

NRC <Plant>-RAIs

The licensee's <date>, letter states that <Plant> does not have a site-specific monitoring program. Instead, the licensee is relying on general industry operating experience as a surrogate for the condition of the Boral installed in the <Plant> spent fuel pool.

NRC-<Plant>-RAI-1

Please describe how industry operating experience bounds the condition of the Boral at <Plant>, thereby providing assurance that any degradation or deformation that may affect the Boral at <Plant> is identified.

<Plant> Response to <Plant>-RAI-1

Through its Nuclear Safety Culture, procedures, and processes, <Plant> systematically and effectively collects, evaluates, and implements relevant internal and external operating experience (OE) in a timely manner. Issues emerging from the use of Boral in the spent fuel racks are monitored through the <Plant> OE Program and Corrective Action Program.

<Plant > collects OE information, specific to issues that may affect neutron-absorbing materials in spent fuel pools, through participation in the nuclear industry's Neutron Absorbers Users Group (NAUG) administered by EPRI. Industry-wide, to date there have been no indications of a loss of Boral material of a nature that diminished the neutron-absorbing capability of the Boral (EPRI Report 1021052). <Plant> follows the EPRI Water Chemistry Control Program and there been no indications of a loss of Boral neutron-absorbing capabilities at a plant following the guidelines. In addition, there are no plant-specific considerations that would merit any concern that the <Plant> spent fuel racks or SFP environment are not bounded by the industry-wide OE. Finally, EPRI Report 3002013119 documents that observed or foreseen degradation or deformation of the Boral has an insignificant impact (<100 pcm) on SFP criticality. The industry OE aligns with the <Plant> licensing basis.

The NAUG, through EPRI, is currently developing an industrywide program/database to aid in monitoring indications of potential Boral degradation and deformation. Over 70,000 water chemistry data points have been collected to date, from over 30 SFPs, for this program. Surveillance data from 50 coupons across 25 SFPs has also been collected to date. The program, supported by EPRI NAUG and industry participants, is described in EPRI document 3002013122 and includes insights and feedback received from numerous communications with the NRC. Relevant issues emerging from this industry effort will be monitored through the <Plant> OE Program and Corrective Action Program.

NRC-<Plant>-RAI-2

Please discuss the criticality impact due to relevant material deformation identified in general industry operating experience, and how it can be accommodated by the nuclear criticality safety analysis of record for <Plant> without exceeding subcriticality requirements.

<Plant> Response to <Plant>-RAI-2

To date, the industry OE has revealed no instances of an impact on SFP criticality due to observed Boral deformation (e.g. blistering) or degradation (e.g. pitting). The NAUG, through EPRI, has recently completed a study (EPRI Report 3002013122) which analyzes the criticality impact of blisters and pits on Boral. Simulations were performed for varying enrichment, burnup, areal density values, at unborated conditions (0 ppm) to ensure applicability to BWRs such as <Plant>. Simulations were performed for varying enrichment, burnup, areal density values, at unborated conditions (0 ppm), which is conservative for PWRs such as <Plant>. The study results demonstrate that pitting and blistering, on a scale much larger than any that has been observed in the industry OE, has an insignificant impact on SFP criticality. Therefore the SFP criticality safety analysis of record remains applicable.

Commented [A1]: Statement for BWRs.

Commented [A2]: Statement for PWRs.