LimerickNPEm Resource

From: Kuntz, Robert
Sent: Tuesday, May 01, 2012 2:31 PM
To: Anthony Z. Roisman; gfettus@nrdc.org
Cc: Smith, Maxwell; Kanatas, Catherine
Subject: FW: DRAFT Request for Information, RE Limerick Generating Station LRA
Attachments: DRAFT RARB AMP Audit RAIs.docx

I believe this is the last of the requested documents that I have, but will double check my records tomorrow. I will include you on distribution on future DRAFT RAIs and teleconference summaries.

From: Kuntz, Robert
Sent: Monday, December 19, 2011 10:42 AM
To: john.hufnagel@exeloncorp.com
Cc: 'Christopher.Wilson2@exeloncorp.com'
Subject: DRAFT Request for Information, RE Limerick Generating Station LRA

John,

Attached is a DRAFT Request for Information related to the license renewal application for Limerick Generating Station. If Exelon would like clarification on the attached please let me know and I will set up a teleconference.

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From: Kuntz, Robert

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LIMERICK GENERATING STATION
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION

DRAI 3.0.2-1

Background

License renewal application (LRA) Table 3.0-2 states that the air-indoor, uncontrolled environment encompasses the Generic Aging Lessons Learned (GALL) Report defined environments of "air-indoor uncontrolled," "air-indoor uncontrolled (>95 °F)," "air with steam or water leakage," "air with leaking secondary-side water and/or steam," and "condensation." LRA Table 3.0-2 also states that, for the air-indoor, uncontrolled environment, humidity levels of up to 100 percent are assumed, surfaces of components may be wet, and the environment may contain aggressive chemical species.

Issue

The staff identified a number of aging management review (AMR) items for which there are no specified aging effects when exposed to "air- indoor, uncontrolled." However, the staff also identified that these same AMR items would have aging effects if they were exposed to "condensation," as defined by the GALL Report. It is unclear to the staff if the components with an environment of air-indoor, uncontrolled are exposed to potentially adverse environments. Without this information, the staff cannot evaluate whether the proper aging effects and aging management programs are being applied to manage components for which the environment is listed as air-indoor, uncontrolled.

Request

Identify which AMR items in the LRA are exposed to an air-indoor, uncontrolled environment for which humidity, condensation, moisture, or contaminants are present. If in identifying these items it is determined that there are aging effects requiring management, propose an aging management program (AMP) to manage the aging effect or state the basis for why no AMP is required.

DRAI 3.1.2.3-1

Background

In the LRA Table 3.1.2-03 (page 3.1-66), there is an AMR result for stainless steel (part of jet pump assembly) in a reactor coolant and neutron flux environment with an aging effect of loss of preload. The AMR results credit the Boiling Water Reactor Vessel Internals Program (BWRVIP) with managing the aging effect of loss of preload. The AMP uses BWRVIP-41, Revision 3 for the jet pump assembly, which outlines specific surface and volumetric inspections that look for evidence of cracking and wear, not loss of preload. Loss of preload is usually associated with bolts and in the reactor coolant and neutron flux environment is addressed as a TLAA as in LRA Section 4.6.9 in the jet pump slip joint repair clamps.

Issue

The LRA does not provide sufficient information for the staff to understand how the BWR Vessel Internals Program can effectively manage loss of preload for the jet pump assembly in a reactor coolant and neutron flux environment.

Request

1. Describe the specific stainless steel components in the jet pump assembly that are related to this AMR line item.

2. Explain what specific features or activities of the BWR Vessel Internals Program and BWRVIP-41, Revision 3 will manage the aging effect of loss of preload for the jet pump assembly that is in the reactor coolant and neutron flux environment.

DRAI 3.3.2.21-1

Background

The SRP-LR, Section 2.1.2.2, "Screening," states that the methodology used by an applicant should be consistent with the process described in Section 4.1, "Identification of Structures and Components Subject to an Aging Management Review and Intended Functions," of NEI 95-10, as referenced by Regulatory Guide 1.188. NEI 95-10, Section 4, "Integrated Plant Assessment," states that aging management reviews first identify the aging effects that require management, and then identify the AMPs to manage these aging effects.

LRA Table 3.3.2-21, "Reactor Water Cleanup (RWCU) System," identifies loss of material and wall-thinning in certain carbon steel components exposed to treated water and references LRA item numbers 3.3.1-21, 3.3.1-25, and 3.4.1-5 for these AMR results. In addition, the LRA Table 3.3.2-21 identifies loss of material in stainless steel piping exposed to treated water and references item numbers 3.3.1-21 and 3.3.1-25 for these AMR results. LRA Table 3.3.2-21 states that loss of material and wall-thinning aging effects for certain carbon-steel components are being managed by the Water Chemistry, One-Time Inspection, and Flow-Accelerated Corrosion Programs, and for stainless steel components are being managed by the Water Chemistry and One-Time Inspection Programs. The aging effects/mechanisms ascribed to items 3.3.1-21, 3.3.1-25, and 3.4.1-5 are loss of material only due to general pitting or crevice corrosion and wall-thinning due to flow-accelerated corrosion.

LRA Section B.2.1.22, "One-Time Inspection," discusses a 2007 issue where ultrasonic test examinations confirmed erosion due to cavitation in RWCU piping and states that periodic inspections have been implemented to monitor the progression of this loss of material.

