Recycling: A Solid Option for Managing U.S. Waste

USEA Briefing on the
American Nuclear Energy Revival

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Used Fuel Management & Technology

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Managing U.S. Nuclear Waste

Aerial view of Yucca Mountain, Nevada

- For the past 20 years, the U.S. has focused on the “once-through” fuel cycle.
- But, the Administration has taken Yucca Mountain repository project off the table.
- The nuclear revival could mean increase for repository space.
- What are options for managing used fuel as we move forward?

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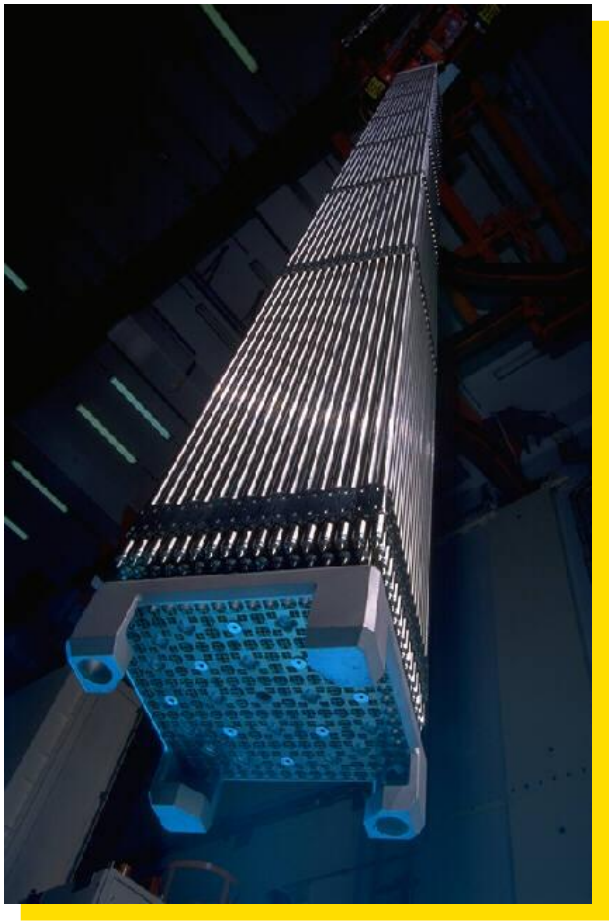
How We Manage Used Fuel Today

- After 18-24 months in a reactor, fuel is moved to the used fuel pool.
- Used fuel can then be moved to onsite dry storage or sent for recycling.
- Even with recycling, a repository is required.



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What is Recycling?

La Hague Facility, Normandy, France

- **Two basic options for managing used nuclear fuel**
  - **Direct disposal, a.k.a. “once-through” or “open fuel cycle”**
  - **Recycling, a.k.a. “closed fuel cycle”**

