IPRenewal NPEmails

From: Daily, John
Sent: Tuesday, November 27, 2012 7:04 AM
To: Waters, Roger M.; 'Walpole, Robert W'
Cc: IPRenewal NPEmails
Subject: Draft RAI Set 2012-04

Draft RAIs 6a and 11a, followups to RAIs 6 and 11, are attached.
Please review these with your staff and indicate whether IPEC desires a conference call to clarify the RAIs.

Thanks!

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Draft Follow Up RAIs 6a_11a-to...

Hearing Identifier: IndianPointUnits2and3NonPublic_EX
Email Number: 3938

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Subject: Draft RAI Set 2012-04
Sent Date: 11/27/2012 7:04:02 AM
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From: Daily, John

Created By: John.Daily@nrc.gov

Recipients:
"IPRenewal NPEmails" <IPRenewal.NPEmails@nrc.gov>
Tracking Status: None
"Waters, Roger M." <rwater1@entergy.com>
Tracking Status: None
"'Walpole, Robert W'" <rwalpol@entergy.com>
Tracking Status: None

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MESSAGE	383	11/27/2012 7:04:04 AM
Draft Follow Up RAIs 6a_11a-to IPEC responses-R1.docx	23763	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
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Draft RAI set 2012-04, Indian Point Units 2 and 3

RAI 6a (Followup to RAI 6)

Background

By letter dated May 15, 2012, the staff requested information from the applicant regarding its RVI Inspection Plan and the RVI components in RAI 6. In particular, the staff requested that the applicant submit an evaluation demonstrating that Indian Point Nuclear Generating Unit Nos. 2 and 3 (IP2 and IP3),are bounded by the assumptions regarding plant design and operating history that were made in the failure modes, effects and consequences analyses (FMECA) and functionality analyses for reactors of those designs.

Issue

Review of applicant's response dated September 28, 2012, indicates that further information is needed in order for the staff to complete its review of the applicant's RVI AMP and Inspection program.

Request

The staff requests the following information as a follow-up to the response to RAI 6:

1. Provide plant specific information for IP2 and IP3, in addition to the core loading pattern and operation history, supporting the assertion that the neutron fluence values for the IP2 and IP3 reactor vessel internals (RVI) components are reasonably represented by the neutron fluences assumed in MRP-191, "Materials Reliability Program: Screening, Categorization and Ranking of Reactor Internals of Westinghouse and Combustion Engineering PWR Designs (Ref. 1)," Table 4-6. The applicant's response should include consideration of Section 4.3.2 of MRP-191, which describes plant-specific variables that can significantly affect the neutron fluence values, such as core power density and certain RVI dimensions, in particular the distance between the active core and the lower core plate.
2. Basing the component temperatures on coolant temperature alone does not appear to take into account gamma heating. Provide plant specific information for IP2 and IP3, in addition to the core loading pattern and operation history, and the reactor coolant hot leg and cold leg temperature, that supports the assertion that the temperature values for the IP2 and IP3 RVI components are reasonably represented by the temperature values provided in MRP-191, Table 4-6. The response should include a discussion of how T_{hot} and T_{cold} for IP2 and IP3 compare to T_{hot} and T_{cold} of the representative Westinghouse plant and how the internal metal temperatures due to gamma heating would compare between IP2 and IP3 and the representative Westinghouse plant.
3. Identify the components, mentioned in Part 3b of the applicant's responses for IP2 and IP3 that are made from Type CF8 stainless steel rather than Type 304 stainless steel as given in MRP-191. Since CF8 is a cast austenitic stainless steel rather than a wrought austenitic stainless steel in the case of Type 304, the applicant should consider whether the Type CF8 components may be subject to different aging mechanisms than assumed in MRP-227-A. Provide a plant-specific aging management program for these components as appropriate.

4. Material and neutron fluence dependent threshold stress values are summarized in Section 3 of MRP-191 for the various aging mechanisms. Table A-1 of MRP-191 provides the results of the expert elicitation process regarding RVI component stresses as compared to these threshold stresses. Summarize the results of step 6 of the process described in part 2b of the applicant's response, regarding "determination of stress values from design basis documents." Compare these results to the stress determination from MRP-191 for the representative Westinghouse RVI.

RAI 11a

Background

In RAI 11, the staff requested additional information on the approach to be used for the plant-specific evaluation of the lower support column bodies. The applicant's response indicates it plans to use a screening approach using the screening criteria for thermal aging embrittlement susceptibility from the staff's May 19, 2000, letter (Ref. 2). The applicant provided a table of the screening criteria based on chemistry, casting method, and delta ferrite content identical to Table 2 of Reference 1.

Issue

In addition to providing a table of screening criteria, Reference 1 recommends that in order to account for a potential synergistic effect on loss of fracture toughness due to the combined effects of thermal embrittlement (TE) and neutron irradiation embrittlement (IE), the applicant should perform component-specific assessments for components that will experience neutron fluence of $1x10^{17}$ neutrons per square centimeter (n/cm^2) or greater. Reference 1 also recommends supplemental inspections for those components that are potentially susceptible to TE and IE, and that are also subject to significant tensile loadings under any normal operating or design basis condition.

Per Table 4-6 of MRP-191, the screening value of the neutron fluence for the lower support column bodies for Westinghouse-design reactor vessel internals (RVI) is $1x10^{22}$ to $5x10^{22}$ n/cm^2. This is significantly greater than the $1x10^{17}$ n/cm^2 threshold value provided in Reference 1 for conducting supplemental inspections.

Request

Describe how the effects of neutron fluence, with respect to a potential synergistic effect of TE and IE, will be addressed in the plant-specific evaluation of the lower support column bodies. The applicant should propose modifications of the aging management requirements for the lower support column bodies as necessary to address the concern regarding a potential synergistic effect.

References

1. MRP-191 Revision 0, "Materials Reliability Program: Screening, Categorization and Ranking of Reactor Internals of Westinghouse and Combustion Engineering PWR Designs," ADAMS Accession Number ML091910130

2. U.S. Nuclear Regulatory Commission Letter, “License Renewal Issue No. 98-0030, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel Components,” May 19, 2000 (NRC ADAMS Accession No. ML003717179)