Issue

Although loss of material and wall-thinning are identified as aging effects in RWCU piping, the corresponding AMR items are not associated with the aging mechanism of erosion due to cavitation that is noted in the operating experience discussion of the One-Time Inspection Program. As such, the AMPs being credited for managing the resulting loss of material (Water Chemistry and One-Time Inspection) and for managing wall-thinning (Flow-Accelerated Corrosion for some carbon-steel components in LRA Table 3.3.2-21) do not appear to be appropriate.

Request

1. Clarify which AMP manages the loss of material in RWCU piping due to cavitation erosion. If no AMP currently addresses this aging effect, either revise existing programs with appropriate enhancements or provide a plant-specific AMP that will address the loss of material within the RWCU system due to cavitation erosion.

2. Include information related to evaluations of this aging effect/mechanism, which provides reasonable assurance that loss of material due to cavitation erosion need not be considered in other locations in the RWCU or other systems within the scope of license renewal.

DRAI 3.4.2.7-1

Background

The staff reviewed a sample of thirty-five component, material and environment combinations, selected from the LRA, during the audit conducted October 3–14, 2011. These components were randomly selected for the staff to verify the accuracy of the information provided in the AMR results in the applicant's LRA. The staff also performed walkdowns during the audit to determine whether the selected component, material and environment combinations, as listed in the LRA, were consistent with descriptions in the LRA.

Issue

The electro-hydraulic control (EHC) drain tank in the main turbine system (Table 3.4.2-7) is identified in the LRA as being constructed of stainless steel and exposed to an environment of air/gas-wetted (internal). The staff could not verify the EHC drain tank material during the walkdown or during a subsequent review of documentation provided by the applicant.

Request

Verify the material composition of the component described above and, if necessary, provide the results of an updated aging management review, in accordance with 10 CFR 54.21(a)(1).

DRAI BWRVIP-1

Background

The LRA references several BWRVIP reports, which have been reviewed and approved by the NRC staff, as part of its aging management programs. As part of the staff's approval of these BWRVIP reports and a condition for the use of these BWRVIP reports, the staff's safety evaluation (SE) identified license renewal applicant action items that are to be addressed by license renewal applicants in the LRA. As an example, BWRVIP-48-A is used by the BWR Vessel ID Attachment Welds Program that is described in LRA Section B.2.1.4 and the license renewal applicant action items are documented in Section 4.1 of the staff's SE, dated January 17, 2001.

Issue

The staff noted that the license renewal applicant action items discussed in the staff's SE dated January 17, 2001, were not discussed in the LRA. In addition, the license renewal applicant action items associated with any staff-reviewed and approved BWRVIP reports were not addressed in the LRA.

Request

Submit the necessary information and revisions to the LRA for each license renewal applicant action item in all applicable BWRVIP reports that are credited for aging management. If not, justify why the license renewal applicant action items do not need to be address in the LRA.

DRAI B.2.1.2-1

Background

SRP-LR, Table 3.0-1, "FSAR Supplement for Aging Management of Applicable Systems," for GALL AMP XI.M2 states that the Water Chemistry program monitors and controls contaminants below the system-specific limits based on Electric Power Research Institute (EPRI) guidelines BWRVIP-190 for BWRs.

LRA Section A.2.1.2, Water Chemistry, states system-specific limits based on guidelines of EPRI but a reference to BWRVIP-190 is omitted.

Issue

The SRP-LR's FSAR supplement for this program specifically references EPRI's BWRVIP-190 which is omitted in the applicant's FSAR supplement. The inclusion of the EPRI BWRVIP-190 guideline is necessary to ensure proper aging management of systems, structures and components through the period of extended operation.

Request

Revise LRA Section A.2.1.2 to reflect the appropriate references recommended for this program consistent with the SRP-LR's FSAR supplement.

DRAI B.2.1.3-1

Background

LRA Section B.2.1.3 states that the Reactor Head Closure Stud Bolting Program is consistent with the ten elements of aging management program XI.M3, "Reactor Head Closure Stud Bolting," specified in the GALL Report. The "preventive actions" program element of GALL Report, AMP XI.M3, "Reactor Head Closure Stud Bolting," references the guidance outlined in Regulatory Guide (RG) 1.65, "Materials and Inspections for Reactor Vessel Closure Studs," and NUREG-1339, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants." The "preventive actions" program element of GALL Report AMP XI.M3 also lists preventive measures that can reduce the potential for stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC), such as (1) using bolting material for closure studs that has an actual measured yield strength less than 150 ksi, and (2) using manganese phosphate or other acceptable surface treatments.

LRA Section B.2.1.3 states that the reactor head closure studs, nuts, bushings, flange threads, and washers are surface treated with an acceptable phosphate coating to inhibit corrosion and reduce SCC and IGSCC. By contrast, LGS UFSAR Section 5.3.1.11, states that a phosphate coating is applied to threaded areas of studs and nuts and bearing areas of nuts and washers. It is not clear from the UFSAR description whether a phosphate coating is applied on the reactor vessel flange threads (as stated in the LRA). In addition, during its audit, the staff was not able to verify from applicant's on-site documents whether the applied coating for the closure bolting components is intact and effective in managing corrosion and SCC of the bolting components.

