LimerickNPEm Resource

From: Kuntz, Robert
Sent: Tuesday, May 01, 2012 2:22 PM
To: Anthony Z. Roisman; gfettus@nrdc.org
Cc: Smith, Maxwell; Kanatas, Catherine
Subject: FW: REVISED DRAFT Request for Information RE: Limerick License Renewal Application
Attachments: DRAFT RASB AMP Audit RAIs Rev2.docx

From: Kuntz, Robert
Sent: Tuesday, January 24, 2012 11:35 AM
To: 'Christopher.Wilson2@exeloncorp.com'
Subject: REVISED DRAFT Request for Information RE: Limerick License Renewal Application

Chris,

Attached is a DRAFT request for information that was revised to clarify the request based on a teleconference held 1/19/12 between the NRC staff and Exelon. If you would like clarification on the attached, let me know and I will set up a teleconference. The following DRAIs were revised based on the teleconference:

B.2.1.30-2
B.2.1.32-3
B.2.1.40-3
B.2.1.40-4
B.2.1.41-2

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Created By: Robert.Kuntz@nrc.gov

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DRAI B.2.1.30-1

Background

GALL Report AMP XI.S1, ASME Section XI, Subsection IWE, element 1, “scope of program,” recommends examination of coatings that are intended to prevent corrosion.

Issue

Section 3.1 of the Limerick Generating Station (LGS) program basis document, LG-AMP-PBD-XI.S1, Revision 1, states that coatings are not credited to prevent corrosion under the scope of ASME Section XI, Subsection IWE program. However, Commitment 30 in Appendix A of the license renewal application (LRA), and Section 2.4 of the program basis document states:

“ASME Section XI, Subsection IWE is an existing program that will be enhanced to:

1. Manage the suppression pool liner and coating system to:
   a. Remove any accumulated sludge in the suppression pool every refueling outage.
   b. Perform an ASME IWE examination of the submerged portion of the suppression pool each Inservice Inspection (ISI) period.
   c. Use the results of the ASME IWE examination to implement a coating maintenance plan to:
      - Perform local recoating of areas with general corrosion that exhibit greater than 25 mils plate thickness loss.
      - Perform spot recoating of pitting greater than 50 mils deep.
      - Recoat plates with greater than 25 percent coating depletion

The coating maintenance plan will be initiated in the 2012 refueling outage for Unit 1 and the 2013 refueling outage for Unit 2 and implemented such that the areas exceeding the above criteria are recoated prior to the period of extended operation. The coating maintenance plan will continue through the period of extended operation to ensure the coating protects the liner to avoid significant material loss.”

Request

Explain the apparent inconsistency between the recommendations in the GALL Report, different sections of the program basis document, and Commitment 30 in the LRA. The response should clearly state whether the coating maintenance plan is credited for preventing corrosion of the surfaces of structures which credit the ASME Section XI, Subsection IWE program.

DRAI B.2.1.30-2

Background

GALL Report AMP XI.S1, ASME Section XI, Subsection IWE, element 6, “acceptance criteria,” recommends documentation of containment steel shell or liner material loss locally exceeding

10 percent of the nominal wall thickness or material loss that is projected to locally exceed 10 percent of the nominal containment wall thickness before the next examination. Such areas are corrected by repair or replacement in accordance with ASME Code, Section XI, Subsection IWE-3122 or accepted by engineering evaluation.

ASME Code, Section XI, Subsection IWE-3122.3 (b) states that, “When flaws or areas of degradation are accepted by engineering evaluation, the area containing the flaw or degradation shall be reexamined in accordance with ASME Code, Section XI, Subsection IWE-2420(b) and (c).

ASME Code, Section XI, Subsection IWE-2420(b) requires that when examination results require evaluation of flaws or areas of degradation in accordance with ASME Code, Section XI, Subsection IWE-3000, the areas containing such flaws or areas of degradation shall be reexamined during the next inspection period listed in the schedule of inspection program of ASME Code, Section XI, Subsection IWE-2411 or IWE-2412, in accordance with ASME Code, Section XI, Subsection IWE, Table IWE-2500-1, Examination Category E-C. ASME Code, Section XI, Subsection IWE Table 2500-1 designates Examination Category E-C as surfaces requiring augmented examination.

