Vendor Perspective on Spent Fuel Pool Criticality Analysis

NEI Used Fuel Management Conference
St. Petersburg, FL
May 8th, 2013

Westinghouse

Topics of Discussion

- Westinghouse Methodology Topical Report
- NEI Guidance Document (NEI 12-16)
- Recent Issues in Criticality Applications
- Areas of Focus in the Future
- Summary

Westinghouse Topical Report – WCAP-17483

- Past practice has been to submit a site-specific methodology for each License Amendment Request (LAR).
- Westinghouse chose to pursue a generic methodology topical report to improve regulatory efficiency and reduce review time on LARs
- Spent Fuel Pool Criticality topical report submitted in December 2011.
- NRC provided review questions in March 2012.
- Westinghouse responded to NRC review questions in June 2012.
- Southern Nuclear provided letter of support in December 2012 to support an LAR submittal in 2014.

Westinghouse Topical Report – WCAP-17483

- Applicable to PWR UO_2 fuel and new and spent fuel storage rack designs.
- Methodology addresses all issues identified in ISG-DSS-2010-01
- Depletion calculations based on NRC approved PARAGON code (WCAP-16045-P-A).
- Depletion based on conservative operating parameters determined from core reload calculations.
- Criticality calculations based on SCALE/KENO. (Other codes possible to be used with proper validation)
- Criticality Code Validation included HTC experiments with expanded trend and statistical analysis.

NEI 12-16: Spent Fuel Criticality Guidance

- Applicable to BWR and PWR fuel/racks.
- Provides guidance to licensees/vendors on areas to be addressed in the criticality analysis – but not a prescriptive methodology.
- Addresses areas outside of the criticality analysis methodology:
  - Neutron Absorber Surveillence
  - Licensee Controls
- The NEI guidance document and Westinghouse methodology topical report can be used together in a complementary manner.

Recent Issues

- Conservatism of Neglecting Gadolinium
- Impact of Control Rod Insertion
- Multiple Misloaded Assemblies
- Justification of the Depletion Code Uncertainty
- Technical Specification Content
- Modeling of Boraflex Degradation
- Requests for Extraneous Information
- Administrative Controls

Future Industry Focus Areas

- Administrative Contols to prevent multiple misloaded assemblies and use of a risk informed approach.
- Creation of a COLR type document for the Spent Fuel Pool
- Further justification for reduction of the depletion uncertainty

Summary

- Continue to support utilities in performing spent fuel pool criticality analyses.
- Having an approved generic methodology will increase safety, regulatory certainty and decrease NRC review time needed for LAR reviews.

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