



# **RIC 2010**

## **Spent Fuel Pool Criticality Analysis Regulatory Path Forward**

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# Introduction

- Significant increase in spent fuel pool (SFP) criticality Licensee Amendment Requests (LAR) over past four (4) years
  - 27 SFP LARs submitted
  - Expecting 5 this calendar year
  - Prior to that (back to 2000) no more than two a year
- Significant increase in complexity of SFP criticality analysis for reasons discussed later



# What are the Requirements?

- 10CFR70.24
  - Monitor/Detect/Mitigation/Recovery
  - Emergency Plan/Drills
- 10CFR50 Appendix A GDC
  - 61: Fuel Storage & Handling and Radioactivity Control
  - 62: Prevention of Criticality in Fuel Storage & Handling
- 10CFR50.68
  - No Boron;  $k_{eff} < 0.95$  at 95/95
  - Boron:  $k_{eff} < 1.0$  w/o at 95/95;  $k_{eff} < 0.95$  at 95/95 w/
- 10CFR50.36
  - Design Features
  - Limiting Conditions for Operation



# State of the POOL

- Reduced Margins
  - More Complex Analyses Required
  - More Complex Storage Configurations
  - Material Degradation
  - Lack of a Holistic Approach
- Low Quality Submittals
- New Requirements/Challenges



## **It isn't your Grandparent's SFP**

- Increased SFP capacity due to re-rack
- Increased fuel enrichments
- Increased use of burnable absorbers
- New fuel assembly designs
- New fuel assembly materials
- Burnup credit
- Soluble Boron credit
- Deterioration of installed neutron absorbers
- Increased storage configuration complexity
- Operating Parameters
- Future Changes



## NRR's Path Forward

- NRR is preparing new guidance on
  - First establish Technical Basis
  - Develop new guidance
  - Retire OLD guidance (Kopp Letter, etc.)
- NRR Industry Engagement
  - Participate in industry forums
  - NRC workshops
  - Nuclear Criticality Safety training
- Coordinating with other NRC offices (NMSS, RES & NRO)
- Working with other stakeholders (ORNL, NEI, and others)



## What Licensees Can Do Today

- Review recent submittals, Requests for Additional Information responses, and Safety Evaluations from other licensee LARs
- Review recent problems that have occurred at SFPs that have resulted in enforcement actions
- Recognize that margins have decreased requiring more analyses with less engineering judgment
- Take a holistic approach
- Come in for pre-submittal meetings
- Improve quality



## Summary

- Each SFP Criticality Analysis is SFP Specific
- Margins have decreased challenging the status quo
- New guidance is currently being developed
- Come talk to us