IPRenewal NPEmails

From: Daily, John
Sent: Thursday, December 13, 2012 9:32 AM
To: Waters, Roger M.; Walpole, Robert W
Cc: IPRenewal NPEmails; Poehler, Jeffrey
Subject: IPEC draft followup RAI 15a

Attached please find draft followup RAI 15a for the IP Units 2 and 3 RVI program, in support of the IPEC SSER currently underway.

Please review with your staff and indicate whether IPEC desires a conference call to clarify these issues.

Thanks!

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Draft RAI 15a for IPEC.docx

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RAI I5a

Background

In its response to RAI 15, Question 1, by letter dated October 17, 2012 (Ref. 1) the licensee revised their response to RAI 12 to indicate that they intend to use the Reactor Vessel Internals (RVI) Program to manage the cracking - fatigue aging effect for RVI components that have a time-limited aging analysis (TLAA) that determined a cumulative usage factor (CUF). The licensee provided a list of the RVI components that have a CUF analysis, a table cross-indexing these components with the equivalent component name in MRP-227-A, along with the inspection requirements, and a justification for each component with a CUF that the inspection requirements are adequate to manage the cumulative fatigue damage aging effect.

Part 5 of Action Item 8 of the staff's final SE of MRP-227-A contains two requirements that must be fulfilled by licensees that intend to use the RVI Program to manage the cracking-fatigue aging effect for components with a time-limited aging analysis (TLAA) for fatigue:

1. For those cumulative usage factor analyses that are TLAAs, the applicant may use the PWR Vessel Internals Program as the basis for accepting these CUF analyses in accordance with 10 CFR 54.21 (c) (1) (iii) only if the RVI components in the CUF analyses are periodically inspected for fatigue-induced cracking in the components during the period of extended operation.

2. The periodicity of the inspections of these components shall be justified to be adequate to resolve the TLAA.

Many of the RVI components with TLAA analyses for both IP2 and IP3 are not "primary" components, or are either "existing programs" or "no additional measures" components under MRP-227-A which are inspected under the ASME Section XI, Inservice Inspection Program and are thus only subject to a VT-3 visual examination. Those components categorized as "expansion" may or may not be inspected under the RVI Program based on the findings of the RVI Inspection Program examinations of the linked "primary" component(s). Additionally, a VT-3 visual examination may not be adequate for all components for detecting fatigue cracking prior to structurally significant cracking occurs, although the staff notes that VT-3 examination is used for some components that were determined to be primary components for fatigue (such as thermal shield flexures and baffle-edge bolts).

In general, a justification for the inspection periodicity was not provided in the response to RAI 15. The default inspection periodicity for most "primary" inspection category components in MRP-227-A is every ten years following the initial inspection.

All of the CUFs for RVI components provided in Tables 4.3-5 and 4.3-6 of the IP2 & IP3 License Renewal Application (LRA) are less than 1.0. However, these CUFs were determined without the application of an environmental correction factor (F_{en}) to account for the effects of the reactor coolant environment. However, it is reasonable to conclude that if the reactor coolant environment affects the fatigue usage of other components in the reactor coolant system and reactor pressure vessel that it would affect the RVI components similarly. The F_{en} for the reactor pressure vessel (RPV) components and reactor coolant system given in Section 4.3.4 of the LRA ranged from 2.45 to 15.35. Application of F_{en} in this range could cause the CUF of

some RVI components to exceed 1.0. This would affect the required periodicity of inspection. For very high environmentally adjusted CUF, even a 10-year inspection interval may not be adequate.

Issue

1. Most of the RVI components with a fatigue TLAA analysis are not "Primary" inspection category components under the RVI Program, thus may be subject to no inspection other than a VT-3 visual examination under the ASME Section XI, Inservice Inspection Program, since "Expansion" category component inspections are only triggered in the event of degradation of the linked "Primary" inspection category component(s).
2. The licensee did not justify the adequacy of the periodicity of the RVI Program inspections performed on RVI components that have fatigue TLAA analyses.

Requested Information

1. For those RVI components having fatigue TLAA analyses for which the cumulative fatigue damage aging effect is to be managed by the RVI Inspection Program, but which are classified as "Expansion", "Existing Programs", or "No Additional Measures" inspection category components, provide a modification to your RVI Inspection Program to recategorize these components as "Primary" inspection category components. If Entergy decides that any such components are to remain in the program's "Expansion" category, provide an adequate technical justification for potentially never inspecting these components.

2. For those RVI components having fatigue TLAA analyses for which the cumulative fatigue damage aging effect is to be managed by the RVI Inspection Program, provide a quantitative justification that the periodicity of inspections for fatigue is adequate, either in terms of the calculated CUF (considering the effects of the environment on the CUF analysis), or by using a flaw tolerance approach.

3. For those RVI components having fatigue TLAA analyses for which the cumulative fatigue damage aging effect is to be managed by the RVI Inspection Program and which are to be inspected by visual VT-3 examination only, justify that such an examination is adequate to detect fatigue cracking before it becomes structurally significant.

References

1. Letter from F. Dacimo to NRC dated October 17, 2012, Subject: Indian Point Nuclear Generating Unit Nos. 2 & 3 - Reply to Request for Additional Information Regarding the License Renewal Application. (ADAMS Accession No. ML12300A391)