September 14, 2009

Mr. Christopher Costanzo
Vice President, Nuclear Plant Support
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE DUANE ARNOLD ENERGY CENTER LICENSE RENEWAL APPLICATION (TAC NO. MD9769)

Dear Mr. Costanzo:

By letter dated September 30, 2008, as supplemented by letter dated January 23, 2009, FPL Energy Duane Arnold, LLC, submitted an application pursuant to 10 *Code of Federal Regulation* Part 54 (10 CFR Part 54) for renewal of operating license DPR-49 for the Duane Arnold Energy Center . The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review from August 10, 2009 through August 14, 2009, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the Enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Mr. Ken Putnam, of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me by telephone at 301-415-2277 or by e-mail at Brian.Harris2@nrc.gov.

Sincerely,

/RA/

Brian K. Harris, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
As stated

cc w/encl: See next page

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Vice President, Nuclear Plant Support
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ADAMS Accession No. ML092310358

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DATE	09/03/09	09/3/09	09/08/09	09/08/09

OFFICE	BC:RER2:DLR	PM:RPB1:DLR
NAME	RAuluck	BHarris (Signature)
DATE	09/10/09	09/14/09

OFFICIAL RECORD COPY

Letter to Christopher Costanzo from Brian K. Harris dated September 14, 2009

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE DUANE ARNOLD ENERGY CENTER LICENSE RENEWAL APPLICATION (TAC NO. MD9769)

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DUANE ARNOLD ENERGY CENTER
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

RAI B.3.16-1

Background

In license renewal application (LRA) Section B.3.16, the applicant stated that the Compressed Air Monitoring Program is an existing program with no exception to Generic Aging Lessons Learned (GALL) Aging Management Program (AMP) XI.M24. The applicant also stated that the program manages and mitigates the aging effect of corrosion and [is] assuring an oil free dry air environment in the instrument air system. LRA Section 18.1.16 describes the Updated Final Safety Analysis Report (UFSAR) Supplement and states that the applicant's program manages or mitigates aging effects of the instrument air system.

Similarly, UFSAR Revision 14, Section 9.3.1.2.3, "Testing and Inspection Requirements" (for the instrument and service air system) states that: The instrument and service air systems operate continuously and are observed and maintained during normal operations. An instrument air system blowdown is performed periodically to remove any possible particulates from the system. Also an instrument air quality test is performed periodically at various instrument air headers downstream of air driers. This test is performed to verify that the air quality [dew point, particulate and oil content] is consistent with the manufacturer recommendation.

In contrast, LRA Section 3.3.1.15 indicates that the Compressed Air Monitoring Program is not credited for the instrument air system, while the applicant credited the Bolting Integrity Program, External Surfaces Monitoring Program and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program for the aging management of the instrument air system.

In addition, LRA Section 3.3.1.27 indicates that the applicant credited the Compressed Air Monitoring Program for the safety-related air system to manage the aging effect of loss of material. The staff also noted that UFSAR, Revision 14, Section 9.3.1.2.1, "Description" under Section 9.3.1.2, "Instrument and Service Air System" states that a safety-related air system is provided as a backup to the normal instrument air system for several critical safety-related components and systems. The staff also noted that in the UFSAR Section 9.3.1.2 for the instrument and service air system is under Section 9.3.1, "Compressed Air Systems".

Issue

The staff found a need to clarify whether the Compressed Air Monitoring Program manages the aging effects and performs the relevant inspection, monitoring and testing for the applicant's instrument air system and safety-related air system in accordance with the GALL Report.

ENCLOSURE

Request

1. Clarify why LRA Section 3.3.1.15 and LRA Table 3.3.2-15 for the instrument air system indicate that the Compressed Air Monitoring Program is not credited for the instrument air system, which is in apparent conflict with the descriptions in the LRA Section B.3.16 and UFSAR Section 9.3.1.2.3 suggesting that the Compressed Air Monitoring Program manages the aging effects of the compressed air systems including the instrument air system as well as the safety-related air system.
2. Clarify whether the Compressed Air Monitoring Program manages the aging effects of the compressed air system(s) including the instrument air and safety-related air systems and performs inspection, monitoring and testing for the systems in accordance with GALL AMP XI.M24 as the applicant claimed its consistency with the GALL Report.
3. Clarify why the UFSAR Supplement in LRA Section 18.1.16 includes only the instrument air system although the Compressed Air Monitoring Program is also credited for the safety-related air system. Clarify whether the description "instrument air system" in the UFSAR Supplement needs to be changed to the "compressed air systems" or relevant system description terminology in such a way to encompass the instrument air system, safety-related air system and other relevant systems as applicable.

RAI B.3.16-2

Background

In LRA Section B.3.16, the applicant stated that the Compressed Air Monitoring Program is an existing program with no exception to the GALL Report. In LRA Section 18.3.16, the applicant provided the UFSAR Supplement for the Compressed Air Monitoring Program.

The Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR; NUREG-1800, Rev. 1) provides the Final Safety Analysis Report (FSAR Supplement for the Compressed Air Monitoring Program in Table 3.3-2 (page 3.3-37). The SRP-LR requires that the applicant's UFSAR Supplement (or equivalent) should be compared against the FSAR Supplement in the SRP-LR to confirm the equivalency between them.

Issue

In its review, the staff found a need to clarify whether the applicant's UFSAR Supplement for the Compressed Air Monitoring Program is equivalent to the FSAR Supplement in the SRP-LR in the following areas. The applicant's UFSAR Supplement did not clearly indicate:

1. Whether the AMP performs inspection, monitoring and testing of the entire system including frequent leakage testing valves, piping and other system components especially those made of steel.
2. Whether the AMP is in response to NRC GL 88-14 and INPO's Significant Operating Experience Report (SOER) 88-01.
3. Whether the description "instrument air system" in the UFSAR Supplement needs to be changed to the "Compressed Air Systems" or relevant terminology for system description in such a way to encompass the instrument air system, safety-related air system and other relevant system as applicable (See RAI B.3.16-1, also).

Request

1. Describe how, if applicable, the UFSAR Supplement for the Compressed Air Monitoring Program will be revised to resolve the potential discrepancies between the SRP-LR and the applicant's UFSAR Supplement as described in the foregoing "Issue" section: 1) performance of inspection, monitoring and testing of the entire system including leakage testing, 2) clarification of the applicable basis references (GL 88-14 and INPO SOER 88-01) and 3) use of relevant terminology for system description.

RAI B.3.16-3

Background

In LRA Section B.3.16.1, which provides the program description of the Compressed Air Monitoring Program, the applicant stated that a semi-annual air system quality check is performed as part of the monitoring activities of the program. The applicant also stated that the applicant program is consistent with the GALL Report with no exception. In addition, applicant's on-site AMP Document, License Renewal Application Project (LRAP)-M024 Compressed Air Monitoring, indicated that the plant Auxiliary Operator Log records system and equipment parameters each shift and the parameters to record include instrument air dew point and system pressure (see page 12).

In comparison, ISA-S7.0.01-1996, "Quality Standard for Instrument Air," which is one of the technical references of GALL AMP XI.M24 states that a monitored alarm for the pressure dew point is preferred; however, if a monitored alarm is unavailable, shift monitoring is recommended.

