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Compatibility of Requirements for Storage and Transportation of Spent Nuclear Fuel

Retrievability, Cladding Integrity, and Safe Handling

Bernard White

Meeting to Obtain Stakeholder Feedback on Enhancements to the Licensing and Inspection Programs for Spent Fuel Storage and Transportation

August 16, 2012

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Background

- Revisiting the Paradigm for Spent Fuel Storage and Transportation Regulatory Programs (SRM COMDEK-09-0001)
- Project Plan for Regulatory Program Review to Support Extended Storage and Transportation (COMSECY-10-0007)
  - Compatibility of storage and transportation
- Public meeting July 27, 2011
  - Retrievability
  - Burnup Credit
  - Moderator Exclusion

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Background – Regulatory Framework

- Nuclear Waste Policy Act Legislation
  - Interim Storage
  - Monitored Retrievable Storage
  - Disposal
- Regulations
  - 10 CFR Part 71 - Transportation
  - 10 CFR Part 72 - Storage
- Regulatory Guidance
  - ISG-1: Classifying the Condition of Spent Fuel
  - ISG-2: Retrievability
  - ISG-11: Cladding Considerations for Storage and Transport

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Issue Description

- Evaluating compatibility of policies and regulations between storage and transport
- Storage
  - Retrievability – 72.122(l) (see SECY-01-0076)
  - Cladding integrity – 10 CFR 72.122(h)
- Transportation
  - Fissile material geometry after normal conditions of transport – 10 CFR 71.55(d)(2)
  - Criticality control – 71.55 and 71.59
  - Opening and unloading operations – 10 CFR 71.89 and 10 CFR 20.1906(e)

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Considerations

- Different back end model prior to disposal?
- Longer storage durations
- High burnup fuel
- Transportation of sealed canisters that have been in storage for many years
- Repackaging?
  - When?
  - By whom?

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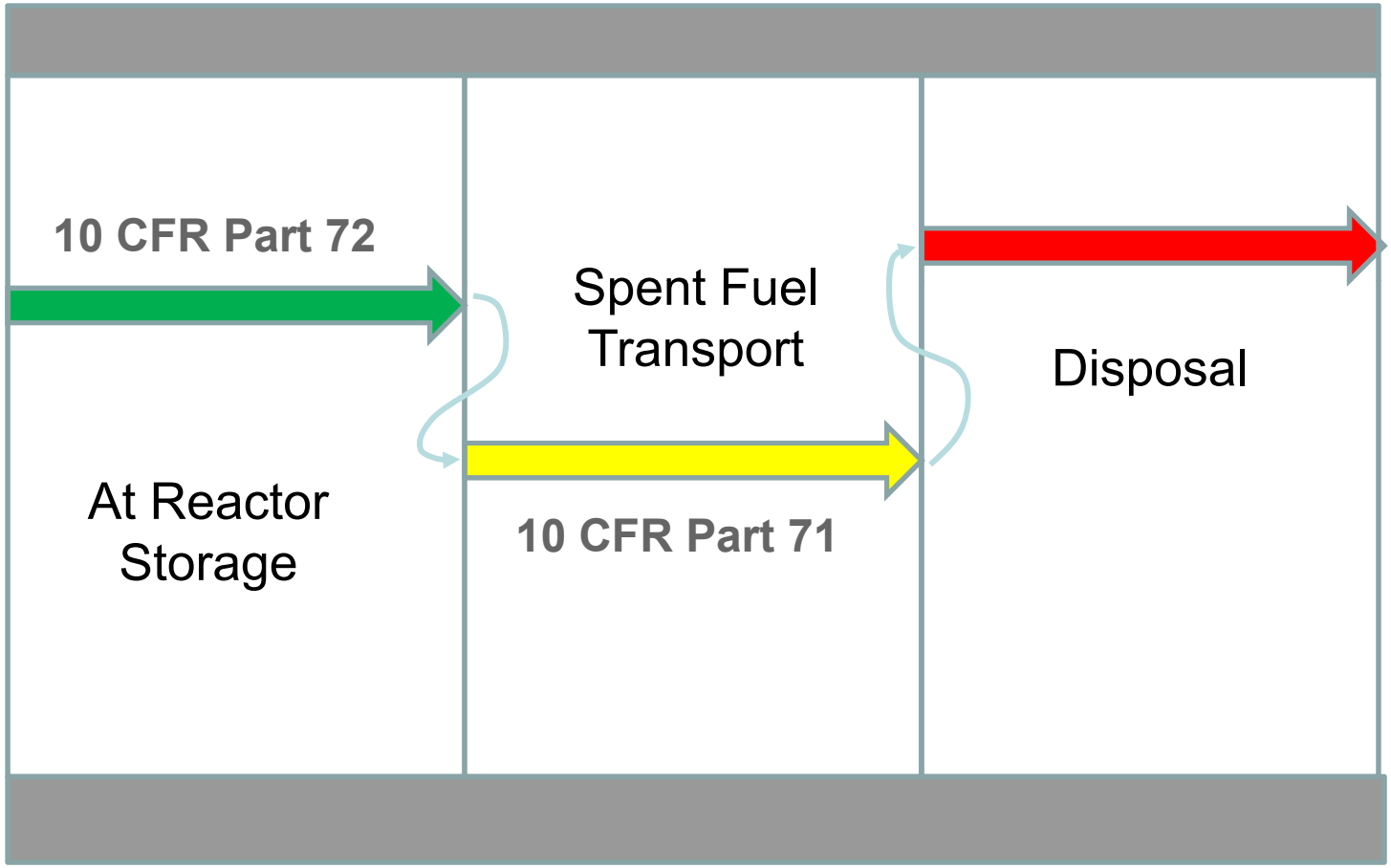
Considerations – Old Model