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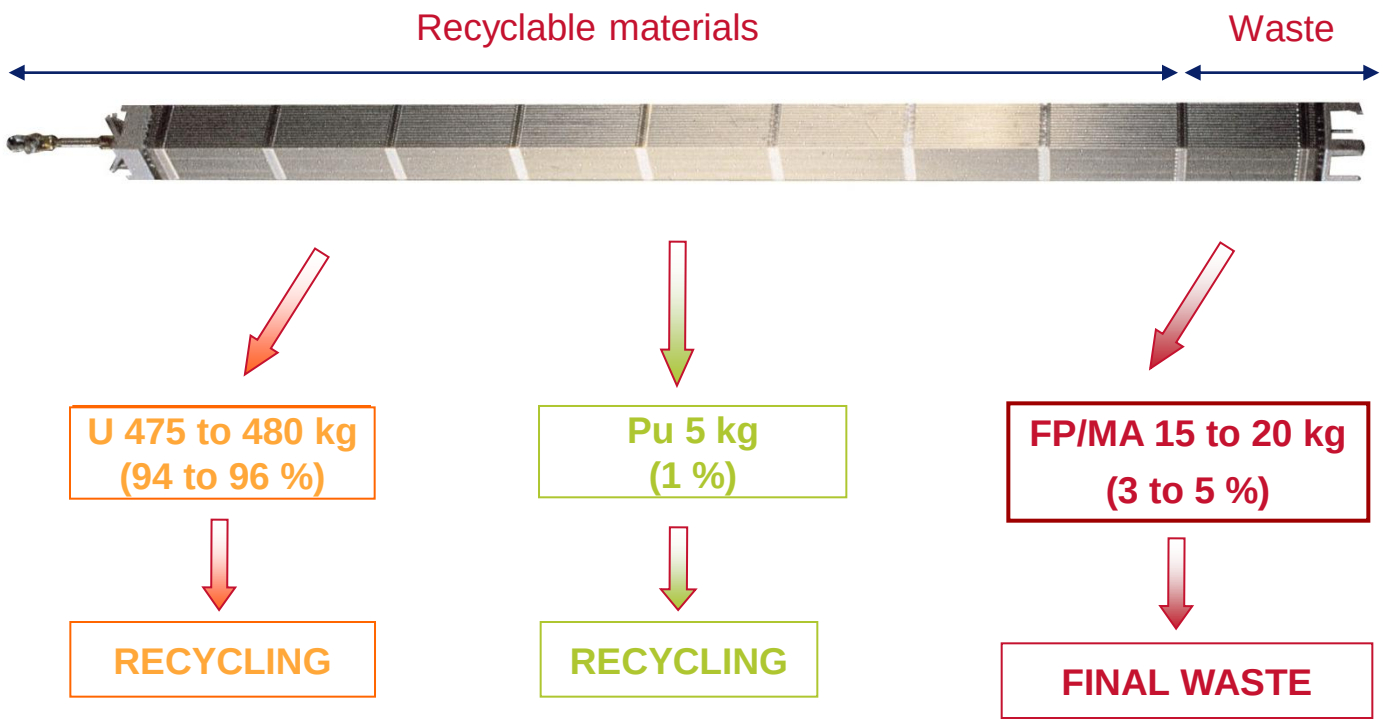
We Can Recycle 96% of Used Fuel Content

- **Composition of used light water reactor fuel**
  - 1 LWR fuel assembly = 500 kg uranium before irradiation in the reactor



* Percentages may vary based on fuel burnup

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Why Recycle?

- Makes waste management easier
- Conserves natural resources
- Enhances security of fuel supply
- Supports non-proliferation

La Hague Facility, Normandy, France

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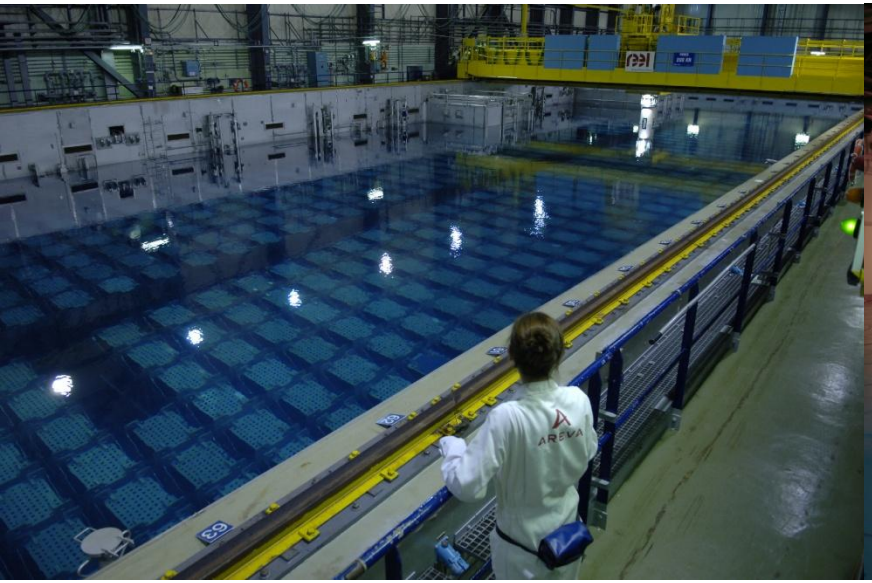
Why Recycle, ctd?