Issue

During its audit, the staff noted that the applicant's documents for its Reactor Head Closure Studs Program indicate that some of the closure studs and nuts are manufactured from material with actual measured yield strength greater than 150 ksi, which is not consistent with the recommendation in the GALL Report. The staff also needs clarification on whether a phosphate coating is applied on the flange threads so that a potential discrepancy between the LRA and UFSAR is resolved. In addition, the staff needs clarification on whether the coating on the closure bolting components is intact and is effective in managing corrosion and SCC of the bolting components, supporting the effectiveness of the coating for the period of extended operation.

Request

1. Clarify if closure studs and nuts manufactured from material with actual measured yield strength greater than 150 ksi will continue to be used in the period of extended operation. If they will be, revise LRA Section B.2.1.3 and associated UFSAR supplement to identify the use of closure stud bolting with actual measured yield strength greater than or equal to 150 ksi as an exception to GALL AMP XI.M3.

2. Justify why the aging management program is adequate to manage cracking due to stress corrosion cracking in the high-strength material. As part of the response, describe preventative actions to avoid exposure of the studs to the environments conducive to SCC.

3. Provide clarification for the potential discrepancy between the LRA and UFSAR and verify whether a phosphate coating is applied on the flange threads. In addition, state whether or not the coating applied to the closure bolting components is intact. If the flange threads do not have a coating and/or the coating on the closure bolting components have degraded, justify why the aging management program is adequate to manage corrosion.

DRAI B.2.1.7-2

Background

The "scope of program" program element of GALL Report, AMP XI.M7, "BWR Stress Corrosion Cracking," states that the program is applicable to all BWR piping and piping welds made of austenitic stainless steel and nickel alloy that are 4 inches or larger in nominal diameter containing reactor coolant at a temperature above 93 °C (200 °F) during power operation, regardless of code classification.

In comparison, LRA Section B.2.1.7 states that the BWR Stress Corrosion Cracking Program manages IGSCC in reactor coolant pressure boundary (RCPB) piping and piping components

made of stainless steel and nickel-based alloy in a reactor coolant environment. In addition, LRA item 3.2.1-54 indicates that the GALL Report recommends the BWR Stress Corrosion Cracking to manage cracking due to SCC and IGSCC of stainless steel piping, piping components, and piping elements exposed to treated water >60°C (140°F). The staff also noted that LRA item 3.2.1-54 is for the engineered safety features. However, LRA Table 3.1.2-1 and related information in the LRA indicate that the applicant credited LRA item 3.2.1-54 to manage the aging effect of RCPB components only.

During the audit, the staff noted that the applicant's onsite documentation, including the weld selection table for inservice inspection, indicates that the BWR Stress Corrosion Cracking Program includes two ASME Code Class 2 welds associated with valves in the reactor water cleanup system (RWCU system) of LGS Unit 1 and that one of the welds is IGSCC Category B and the other weld is IGSCC Category C.

Issue

The LRA does not clearly address whether the scope of applicant's BWR Stress Corrosion Cracking Program includes piping and piping welds regardless of ASME Code classification, consistent with the GALL Report. The staff noted that the LRA includes the RCPB in the program scope; however, the LRA does not clearly address whether or not the scope of the program includes non-ASME Class-1 piping and its associated welds.

In addition, the staff noted that only RWCU system piping and piping welds outboard of the second containment isolation valves are included in the scope of GALL Report AMP XI.M25, while RWCU system piping and piping welds inboard of the second containment isolation valves are included in the BWR Stress Corrosion Program; therefore, the staff found a need to further clarify whether or not the LGS Unit 1 ASME Code Class 2 welds, categorized as IGSCC Category B and C, are located inboard of the second containment isolation valves.

Request

1. Describe whether or not the scope of the BWR Stress Corrosion Cracking Program includes BWR piping and piping welds made of austenitic stainless steel and nickel alloy regardless of ASME Code classification, consistent with the GALL Report.

   If the scope of the program does not include non-Class-1 piping and piping welds, justify why non-Class-1 piping and piping welds can be excluded from the program scope.

2. Revise LRA Section A.2.1.7 (the UFSAR supplement) to clarify that the scope of the program includes the relevant piping and piping welds regardless of code classification.

3. Clarify whether or not the Class 2 welds associated with the valves in the LGS Unit 1 RWCU system are located inboard of the second containment isolation valves (i.e., "inboard" valves).

   If these Class 2 welds are associated with "inboard" valves, clarify why the applicant's statement that the program manages the aging effect of the RCPB components is inconsistent with the inclusion of these Class 2 welds in the program.

DRAI B.2.1.7-3

Background

The "detection of aging effect" program element of GALL Report, AMP XI.M7, "BWR Stress Corrosion Cracking," states that the extent, method, and schedule of the inspection and test techniques delineated in NRC GL 88-01 or BWRVIP-75-A are designed to maintain structural integrity and ensure that aging effects are discovered and repaired before the loss of intended function of the component. The GALL Report also states that modifications to the extent and schedule of inspection in NRC GL 88-01 are allowed in accordance with the inspection guidance in approved BWRVIP-75-A.