Issue

The staff noted that the on-site documentation for the program references included applicant's surveillance test procedure (STP), NS180001, "Instrument Air Quality" and the procedure describes air quality tests, which are oil concentration test, dew point test and particulate size and concentration test. However, the staff found that the surveillance test procedure does not specify the test frequencies for the air quality tests in contrast to the semi-annual air system check described in LRA Section B3.16. Therefore, the staff found a need to clarify how the frequencies of the air quality tests are specified and controlled in the applicant's program.

The staff also reviewed pages 8, 16 and 17 of applicant's Auxiliary Operator's Log, Revision 103, as provided as part of the on-site documentation by the applicant and found the dew point is one of the parameters to record on the log. However, the staff found that the Auxiliary Operator Log does not specify the frequency of recording the dew point.

Request

1. Clarify how the frequencies of the air quality tests per STP NS180001 are specified and controlled.

2. Clarify how the frequency of monitoring the dew point data with the Auxiliary Operator's Log is specified and controlled. Confirm whether the frequency of the dew point monitoring is consistent with the recommendation of ISA-S7.0.01-1996, which is shift monitoring.

RAI B.3.16-4

Background

In LRA Section B.3.16.5, which described the operating experience with the Compressed Air Monitoring Program, the applicant stated that: Corrosion products were found in the instrument air receiver tanks and in the accessible sections of the air receivers supply piping. Modifications included replacement of the carbon steel underground piping (in 2007) with stainless steel piping and the installation of blowdown piping on the Y-strainers associated with the instrument air receiver tanks to allow the Y-strainers to be cleared by blowing them down which allowed the downstream drain taps to perform their water removal function more reliably.

In addition, applicant's on-site AMP Document, LRAP-M024 Compressed Air Monitoring, addressed CAP030621 (1T055A Instrument Air Tank Has Min wall of 0.224 & UT Readings down to 0.077", February 5, 2004) as part of the operating experience with the Compressed Air Monitoring Program.

The Detailed Description section of CAP030621 indicated that: A work order was written to take UT readings on the lower portion of 1T055A (instrument air receiver tank) to determine the wall thinning due to internal corrosion. The bottom head is nominal wall of 0.344". [The] minimum wall based on hoop stress is 0.224. Four small areas indicate wall thickness of 0.224 down to 0.181, 0.094, 0.082 and 0.077. Need [was identified] to evaluate for continued acceptance and/or repair.

EPRI/NMAC NP-7079, "Instrument Air System," is one of the technical references of GALL AMP XI.M24, "Compressed Air Monitoring" and in relation with instrument air receivers, NP-7079, Section 2.0 (pages 4 and 5) states that: In some systems, air from the after cooler enters a moisture separator for final water removal, thus protecting the receiver from moisture accumulation. The compressed air temperature at the outlet of the after cooler may still be above the plant ambient temperature, in which case further cooling and condensation occurs in the air receiver. Plants without a moisture separator usually provide drain taps and receiver blowdown. Finally, the compressed air enters the receiver, acts as a storage tank and pressure surge buffer for the distribution system.

Issue

The staff found a concern that the wall thinning of the instrument air receiver tank due to internal corrosion degrades the integrity of the air receiver tank. The staff also noted that the internal corrosion of the air receiver tank can degrade air-operated equipment by generating and releasing corrosion products to the air distribution system.

Request

1. Describe how the wall thinning evaluation was performed for continued acceptance and/or repair of the four small areas, which indicated thickness less than the minimum wall thickness based on hoop stress as described in CAP030621. In addition, describe what actions were taken to prevent and mitigate the wall thinning and internal corrosion of the air receiver tank.
2. Clarify whether the applicant's instrument air system has moisture separator(s) at the upstream of the instrument air receiver(s) as addressed in Electric Power Research Institute (EPRI) NP-7079, Section 2.
3. Describe how the applicant's program prevents or mitigates the wall thinning and internal corrosion of the air receiver tank. In addition, describe how the applicant's program prevents or mitigates the transport of corrosion products and contaminants from the air receiver tank and its upstream portions to the other downstream portions of the air distribution system.
4. Using the operating experience, clarify whether the corrosion and wall thinning observed in the air receiver tank have adversely affected the performance or integrity of the air-operated equipment and components in the applicant's compressed air system(s).

RAI B.3.25 -1

Background

NRC Information Notice 2009-02, "Biodiesel in Fuel Oil Could Adversely Impact Diesel Engine Performance," indicates that No. 2 diesel fuel could contain up to a 5 percent biodiesel fuel (B5) blend without labeling the blend in accordance with ASTM D 975-08a, "Standard Specification for Diesel Fuel Oils".

Issue

Biodiesel B5 blend 1) can have a cleaning effect that can increase sediment that could plug filters, 2) could form "dirty water" which leads to algae growth, 3) is biodegradable such that long term storage is not recommended and 4) can be more susceptible to gel creation in the presence of brass, bronze and copper fittings, piping and tanks. These effects could lead to plant-specific operating experience outside the bounds of industry operating experience.

Request

Is biodiesel fuel B5 blend used or will be used at Duane Arnold Energy Center (DAEC)? If so, has there been operating experience that indicates an increase in sediment, water formation, or gel formation? What actions have been taken to minimize the effects of using B5? If not, what method(s) are being used to assure that biodiesel fuel is not inadvertently being introduced into DEAC fuel tanks?

RAI B.3.25–2

Background

In the Fuel Oil Chemistry Program Basis Document, LRAP-M030, element 2, preventive actions, it is stated that the DEAC does not use fuel additives of biocides to minimize biological activity, stabilizers to prevent biological breakdown of the diesel fuel, and corrosion inhibitors to mitigate corrosion. GALL AMP XI.M30, element 3, "parameters monitored/inspected recommends monitoring for microbiological organisms.

Issue

However, it is not stated in the LRA if and how biological activity is monitored at DAEC.

Request

How is the presence of microbiological organisms monitored in fuel tanks at DAEC? What corrective action will be taken if microbiological organisms are determined to be present in diesel fuel oil at DAEC?

RAI B.3.25-3

Background

In the Fuel Oil Chemistry Program Basis Document, LRAP-M030, element 4, Detection of Aging Effects, it is stated that there are no equipment specific procedures required to validate the quality of the fuel oil in the diesel driven air start air compressor fuel oil tanks 1T-477 and 1T-478. In addition, it was also stated that these tanks are not subjected to periodic cleaning and visual inspection, or UT because the tanks are small, have high fuel turnover and general inspections indicate no degradation, and as such this is not considered an exception to the GALL.

Issue

The staff does not agree that inscope fuel tanks, that are not subjected to any of the elements recommended in the GALL AMP XI.30, are not an exception to GALL AMP XI.30. The staff noted that since there is a high turnover of fuel in the diesel driven air start air compressor fuel oil tanks from a source where contaminants are controlled, loss of material is not expected for these tanks or would be occurring so slowly such that the intended function of the tanks will be compromised during the period of extended operation.

Request

To verify loss of material is not a concern for the driven air start air compressor fuel oil tanks, the staff requests further justification for not performing any preventive/mitigative activities and interior visual or one-time UT examinations to confirm degradation has not occurred in diesel driven air start air compressor fuel oil tanks 1T-477 and 1T-478.

RAI B.3.25-4

Background

The LRA provides an enhancement to the Fuel Oil Chemistry Program, element 2, Preventive Action, to expand the existing program preventive action element to add periodic draining or cleaning of the diesel fuel oil day tanks, diesel fire pump day tank and diesel driven air start air compressor fuel oil tanks on a schedule of every ten years.