- Spurs economic development … creates jobs!
- Improves public acceptance of nuclear energy by creating a solid plan for managing waste
- Is economically comparable with other used fuel management options



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Initial Recycling Facility

- Recycling capacity matched to market demand
- Propose an initial "*Pilot*" plant that builds on best available proven technology to minimize risk
- COEX™ Separations process so NO separated Pu
- Manage recycled product using existing nuclear infrastructure with continued R&D on advanced fuel cycles
- LWR MOX is an "*interim*" step for closing the cycle
- Pilot Facility could supply MOX fuel to:
  - Limited number of existing LWR's or
  - ~4 Gen III+ new build reactors or
  - 500 MWe fast reactor

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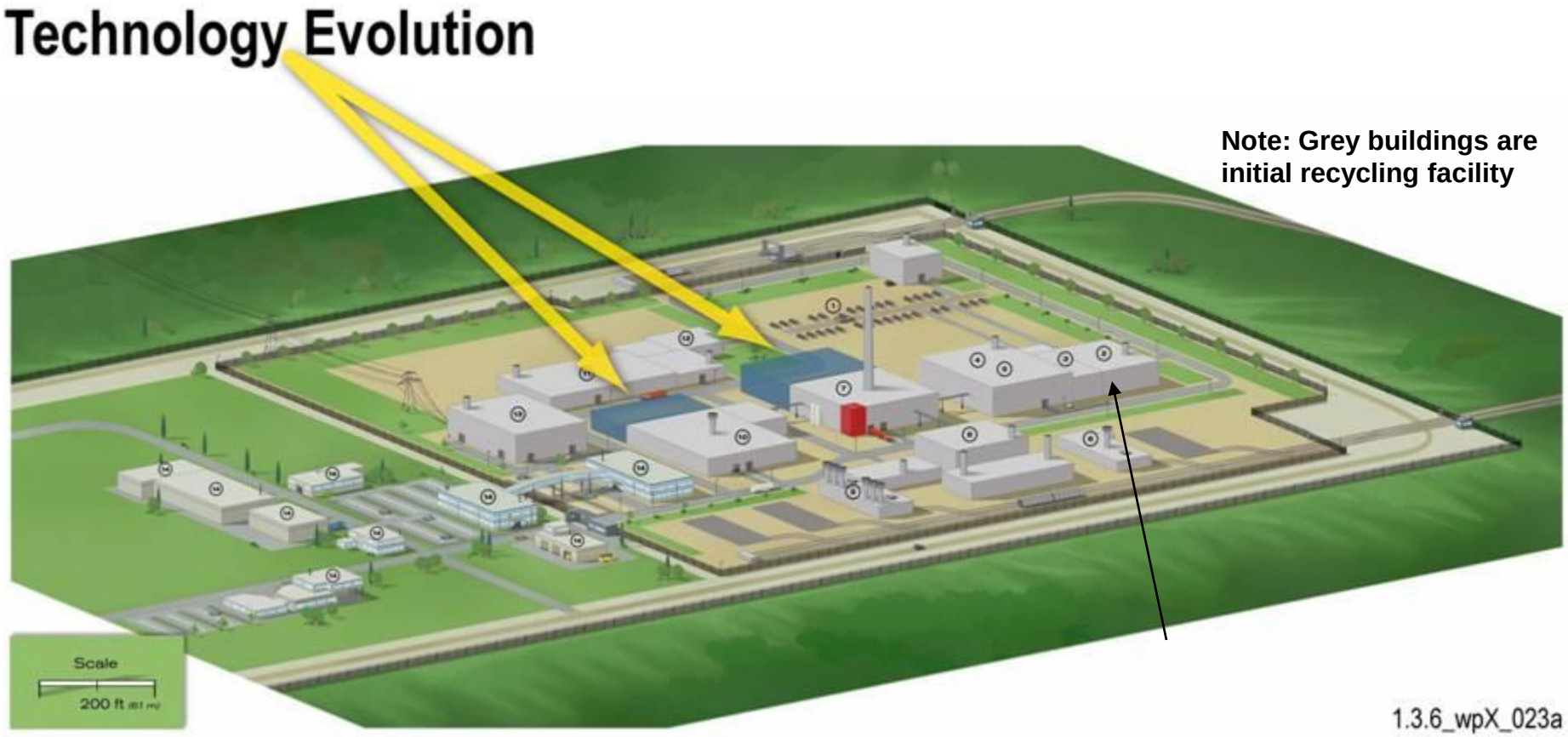
Pilot Facility with Incorporation of Advanced Technology