Issue

Section 3.4 of the LGS program basis document LG-AMP-PBD-XI.S1, Revision 1 states that:

ASME Section XI, Subsection IWE is an existing program that will be enhanced to manage the suppression pool liner and coating system to:

a. Remove any accumulated sludge in the suppression pool every refueling outage.
b. Perform an ASME Code, Section XI, Subsection IWE examination of the submerged portion of the suppression pool each ISI period.
c. Use the results of the ASME Code, Section XI, Subsection IWE examination to implement a coating maintenance plan to:
    - Perform local recoating of areas with general corrosion that exhibit greater than 25 mils plate thickness loss.
    - Perform spot recoating of pitting greater than 50 mils deep.
    - Recoat plates with greater than 25 percent coating depletion.

Section 3.4, detection of aging effects, of LG-AMP-PBD-XI.S1 states that there are no areas identified for augmented inspection in the drywells or suppression pools. Section 3.6, acceptance criteria, also states that the ASME Section XI, Subsection IWE program implementing procedures and references contain the acceptance criteria for containment surface examinations.

LGS implementing procedure MA-LG-793-001, “Visual Examination of Containment Vessels and Internals,” has the following acceptance criteria:

Localized areas of corrosion shall not exceed the following:

Drywell 100 mils

Drywell Head	50 mils
Suppression Pool	62.5 mils

Contrary to the GALL Report recommendations and acceptance criteria delineated in the implementing procedure MA-LG-793-001, an Assignment Report, AR 01063631, identified pitting of up to 122 mils in the liner plate, and was dispositioned to be acceptable by the use of the following acceptance criteria:

- For pitting corrosion the area shall be recoated when the metal loss is 1/8 inch (125 mils lost and 125 mils remain)
- For pitting corrosion the area shall be repaired (metal repair) when the metal loss is 3/16 inch (187.5 mils lost and 62.5 mils remain)
- For general corrosion the area shall be repaired (metal repair) when metal loss is 1/8 inch (125 mils lost and 125 mils remain)
- Suppression pool columns recoating criteria is a loss of 60 mils

During the audit, the staff reviewed suppression pool liner plate corrosion records and found that adjacent plate panels had a variation in thickness of up to 50 mils (20 percent) due to general corrosion.

<u>Request</u>

Provide:

1. The basis for the acceptance criteria used for corrosion of liner plate and suppression pool columns.

2. Acceptance criteria used for corrosion of downcomer piping and its basis.

3. The reason for the apparent discrepancy between the acceptance criteria identified in Commitment 30, LGS procedure MA-LG-793-001, and the one used for disposition of AR01063631.

4. Confirm that the acceptance criteria delineated in the implementing procedure MA-LG-793-001 and the one used to disposition AR01063631 was established considering the effect of a variation in plate thickness between two adjacent panels on the liner plate anchors, and is consistent with original design basis that was based on Section 3.3 of the Bechtel Topical Report BC-TOP-1, Revision 1 which states, “In the analysis, a panel with outward curvature which is +16% over nominal thickness will be considered adjacent to a plate with inward curvature of nominal thickness. The preceding condition is highly improbable and therefore, it is not necessary to consider a case of plate which is -4% under the nominal thickness.”

5. Reasons for not following the recommendations of the GALL Report and ASME Section XI, Subsection IWE requirements for augmented examinations (Examination Category E-C) of the containment surfaces subject to degradation in accordance with IWE-1240 for areas with material loss in excess of 10 percent of the nominal containment wall thickness.

DRAI B.2.1.30-3

Background

GALL Report AMP XI.S1, ASME Section XI, Subsection IWE recommends that containment coatings shall be monitored and maintained in accordance with GALL Report AMP XI.S8.

Issue

1. LGS Specification NE-101, Revision 5, "Specification for Coating and Liner Inspection and Coating Repair of Suppression Chambers at Limerick Generating Station Units 1 and 2," requires that a floor or wall steel plate or downcomer in the suppression chamber with a loss coating greater than 25 percent of the surface area to be classified as ASME Section IWE, Category E-C, "Containment Surfaces Requiring Augmented Inspection."