Issue

However, GALL AMP XI.M30, element 2 "preventive action" states that periodic cleaning of a tank allows removal of sediment and periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of contact time.

Request

Provide justification for not performing both draining and cleaning of these tanks. Additionally, GALL AMP XI.M30, element 4 "detection of aging effects" recommends visual inspection of tanks that are drained and cleaned to detect potential degradation. Will diesel fuel oil day tanks, diesel fire pump day tank and diesel driven air start air compressor fuel oil tanks be subjected to visual inspection after they are drained and cleaned on a schedule of every ten years?

RAI B.3.25-5

Background

The operating experience element of the LRA indicates that the main diesel fuel oil storage tank was drained, cleaned and ultrasonically inspected in April 2001.

Issue

GALL AMP XI.M30 recommends visual examination after draining and cleaning.

Request

Was visual inspection performed at that time and will visual inspection be performed after draining and cleaning in the future?

RAI B.3.32-1

Background

GALL AMP XI.M32, element 4 “detection of aging effects” 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 due to time in service, severity of operating conditions, and lowest design margin. The program will rely on established NDE techniques, including visual, ultrasonic, and surface techniques that are performed by qualified personnel following procedures consistent with the American Society of Mechanical Engineers (ASME) Code and 10 CFR Part 50, Appendix B. The inspection and test techniques will have a demonstrated history of effectiveness in detecting the aging effect of concern. Typically, the one time inspections should be performed as indicated in the table GALL AMP XI.M32.

Issue

The LRA B.3.32, one-time inspection (OTI) Program and the associated basis document do not provide criteria that will be used to select locations and sample size for OTI inspection nor the techniques to be used to detect the various aging mechanisms.

Request

Provide criteria that will be used to select locations and sample size for OTI inspection and the techniques to be used to detect the various aging mechanisms.

RAI B.3.32-2

Background

GALL AMP XI.M32, element 4 “detection of aging effects” states that with respect to inspection timing, the population of components inspected before the end of the current operating term needs to be sufficient to provide reasonable assurance that the aging effect will not compromise any intended function at any time during the period of extended operation.

Issue

It appears that all OTIs can not practically take place in the last RFO before entering the period of extended operation.

Request

Provide timing for the various inspections such that all inspections will be performed before entering the period of extended operation.

RAI B.3.37-1

Background

The LRA Section B.3.37 states the Structures Monitoring Program is an existing program with an inspection frequency of five or ten years plus or minus one year depending on the environment.

Issue

The LRA states that the Structures Monitoring Program is consistent with GALL AMP XI.S6 and GALL AMP XI.S7. GALL AMP XI.S6 states that ACI 349.3R-96 provides an acceptable basis for inspection frequencies. ACI 349.3R-96 lists five or ten years as acceptable inspection frequencies, without mention of a possible one year extension. ACI 349R-96 further states that all safety-related structures should be visually inspected at intervals not to exceed 10 years. Furthermore, GALL AMP XI.S7 refers to Regulatory Guide 1.127, which states that visual inspections should not exceed five years for water-control structures.

Request

Provide justification for the five or ten year plus one year inspection interval discussed in the LRA. Explain how the frequency will provide assurance that any age-related degradation is detected at an early stage and that appropriate actions can be implemented.

RAI B.3.37-2

Background

The LRA Section B.3.37 states that the Structures Monitoring Program will be enhanced to include periodic sampling of groundwater for chloride concentration, sulfate concentration, and pH on a ten year basis.

Issue

The GALL Report suggests periodic monitoring of below-grade water chemistry, including consideration of potential seasonal variations, to demonstrate that the below-grade environment remains non-aggressive. The GALL Report also states that ACI 349.3R-96 provides an acceptable basis for inspection frequencies. ACI 349.3R-96 lists five or ten years as acceptable inspection frequencies, depending on the structure and the environment. The staff believes the sampling for an aggressive groundwater environment should be at least as frequent as the inspection of structures located in an aggressive environment.

Request

1. Explain why the current ten year ground water monitoring frequency, as opposed to a five year frequency, is adequate to demonstrate a non-aggressive environment.
2. Provide the results of recent groundwater sampling.

3. Explain how the groundwater test samples provide a representative sample of the groundwater in contact with safety-related and important-to-safety embedded concrete foundations.
4. Explain how the enhancement will address seasonal variations.

RAI B.3.37-3

Background

IN 2004–05 identified leakage of spent fuel pools at several existing nuclear power plants.

Issue

In the operating experience review, the applicant stated that the DAEC spent fuel pool has been leaking since at least 1994 and this leakage only appears in the spent fuel pool liner drains.

Request

1. Provide a chemical analysis of the leakage and the spent fuel pool water which demonstrates that the leakage originates in the spent fuel pool. Include pH in the chemical analysis.

2. Provide the basis for the conclusion that the leakage is entirely contained within the liner drain system and is not leaking through the surrounding concrete.

RAI B.3.32-3

Background

GALL AMP XI.M32, element 10 “operating experience” states that this program applies to potential aging effects for which there are currently no operating experience indicating the need for an AMP. Nevertheless, the elements that comprise these inspections (e.g., the scope of the inspections and inspection techniques) are consistent with industry practice. The LRA states that the DAEC One-Time Inspection is a new program; therefore, there is no plant-specific program operating experience for program effectiveness.

Issue

Although there is no captured plant-specific operating experience (OE) related to this program because this program is yet to be developed, any OE resulting from maintenance etc. should be included for systems and components that will be subjected to OTI.

Request

Provide a summary of OE resulting from observations resulting from maintenance and corrective action activities.

RAI B.3.6-01

Background

For DAEC AMP B.3.6, the FSAR Supplement in LRA Appendix A.18.1.6 states, in part, "The Bolting Integrity Program credits three separate AMPs for the inspection of bolting. The four AMPs are: (1) ASME Section XI Inservice Inspection, Subsections IWB, IWC, IWD Program, (2) ASME Section XI Inservice Inspection Subsection IWF, (3) External Surface Monitoring Program, and (4) Structural Monitoring Program."

The DAEC program basis document for the Bolting Integrity Program states that five (5) programs are credited and lists the following programs: (1) ASME Section XI Inservice Inspection, Subsections IWB, IWC, IWD Program, (2) ASME Section XI Inservice Inspection Subsection IWF, (3) External Surface Monitoring Program, (4) Structural Monitoring Program, and (5) Buried Piping and Tanks Inspection Program.

In addition, LRA Section B.3.6, Bolting Integrity Program, does not list the Buried Piping and Tanks Inspection Program as an AMP where inspection of bolting is also credited in the Bolting Integrity Program.

Issue

The list of credited programs in the FSAR Supplement and in LRA Section B.3.6 does not match the list of credited programs in the program basis document for the DAEC Bolting Integrity Program. Additionally the number of programs stated at one place in the FSAR Supplement is not the same as listed at another place in the FSAR Supplement.

Request

Revise the documentation discrepancy.

RAI B.3.6-02

Background:

LRA Section B.3.6 states that the Bolting Integrity Program credits inspections of fasteners, bolting, washers and nuts performed under other AMPs. The DAEC Program Basis Document states that the following five (5) AMPs are credited for inspection of fasteners, bolting, washers and nuts: (1) ASME Section XI Inservice Inspection, Subsections IWB, IWC, IWD Program, (2) ASME Section XI Inservice Inspection Subsection IWF, (3) External Surface Monitoring Program, (4) Structural Monitoring Program, and (5) Buried Piping and Tanks Inspection Program.

