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Fuel Cycle and Transportation of Fuel and Waste Evaluation - Acceptance Criteria for the Kairos Review

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Acceptance/Review Criteria Considerations for the Kairos Hermes Review

- Limited publicly available non-LWR information
 - ⊕ Rationale for two PNNL reports (ML20267A217 and ML20267A157)
- Portions of prior NEPA assessments should apply
- Additional assumptions considered in development of the draft ANR GEIS (est. publishing date in May 2022)
- Should help inform the Kairos Hermes environmental review

Fuel Cycle Assumptions

- Table S-3 is expected to bound front-end impacts for ANR fuels:
 - ⊕ Increasing use of in situ leach uranium mining
 - ⊕ Current light-water reactors are using nuclear fuel more efficiently
 - ⊕ Less reliance on coal-fired electrical generation plants
 - ⊕ Transitioning of U.S. uranium enrichment technology from gaseous diffusion to gas centrifugation
- Waste and spent fuel conditions should not be significantly different from NUREG-2157
 - ⊕ For example, assuming once-through fuel cycle for TRISO
- Must satisfy the regulatory requirements of 10 CFR Parts 40, 70, 71, and 73

Fuel Cycle Verification

- Verify the following:
 - ⊕ Fuel fabrication source
 - ⊕ Anticipated levels of fuel burnup
 - ⊕ Waste and spent fuel conditions bounded by NUREG-2157
 - ⊕ Meet 10 CFR Parts 40, 50, 70, 71, 72, and 73
- Confirm if TRISO fuel fabrication has similar impacts as existing fuel fabrication (e.g., performed under existing license)
- Check for missing information using PNNL-29367 Rev. 2, Non-LWR Fuel Cycle Environmental Data (ML20267A217)

Transportation of Fuel and Waste Assumptions

- Consideration of prior staff assessments such as the Clinch River ESP FEIS analysis
 - ⊕ Could bound ANRs if similar to conditions in past new reactor EISs
- For the draft ANR GEIS, the staff compiled information from the prior new reactor transportation of fuel and waste impacts
- Believe total annual shipment distances are a good indicator of impacts based on:
 - ⊕ Review of 15 new reactor ESP and COL EISs
 - ⊕ Number of shipments normalized to net electrical output of 880 MW(e) from WASH-1238 (see RG 4.2 Rev 3 Section 6.2.2 for details)
 - ⊕ One-way and two-way distances where appropriate

Transportation of Fuel and Waste Verification

- Verify the following:
 - ⊕ Were prior new reactor analyses relied upon
 - ⊕ Were certified transportation packages cited
 - ⊕ Is the Fuel fabrication source and are potential LLRW and spent ANR disposal or away-from-reactor sites provided in the ER
 - ⊕ Are TRISO release fractions available or can assumptions be applied
 - ⊕ Can maximum annual one-way and two-way shipment distances can be determined from information in ER
- Based on the outcomes above, may have to consider a full description and detailed analysis
 - ⊕ See RG 4.2 Rev 3 Section 6.2 and PNNL-29365, Transportation of Fuel and Wastes to and from Non-LWRs (ML20267A157)

Questions?