2. The staff review of AR 01063631 during the audit identified extensive general and pitting corrosion of the suppression pool liner plate, downcomers, and columns. This included the following:

    - General corrosion and spot corrosion was recorded on about 13 percent of the cumulative surface area of the 87 downcomers. Seventy-five percent of the underwater coating of one downcomer (number 79) was missing.
    - One column had no coating in an area of 42" x 36".
    - Four of the 44 floor panels and 2 of the 30 wall panels experienced a loss of greater than 30 percent of the protective coating. One floor panel had a loss of seventy two percent of the underwater coating.

All of these conditions were found to be acceptable in AR 01063631.

3. The carbon steel suppression pools of the LGS containments were coated with zinc primer. The zinc coating was applied to the suppression pool about 30 years ago. Recent operating experience has shown that zinc coatings have a limited lifetime and may not be effective during the period of extended operation if not reapplied.

Request

Explain the following:

1. The basis for accepting the degradation due to corrosion of the suppression pool components as documented in AR 01063631.

2. Basis for using 25 percent loss of coating as a criterion to classify the affected area as ASME Section IWE, Category E-C that require augmented inspection.

3. Reasons for not recoating the entire suppression pool and drywell liner plate, and associated components to manage the aging of the containment during the period of extended operation.

DRAI B.2.1.30-4

Background

GALL Report AMP XI.S1, element 5, “monitoring and trending,” recommends developing a corrosion rate for containment liner plate and associated components that can be inferred from past ultrasonic testing (UT) examinations or establish a corrosion rate using representative samples in similar operating conditions, materials, and environments.

Issue

During the audit, the staff did not find any evidence that the applicant is trending the degradation of the containment drywell and suppression chambers, or has established a corrosion rate using UT examinations or by any other method.

Request

Provide trending details related to the thickness of the containment drywell and suppression chamber components that establish a corrosion rate and project the loss of thickness through the end of the period of extended operation. Specifically, provide the trends in loss of thickness and corrosion rate for the suppression pool floor and wall panels, columns, downcomers, and reactor pedestal.

DRAI B.2.1.30-5

Background

The GALL Report recommends non-coated surfaces to be examined for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities.

Issue

During the audit, the staff reviewed the ASME IWE (Class MC) Containment Visual Examination NDE Report for different components, including one for the drywell closure head (IWE-20S199-DWH). This report had photographs of the different attachments to the drywell closure head that show extensive corrosion and pitting. However, the examination report found that the condition is acceptable by visual examination.

Request

Explain the basis for acceptance of extensive corrosion and pitting on the different attachments to the drywell closure head (IWE-20S199-DWH). The response should include any records of measurement of loss in thickness due to general and pitting corrosion, and any trends in the loss of thickness to demonstrate that the effects of aging will be adequately managed during the period of extended operation.

DRAI B.2.1.31-1

<u>Background</u>

GALL Report AMP XI.S2, ASME Section XI, Subsection IWL, program element 6, “acceptance criteria,” refers to American Concrete Institute (ACI) 349.3R for identification of concrete degradation. Chapter 5, “evaluation criteria,” of ACI 349.3R states that “The application of first-tier evaluation criteria can be overly conservative for massive concrete structures, structures not exposed to certain degradation mechanisms, or structures possessing concrete cover in excess of the minimum requirements of ACI 349, Chapter 7, such as concrete tank foundations, retaining walls, and concrete containment structures.”

Chapter 7.7 of ACI 349, “Code Requirements for Nuclear Safety-Related Concrete Structures,” lists the minimum requirement for concrete protection cover for reinforcement for No. 18 bars as 1.5 inch. LGS Plant drawings: C-866, Revision 5, “Reactor Building Units 1 & 2 Primary Containment Drywell Wall Sections & Detail,” and C-250, Revision 8, “Reactor Building Units 1 & 2 Primary Containment Suppression Pool Wall – Sections,” shows the minimum reinforcement cover as 2.0 inches from the center of 6X6X6/6 Welded-Wire-Fabric.

<u>Issue</u>

The program basis document states that, “Criteria based on the ACI 349.3R-02 Chapter 5 second tier has been used consistent with the following Chapter 5 statements and provisions: ‘The application of first-tier evaluation criteria can be overly conservative for massive concrete structures, structures not exposed to certain degradation mechanisms, or structures possessing concrete cover in excess of the minimum requirements of ACI 349 Chapter 7, such as concrete tank foundations, retaining walls, and concrete containment structures. For these types of structures, it is acceptable to compare the observed conditions with the second-tier evaluation criteria parameters’.”

