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Extended Storage of Spent Nuclear Fuel: NRC Plans and Activities

Fuel Cycle Information Exchange

Back-End of the Fuel Cycle/Spent Fuel Issues

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Background

NRC's role in an evolving policy environment

- Assure safety and security as changes occur in the national strategy
- Develop predictable regulatory programs
- Ensure continuous improvement
- Continue to engage stakeholders and the international community

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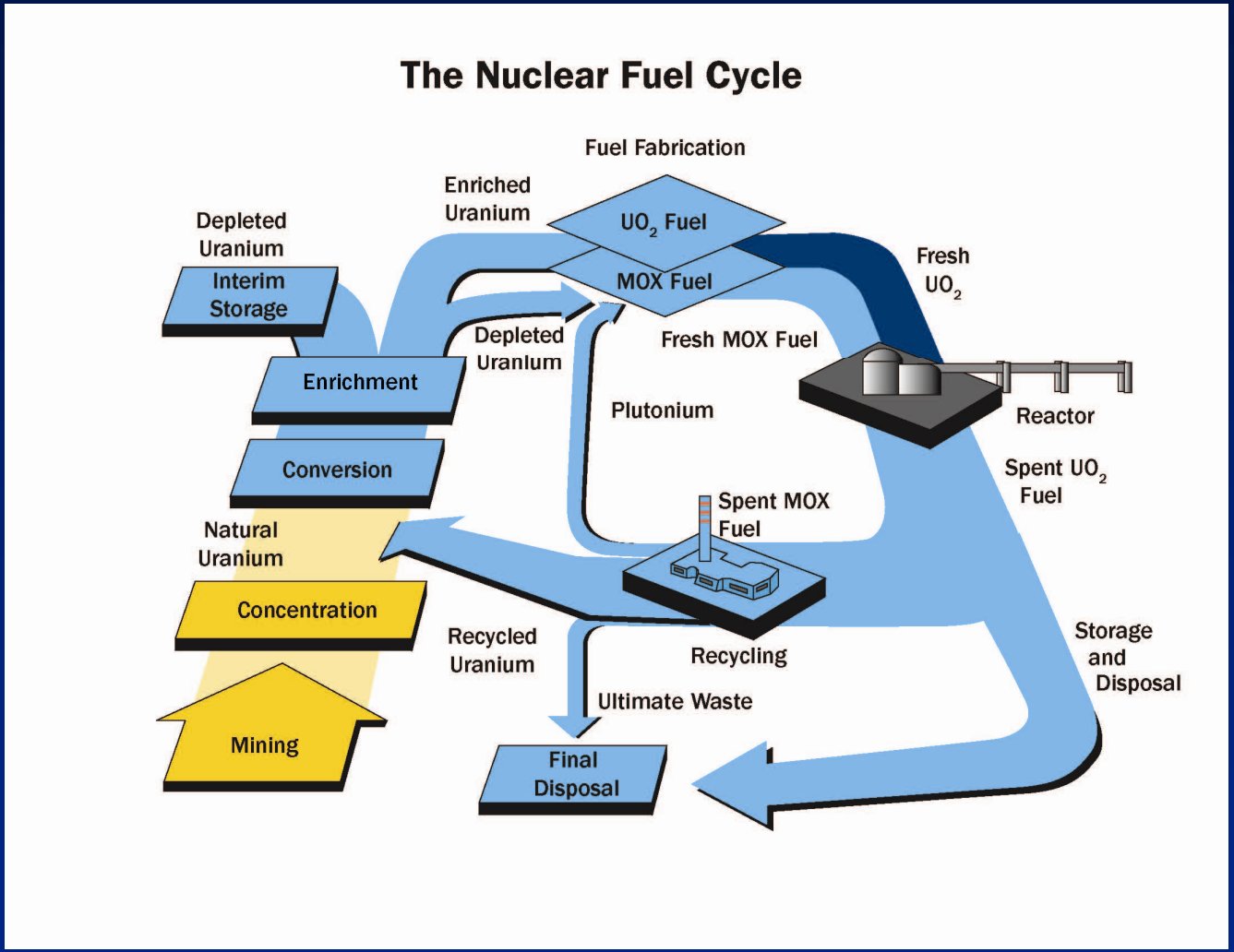
Integrated spent fuel regulatory activities



Extended Spent Fuel Storage: Regulatory Needs

- Extended Storage and Transportation (EST)
  - Potential changes to guidance and regulations
  - Opportunity to improve integration of storage and transportation regulations and guidance
  - Technical needs
  - Risk informing

- Waste Confidence Decision and Rule
  - Updated in 2010 for licensed life plus 60 years
  - Commission directed staff to begin a longer-term rulemaking to account for storage beyond a 120-year timeframe

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Current NRC Regulatory Framework for Storage

- Renewable Term Licenses
- Aging Management Plan
  - Time-limited aging analyses
  - Design for prevention
  - Monitoring – how, how often, in-situ
  - Maintenance – what type
  - Corrective Actions – when

