

Criticality Safety of Spent Fuel Casks Considering Water Inleakage



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Regulations for Fissile Packages

- Single Package
 - Nonmechanistic water inleakage
 - Normal conditions of transport
 - Hypothetical accident conditions
- Package Arrays
 - Criticality Safety Index

Past Review Practice

- Guidance in Standard Review Plans
 - Water inleakage for single package
 - Undamaged and damaged packages
 - Defense in depth
- High burn fuel caused reevaluation
 - Fuel reconfiguration credible

Reevaluation of Review Practice

- Working group
 - Scope limited to spent fuel casks
 - Scope limited to undamaged fuel
- Documented conclusions in ISG
 - Issued to standardize review practice
 - Assures consistent reviews
 - Available to applicants

ISG 19 Revised Review Guidance

- Issued May 2003
- Demonstrating criticality safety of spent fuel
- Single package analysis under accident conditions
- Provides two approaches
 - Approvals based on moderator exclusion
 - Approvals based on reconfigured fuel

ISG 19 Criticality Assessment

- Moderator exclusion
 - Must demonstrate water-tight barrier
 - High confidence bolted closure (NUREG/CR-6007)
 - Physical test of cask or inner canister
- Reconfigured fuel
 - Limiting configuration under accidents
 - No reliance on material properties of fuel cladding
 - Predicting fuel failure not practical

Conclusion

- Review practice reviewed
 - Initiated due to high burnup fuel
 - Consensus staff working group
- Issued ISG 19
 - Documents review practice