The difference of ½ inch in reinforcement cover from the ACI code requirement to construction application can be considered as the construction-tolerance. Therefore, the code requirement of ACI 349.3R-02 in Chapter 5 “…..structures possessing concrete cover in excess of the minimum requirements of ACI 349, Chapter 7….” may not be satisfied.

<u>Request</u>

Provide justification for not using first-tier evaluation criteria for containment degradation per the requirements of Chapter 5.1 of ACI 349.3R-02, “Evaluation of Existing Nuclear Safety-Related Concrete Structures.”

DRAI B.2.1.31-2

Background

GALL Report AMP XI.S2, ASME Section XI, Subsection IWL, program element 6, "acceptance criteria," rely on the determination of the "Responsible Engineer" as defined by the ASME Code. Specifically, IWL-2320 states that, "The Responsible Engineer shall be a Registered Professional Engineer experienced in evaluating the conditions of structural concrete. The Responsible Engineer shall have knowledge of the design and Construction Codes and other criteria used in design and construction of concrete containments in nuclear power plants."

Issue

The applicant's procedures ER-AA-335-001, Revision 5, "Qualification and Certification of Non-Destructive Examination (NDE) Personnel," and Section 3.3.1 of ER-AA-335-018, Revision 5, do not clearly define the qualification requirements of the Responsible Engineer.

Request

Please clarify if the Responsible Engineer will be qualified in accordance with the requirements of ASME Code, Section IWL-2320.

DRAI B.2.1.31-3

Background

GALL Report AMP XI.S2, ASME Section XI, Subsection IWL, program element 10, "operating experience," states that "Implementation of Subsection IWL, in accordance with 10 CFR 50.55a, is a necessary element of aging management for concrete containments through the period of extended operation."

Issue

The applicant identified containment boundaries on a drawing in AR 00836350 for the ASME Code, Section XI, Subsection IWL and IWE programs (Drawing #: ISI-C-001, Revision 0 "Limerick Generating Station Units 1& 2") by responding to an ISI Focus Area Self Assessment (FASA) Report. The ISI Boundary drawing included the ceiling of the suppression pool (Q-deck and diaphragm slab) as part of the IWL Program. The applicant responded to an Issue Report, AR 01048714, regarding the inspection results of the Q-deck installed at the bottom of the 3"-6" thick diaphragm slab. Even though the Q-deck and other abandoned steel structural members serve no structural purpose, the applicant's discussion/evaluation included surface rust of Q-deck in the corrosion product inventory value used for sizing the Emergency Core Cooling Systems (ECCS) suction strainers. This condition was documented in GE CNF-10-001 inspection report. The staff is concerned that the degradation of the Q deck and abandoned steel structural members may impact ECCS through the period of extended operation.

Request

1. Identify the effects of Q-deck degradation on the concrete diaphragm slab, including potential degradation of rebars.

2. Discuss how the corrosion from the Q-deck and other abandoned steel structures attached to the ceiling of the suppression pool would impact the corrosion-product inventory in the suppression pool and the operation of the current ECCS suction strainers through the period of extended operation.

DRAI B.2.1.32-1

Background

GALL Report AMP XI.S3 states that ASME Code-class MC component supports should be managed for aging using the ASME Section XI, Subsection IWF code. The license renewal application and program basis document state that the ASME Section XI, Subsection IWF program includes ASME Code-class MC component supports.

Issue

The staff reviewed the implementing procedures for the Inservice Inspection, IWF program and noted that the procedure specifically states that examination of ASME Code-classified MC supports is not required at LGS. The staff also noted that LGS has components that are classified as ASME Code-class MC.

Request

Explain how the identified class MC components will be managed for aging during the period of extended operation.

DRAI B.2.1.32-2

Background

GALL Report AMP XI.S3 program element 2, "preventive actions," states that if ASTM A325, ASTM F1852, and/or ASTM A490 bolts are used, the preventive actions as discussed in Section 2 of the Research Council for Structural Connections "Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts" should be followed.

Issue

The staff noted that element 2 of the aging management program basis document states that structural bolting used in ASME Section XI, Subsection IWF supports does not include ASTM A325, ASTM F1852 or ASTM A490 bolts. Element 3 of the program basis document states that, "while the use of high strength bolts in supports is not common at LGS, A490 bolts are used for some larger supports." It is not clear to the staff whether the applicant uses ASTM A490 bolts, and if so, whether the preventive actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of Research Council for Structural Connections publication "Specification for Structural Joints Using ASTM A325 or A490 Bolts" are followed.