Issue

The staff does not have sufficient information, nor a commitment, to ensure that inspections of fasteners, bolting, washers and nuts performed under the five (5) listed AMPs are equivalent to the bolting inspections recommended in the GALL Report for AMP XI.M18, "Bolting Integrity."

Request

1. Provide a commitment to include inspection of fasteners, bolting, washers and nuts as a specific activity in each of the five (5) listed AMPs.
2. Provide justification that the inspection of fasteners, bolting, washers and nuts performed under the five (5) listed AMPs are equivalent to the inspection of fasteners, bolting, washers and nuts recommended in GALL AMP XI.M18 with regard to program element 3, "Parameters Monitored/Inspected," and element 4, "Detection of Aging Effects."

RAI B.3.6-03

Background

LRA Section B.3.6 states that the Bolting Integrity Program credits inspections of bolting performed under other AMPs. The DAEC Program Basis Document states that the following five (5) AMPs are credited for inspection of bolting: (1) ASME Section XI Inservice Inspection, Subsections IWB, IWC, IWD Program, (2) ASME Section XI Inservice Inspection Subsection IWF, (3) External Surface Monitoring Program, (4) Structural Monitoring Program, and (5) Buried Piping and Tanks Inspection Program.

For the Emergency Service Water System (LRA Table 3.3.2-10), the Fire Protection System (LRA Table 3.3.2-11), the Intake and Traveling Screens (LRA Table 3.3.2-16), the RHR Service Water System (LRA Table 3.3.2-25), and the River Water Supply System (LRA Table 3.3.2-26), the LRA includes aging management review (AMR) result lines in which the Bolting Integrity Program is credited with managing the aging effect of loss of material in carbon steel and stainless steel fasteners, bolting, washers and nuts where the environment is raw water (external).

Issue

The staff does not have sufficient information to determine which of the five AMPs listed in the DAEC Program Basis Document for the Bolting Integrity Program is credited for performing inspections of fasteners, bolting, washers and nuts in a raw water environment.

Request

1) For each system in which the LRA credits the Bolting Integrity Program to manage loss of material in carbon steel or stainless steel fasteners, bolting, washers and nuts in a raw water environment, identify the AMP under which the inspection for loss of material in fasteners, bolting, washers and nuts is actually performed.

2) Provide justification that the inspection of fasteners, bolting, washers and nuts performed under the identified AMP(s) is equivalent to the inspection of fasteners, bolting, washers and nuts recommended for these components in GALL AMP XI.M18, "Bolting Integrity."

RAI B.3.8-01

Background

GALL AMP XI.M6, BWR Control Rod Drive Return Line Nozzle (CRDRL), endorses the recommendations described in NUREG-0619. In GALL AMP XI.M6, the Preventive Actions program element states that mitigation occurs by system modifications such as rerouting the CRDRL to a system that connects to the reactor vessel and that for some classes of BWRs mitigation is accomplished by cutting and capping the CRDRL nozzle without rerouting.

Issue

The DAEC modifications do not appear to be one of the modification options described in NUREG-0619.

Request

Explain why the DAEC modifications, if different from the options described in NUREG-0619, are not considered an exception to the recommendations in GALL AMP XI.M6, Preventive Actions program element.

RAI B.3.8-02

Background

GALL AMP XI.M6, BWR Control Rod Drive Return Line Nozzle, in the "Parameters Monitored or Inspected" program element, states that the AMP monitors the effects of cracking on intended function or the CRDRL nozzles by detecting and sizing cracks by in service inspection (ISI) in accordance with Table IWB 2500-1 and NUREG-0619. Program element "Detection of Aging Effects" states that the extent and schedule of inspection, as delineated in NUREG-0619, assures detection of cracks before the loss of intended function of the CRDRL nozzles. Program element "Monitoring and Trending" states that the inspection schedule of NUREG-0619 provides timely detection of cracks. NUREG-0619, Section 8.2(3)(b) states that during each refueling outage, that portion of the CRDRL containing stagnant water must be inspected in accordance with the recommendations in NUREG-0313, and that requirement this does not apply if the piping containing stagnant water is fabricated from carbon steel.

Issue

DAEC's Augmented Inspection Administrative Document, Section 5.4, states that the stainless steel portion of the control rod drive piping containing stagnant flow currently is examined every third refueling outage.

Request

Justify that examination every third refueling outage is adequate, and explain why this examination schedule is not identified as an exception to the recommendations in GALL AMP XI.M6, program elements "Parameters Monitored or Inspected," "Detection of Aging Effects," and "Monitoring and Trending."

RAI B.3.28-1

Background

The DAEC LRA Section (AMP) B3.36, Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Program, commits to consistency with the GALL Report AMP XI.M33 with no exceptions or enhancements. The DAEC AMP Basis Document "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components of Materials Program," LRAP-M038, Revision 3, 03/31/09, quotes the GALL Report XI.M33 for the AMP element 5, Monitoring and Trending, and briefly describes the corresponding DAEC AMP elements.

Issue

GALL Report AMP XI.M33, Element 5 states, in part, that "Maintenance and surveillance activities provide for monitoring and trending of aging degradation. Inspection intervals are dependent on component material and environment, and take into consideration industry and plant-specific operating experience." For this AMP, the DAEC LRA and LRAP-M038 do not specifically commit to trending of aging degradation, having inspection intervals dependent on component material and environment, and consideration of industry operating experience.

Request

For AMP B3.36 Element 5, Monitoring and Trending, provide specific commitments to trending of aging degradation, having inspection intervals dependent on component material and environment, and consideration of industry operating experience, or provide the technical basis for this AMP Element's acceptability and consistency with the GALL Report AMP XI.M33.

RAI B.3.36-1

Background

The DAEC LRA Section (AMP) B3.36, Selective Leaching of Materials Program, commits to consistency with the GALL Report AMP XI.M33 with no exceptions or enhancements.

Issue

The DAEC AMP Basis Document Selective Leaching of Materials Program, LRAP-M033, Revision 3, 04/06/09, quotes the GALL Report XI.M33 wording for the AMP elements of Scope of Program, Parameters Monitored or Inspected, Detection of Aging Effects, and Acceptance Criteria, and briefly describes the corresponding DAEC AMP elements. Sufficient description is not provided to evaluate the acceptability of these AMP elements of Scope of Program.

Request

For AMP B.3.36, provide additional description of the basis, actions, support and specifics for the following elements:

A. Scope of Program

1. Clarify the basis for the inspection population and sample size for the selected set of sample components for the one-time visual inspection and hardness measurements.
2. Clarify that the AMP will evaluate external, as well as internal surfaces, where appropriate for the system or component.

B. Parameters Monitored or Inspected
   1. Provide description of the parameters to be monitored or inspected, including the methods or techniques to be used. Identify specifics of hardness measurements or other inspection techniques.

C. Detection of Aging Effects
   1. Clarify the basis for the inspection population and sample size for the selected set of sample components for the one-time visual inspection and hardness measurements.
   2. Clarify that the AMP will evaluate external, as well as internal surfaces, where appropriate, and that inspection or monitoring will adequately detect internal or external corrosion caused by selective leaching.
   3. Clarify what are considered acceptable "other mechanical tests."

D. Acceptance Criteria
   1. Identify and provide details of acceptance criteria for hardness or other mechanical inspection technique.
   2. Clarify what constitutes "identification of selective leaching," which would lead to further engineering evaluation and, if necessary a root cause analysis.

