribbon Commission Key Findings



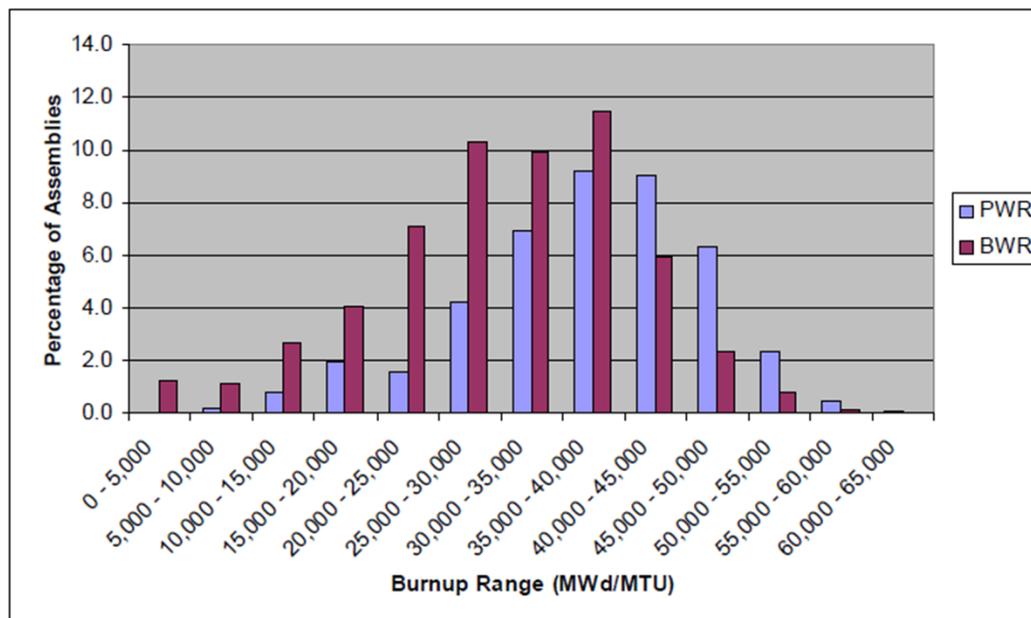
- ▶ ***A new organization dedicated solely to implementing the waste management program and empowered with the authority and resources to succeed with access to nuclear waste funds.***
 - ◆ Important for sustainability and success
- ▶ ***Prompt efforts to develop one or more geologic disposal facilities.***
 - ◆ Necessary whichever solution is chosen for used fuel management
- ▶ ***Prompt efforts to develop one or more centralized storage facilities.***
 - ◆ “... a longer period of time in storage offers a number of benefits because it allows the spent fuel to cool while keeping options for future actions open.”
- ▶ ***Regarding recycling, BRC said***
 - ◆ “It is the Commission’s view that it would be premature for the United States to commit, as a matter of policy, to “closing” the nuclear fuel cycle given the large uncertainties that exist about the merits and commercial viability of different fuel cycles and technology options.” – does not preclude recycling as one option
- ▶ ***Prompt efforts to prepare for the eventual large-scale transport of spent nuclear fuel and high-level waste.***
- ▶ ***Support for continued U.S. innovation in nuclear energy technology = R&D***

***Need evolutionary approach that can be adapted and upgraded
with new technology as mature***



US UNF Inventory

Year	Assemblies			Per Year
	Dry Storage	In Pool	Total	
2009	39,460	177,397	216,857	
2010	44,552	179,894	224,446	7,589
2011	49,951	182,448	232,399	7,953
2012	54,946	184,701	239,647	7,248
2013	60,986	186,159	247,145	7,498

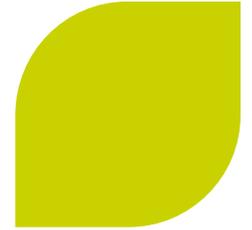


Source of data NWTRB

Influencing Factors

- ▶ Self Protecting Nature of UNF.
- ▶ 40 CFR 190 .

Integrated UNF Management Facility: Phase 1 – Centralized Storage



- ▶ Allows key UNF to be moved off-site such as stranded UNF from shutdown plants
- ▶ Demonstrates
 - ◆ Public Acceptance
 - ◆ Licensing
 - ◆ Transportation

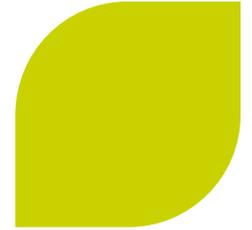
Interim storage by itself:- Risk, cost, progress?



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Centralized Storage—Historical Perspective



▶ Initiatives

- 
- ◆ Federal Interim Storage
 - ◆ Monitored Retrievable Storage
 - ◆ Office of Nuclear Waste Negotiator
 - ◆ Early Receipt Facility
 - ◆ Private/Commercial Storage Initiatives
 - ◆ Centralized Interim Storage

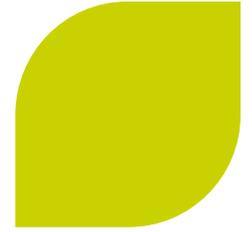
▶ Host Sites/Locations

- ◆ Mescalero Tribe
- ◆ Goshute Tribe
- ◆ Owl Creek
- ◆ Caliente, NV
- ◆ Nevada Test Site
- ◆ Private Fuel Storage

▶ **Key Lesson Learned:**

- ▶ **Centralized storage alone does not offer sufficient economic development opportunities to withstand political opposition, election cycles, etc.**