Request

If ASTM A325, ASTM F1852, and/or ASTM A490 bolts are used, explain how the preventive actions discussed in Section 2 of "Specification for Structural Joints Using ASTM A325 or A490 Bolts" are addressed, or why they are unnecessary.

DRAI B.2.1.32-3

Background

GALL Report AMP XI.S3 program element 5, "monitoring and trending," states that examinations of component supports that reveal indications which exceed the acceptance standards and require corrective measures are extended to include additional examinations in accordance with ASME Code Section IWF-2430.

Issue

Upon review of plant-specific operating experience, the staff noted several cases in which conditions were found during ASME Code, Section IWF, examinations that appeared to be degraded. The applicant performed an engineering evaluation and determined that the as-found component was acceptable for continued service (i.e., did not violate the acceptance standards of ASME Code Section IWF-3410) but chose to enter the component into its corrective action program and re-work the component to as-new condition. Since the engineering evaluation determined that the as-found condition did not affect the support's capability to perform its design function, the licensee did not apply ASME Sections IWF-2420 and IWF-2430 for successive or additional examinations.

The ASME Code, Section XI, Subsection IWF program requires the inspection of the same sample of the total population of component supports each inspection interval. The staff's concern with respect to aging management is that if IWF supports that are part of the inspection sample are reworked to as-new condition, they are no longer typical of the other supports in the population. Subsequent ASME Code, Section XI, Subsection IWF interval inspections of the same sample would not represent the age-related degradation of the rest of the population.

Request

When corrective actions are not required per the ASME Code, Section IWF, acceptance criteria, but a support within the IWF inspection sample is repaired to as-new condition without an expansion if the ISI sample population size, describe how the ASME Code, Section XI, Subsection IWF Program will be effective in managing aging of similar/adjacent components that are not included in the ISI Program sample population.

DRAI B.2.1.33-1

Background

Through the integrated leak rate test (ILRT) and local leak rate test (LLRT) testing and ASME Code Section XI, Subsection IWE visual examinations, LGS ensures that the structural integrity of the containment structure will be maintained to withstand the maximum calculated pressure in the event of a loss of coolant accident (LOCA). For the period of extended operation these tests as implemented through the 10 CFR Part 50, Appendix J Program also provide for the detection of age-related pressure boundary degradation for loss of material, loss of sealing/degradation of gaskets, leakage, and loss of bolt preload for valves and penetrations.

Pursuant to 10 CFR Part 50 the applicant, through exemptions (per 10 CFR 50.12) and exclusions (per 10 CFR 50.59), excluded certain structures and components (SCs) (valves and penetrations) from Appendix J testing. The GALL Report, however, in its "scope of program," program element recommends that the scope of the containment LRT program include all containment boundary pressure-retaining components.

Issue

During the on-site audit the applicant identified and presented justification for a number of exemption(s)/exclusions for valves and penetrations from the 10 CFR Part 50, Appendix J testing. The applicant noted, however, that during the period of extended operation it intends to manage the aging effects for the exempted/excluded SSCs through other AMPs than the designated 10 CFR Part 50, Appendix J testing program. The staff indicated that the SRP-LR, specifies the acceptance criteria for 10 CFR 54.21, on the recommended review procedures for AMR items, and on whether or not these are consistent with the GALL Report recommendations. The AMR tables in Chapters II through VIII of the GALL Report provide guidelines for management of the pertinent aging effects.

Request

1. Identify all of the SCs (valves, penetrations, and other components) that have been exempted/excluded from the 10 CFR Part 50, Appendix J testing and the basis for their exemption/exclusion.

2. For those SCs (valves, penetrations, and other components) that have been exempted/excluded identify the selected AMPs to be used for managing aging effects during the period of extended operation.

DRAI B.2.1.35-1

Background

RG 1.90, "Inservice Inspection of Prestressed Concrete Containment Structures," Revision 1, dated August 1977, and DG-1197, and its proposed Revision 2, point out that plant operating and environmental conditions could affect the safety margins of prestressed concrete structures. In particular, they identify tendon corrosion and concrete creep and shrinkage as long-term factors that could adversely impact the integrity of such structures.