RAI B.3.36-2

Background

The DAEC LRA Section (AMP) B3.36, Selective Leaching of Materials Program, commits to consistency with the GALL Report AMP XI.M33 with no exceptions or enhancements. The DAEC AMP Basis Document Selective Leaching of Materials Program, LRAP-M033, Revision 3, 04/06/09, quotes the GALL Report XI.M33 wording for the AMP element Operating Experience and briefly describes the corresponding DAEC AMP element.

Issue

The GALL Report AMP XI.M33, states that the elements that comprise these one-time inspections (e.g., the scope of the inspections and inspection techniques) are consistent with industry practice and staff expectations. For AMP Element 10, Operating Experience, Industry has identified a number of instances attributed to selective leaching that may be applicable to the DAEC AMP. LRA Section (AMP) B.3.36 and LRAP-M033 address plant-specific operating experience, but they do not address other industry experience and practices for the staff to evaluate the acceptability of the AMP.

Request

For AMP B3.36, provide description of the industry operating experience searched and reviewed, and how it will be utilized for the basis and actions for implementation of the DAEC Selective Leaching AMP. Also provide specifics as to data bases, sources and documents searched, key search terms, and time periods.

RAI B.3.34-1

Background

GALL Report AMP XI.M3, "Reactor Head Closure Studs," element 4, Detection of Aging Effects, recommends surface and volumetric examination of studs when removed.

Issue

LRA B.3.34 states that the DAEC AMP is consistent with the GALL Report AMP and states that the AMP is an integral part of the DAEC Section XI Inservice Inspection Program. However, Attachment III of the DAEC Inservice Inspection Administrative Document, Table IWB-2500-1, Examination Category B-G-1, for Reactor Vessel closure head studs and nuts, under footnote 7, states that when bolts or studs are removed for examination, surface examination meeting the acceptance standards of IWB-3515 may be substituted for volumetric examination.

Request

Please justify why this is not considered an exception to the GALL Report AMP.

RAI B.3.23-1

Background:

GALL AMP XI.M27, "Fire Water System," states in "detection of aging effects" program element that fire hydrant hose hydrostatic tests, gasket inspections, and fire hydrant flow tests, performed annually, ensure that fire hydrants can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur.

Issue:

The DAEC Fire Water System program basis document states that STP-NS13E006, Fire Hose Hydrostatic Pressure Testing procedure provides the guidance to perform the fire hydrant hose hydrostatic tests and gasket inspection annually. However, Section 4.1 of the procedure, the drywell access cabinet, fire brigade assembly area, and B5b hose hydrostatic pressure tests are performed every 3 years.

Request:

Please justify why this is not identified as an exception to the GALL AMP XI.M27 in the LRA. If it is an exception, please provide the basis for the 3-year test frequency.

RAI B.3.22-1

Background

LRA AMP B.3.22, Fire Protection program has taken an exception for “detection of aging effects” and “monitoring and trending” program elements as follows:

DAEC Fire Plan – Volume 1, Program reflects the current Duane Arnold licensing bases as defined in License Amendment Number 132. This amendment allows the frequency of the visual inspections for the walls, ceilings, and floors use as fire barriers to be performed at an interval of 35 per cent once each operating cycle with 100 per cent visually inspected within a period of five years.

Issue

However, License Amendment Number 132, as approved by NRC SE dated April 24, 1986 addresses inspection frequencies of fire barrier penetration seals, and not walls, ceilings and floors.

Request

Please confirm if the exception should be addressing fire barrier penetration seals and indicate what happens after the five-year period.

RAI B.3.22-2

Background

GALL AMP XI.M26, “Fire Protection,” states in “parameters monitored/inspected” program element that visual inspection of approximately 10% of each type of penetration seal is performed during walkdowns carried out at least once every refueling outage.

Issue

It is not clear if the 35% of penetration seals that are inspected during each operating cycle includes each type of penetration seal.

Request

Please confirm if the 35% sample of penetrations seals visually inspected include each type of penetration and if not, please justify why this is not an exception to the GALL AMP XI.M26

RAI B3.22-3

Background

GALL AMP XI.M26, "Fire Protection," states in "parameters monitored/inspected" and "detection of aging effects" program elements that periodic visual inspection and function test is performed at least once every six months to examine the signs of degradation of the halon/CO2 fire suppression system.

Issue

Review of the DAEC Fire Protection Program basis document indicates that performance testing and visual inspection of CO2 fire suppression system is done annually, however; there is no exception taken in the LRA.

Request

Please justify why an exception to the GALL AMP is not addressed in the LRA. If an exception is taken, please provide the basis of the exception.

RAI B3.22-4

Background

GALL AMP XI.M26, "Fire Protection," states in "detection of aging effects" program element that visual inspections of the halon/CO2 fire suppression system detect any sign of added degradation, such as corrosion, mechanical damage, or damage to dampers. GALL AMP XI.M26 states in "acceptance criteria" program element that any signs of corrosion and mechanical damage of the halon/CO2 fire suppression system are not acceptable.

Issue

Review of the DAEC Fire Protection Program basis document, and supporting surveillance test procedure document for Cardox System Operability Test indicated that this procedure only addresses performance testing and did not include visual inspection.

Request

Please explain how DAEC proposes to meet the GALL AMP recommendation to detect any sign of corrosion and mechanical damage of the CO_2 Cardox system.

RAI B.3.22-5

Background

GALL AMP XI.M26, "Fire Protection," states in "detection of aging effects" program element that visual inspection by fire protection qualified inspectors of the fire barrier walls, ceilings, and floors, performed in walkdowns at least once every refueling outage ensures timely detection of concrete cracking, spalling, and loss of material.

Issue

Review of the DAEC Fire Protection Program basis document, Section 3.4.2, indicates that fire barriers are inspected once every five years, and that this is an exception to the GALL AMP interval of once every refueling outage. Furthermore, the same section also references Structures Monitoring Program and identifies a ten-year inspection cycle. The LRA AMP B.3.22, Fire Protection Program, does not identify this as an exception to the GALL AMP XI.M26.

Request

Please justify why this is not an exception and provide the basis for the exception. Also please explain if the ten-year inspection using the Structure Monitoring Program is in addition to the Fire Protection Program inspections or in lieu of the Fire Protection program inspection.

RAI B.3.22-6

Background

LRA B.3.22, Fire Protection Program, in Section B.3.22.5, states that "DAEC performs a biennial assessment of the Fire Protection Program. The most recent assessment concluded that, on an overall basis, the Fire Protection Program is satisfactory."

Issue

Staff review of DAEC operating experience identified a CAP040770 dated March 7, 2006 that was written to address the Fire Protection self assessment of Penetration Seal Program Effectiveness. This CAP identified several issues with the penetration seal program and warranted the classification of penetration seal program as an issue of attention. The penetration seal program inspections are performed under seal inspection procedure STP-NS13F001, which was used by DAEC as the basis to establish consistency with GALL AMP XI.M26.

Request

Please explain why this plant operating experience was not included in LRA Section B.3.22.5. Please also identify the corrective actions taken to confirm that the Fire Protection Program will provide reasonable assurance that the effects of aging will be managed such that applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

RAI LRA Table 3.4.2-4

Background

Accurate identification of material and environment combinations, as described in the GALL report (NUREG-1801), is necessary to support AMRs.

