DiabloCanyonNPEm Resource

From: Green, Kimberly
Sent: Thursday, May 20, 2010 5:31 PM
To: Grebel, Terence; Soenen, Philippe R
Cc: DiabloHearingFile Resource
Subject: Draft RAI Set 4 (Correction Email)
Attachments: Draft RAI Set 4 AMP Audit RAIs Part 2.doc

Terry and Philippe,

Attached is Set 4 (corrected) containing draft RAIs, specifically on some of the aging management programs (AMPs) reviewed during the AMP audit. Please review the attached draft RAIs and let me know if and when you would like to have a teleconference call. The purpose of the call will be to obtain clarification on the staff's request.

Please let me know if you have any questions.

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Recipients:
"DiabloHearingFile Resource" <DiabloHearingFile.Resource@nrc.gov>
Tracking Status: None
"Grebel, Terence" <TLG1@pge.com>
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Diablo Canyon Nuclear Power Plant, Units 1 and 2 (DCPP)
License Renewal Application (LRA)
Draft Request for Additional Information Set 4
Aging Management Programs

D-RAI B2.1.16-1

GALL Report AMP XI.M32, "One-Time Inspection," "detection of aging effects" program element states that "the inspection includes a representative sample of the system population, and, where practical, focuses on the bounding or lead components most susceptible to aging…." The applicant's One-Time Inspection program description states, in part, that sampling will be conducted "using an engineered sampling technique for each material-environment group based on criteria such as the longest service period, most severe operating conditions, lowest design margins, lowest or stagnant flow conditions, high flow conditions, and highest temperature."

Provide additional details of the sampling procedure to be used. Indicate whether the One-Time Inspection program utilizes a risk-informed inservice inspection or similar methodology, or an alternative form of probabilistic or statistical sampling to select the number, types, and locations of the components to be inspected under this program. If not, provide additional details of the sampling procedure to be used.

D-RAI B2.1.16-2

LRA Table 3.3.1, Item 3.3.1.07 refers to the aging evaluation of stainless steel non-regenerative heat exchanger components exposed to treated borated water in the auxiliary systems. The aging effect identified is cracking due to stress corrosion cracking, and the GALL Report recommends the use of the Water Chemistry Program to manage this effect. The GALL Report also states that further evaluation is recommended and that an acceptable verification program is to include temperature and radioactivity monitoring of the shell side water, and eddy current testing of the tubes. The applicant proposes to manage this aging effect using its Water Chemistry Program, with its One-Time Inspection Program to be used for verification of program effectiveness.

In its further evaluation of this aging effect, the applicant states that temperature and radioactivity of the shell-side water of the letdown (non-regenerative) heat exchanger is monitored continuously by installed plant instrumentation. The applicant also states that its One-Time Inspection Program will be used in lieu of eddy-current testing of the tubes to provide confirmation that cracking is not occurring. However, the applicant does not identify the testing technique to be used to perform the proposed inspections.

Describe the details of the inspection technique to be used to perform the one-time inspection of these components in lieu of eddy-current testing and provide relevant plant or industry experience to demonstrate the effectiveness and reliability of this technique.

D-RAI B2.1.16-3

LRA Table 3.3.1, Item 3.3.1.35 refers to the aging evaluation of pump casings in auxiliary systems fabricated of steel with stainless steel cladding and exposed to treated borated water. The aging effect identified is loss of material due to cladding breach, and the GALL Report recommends the use of a plant-specific aging management program. The applicant proposes to manage this aging effect using its Water Chemistry Program, with its One-Time Inspection Program to be used for verification of program effectiveness.

The staff notes that treated borated water is corrosive with respect to the ferritic steel underlying the stainless steel cladding in these pump casings. This means that even if proper water chemistry is maintained under the applicant's Water Chemistry Program, the ferritic steel substrate will undergo corrosive attack in the event of a cladding breach. The applicant must therefore rely on its proposed One-Time Inspection Program to detect this aging effect in these components. Since loss of material in the underlying ferritic steel is not normally surface-intersecting, a volumetric inspection technique such as ultrasonic testing would normally be used for detection purposes. However, the complex microstructure and geometry of this weld-clad component makes ultrasonic inspection difficult and potentially unreliable.

Describe the details of the inspection technique to be used to perform the one-time inspection of these components and provide relevant plant or industry experience to demonstrate the effectiveness and reliability of this technique.