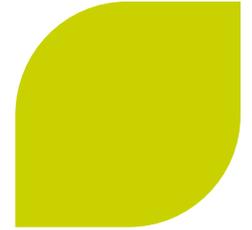
Integrated UNF Management Facility Phase 2 – Pilot 800tHM/y Recycling Facility



- ▶ **Significant operating expenses spent locally**
 - ◆ \$500M per year for 50 years
- ▶ **Large job creation opportunity**
 - ◆ Up to 18,000 direct jobs during construction
 - ◆ About 5,000 steady direct jobs for 50 years of operation
 - ◆ Up to 30,000 additional Indirect jobs created in the wider economy

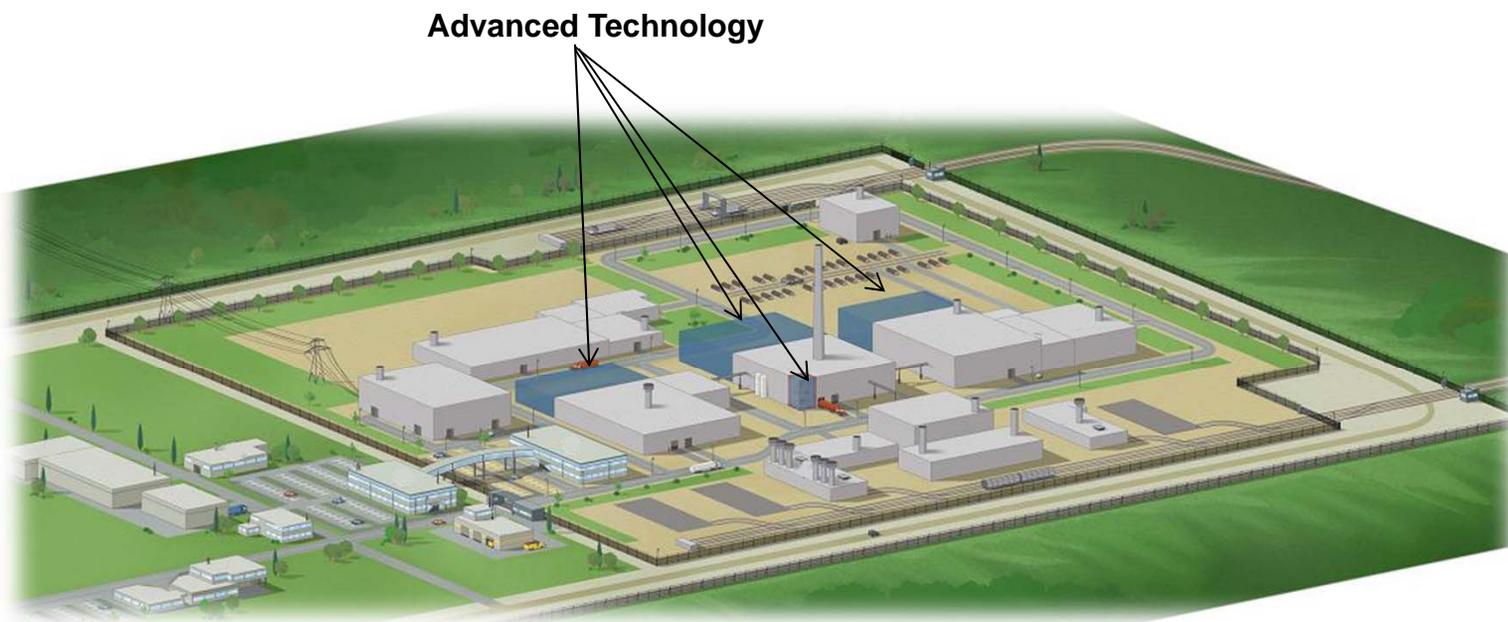
Pilot Facility - keeps options open

Initial Recycling Facility



- ▶ **Balanced fuel cycle**
 - ◆ Recycling capacity matched to product demand
- ▶ **Propose an initial “*Pilot*” 800 tHM/y capacity plant that builds on best available technology to minimize risk**
- ▶ **COEX™ Separations process so “NO” separated Pu**
- ▶ **Manage product using existing nuclear infrastructure while DOE develops Gen IV Reactor (50 plus years for first commercial Unit.)**
- ▶ **LWR MOX is therefore an “*interim*” step for closing the cycle.**
- ▶ **Recycle of US MOX is possible**
- ▶ **Pilot Facility could supply fuel to,**
 - ◆ Limited number of existing LWR’s or
 - ◆ ~4 x Gen III+ reactors or
 - ◆ ~Limited number of 500 MWe SFR

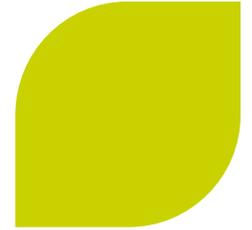
Advanced Separations and Fuel Fabrication



Advanced separations and transmutation fuel production are an addition to the pilot facility, not a replacement.

What do we do with the advanced product?

Conclusions



- ▶ **US is unique due to the large stockpile of UNF.**
- ▶ **US has specific regulations that will influence the fuel cycle.**
- ▶ **Need a FedCorp to manage UNF.**
- ▶ **Phased approach to recycling is proposed.**
 - ◆ **Do not commit the country 100% to anyone technology.**
 - ◆ **Can be adapted and upgraded with new technology.**
- ▶ **DOE working with industry should develop “evolutionary” next step technology applicable to US requirements.**
- ▶ **Nuclear industry takes a “*long time*” to develop and deploy technology.**
- ▶ **Fuel cycles will overlap.**
- ▶ **Interim storage, final geological repository will influence fuel cycle deployment and economics.**