NRC Pre-application Meeting
River Bend Station
Spent Fuel Pool Inserts and Criticality Safety Analysis

October 12, 2017

Purpose

- Discuss the proposed change to install NETCO's SNAP-IN® neutron absorber inserts into the RBS spent fuel pool storage cells
- Describe the methodology for a proposed spent fuel pool new criticality safety analysis supporting a license amendment request
- Seek feedback on the approach from the NRC staff

Background / Objective

- Current RBS spent fuel pool criticality analysis credits Boraflex neutron absorber material
- Contracted with Curtiss-Wright Nuclear Division to design, manufacture, and install inserts
- Contracted with Global Nuclear Fuel-Americas to prepare new criticality analysis which removes credit for Boraflex and credits inserts

SNAP-IN® Inserts

- Simple design; L-shaped (chevron), full length inserts
- Robust material, Rio Tinto Alcan's Boralcan™; a metal matrix of aluminum alloy with nuclear grade B_4C
- Similar inserts installed in BWR racks for Exelon's LaSalle, Peach Bottom and Quad Cities
- Ample neutron absorption
  - Nominal B_4C content ⟹ 21 wt%
  - Minimum certified B^{10} areal density ⟹ 0.0129 gm/cm^2
- Monitoring coupons will accompany inserts; will follow most current industry guidance
  - NEI 16-03, Guidance for Monitoring of Fixed Neutron Absorbers in Spent Fuel Pools

Criticality Analysis Methodology

- Will follow most current NRC and industry guidance
  - DSS-ISG-2010-01, Staff Guidance Regarding the Nuclear Criticality Safety Analysis for Spent Fuel Pools
  - NEI 12-16, Guidance for performing Criticality Analyses of Fuel Storage at Light-Water Reactor Power Plants (sections applicable to BWRs)
- No credit for Boraflex neutron absorber; only credit for inserts
- Main codes will be TGBLA-06 and MCNP-05P with ENDF/B-VII.0
- Standard BWR cold, in-core k_∞ peak reactivity methodology
  - Will model most reactive lattice over entire axial length; no axial blankets credited
  - Will establish maximum in-core k_∞ so that $k_{max} < 0.95$ for normal and accident conditions

Criticality Analysis Methodology

- Will address current fuel type (GNF2), next potential fuel product (GNF3) and all legacy fuel
- Uniform pool loading - all fuel storage locations with an insert and maximum reactivity fuel; no misload of fuel to consider in the rack
- Misload of fuel outside the rack is evaluated
- Missing insert evaluated to address removal during fuel movement and during periodic removal for inspection

Implementation Strategy

- Inserts installed through 10 CFR 50.59 process but not credited until license amendment request approval from NRC
  - Installation scheduled April - November 2019
- Criticality analysis submission end of 1st quarter 2018
  - Request 18 month review from NRC
- License amendment request submission end of 3rd quarter 2018
  - Request 12 month review from NRC
- Incorporate updated Technical Specifications and incorporate other changes once NRC license amendment approval is received by end of 2019