Issue

LRA Table 3.4.2-4 "Summary of Aging Management Review Results Main Steam Isolation and Automatic Depressurization System" describes stainless steel Pipe, pipe fittings, hoses, tubes, rupture disk with an internal steam environment. During the material/environment verification audit walkdown, the NRC staff requested that the applicant show examples of component(s) that included tubing with steam environment, hoses with steam environment and rupture disk with steam environment. The applicant showed an example of an instrument tube line that was not thermally insulated (lagged) and would appear, based on a dead leg tap from a steam line, to contain condensate rather than steam. In addition when asked to follow up on examples for hose material in a steam environment, the applicant referred to a valve stem leak off pipe indicated on the drawing as flexible, but was not considered a “hose,” either on the drawing or in the applicant’s equipment data base. Lastly, the applicant referred to a rupture disk, a device “in scope”, but in discussions, confirmed that these components were screened out as short lived components not requiring an AMR and therefore should not have been included in Table 3.4.2-4.

Request

Provide the documentation to show that there are specific examples of these component types with material/environment described, or correct the material environment description in Table 3.4.2-4. In addition, describe how the generic component and environment types were verified to ensure specific plant components are accurately represented in the Summary of AMR Results submitted in the DAEC license renewal application.

RAI B.3.4-1

Background

GALL Report (NUREG-1801), Element 5 of the AMP X1.S1, “ASME Section XI, Subsection IWE,” require that areas containing flaws, degradation, or repairs shall be reexamined during the next inspection period, in accordance with Examination Category E-C. When these reexaminations reveal that the flaws, areas of degradation, or repairs remain essentially unchanged for three consecutive periods, these areas no longer require augmented examination in accordance with Examination Category E-C.

Issue

LRA Section B.3.4, “ASME Section XI Inservice Inspection, Subsection IWE Program,” states that this program is consistent with NUREG-1801 (GALL) AMP XI.S1. Section 3.5 of the DAEC program basis document (LRAP-S001, Rev. 2) further states that Monitoring and Trending element for LRAP-0001 is consistent with 2001 Edition, including the 2002 and 2003 Addenda, of ASME Section XI, Subsection IWE which fulfills the requirements of NUREG-1801 XI.S1, Element 5, “Monitoring and Trending.” However, Section 3.5.2 of LRAP-S001 states that:

"When the reexaminations required by IWE-2420(b) reveal that the flaws or areas of degradation remain essentially unchanged for the next inspection period, these areas no longer require augmented examination in accordance with Table IWE-2500-1, Examination Category E-C."

Request

Explain how Section 3.5 of the LRAP-S001, Rev. 2 and the LRA Section B.3.4 are consistent with the GALL AMP XI.S1, Element 5.

RAI 3.4-2

Background

GALL Report (NUREG-1801), Element 5 of the AMP X1.S1, "ASME Section XI, Subsection IWE," require that areas containing flaws, degradation, or repairs shall be reexamined during the next inspection period, in accordance with Examination Category E-C. When these reexaminations reveal that the flaws, areas of degradation, or repairs remain essentially unchanged for three consecutive periods, these areas no longer require augmented examination in accordance with Examination Category E-C.

Issue

DAEC document LRAP-S001, Rev. 2, "ASME Section XI Inservice Inspection Subsection IWE," references DAEC Station 2nd Interval Containment Inspection Plan. This inspection plan contains Relief Request No. MC-R001 which has different requirements for augmented examinations (twice during 10 year interval) than GALL report AMP XI.S1. Relief Request MC-R001 has been approved by the NRC for the period between May 2008 and February 2014.

Request

Explain how the relief request MC-R001 is consistent with GALL Element 5. In addition, provide documentation that this relief request has been approved by the USNRC for the period of extended operation.

RAI 3.4-3

Background

ASME Subsection IWE, Subarticle IWE-5240 requires that during the pressure test required by IWE-5220, a detailed visual examination (IWE-2310) shall be performed on areas affected by repair/replacement activities.

Issue

DAEC Station 2nd Interval Containment Inspection Plan contains a copy of the relief request MC- P001 which requests relief from performing detailed VT-1 examination for minor repairs prior to performing pneumatic tests conducted in accordance with 10 CFR 50, Appendix J in lieu of IWE 5420. Relief Request MC-P001 has been approved by the NRC for the period between May 2008 and February 2014.

Request

Explain how relief request MC-P001 for not performing VT1 examination is consistent with GALL AMP XI S.1. In addition, provide documentation that this relief request has been approved by the USNRC for the period of extended operation.

RAI 3.4-4

Background

GALL Report (NUREG-1801), Element 5 of the AMP X1 S.1, "ASME Section XI, Subsection IWE," require all accessible surfaces be monitored by virtue of examination on a scheduled basis.

Issue

A review of various Corrective Action Program (CAP) Reports, including CAP 0611106, and RFP No. 20 inspection report of the torus indicate that DAEC does not maintain a database of the all degradations observed over the life of the plant.

Request

Explain how DAEC maintain the records of degradations and repairs of the torus internal surface to ensure that the effects of aging on the torus will be adequately managed for the period of extended operation.

RAI 3.4-5

Background

GALL report AMP XI S8, Element 1 requires proper maintenance of protective coatings inside containment (defined as Service Level I in Nuclear Regulatory Commission [NRC] Regulatory Guide [RG] 1.54, Rev. 1) in order to ensure operability of post-accident safety systems that rely on water recycled through the containment sump/drain system. Degradation of coatings can lead to clogging of strainers, which reduces flow through the sump/drain system. Maintenance of Service Level I coatings applied to carbon steel surfaces inside containment (e.g., steel liner, steel containment shell, penetrations, hatches) also serves to prevent or minimize loss of material due to corrosion.

Issue

DAEC document, “ASME Section XI, Subsection IWE, LRAP-S001, Rev. 2” references DAEC procedure STP 3.6.1.1-01, “Surveillance Test Procedure, Suppression Chamber and Drywell Inspection,” for inspection of the ASME Subsection IWE inspection. DAEC document STP 3.6.1.1-01 states that the design basis for inspection and repair of the coatings in the Drywell and Suppression Pool is described in ACP 1601 and ACP 1603. According to ACP 1601, all exposed coatings within containment that in the event of a DBA-LOCA could dislodge and be carried down to the torus where it could block essential ECCS suction strainers are considered safety-related, Service Level I, with regards to DAEC Protective Coating Program (PCP), both in the vapor area and those in immersion service. In addition, according to the DAEC PCP, coatings in the torus area are used to prevent corrosion.

Request

Explain why there is no AMP for safety-related, Service Level 1 coatings applied to the torus area. In addition, justify why NUREG-1801 AMP XI S.8 does not apply to DAEC.

New Program Commitments RAI

Background

This RAI applies to all new AMPs.

Issue

Appendix A, Section 18.4, table A-1 of the LRA, contains commitments for each new AMP. In this table, the applicant uses words such as “develop” or “establish” to describe the action to be taken prior to the period of extended operation. The SRP-LR (tables 3.x-2 where x=1through 6) recommends the use of very precise language to describe the actions to be taken prior to the period of extended operation. In reviewing the new AMPs the staff has, in general, found that the language used in the SRP is contained within the AMP. However, the staff recognizes that it is possible to develop an AMP without implementing it. Given the possibility that an AMP could be developed and not implemented, it is not clear to the staff that the wording used by the applicant is consistent with the wording used in the SRP-LR.

Request

Please modify the commitments for new programs so that the commitment clearly states that the new program will be implemented prior to the period of extended operation.