In comparison, LRA Section B.2.1.7 and onsite program basis document state that the inspection frequency for welds, classified as Category B through G per NRC GL 88-01, has been modified per the recommendations provided in the staff-approved BWRVIP-75-A, for normal water chemistry conditions. The LRA further states that welds classified as Category A have been subsumed into the Risk-Informed Inservice Inspection program in accordance with staff-approved EPRI Topical Report TR-112657, Revision B-A, Final Report, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," December 1999.

Issue

Although the applicant indicated that the program uses a staff-approved methodology described in EPRI TR-112657, Revision B-A to subsume IGSCC Category A welds in the risk-informed inservice inspection, the staff noted that the relief request was approved for the applicant's third 10-year inservice inspection interval, which is scheduled to end on January 31, 2017. The staff finds that the applicant should continue to get NRC approval for using this risk-informed method as an alternative to the ASME Code Section XI inservice inspection requirements for piping and the inspection requirements of GL 88-01.

Therefore, the staff finds a need to further clarify what extent, method and schedule the applicant would use to inspect the piping and piping components in the scope of the BWR Stress Corrosion Cracking Program in case the applicant could not continue to get NRC approval for using the risk-informed method described in EPRI TR-112657, Revision B-A. The staff also finds that the UFSAR supplement for this program should be further evaluated in terms of its consistency with the program on the use of the risk-informed method.

Request

1. Describe the extent, method and schedule that will be used to inspect the piping and piping components in the scope of the BWR Stress Corrosion Cracking Program in case the applicant could not continue to get NRC approval for using the risk-informed method described in EPRI TR-112657, Revision B-A.

2. Revise LRA Section A.2.1.7 (the UFSAR supplement), consistent with the response regarding the need for removing the reference to the risk-informed inservice inspection from the UFSAR supplement.

DRAI B.2.1.11-1

Background

GALL Report AMP XI.M18, "Bolting Integrity," states that the program includes periodic inspections of closure bolting for loss of material, loss of preload, and cracking as well as preventive measures to minimize loss of preload and cracking. The "preventive actions" program element of GALL Report AMP XI.M18 states that the preventive measures to minimize cracking include not using lubricants that contain molybdenum disulfide and not using high strength bolting materials.

LRA Section B.2.1.11 states that the applicant's Bolting Integrity Program manages loss of material and loss of preload for pressure retaining bolts within the scope of license renewal. The LRA also states that high strength bolts are not used on pressure retaining bolted joints within the scope of the program and that station procedures ensure that lubricants containing molybdenum disulfide are not used. However, the program does not state that it manages cracking and does not include inspections for cracking.

Issue

It is unclear to the staff why cracking is not an aging effect requiring management by the applicant's Bolting Integrity Program, given that the preventive measures used in the program minimize the occurrence of cracking.

Request:

Clarify whether cracking is an aging effect being managed by the Bolting Integrity Program. If cracking is an aging effect being managed by the program, revise the LRA description of the program and the UFSAR supplement to include management of the aging effect. If cracking is not an aging effect being managed by the program, justify the exception to the GALL Report AMP.

DRAI B.2.1.11-2

Background

GALL Report AMP XI.M18, "Bolting Integrity," states that bolting for safety-related pressure retaining components should be inspected for leakage as well as loss of material, cracking, and loss of preload.

LRA Section B.2.1.11 states that the program will manage loss of material and loss of preload using visual inspections for pressure-retaining bolted joint leakage. The LRA does not state that inspections will be performed for other indications of loss of material (such as corrosion or rust) cracking, or loss of preload (such as loose or missing bolts).

Issue

It is not clear to the staff whether the inspections performed by the Bolting Integrity Program will include inspections for indications of loss of material, cracking, and loss of preload other than just leakage.

Request

Clarify whether the inspections performed by the Bolting Integrity Program include inspections for other indications of loss of material, cracking, and loss of preload. If the inspections include other indications of loss of material, cracking, and loss of preload, revise the LRA description of the program and the UFSAR supplement to include this information. If the inspections are limited to leakage, justify the exception to the GALL Report AMP.

DRAI B.2.1.12-1

Background

GALL Report AMP XI.M20, "Open-Cycle Cooling Water System," relies on the implementation of recommendations in GL 89-13 and states that components exposed to raw water should be inspected for signs of corrosion, erosion, and biofouling. In addition, SRP-LR, Section A.1.2.3.10, "Operating Experience," states that past corrective actions for existing AMPs should be considered, and that feedback from past failures should have resulted in appropriate program enhancements.

LRA Section B.2.1.12, "Open-Cycle Cooling Water System," states that routine inspections and maintenance ensure that corrosion, erosion, and biofouling cannot degrade the performance of safety-related systems serviced by the open-cycle cooling water system. In addition, the LRA includes a program enhancement to perform internal inspections of buried safety-related service water piping whenever it is accessible during maintenance and repair activities.

The LRA's "Operating Experience" section for this AMP states that multiple leaks in the site's emergency service water (ESW) piping have been attributed to initial operation with untreated water that established significant corrosion cells. The LRA also states that although the current chemical treatment is appropriate, no chemical treatment is capable of reaching the active corrosion cells under the deposits of corrosion products, silt, and tubercles, and this has led to the replacement of susceptible portions of carbon steel piping with stainless steel. The operating experience section also discussed localized thinned areas in the residual heat removal service water (RHRSW) system, and concluded by stating that adequate corrective actions were taken to prevent recurrence for the problems identified.