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Technical Basis for Regulating EST

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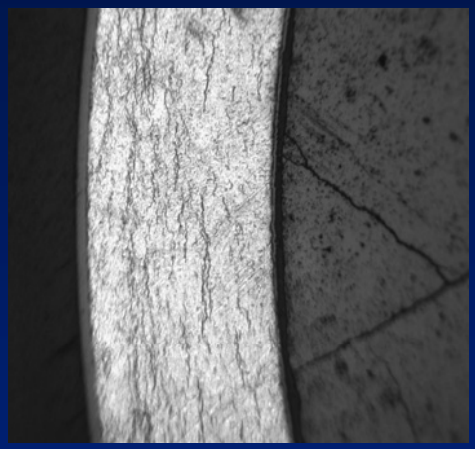
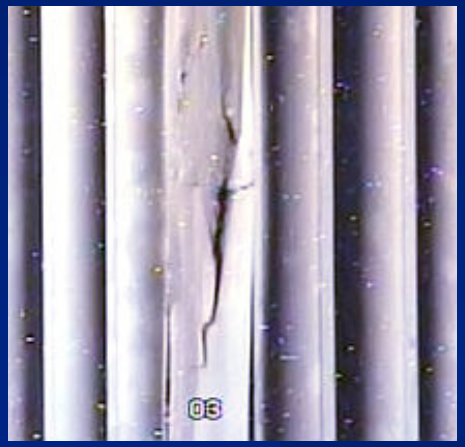
Potential Technical Issues
Cladding Integrity

- Safety Functions
  - Confinement (primary fission product barrier)
  - Geometry control (criticality and retrievability)
- Technical Challenges
  - Higher burnup levels
  - Temperature effects
  - New cladding types
  - In-situ monitoring in sealed canisters





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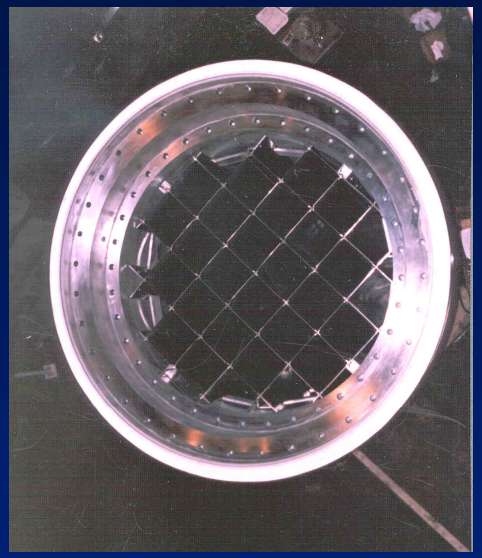
Potential Technical Issues
Canister Integrity

- Safety Functions
  - Confinement
  - Criticality control
- Technical Challenges
  - Long-term corrosion
  - Basket properties
  - Absorber efficiency
  - Monitoring sealed internals



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Potential Technical Issues
Overpack Performance

- Safety Functions
  - Shielding
  - Heat transfer
- Technical Challenges
  - Long-term degradation
  - Response to external natural events and external disruption

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EST Technical Basis

Path Forward

- Synthesis of Technical Gap Assessments
  - Draft synthesis report for comment, Fall 2011
  - Final synthesis report, Spring 2012
- Regulatory Plan
  - Integration of EST regulatory needs and Waste Confidence long-term update
  - Research plan to address technical gaps
- Cooperative Research (e.g., ESCP)
- Stakeholder Involvement

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Waste Confidence Decision

- Provides basis for generic finding that spent fuel can be stored safely and without significant environmental impacts associated with storage for at least 60 years beyond licensed life of any reactor

- Planning for longer-term rulemaking and EIS to assess the environmental impacts and safety of spent fuel storage for more than 120 years (60 years following termination of a reactor license).

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Waste Confidence EIS
Initial Scope and Assumptions

- Impacts to be assessed over extended time periods (2050-2250)
- Potential scenarios include onsite, regional, centralized storage, and reprocessing
- Assumes dry cask storage and an extended aging management program

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Waste Confidence EIS
Path Forward

- Draft report of internal scoping activities issued for public comment in fall 2011, final in spring 2012
- Formal NEPA scoping and draft EIS development to begin in spring 2012
- Leveraging currently planned work for regulating extended spent fuel storage and transportation
- Resources permitting, final EIS and Waste Confidence rule to be issued in 2016

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Summary

- Assuring safety and security as changes occur in the national strategy by developing predictable regulatory programs
- NRC is preparing to
  - develop a regulatory framework to better support long-term dry storage
  - assess the environmental impacts and safety of extended spent fuel storage
  - coordinate EST technical basis work with environmental impact analysis for long-term update of Waste Confidence
- Opportunities for stakeholder input through public meetings, workshops, and draft reports