Pursuant to 10 CFR 54.21(c)(1), a license renewal applicant is required to provide a list of TLAAs, as defined in 10 CFR 54.3. Calculations/analyses are required for certain structures within the scope of license renewal that are to consider the effects of aging that involve time-limited assumptions based on the proposed operating term. The TLAAs are to provide the basis for conclusions related to the capability of the structure to perform its intended function(s) as delineated in 10 CFR 54.4(b) and are contained by reference in the continuing license basis.

Issue

The prestressed concrete girders that provide the main support for the spent fuel pools use grouted tendons. During extended operation, and in the presence of elevated temperature, creep and shrinkage of the concrete and relaxation of the prestressing tendon steel can result in loss of prestressing force that will produce increased deflections of the girders that can also

impact associated structures or supports.

Another major concern of grouted tendons is the possibility that corrosion of the tendon steel may occur and remain undetected and once grouted the tendons cannot be retensioned or replaced. RG 1.90 identifies quality of materials used, workmanship, and the environment (including temperature variations), to be the most influential factors affecting corrosion of tendons. Therefore, in addition to the thermally induced relaxation, the staff is also concerned with possible corrosion and cracking of the cold formed stressed steel tendons (typically stressed to 80 percent of ultimate tensile strength), including the potential development of crevice and SCC when exposed to aggressive environments.

Since the tendons are grouted, conventional inspection procedures (e.g., ASME Code Section XI, Subsection IWL) used to evaluate the structural integrity of ungrouted tendon systems cannot be used.

<u>Request</u>

Provide a plant-specific TLAA or inspection/surveillance program to provide assurances that the capability of the prestressed concrete girders associated with the spent fuel pool will continue to meet their intended function(s) during the period of extended operation.

DRAI B.2.1.35-2

<u>Background</u>

GALL Report, AMP XI.S6, Structures Monitoring Program, element 10 recommends that the Structures Monitoring Program consider operating experience.

<u>Issue</u>

In AR 01198943 it is noted that the turbine building operating floor consists of the turbine pedestal and a concrete slab on steel beams in all other floor areas. The ends of the steel beams adjacent to the turbine pedestal are supported by concrete ledges of the turbine pedestal. The other ends of the beams are supported by steel girders. The beam seat assemblies supported by the turbine pedestal consist of sliding surface plates, backup plates, and elastomeric pads. A walk-down found that the beam ends supported by the turbine pedestal had settled approximately 0.5 inches as a result of deterioration/melting of the elastomeric pads. This condition was observed at almost all locations around the entire turbine pedestal expansion joint of both LGS Units 1 and 2. An extent of condition evaluation determined that the settlement at one end of the beam/slab does not affect the structural integrity of the turbine building operating floor and the structure can still perform its intended function of supporting loads from the operating floor.

<u>Request</u>

Provide the assessment demonstrating that the turbine building operating floor and structure can still perform its intended functions (e.g., supporting loads from the operating floor) and that the resulting change in alignment does not impact attachments or supports (e.g., pipe support anchor for the main steam line attached to a beam web does not induce stress into the pipe).

DRAI B.2.1.40-1

Background

GALL Report AMP XI.E3 recommends that periodic actions be taken to prevent inaccessible power cables from being exposed to significant moisture, such as identifying and inspecting in-scope accessible cable conduit ends and cable manholes for water collection, and draining the water, as needed.

Issue

The program description and "preventive actions" program element of the program basis document, LG-AMP-PBD-XI.E3, LRA Appendix A, Section A.2.1.40, LRA Appendix B, Section B.2.1.40 and LRA Table A.5, "License Renewal Commitment List," Commitment No. 40 are not consistent in describing how the program will manage inaccessible power cables subject to significant moisture (e.g., at times exposed to significant moisture, minimize exposure and prevent exposing cables to significant moisture). It is not clear to the staff that these statements are consistent with the GALL Report AMP, because the LRA AMP including Sections B.2.1.40, A.2.1.40, and Table A.5, Commitment No. 40 describe the program as minimizing potential exposure to significant moisture.

Request

Verify that LRA AMP is consistent with the GALL Report and revise the program basis document, LG-AMP-PBD-XI.E3, LRA Sections B.2.1.40, A.2.1.40, and Table A.5, Commitment No. 40 to provide consistency with the GALL Report AMP in the program's purpose to manage inaccessible power cable exposure to significant moisture, as necessary.