RAI B.3.33-1

Background

The applicant states that its LRA AMP Open Cycle Cooling Water System (B.3.33) is consistent with the GALL Report AMP, Open Cycle Cooling Water System (XI.M20). In its audit of program elements 2, 3 and 5 (preventive actions, parameters monitored or inspected and monitoring and trending), the staff identified a potential inconsistency between the LRA AMP and the GALL Report AMP.

Issue

Program element 2 of the GALL Report AMP, preventive actions, states that system components should be constructed of appropriate materials and be lined or coated to protect the underlying metal surfaces. Program elements 2, 3, and 5 of the LRA AMP state that open cycle cooling water piping is constructed from carbon steel, which is not lined or coated. Corrosion rates of lined piping exposed to open cycle cooling water are expected to be much lower than those experienced by unlined pipe. Since the GALL Report AMP is designed to manage the corrosion of lined pipe, it is not clear that the LRA AMP, which claims consistency with the GALL AMP, will adequately manage the aging of the unlined pipe. The inclusion of unlined pipe in the LRA AMP is considered to be an exception to the GALL AMP.

Request

Please commit to revise the LRA AMP to show the inclusion of unlined pipe as an exception. Additionally please justify why the proposed program is sufficient to manage the aging of unlined pipe.

RAI B.3.7-1

Background

The applicant states that its LRA AMP Buried Piping and Tanks Inspection (B.3.7) is consistent with the GALL Report AMP, Buried Piping and Tanks Inspection (XI.M34). In its audit of program element 1 (scope), the staff identified a potential inconsistency between the LRA AMP and the GALL Report AMP.

Issue

Program element 1 of the GALL Report AMP, scope, states that the scope of the AMP includes buried steel piping and tanks. Chapter IX of Volume 2 of the GALL report states that the term “steel” includes carbon steel, low alloy steel and cast iron. The term “steel” does not include stainless steel. Program element 1 of the LRA AMP states that the scope of the program includes carbon steel, low alloy steel, and stainless steel. The scope of the LRA AMP does not appear to include cast iron although cast iron components appear to be present in systems addressed by this AMP. Given that the corrosion characteristics of stainless steel are different than steel (as defined in the GALL Report) and that the procedures for adequately managing aging may, therefore, be different, the inclusion of stainless steel in this AMP must be considered an exception to the GALL AMP.

Request

Please commit to revise the LRA AMP to show the inclusion of stainless steel buried piping as an exception. Additionally please justify why the proposed program is sufficient to manage the aging of stainless steel pipe. Also, please modify the scope of the LRA AMP to specifically include cast iron.

RAI B.3.7-2

Background

The applicant states that its LRA AMP Buried Piping and Tanks Inspection (B.3.7) is consistent with the GALL Report AMP, Buried Piping and Tanks Inspection (XI.M34). In its audit of program element 2 (preventive actions), the staff identified a potential inconsistency between the LRA AMP and the GALL Report AMP.

Issue

Program element 2 of the GALL Report AMP, preventive actions, states that underground piping and tanks are coated. Program element 2 of the LRA AMP states that carbon and low alloy steel pipes are coated. Elsewhere in the LRA AMP it is stated that stainless steel pipes are not coated. From the LRA AMP, it is not clear whether cast iron pipes are coated. Given that the corrosion rate of uncoated pipe exceeds that of coated pipe and that the GALL report AMP is designed for coated pipe, it is not clear that the LRA AMP, which claims consistency with the GALL AMP, will adequately manage aging. The absence of coatings must, therefore be considered an exception to the GALL AMP.

Request

Please clarify whether buried cast iron pipes are coated. Please commit to revise the LRA AMP to show the inclusion of uncoated buried piping as an exception. Additionally please justify why the proposed program is sufficient to manage the aging of uncoated stainless steel and/or cast iron pipes.

RAI B.3.7-3

Background

The applicant states that its LRA AMP, Buried Piping and Tanks Inspection (B.3.7) is consistent with the GALL Report AMP, Buried Piping and Tanks Inspection (XI.M34). In its audit of program element 4 (detection of aging effects), the staff identified a potential inconsistency between the LRA AMP and the GALL Report AMP.

Issue

Section A.1.2.3.4 of the SRP-LR states that the program element “detection of aging effects” should contain information concerning the frequency, extent, sample size and methods used to detect aging. The staff notes that much of this information is absent from this section of the LRA AMP. In order for the staff to evaluate the consistency of this LRA program element with the corresponding GALL Report program element, it is necessary that the applicant provide additional information concerning the program for detection of aging effects.

Request

Please provide additional details of the proposed inspection program.

RAI B.3.7-4

Background

The applicant states that its LRA AMP, Buried Piping and Tanks Inspection (B.3.7) is consistent with the GALL Report AMP, Buried Piping and Tanks Inspection (XI.M34). In its audit of program element 6 (acceptance criteria), the staff identified a potential inconsistency between the LRA AMP and the GALL Report AMP.

Issue

Section A.1.2.3.6 of the SRP-LR states that the program element “acceptance criteria” should contain information concerning the acceptance criteria against which the need for corrective action will be measured. This section of the SRP-LR also states that the acceptance criteria should consist of numerical values or methods by which they are determined. The staff notes that this information is absent from this section of the LRA AMP. In order for the staff to evaluate the consistency of this LRA program element with the corresponding GALL Report program element, it is necessary that the applicant provide this information in the LRA AMP.

Request

Please provide acceptance criteria as indicated in the SRP-LR.

RAI 3.18-1

Background

GALL AMP XI.E2, under Scope of Program, states that this program applies to electrical cable and connections used in circuits with sensitive, high voltage, low-level signals such as radiation monitoring and nuclear instrumentation that are subject to an AMR. In the applicant’s basis document LRAP-E002, under Scope of Program, it states that the cables in the scope of license renewal are in the nuclear instrumentation system, and there are no radiation monitoring system cables in the scope of this AMP.

Issue

Per GALL AMP XI.E2, the radiation monitoring system cables are in the scope of license renewal because they perform an intended function. These cables are used in sensitive, high voltage, low level signals. Exposure of these electrical cables to adverse localized environments caused by heat, radiation, or moisture can result in reduced insulation resistance (IR). Reduced IR can cause an increase in leakage current between conductors and from individual conductors to ground. A reduction in IR is a concern for circuits with sensitive, high voltage, low-level signals such as high-range radiation monitoring system.

Question

Explain why radiation monitoring system circuits are not included in the scope of Electrical Cables and Connections Used in Instrumentation Circuits AMP.

RAI B.3.3-1

Background

In the DAEC LRA Section B.3.3, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program," the applicant stated that the AMP is "consistent with the ten elements of NUREG-1801, Section XI.M1."

NUREG-1801 Section XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD" recommends the use of ASME Section XI Table IWB-2500-1 to determine the examination of category B-F and B-J welds. DAEC is currently using examination category R-A in accordance with risk-informed methodology approved by the NRC under 10 CFR Part 50, for use during the current ten-year interval for examination of Table IWB-2500-1 category B-F and B-J welds.

Issue

The approval of the risk-informed methodology can not be assumed for the subsequent intervals.

Request

Clarify how the inspection of Categories B-F and B-J will be implemented during the extended period of operation.

RAI B.3.3.2

Background

In the DAEC LRA Section B.3.3, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program," the applicant stated that the AMP is "consistent with the ten elements of NUREG-1801, Section XI.M1."