D-RAI B2.1.19-1

GALL AMP XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping," states that a volumetric inspection should be used to detect cracking in small-bore piping. However, the applicant's One-Time Inspection of ASME Code Class 1 Small-Bore Program in LRA Section B2.1.19 states that a reliable and effective volumetric inspection technique to detect cracking in socket welds is currently not available. The applicant instead proposes to use the visual examination technique (VT-2) for the examination of small-bore socket welds.

The applicant's proposed usage of the VT-2 technique for the examination of these welds conflicts with the guidance in the GALL Report.

Justify the proposed deviation from the GALL Report recommendation to perform volumetric examinations of socket welds in ASME Code Class 1 small-bore piping.

D-RAI B2.1.19-2

GALL AMP XI.M35 states that the One-Time Inspection of ASME Class 1 Small-Bore Piping Program is applicable only to plants that have not experienced cracking of ASME Class 1 small-bore piping. It further states that "[s]hould evidence of significant aging be revealed by a one-time inspection or previous operating experience, periodic inspection will be proposed, as managed by a plant -specific program."

During a review of the applicant's operating experience, the staff noted that there have been failures of Class 1 small bore piping at DCPP.

In view of the above-cited GALL Report guidance and plant-specific operating experience, justify the proposed application of the applicant's proposed One-Time Inspection of ASME Code Class 1 Small-Bore Piping Program, or provide a plant-specific AMP for managing aging during the period of extended operation.

D-RAI B2.1.22-1

GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," states that the program includes visual inspections of internal surfaces of steel piping, piping components, ducting, and components in an internal environment (such as indoor uncontrolled air, condensation, and steam) for degradation from various corrosion mechanisms. In the two exceptions to the GALL Report stated in LRA Section B2.1.22, the program is expanded to include additional materials (aluminum, asbestos cement, copper alloy, elastomers, nickel alloys, stainless steel, and cast austenitic stainless steel) and to include additional examination techniques (volumetric testing and physical manipulation).

In the actual application of this AMP as summarized in the applicant's LRA, the scope of the program is significantly expanded beyond both GALL XI.M38 and the applicant's description of the program in LRA Appendix B, Section B2.1.22. This expanded application of the program in the LRA appears to encompass a substantial number of additional component types, materials, and environments beyond those in the GALL Report and the applicant's AMP description.

Clarify that the program description for Inspection of Internal Surfaces of Miscellaneous Piping and Ducting Components Program in Appendix B of the LRA encompasses the actual application of the program as described in the LRA.

D-RAI B2.1.22-2

In LRA Appendix B, Section B2.1.22, the applicant states that this program "will use the work control process for preventive maintenance and surveillance to conduct and document inspections."

The term "work control process" appears nowhere else in the applicant's LRA except in the Appendix A FSAR supplement for this AMP, nor does it appear anywhere in either the GALL Report or NUREG-1800, Revision 1, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." Consequently, the staff is unable to determine precisely what is meant by this term in the context of the applicant's program description.

Define what is meant by the term "work control process" as it is used in the description of the program, particularly with respect to what program elements in the GALL Report it impacts and how it impacts these elements.

D-RAI B2.1.24-1

The GALL Report AMP XI.E1 program description states that cables and connections from accessible areas (the inspection sample) are inspected and represent, with reasonable assurance, all cables and connections in the adverse localized environments. The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program in the LRA states: "At least once every 10 years, accessible

cables/cable jackets, connections, and terminal blocks within the scope of license renewal located in an adverse localized environment are inspected."

It is unclear if the applicant will use sampling or include all cables (within the scope of license renewal) in its inspection.

Please clarify if all accessible cables and connections within adverse localized environments will be inspected consistent with the GALL Report.

D-RAI B2.1.25-1

In order for NRC staff to review an Aging Management Program with enhancement(s), the impact of the enhancement(s) for each element of the Aging Management Program must be clearly stated.

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program (LRA Appendix B, Section B2.1.25) states: "the following enhancement will be implemented in the following program elements: Scope of Program - Element 1, Parameters Monitored/Inspected - Element 3, Detection of Aging Effects - Element 4, Acceptance Criteria - Element 6, and Corrective Actions - Element 7." The LRA lacks detailed information on how the enhancement impacts each element. This information is also incomplete in the basis document.

Explain how each element will be impacted by enhancement such that it will be consistent with the GALL Report.