DRAI B.2.1.40-2

Background

GALL Report, Chapter VI, Table VIA, "Electrical Components - Equipment Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," item VI.A.LP-35 lists the material as various organic polymers and the aging effect/mechanism as reduced insulation resistance due to moisture and recommends managing the effects of aging with GALL Report AMP XI.E3.

Issue

The LRA uses the term "electrical continuity" in describing the intended function in LRA Table 2.5.2-1, for the commodity "Insulation Material for Electrical Cables and Connections." LRA Table 3.6.2-1 uses "electrical continuity" for the intended function for component types, "Conductor Insulation for Inaccessible Power Cables Greater Than or Equal to 400V," "Fuse Holders (Not Part of Active Equipment): Insulation Material," "Insulation Material for Electrical Cables and Connections," "Insulation Material for Electrical Cables and Connections Used in Instrumentation Circuits," and LRA Section 2.5.2.5.2, Electrical Penetrations." In addition, component type, "Electrical Equipment Subject to 10 CFR 50.49 EQ Requirements," in Table 3.6.2-1 lists the materials "Various Polymeric and Metallic Materials" and therefore should also include the intended function "Insulate (Electrical)." The use of the intended function, "electrical continuity" in the above examples is inconsistent with the material (various organic polymers) listed for the component types referenced.

Request

Clarify the intended function of the insulation material discussed. As necessary, provide revised intended functions for Table 2.5.2-1 Insulation Material for Electrical Cables and Connections and Table 3.6.2-1 component types (Conductor Insulation for Inaccessible Power Cables Greater Than or Equal to 400V, Electrical Equipment Subject to 10 CFR 50.49 EQ Requirements, Fuse Holders (Not Part of Active Equipment): Insulation Material, Insulation Materials for Electrical Cables and Connections, and Insulation Materials for Electrical Cables and Connections Used in Instrumentation Circuits.

DRAI B.2.1.40-3

Background

Gall Report AMP XI.E3 recommends that inaccessible power cables which are exposed to significant moisture will be tested at a frequency of at least every 6 years and that test frequencies will be adjusted based on test results and operating experience.

Issue

Draft implementing procedures specify a test frequency of every third refueling outage. The "detection of aging effects" program element of the applicant's AMP (LG-AMP-PBD-XI.E3) states that the testing will be performed every 6 years and does not include a provision that test frequencies are adjusted based on test results and operating experience. It is not clear to the staff that the applicant's program, when implemented, will be consistent with the GALL Report AMP such that testing will occur at least every 6 years and more frequent testing will occur based on test results and operating experience. In addition, LRA Sections A.2.1.40, and B.2.1.40, and LRA Table A.5, Commitment No. 40 specify a test interval of at least every 6 years but do not specify that test frequencies are adjusted based on test results and operating experience.

Request

Explain why the "detection of aging effects" program element in the program basis document LG-AMP-PBD-XI.E3 along with draft work order revisions specify only a 6 year test interval but do not specify a test frequency of at least every 6 years and that test frequencies are adjusted based on test results and operating experience. In addition, explain why LRA Sections A.2.1.40, and B.2.1.40, and LRA Table A.5, Commitment No. 40 only specify a test interval of at least every 6 years but do not specify that test frequencies are adjusted based on test results and operating experience.

DRAI B.2.1.40-4

Background

GALL Report AMP XI.E3, program element "preventive actions" recommends that inspections be performed periodically based on water accumulation over time and event driven occurrences, such as heavy rain or flooding.

Issue

The program basis document, LG-AMP-PBD-XI.E3, and LRA Appendix A, Section A.2.1.40, LRA Appendix B, Section B.2.1.40 and LRA Table A.5, “License Renewal Commitment List,” Commitment No. 40 are not consistent with GALL Report AMP XI.E3 in that event driven inspections are not specified to be performed after heavy rain or flooding events.

Request

Explain why the program basis document, LG-AMP-PBD-XI.E3, LRA Sections A.2.1.40, B.2.1.40 and LRA Table A.5, Commitment No. 40 do not specify inspections will be performed following event driven occurrences.