During its onsite audit of the Open-Cycle Cooling Water System Program, the staff reviewed documents indicating that the historical corrosion issues in small and medium diameter raw water piping have more recently become evident in large diameter piping of the ESW and RHRSW systems. The staff also noted that the buried portions of these systems are typically among the largest diameter piping in the systems.

Issue

Based on the extent of degradation in the ESW and RHRSW systems, the staff lacks sufficient information to conclude that the Open-Cycle Cooling Water System Program will adequately manage the effects of aging so that the intended function(s) will be maintained consistent with the current licensing basis (CLB) for the period of extended operation. Due to the established, active corrosion cells, the existing carbon steel piping will continue to degrade, and although the current chemical treatment may prevent the establishment of new corrosion cells, it is unclear to the staff what enhancements were made to this AMP to address the consequences of past

program weaknesses. Since additional leaks continue to be identified, it is unclear to the staff what specific corrective actions were taken to prevent recurrence of the identified problems.

In addition, discussions during the onsite audit indicated that portions of the associated aboveground piping were scheduled to be replaced and that future decisions regarding activities for buried piping would be based on information gathered from the removed piping. It is unclear to the staff whether these activities were only tentative or if any replacement activities could be definitively considered in the staff's evaluation of the program. Also, it is unclear to the staff whether the enhancement to perform opportunistic inspections of buried piping would be adequate to maintain the systems' intended functions(s) during the period of extended operation, given the progression of through-wall leaks in large diameter ESW and RHRSW piping.

Request

1. State what augmented inspections are currently being performed, or planned to be performed, to identify loss of material before through-wall leakage occurs, including inspection method(s) and frequency, number and selection of locations, and acceptance criteria. If corrective actions include plans for replacing piping, provide those aspects that can be credited in license renewal to alleviate ongoing degradation concerns. If specific inspections have not been incorporated into current site procedures, or if piping replacements have not been completed, clarify the enhancement associated with this program.

2. Provide a summary of analyses conducted in the past five years for the ESW and RHRSW systems that evaluated the structural integrity of areas where degradation has caused pipe wall thicknesses to be less than nominal values. Include data to demonstrate that the degradation is limited to independent, localized corrosion sites or state how structural integrity has been evaluated for the potential of multiple adjacent corrosion sites that could have a cumulative adverse impact. If only independent localized corrosion sites have been discovered to date, state the basis for why multiple adjacent corrosion sites will not occur during the period of extended operation. In addition, provide a summary of any associated evaluations that considered system interactions such as flooding, spraying water on equipment, and loss of flow.

3. Provide technical bases to justify how opportunistic inspections of the buried safety-related service water piping will be capable of assessing its condition before loss of intended function occurs, or propose an alternate inspection approach to manage aging. If an alternate inspection approach is adopted, provide information on planned inspection activities, inspection techniques, frequency, location selection, acceptance criteria, and actions to be taken based on inspection findings to ensure that through-wall leaks of buried piping are not occurring. As appropriate, clarify the enhancement associated with this program.

DRAI B.2.1.12-2

Background:

The GALL Report AMP XI.M20, "Open-Cycle Cooling Water System," relies on the implementation of recommendations in GL 89-13, which states that components exposed to raw water be inspected for corrosion, erosion, and biofouling.

Enhancement 2 of LRA Section B.2.1.12 states that periodic inspections for loss of material in the nonsafety-related service water system will be performed at a frequency in accordance with GL 89-13.

The staff noted that GL 89-13 does not specify inspection frequencies for loss of material, and the applicant's responses to that Generic Letter did not provide specific inspection frequencies for loss of material.

Issue:

It is unclear to the staff how the nonsafety-related service water system will be inspected to ensure that loss of material will be detected prior to loss of intended function.

Request:

Describe the number, frequency, and location of inspections for the nonsafety-related service water system, and, as appropriate, clarify the periodic inspection frequency in the associated enhancement.

DRAI B.2.1.13-1

Background

GALL Report AMP XI.M21A, "Closed Treated Water Systems," recommends that piping, piping components, and piping elements exposed to treated water be managed for cracking due to SCC. GALL Report Section IX.D states that closed cycle cooling water >60°C (>140°F) makes SCC of stainless steel possible.

LRA Section B.2.1.13, "Closed Treated Water Systems," does not include cracking as an aging effect requiring management. LRA Tables 3.0-1 and 3.0-2 associate the closed cycle cooling water environment with the GALL Report environments of closed cycle cooling water and closed cycle cooling water >140°F.

Issue

It is not clear to the staff why SCC is not considered an aging effect requiring management in piping, piping components, and piping elements exposed to closed cycle cooling water.

In its review of AMR items with an environment of closed cycle cooling water, the staff cannot determine whether the temperature of the environment is above or below the GALL Report stress corrosion cracking threshold of 60°C (140°F).

Request:

1. Provide technical justification for not including SCC as an aging effect requiring management in the closed treated water systems.

2. For the AMR items with a closed-cycle cooling water environment, clarify whether the temperature of the environment is above or below the GALL Report stress corrosion cracking threshold of 60°C (140°F).

