NRR-PMDAPEm Resource

From: Klos, John
Sent: Tuesday, November 01, 2016 1:38 PM
To: Garcia, Richard M.
Cc: Klos, John
Subject: Request for Additional Information, Columbia MUR LAR: ESGB, Coating and FAC, CAC MF8060

Importance: High

Dear Mr. Garcia,

By letter dated June 28, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16183A365), as supplemented by letter dated August 18, 2016 (ADAMS Accession No. ML16231A511), Energy Northwest submitted a license amendment for Columbia Generating Station. The proposed amendment would revise the operating license and technical specification to implement an increase in rated thermal power from the current licensed thermal power of 3486 megawatts thermal (MWt) to a measurement uncertainty recapture thermal power of 3544 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the submittal and determined that following requests for additional information (RAIs) are needed to complete its technical review and make a regulatory finding regarding this license amendment.

Please see the formal RAIs below. A clarification call was held on November 1, 2016 to ensure your staff understood the RAIs. In the clarification call, Energy Northwest agreed to submit the response to the RAIs by Friday, December 9, 2016.

REQUEST FOR ADDITIONAL INFORMATION

REGARDING LICENSE AMENDMENT REQUEST FOR

MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE

COLUMBIA GENERATING STATION

ENERGY NORTHWEST

DOCKET NO. 50-397

Protective coating systems (paints) provide a means for protecting the surfaces of facilities and equipment from corrosion and contamination from radionuclides and also provide wear protection during plant operation and maintenance activities, and for their suitability for and stability under design basis LOCA accident conditions, considering radiation and chemical effects. The NRC's acceptance criteria for protective coating systems is based on (1) 10 CFR Part 50, Appendix B, which states quality assurance requirements for the design, fabrication, and construction of safety-related structures, systems, and components (SSCs) and (2) Regulatory Guide (RG) 1.54, Revision 2, Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants. Specific review criteria are contained in SRP Section 6.1.2, Protective Coating Systems (Paints)- Organic Materials Review Responsibilities.

Steam Generator Tube Integrity and Chemical Engineering Branch (ESGB) Request for Additional Information **(RAI)-1** – Protective Coatings in Containment: Consistent with the regulatory requirements stated above, the

license amendment request (LAR) dated June 28, 2016 (Agencywide Documents Access Management System (ADAMS) Accession No. ML16183A365, Enclosure 9, Section 4.1.5 Containment Coating states that the service level 1 coatings in containment are qualified to 340 degrees F, 70 psi, and 1.1 x 106 rads. In order for the staff to determine whether the coatings will continue to perform their safety function and will not be adversely impacted by the power uprate conditions, provide the containment temperature, pressure, and radiological dose conditions for the expected post-measurement uncertainty recapture power uprate design basis loss of cooling accident environmental conditions.

Flow Accelerated Corrosion (FAC) is a corrosion mechanism occurring in carbon steel components exposed to single-phase or two-phase water flow. Components made from stainless steel are immune to FAC, and FAC is significantly reduced in components containing even small amounts of chromium or molybdenum. The rates of material loss due to FAC depend on the system flow velocity, component geometry, fluid temperature, steam quality, oxygen content, and pH. During plant operation, it is not normally possible to maintain all of these parameters in a regime that minimizes FAC; therefore, loss of material by FAC can occur and the rate of material loss needs to be predicted so that repair or replacement of damaged components could be made before reaching a critical thickness. The NRC's acceptance criteria are based on the structural evaluation of the minimum acceptable wall thickness for the components undergoing degradation by FAC.

ESGB **RAI-2** – FAC:

The measurement uncertainty recapture (MUR) power uprate will affect several process variables that influence FAC. Identify the systems (e.g. main steam, feedwater, and balance of plant systems) that are expected to experience the greatest increase in wear as a result of the power uprate and discuss the effect of individual process variables (i.e., moisture content, temperature, oxygen, and flow velocity) on each system identified. For the most susceptible components, provide the predicted increase in wear rate due to FAC as a result of power uprate conditions.

ESGB **RAI-3** – FAC:

In April 2013, a through wall leak was discovered in the reactor water clean up (RWCU) system at Columbia Generating Station. This leak appeared to be the result of FAC (as stated by the licensee in a relief request dated April 5, 2013, ADAMS Accession No. ML13108A218).

Accordingly, the staff requests that the licensee provide a summary of the corrective actions taken that impacted the FAC monitoring program, as a result of this operating experience, to include;

- a sample list of components for which wall thinning is predicted and measured by ultrasonic testing or other methods that includes the initial wall thickness (nominal),
  current (measured) wall thickness, and a comparison of the measured wall thickness to the thickness predicted by the model,
- confirmation that the CHECWORKS predictive modeling software is still used; and
- changes to the input for the predictive method to calculate wall thinning due to FAC that have been made.

In addition, please describe any impacts that the proposed MUR power uprate may have on areas that were impacted by this operating experience above, such as,
if the inspection frequency or scope has changed.

Thank you,

John Klos
DORL Callaway, Columbia Project Manager
U.S. NRC, Office of Nuclear Reactor Regulation,
Division of Operating Reactor Licensing, O8E7
NRC/NRR/DORL/LPL4-1, MS O8H4A

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