DRAI B.2.1.41-1

Background

In the program basis document, LG-AMP-PBD-XI.E4, Revision 1, under the “parameters monitored or inspected” program element, it states that this program element is consistent with the GALL Report AMP XI.E4. The GALL Report AMP recommends that a sample of accessible bolted connections be inspected for increased resistance using thermography. The program will be implemented via procedure M-092-002. This procedure requires bus joint nuts and bolts be retorqued. EPRI TR-104213s, “Bolted Joint Maintenance & Application Guide” states that bolted joints should be inspected for evidence of overheating, signs of burning or discoloration, and indications of loose bolts. The bolts should not be retorqued, unless the joint either requires service or the bolts are clearly loose. Verifying the torque is not recommended. The torque required to turn the fastener in the tightening direction (restart torque) is not a good indicator of the preload once the fastener is in service. Due to relaxation of the parts of the joint, the final loads are likely to be lower than the installed loads. In addition, the program basis document, as well as GALL Report AMP XI.E4, do not recommend to retorque.

Issue

The program implementation procedure is not consistent with the program basis document nor the EPRI recommendations. The program basis document does not reference retorqueing and the EPRI guidance states that bolts should not be retorqued and that the torque required to turn the fastener in the tightening direction (restart torque) is not a good indication of the preload once the fastener is in service.

Request

Provide technical justification of why retorqueing of bus connections are a good engineering practice to check for bolted loosening and clarify the discrepancy between the program basis document and the implementing procedure.

DRAI B.2.1.41-2

Background

In the program basis document, LG-AMP-PBD-XI.E4, Revision 1, under program element “detection of aging effects,” it states that a sample of the metal enclosed bus (MEB) accessible bolted connections in each bus section shall be inspected using thermography for increased resistance. GALL Report AMP XI.E4 also recommends inspecting a sample of the accessible

bolted connections for increased resistance using thermography or connection resistance measurements. The applicant provided the staff a photograph of thermography showing a heat source from a space heater inside a MEB. However, the applicant did not provide any photograph taken from outside the bus duct showing the temperature difference between the bus connection due to increased resistance.

Issue

The metal enclosed bus cover as well as space heater may mask the heat resulting from loose bus connections. The staff is concerned that temperature differences between bus connections may not be detected using thermography measurements.

Request

Discuss the plant-specific operating experience with thermography taken from outside a bus duct showing the bus connection temperature difference due to bolt loosening. In addition, discuss manufacturer's recommendation for inspecting bolted connections from outside a bus enclosure. Also explain how thermography inspection is effective in detecting MEB bolted connections for increased resistance.

DRAI B.2.1.28-1

Background

The GALL Report AMP XI.M40 states that for neutron absorber materials, gamma irradiation and/or long-term exposure to the wet pool environment may cause loss of material and changes in dimension (such as gap formation, formation of blisters, pits and bulges) that could result in loss of neutron-absorbing capability of the material.

Issue

It appears that the Boral coupon trees in the LGS, Units 1 and 2, spent fuel pools are located in a 'representative' location rather than a 'bounding' location. That is, the coupon tree location is expected to receive a uniform gamma flux that is representative of typical rack exposure. The program is not clear on whether the coupon exposure to the environment is bounding for the Boral material in all racks.

Request

Please discuss how the coupon exposure (i.e., coupon tree location) will provide reasonable assurance that Boral degradation is identified prior to potential loss of neutron-absorbing capability of the material. If the coupon exposure to the environment is not bounding of the material in all racks, discuss how the aging effects of the Boral material will be managed for the unbounded racks.

DRAI B.2.1.37-1

Background

The GALL Report AMP XI.S8 recommends using ASTM D 5163, in as much as it defines the inspection frequency to be each refueling outage or during other major maintenance outages,

as needed. Although this may be the case, the guidance document also states that the frequency of in-service coating inspection monitoring shall be determined by the licensee or his designee.

Issue

The ASME Section XI, Subsection IWE program described in LRA AMP B.2.1.30 will be enhanced to include inspection of 100 percent of the accessible coating in the immersed region of the suppression pool each ISI period. The applicant does not address inspection techniques or the frequency for inspection of the coating in the immersed region of the suppression pool in the Protective Coating Monitoring Maintenance Program.

Request

Please provide the inspection technique used, and frequency and scope of inspection for the Service Level I immersed coating in the suppression pool. In addition, discuss how the technique