DRAI B.2.1.15-1

Background

The GALL Report AMP XI.M24, "Compressed Air Monitoring," "monitoring and trending" program element recommends that daily readings of system dew point are recorded and trended. The "monitoring and trending" program element in the applicant's LRA AMP basis document for the Compressed Air Monitoring program states that the instrument air system dew point is continuously monitored and alarmed, inspected weekly, and recorded quarterly. The basis document also states that the primary containment instrument gas system's dryer desiccant outlet moisture indicator is verified weekly.

The LRA AMP program basis document also states that trending is accomplished by satisfactory completion of the surveillances and quarterly recorded values and Issue Reports are initiated for alarms or test or inspection results that do not satisfy the established criteria.

Issue

It is not clear to the staff that the LRA is consistent with the GALL Report because, for the instrument air system, the dew point is not recorded on a daily basis, and for the primary containment instrument gas system, dew point is not recorded. It is also not clear to the staff that the applicant is comparing prior data points to current data points during trending.

Request

1. Explain why weekly inspections and quarterly recording of the instrument air system dew point are sufficient to detect potentially unacceptable levels of moisture within in-scope components, or propose an alternative to how often the system's dew point will be recorded and trended.

2. For the primary containment instrument gas system's dryer desiccant outlet moisture indicator, explain why using a desiccant outlet moisture indicator in lieu of monitoring dew point, and why verifying the desiccant outlet moisture indicator on a weekly basis are sufficient to detect potentially unacceptable levels of moisture within in-scope components, or propose an alternative to the recorded parameter and how often it will be recorded and trended.

3. State whether prior data points are compared to current data points during trending, and if they are not, state why the trending of data points will be sufficient to detect changes in air quality prior to degraded air quality impacting the ability of the instrument air systems to meet their current licensing basis function(s).

DRAI B.2.1.15-2

Background

SRP-LR Table 3.0-1 states that the UFSAR Supplement for the "Compressed Air Monitoring" program should reference the applicant's crediting of its response to GL 88-14 and standards such as ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture. LRA Section A.2.1.15, Compressed Air Monitoring program, does not reference the above.

Issue

The licensing basis for the period of extended operation may not be adequate if the applicant does not incorporate this information in its UFSAR Supplement.

Request

Provide further information showing why referencing the response to GL 88-14 and standards such as ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture is not required for the UFSAR Supplement, or revise LRA Section A.2.1.15 to include key aspects of the program that provide guidance for testing and monitoring air quality and moisture.

DRAI B.2.1.17-1

Background

The "scope of program" program element of GALL Report AMP XI.M26, "Fire Protection," states that the program includes visual inspections of fire barrier penetration seals, walls, ceilings, floors, doors, and other fire resistant materials that perform a fire barrier function.

The LGS UFSAR states that gypsum fire barrier walls, fiberglass sleeving fire barriers, and refractory material raceway fire stops covered with silicone rubber are used as fire barriers. However, the LRA does not include any aging management results for components constructed of these materials.

Issue

It is not clear to the staff whether the gypsum, fiberglass sleeving, and refractory material fire barriers discussed in the UFSAR are being managed for aging.

Request

Clarify if the gypsum, fiberglass sleeving and refractory material fire barriers discussed in the UFSAR are within the scope of license renewal. If they are, explain how the gypsum, fiberglass sleeving, and refractory material fire barriers discussed in the UFSAR are being managed for aging.

DRAI B.2.1.17-2

Background

The “detection of aging effects” program element of GALL Report AMP XI.M26, “Fire Protection,” recommends that visual inspections be performed by fire protection qualified personnel of not less than 10 percent of each type of penetration seal during walkdowns, and that the scope of the inspections be expanded if any sign of seal degradation is detected.

LRA Section B.2.1.17, Fire Protection, states that not less than 10 percent of each type of penetration seal is inspected at least once per refueling cycle, except for internal conduit seals which are not accessible for visual inspection.

Issue

The LRA does not discuss how internal conduit seals, which are not accessible for visual inspection, are managed for aging.

Request

Explain how internal conduit seals which are not accessible for visual inspection are managed for aging.

DRAI B.2.1.17-3

Background

The “detection of aging effects” program element of GALL Report AMP XI.M26, “Fire Protection,” states that visual inspections are performed by fire protection qualified personnel of fire barrier penetration seals, walls, ceilings, floors, doors, and other fire barrier materials.

LRA Section B.2.1.17, Fire Protection, states that the personnel performing inspections are qualified and trained to perform the inspection activities. However, during the audit, the staff noted that the personnel responsible for performing fire barrier inspections are maintenance-qualified personnel; not fire protection-qualified personnel.

Issue

It is not clear to the staff whether the personnel performing fire barrier inspections will be adequately trained and qualified to identify fire barrier deficiencies.

Request

Describe the training and qualifications of the personnel responsible for performing fire barrier inspections.

DRAI B.2.1.19-1

Background

The “preventive actions” program element of the LRA Section B.2.1.19-1, Aboveground Metallic Tanks, states that there is no caulking or sealant at the base of the backup fire water storage tank. The GALL Report AMP XI.M29, Aboveground Metallic Tanks, “preventive actions” program element, recommends installation of sealant or caulking at the tank to foundation interface to minimize the amount of water and moisture penetrating the interface, which could lead to corrosion of the tank bottom.