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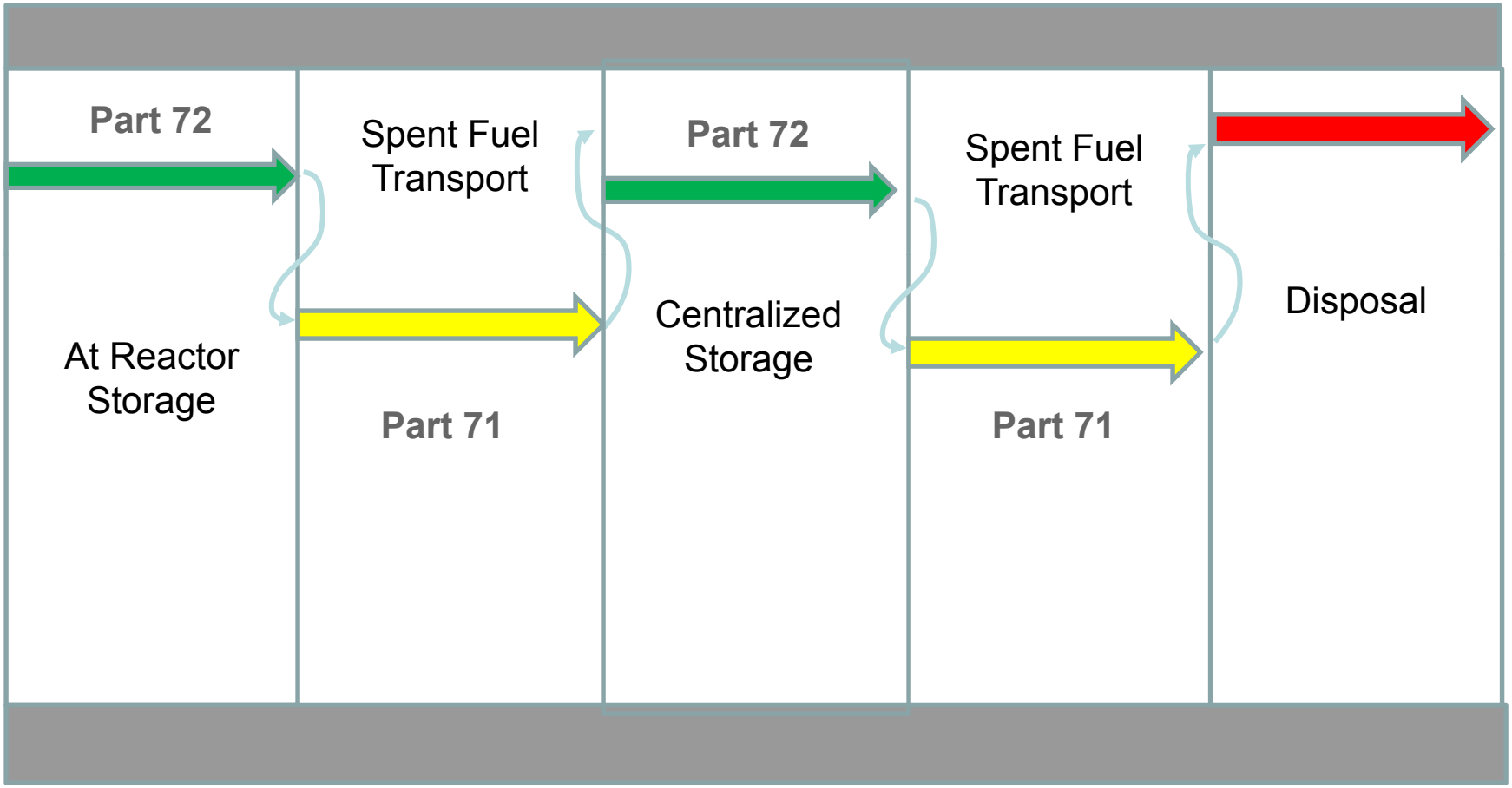
Consideration – New Backend Model?



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Considerations - Retrievability

- Individual Fuel Assembly Retrievability
  - Maximizes future handling options
  - Additional cladding research and laboratory studies
  - Implement storage demonstration programs
  - Potential significant impact for repackaging loaded canisters, if cladding integrity can not be demonstrated
- Canister-Based Retrievability
  - Rely upon dual-purpose canister technologies
  - Overcomes some near-term certification hurdles
  - Potential significant impact if repackaged later
  - May limit future disposal options
  - May need additional research on canister behavior

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Considerations – Cladding Integrity

- Storage
  - Generally, relied upon to meet retrievability for storage
  - Provides criticality geometry control
- Transportation
  - Provides geometry control for criticality safety
  - Unloading and handling at receipt facility

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Conclusion

- Retrievability and cladding integrity are potential policy issues based, in part, on:
  - Regulatory safety criteria and safety barrier concepts
  - Present and future operational needs for storage and transport
  - Consideration of technological limitations
  - Spent fuel management risks and uncertainties

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