- ***Advanced separations and transmutation fuel production are an addition to the Pilot Facility and not a replacement***
- ***Pilot facility serves as ideal location for interim storage with early receipt***

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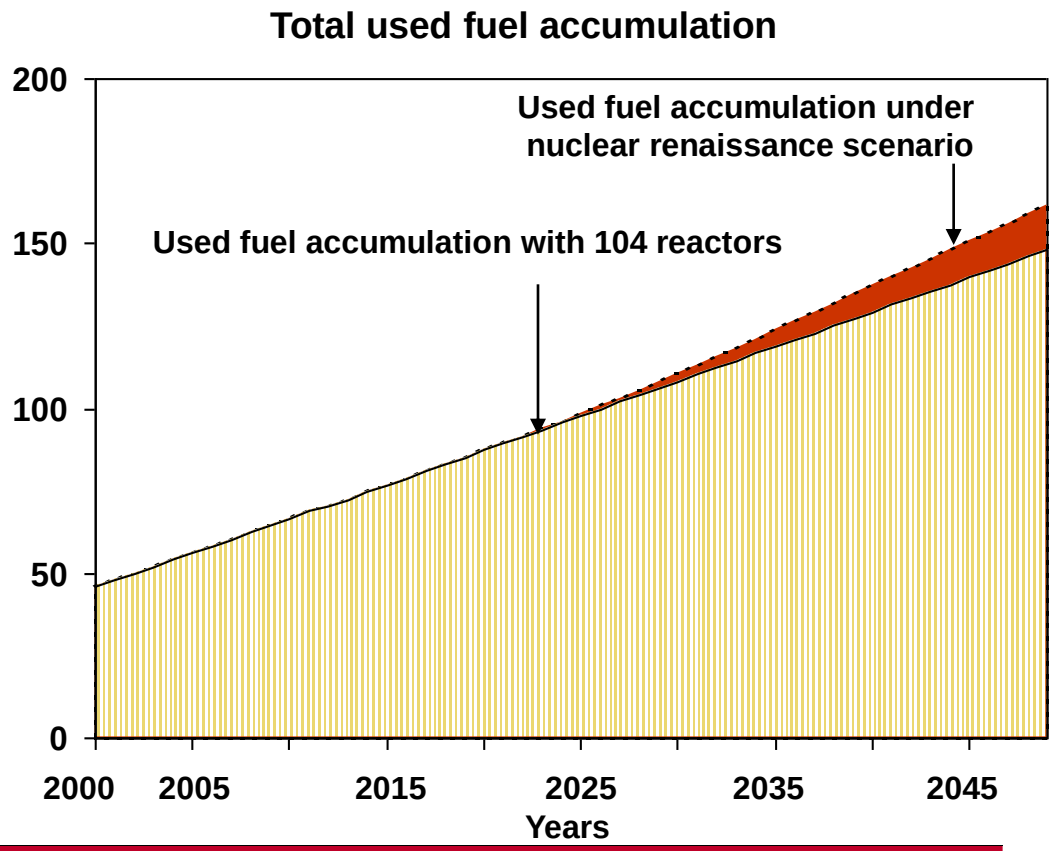
Why Start Recycling Near-Term?

- **The biggest public issue with nuclear power continues to be, "what do we do with the used nuclear fuel?"**



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Conclusion

- To support U.S. nuclear revival, we need an integrated used nuclear fuel management strategy with options for recycling, interim storage and disposal
- Federal government action is required
- Nuclear industry cannot wait for “leap-frogging” or transformational technology from the government
- Two step recycling is proposed: start recycling in existing reactors (with MOX) and evolve towards advanced reactors when commercially available
- Public and stakeholders acceptance with long-term political support is mandatory

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