Issue

During the audit, the staff reviewed the applicant’s program basis document for the Aboveground Metallic Tanks program which stated that the backup fire water storage tank was installed on a compacted oil treated sand bed. The document also stated that no caulking or sealant was installed at the tank to soil interface. The staff lacks sufficient information (e.g., thickness of the sand bed, tank bottom coating) to determine if the backup fire water storage tank will be capable of performing its current licensing basis function(s) based on the applicant’s currently proposed tank bottom inspection frequency and the potential for water intrusion at the tank’s base.

Request

State the basis for concluding that there is a reasonable assurance that the backup fire water storage will be capable of performing its current licensing basis function(s) in the absence of sealant or caulking at the tank’s base.

DRAI B.2.1.19-2

Background

The “detection of aging effects” program element, Enhancement 2, of the LRA Section B.2.1.19-1, Aboveground Metallic Tanks states that in order to provide for visual inspection of the external surface of the backup fire water storage tank on a two-year frequency, insulation will be removed on a sampling basis. The GALL Report AMP XI.M29, “Aboveground Metallic Tanks” recommends that the external surface of the tank be visually inspected at each outage to confirm that the paint is intact.

Issue

During the AMP audit, the applicant stated that they could not determine the manufacturer of the sprayed on thermal insulation on the exterior of the backup fire water storage tank. As a result, they could not conclude that the exterior membrane and insulating material is water resistant. In addition, during the audit the staff walked down the tank and noted that there are several locations where the outer insulation jacketing is damaged, thus exposing the interior foam style insulation, and possibly the tank’s external surface, to water intrusion. Given that the applicant did not state the amount of insulation that will be removed during the two-year frequency inspections and the potential for water to be trapped between the external surface of the tank and the insulation, the staff lacks sufficient information to conclude that the tank will meet its current licensing basis function(s) throughout the period of extended operation.

Request

State how much insulation will be removed from the backup fire water storage tank during its two-year frequency external surface inspections. In addition, state the basis for why the amount of insulation to be removed is sufficient to detect potential tank exterior degradation prior to its impacting the ability of the tank to perform its current licensing basis function(s).

DRAI B.2.1.20-1

Background

GALL AMP XI.M30, "Fuel Oil Chemistry," states that, "Periodic multilevel sampling provides assurance that fuel oil contaminants are below unacceptable levels. If tank design features do not allow for multilevel sampling, a sampling methodology that includes a representative sample from the lowest point in the tank may be used."

Issue

The LRA basis document states that the LGS Fuel Oil Chemistry program will be enhanced to periodically analyze for water and sediment and microbiological organisms in the Diesel Generator Diesel Oil Storage Tanks. The samples for analysis are taken by running the fuel oil transfer pumps, which take suction 11 inches from the bottom of the Diesel Generator Diesel Oil Storage Tanks, to transfer fuel oil to a sample collection point in the Diesel Generator Day Tank room, which may not provide a representative sample.

Request

Explain how the current LGS sample collection methodology assures that fuel oil contaminants are below unacceptable levels, as is recommended in GALL AMP XI.M30.

DRAI B.2.1.23-1

Background

The program basis document for the Selective Leaching program states the acceptance criteria are as follows: no visible signs of selective leaching, no more than a 20 percent reduction in hardness, or no reddish copper color (i.e., for copper alloy greater than 15 percent zinc). The GALL Report AMP XI.M33, "Selective Leaching," recommends similar acceptance criteria.

Issue

The applicant proposes to use alternative mechanical examination techniques, for which none of the above acceptance criteria is applicable. It is not clear to the staff what acceptance criteria will be used when alternative mechanical examination techniques are implemented.

Request

State what acceptance criteria will be used when alternative mechanical examination techniques are implemented.

DRAI B.2.1.25-1

Background

GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," recommends that stainless steel piping, piping components, and piping elements and tanks exposed to air-outdoor (external) need to be managed for cracking due SCC.

SRP-LR Section 3.3.3.2.3 states that the GALL Report recommends further evaluation to manage cracking due to SCC of stainless steel piping, piping components, piping elements, and tanks exposed to outdoor air environments containing sufficient halides (primarily chlorides) and in which condensation (including rain) is possible. SPR-LR Section 3.3.3.2.3 further states that applicable outdoor air environments include those plants within a half a mile of a highway which is treated with salt in the wintertime and those having cooling towers where the water is treated with chlorine or chlorine compounds.

LRA Section 3.3.2.2.3 states that outdoor air is assumed to be an aggressive environment having a potential concentration of contaminants that could promote SCC. LRA Section 3.3.2.2.3 further states that SCC of stainless steels exposed to outdoor air is considered plausible only if the material temperature is above 140°F. The LRA states that stainless steel components in outdoor Auxiliary Systems are not susceptible to SSC since temperatures of these components do not exceed < 140ºF at LGS.

Issue

LRA Table 3.0-1 describes air – outdoor (external) as an environment that is periodically subject to wetting (condensation, rain, etc.) which the staff believes could introduce halides (i.e., road salt, etc.) which are known to contribute to SCC, regardless of temperature. LRA Section 2.4.7 further states that two circulating water chlorine and acid feed enclosures are used to maintain the chemical properties of the cooling tower basins which can also contribute to halides in condensation.

Request

Provide technical justification as to why the LRA AMP does not consider SCC to be an aging effect requiring management for the stainless steel components in the Auxiliary Systems that are subjected to wet external environments. The technical justification needs to address the consideration of halides in the external environment.

DRAI B.2.1.26-1

Background

GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," "scope of program" element describes the aging effects that are addressed within the program such as loss of material.

The LRA credits LRA AMP B.2.1.26, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," for managing the following aging effects; loss of fracture toughness, reduction of heat transfer, and cracking (in Tables 3.3.2-21, 3.3.2-20, and 3.3.2-19,

respectively). LRA AMP B.2.1.26's program description section does not include these aging effects within that section.

Issue

LRA AMP B.2.1.26 does not include all of the aging effects addressed by the aging management program.

Request

Revise LRA AMP B.2.1.26 to include the program's aging effects of loss of fracture toughness, reduction of heat transfer and cracking.

Also include the appropriate details such as parameters to be monitored, acceptance criteria and detection of aging effect elements necessary to support these additional program aging effects.

DB.2.1.26-2

Background

GALL Report AMP XI.M38 states that the program is intended for "...internal surfaces of metallic piping, piping components, ducting, polymeric components, and other components that are exposed to air-indoor uncontrolled, air outdoor, condensation, and any water system other than open-cycle cooling water system (XI.M20), closed treated water system (XI.M21A), and fire water system (XI.M27)."

LRA AMP B.2.1.26, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," states that "This program will manage the aging effects of loss of material for metallic and elastomeric components, and hardening and loss of strength for elastomers, in air/gas wetted, closed cycle cooling water, diesel exhaust, fuel oil, lube oil, raw water, treated water, and waste water environments."

Issue

The staff considers the application of LRA AMP B.2.1.26 to components in environments of fuel oil, lube oil, and closed cycle cooling (i.e., closed treated water), to be beyond the scope of GALL Report AMP XI.M38 and therefore requires an appropriate technical justification, consistent with the SRP-LR.

Request

Provide a technical justification for including components in environments of fuel oil, lube oil, and closed cycle cooling (i.e., closed treated water) within the scope of LRA AMP B.2.1.26, including how applying this AMP will ensure appropriate preventive actions and aging detection activities will be performed for components exposed to fuel oil, lubricating oil, or located within closed cycle cooling water systems.

DRAI B.2.1.29-1

Background

The program basis document for LRA AMP B.2.1.29, Buried and Underground Piping and Tanks, "preventive actions" program element states that the plant drainage system piping is neither coated nor cathodically protected, and the circulating water system piping is not coated. The applicable AMR items state that the components are constructed of steel. GALL Report AMP XI.M41, "Buried and Underground Piping and Tanks," Table 2a, recommends that buried steel piping be coated and cathodically protected.

Issue

The lack of cathodic protection and coatings for the plant drainage system and lack of coating for the circulating water system result in the LRA AMP B.2.1.29, Buried and Underground Piping and Tanks, not being consistent with the GALL Report "preventive actions" program element. The basis for this exception is not clear to the staff.

Request

State the basis for how the aging of buried components in the plant drainage and circulating water systems will be adequately managed such that their intended functions will be maintained consistent with the current licensing basis despite a lack of cathodic protection and coatings for the plant drainage system and lack of coating for the circulating water system.

DRAI B.2.1.29-2

Background

The program basis document for LRA AMP B.2.1.29, Buried and Underground Piping and Tanks, "detection of aging effects" program element states that adverse conditions detected during inspections will be evaluated and the potential inspection expansion will be determined in accordance with the corrective action program. GALL Report AMP XI.M41, "Buried and Underground Piping and Tanks," recommends that if adverse indications are detected, inspection sample sizes within the affected piping categories are doubled and if adverse indications are found in the expanded sample, the inspection sample size is again doubled, with the doubling of the inspection sample size continuing as necessary.

Issue

It is not clear to the staff that the LRA is consistent with the GALL Report because the inspection expansion as determined by the applicant's corrective action program may not meet the quantities recommended in the GALL Report.

Request

State the basis for how the corrective action program inspection expansion size will be consistent with GALL Report AMP XI.M41, or state why the corrective action inspection expansion size will be sufficient to detect degradation prior to it causing an in-scope component to not be capable of meeting its current licensing basis function(s).

DRAI B.2.1.29-3

Background

The cathodic protection design basis document states that the cathodic protection system is required to maintain an energized voltage of not less than 850 millivolts negative potential with respect to a copper-copper sulfate reference electrode. The GALL Report AMP XI.M41, "acceptance criteria" program element recommends that cathodic protection system soil to pipe potential acceptance criteria be consistent with NACE SP0169-2007. NACE SP0169-2007, Section 7.1.2.7 states that excessive levels of cathodic protection can cause external coating disbondment.

Issue

Given that neither LRA AMP B.2.1.29, Buried and Underground Piping and Tanks, nor the cathodic protection design basis document state an upper limit to the pipe to soil potential, it is not clear to the staff that annual cathodic protection survey results will be used to ensure that excessive levels of cathodic protection are not applied.

Request

State an upper limit acceptance criterion for pipe to soil potential measurements, and state the basis for using the stated value.