Operating experience and AMP audit discussion with the applicant indicated that DAEC had experienced significant aging effect of stress corrosion cracking (SCC) in its Code Class 1 piping including small bore piping. NUREG-1801, Section XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping," states that "Should 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 AMP."

Issue

No specific program was provided to manage the aging effects in small bore piping.

Request

Please provide a plant-specific AMP to address the aging effects of SCC and fatigue in Code Class 1 small bore piping including socket welds.

RAI B.3.3-3

Background

In the DAEC LRA Section B.3.3, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD Program," the applicant stated that the AMP is "consistent with the ten elements of NUREG-1801, Section XI.M1."

Issue

The program documents submitted do not include operating experience. The staff finds it difficult to evaluate the sufficiency of the AMP in the absence of operating experience.

Request

Please provide DAEC plant-specific operating experience related to the Section XI, IWB, IWC, and IWD Program. Please also provide operating experience related to Code Class 1 small bore piping.

RAI B.3.2-1

Background

The Acceptance Criteria section of the Aboveground Steel Tank Program in NUREG-1801, Rev. 1, Section XI.M29 recommends that any degradation of steel tank paint, coating, sealant, and chalking will require further evaluation. The degradation of aboveground steel tank is detected by (1) periodic system walkdowns to monitor the degradation of the protective coating and sealant at the metal-concrete interface and (2) thickness measurement of the tank bottom to assess the underground surface conditions in contact with soil or concrete.

Issue

In the DAEC LRA, Appendix B, Section B.3.2 indicates that the applicant's Aboveground Steel Tanks Program is consistent with the NUREG-1801, Rev. 1 Section XI.M29 and does not take any exceptions. It was indicated in the applicant's basis document LRAP-M029 Revision 2, Aboveground Steel Tanks, that the protective coating is visually inspected. Material degradation may also occur in inaccessible locations, such as the tank bottom. These areas are monitored by ultrasonic thickness measurements from inside the tank. It is not clear the techniques used or the monitoring frequency will adequately manage the aging effects of the tank bottoms to ensure their intended function will be maintained during the extended period of operation. In the DAEC operating experience, pitting corrosion was reported for both Condensation Storage Tank IT-5A, and IT-5B during an inspection in 1992. The maximum pit depths were 0.080" and 0.066" for IT-5A and IT-5B, respectively. It is not clear what the acceptance criteria are.

Request

The applicant is requested to:

1. Clarify how visual inspection is adequate to exclude corrosion of aboveground steel tank wall surfaces if no additional thickness measurements are made.
2. Clarify and justify how the frequency of tank bottom thickness measurement to be performed under the preventive maintenance program is sufficient to detect and monitor the effects of corrosion on the tank bottom surfaces.
3. Clarify and justify how the acceptance criteria are determined.

RAI B.3.24-01

Background

GALL Section XI.M17, "Flow-Accelerated Corrosion," states that the program relies on implementation of the guidelines in NSAC-202L-R2 for an effective flow-accelerated corrosion program. DAEC LRA Section B.3.24, "Flow-Accelerated Corrosion," states that this program manages the loss of material aging effect due to flow-accelerated corrosion, and is based on the guidelines of NSAC-202L-R2. However, NSAC-202L-R2, states that systems can be susceptible to damage from other corrosion or degradation mechanisms, such as cavitation erosion, liquid impingement erosion, as well as others, and specifically states these mechanisms are not part of a flow accelerated corrosion program and should be evaluated separately.

Issue

The DAEC AMP Basis Document, LRAP-M017, Revision 2, “Flow-Accelerated Corrosion,” Attachment 7.1, “Equipment and Internal Aging Effects Managed by Flow-Accelerated Corrosion Program,” indicates that this program is also used to manage the aging effect “loss of material” due to both flow accelerated corrosion and erosion. Although the LRA program description clearly addresses flow accelerated corrosion, erosion is not discussed in any manner. In addition, the AMP Basis Document does not address the loss of material due to erosion in any of the ten program elements.

Request

Clarify the information in the LRA to indicate that the Flow-Accelerated Corrosion program will also be used to manage the aging effect of loss of material due to erosion, and discuss any consequent changes to the program elements within the Program Basis Document, LRAP-M017, Revision 2.

RAI B.3.24-02

Background

LRA Section B.3.24.5, “Operating Experience,” states that the flow accelerated corrosion program has verified that actual wear was less than or equal to predicted wear.

Issue

The inspection results from refueling outage 20 indicated that there were several areas where the measured wear rate was higher than the predicted wear rate. In some cases, the measured wear rate was more than 2.5 times higher than predicted wear rate.

Request

Reconcile the apparent discrepancy between the statement made in the LRA and the latest refueling outage information relative to actual wear being less than predicted wear.

RAI B.3.24-03

Background

NUREG-1800 discusses the FSAR supplement for flow-accelerated corrosion program, and notes that the program consists of conducting appropriate analysis and baseline inspection.

Issue

LRA, Appendix A, “Duane Arnold UFSAR Supplement,” Section 18.1.24, states that the program includes performance of limited baseline inspections.

Request

Clarify the extent that baseline inspections are limited and address the bases for the limitations of the baseline inspections.

RAI B.3.39-1

Background

The water chemistry Parameters Monitored/Inspected, described in NUREG-1801, Rev. 1, Section XI.M2 indicates that the guidance in EPRI BWR water chemistry guidelines may be used to monitor reactor water chemistry to minimize exposure to contaminant concentration.

Issue

The DAEC LRA, Appendix B, Section B.3.39 indicates that the applicant's Water Chemistry System Program is consistent with the NUREG-1801, Rev. 1 Section XI.M2 and does not take any exceptions. In addition, the applicant indicates that its prevention and monitoring practices are based on the guidance from EPRI Boiling-Water Reactor Vessel and Internals Project (BWRVIP) – 130, BWR Water Chemistry Guidelines. The EPRI BWR Water Chemistry Guidelines in Table 6-6 indicates that condensate dissolved oxygen should be measured. However, the applicant's Water Chemistry Guidelines, Attachment 5, does not appear to indicate that condensate dissolved oxygen is measured. It is not clear to the staff why condensate dissolved oxygen is not monitored as suggested in the EPRI BWR Water Chemistry Guidelines.

Request

Provide additional information to justify why the condensate dissolved oxygen is not monitored in the Water Chemistry Program as suggested in the EPRI BWR Water Chemistry Guidelines.

RAI B.3.39-2

Background

Monitoring and Trending described in the Water Chemistry Program in NUREG-1801, Rev. 1, Section XI.M2 indicates that the frequency of sampling water chemistry parameters will vary, but are based on the EPRI BWR Water Chemistry Guidelines. Furthermore NUREG-1801, Rev. 1, Section XI.M2 indicates that whenever corrective actions are taken to address an abnormal chemistry condition, increased sampling is utilized to verify the effectiveness of these actions.

Issue

In the DAEC LRA, Appendix B, Section B.3.39 indicates that the applicant's Water Chemistry System Program is consistent with the NUREG-1801, Rev. 1 Section XI.M2 and does not take any exceptions. Section 3.5.2 of the LRAP-M002 Water Chemistry program basis document, the applicant indicates that the program does not contain specific guidance to increase the sampling rate after corrective actions have been taken to address an abnormal chemistry condition. It is not clear to the staff why the technical basis document states that it is consistent

with NUREG-1801 because it appears to take exception to the increased sampling rate suggested in the NUREG-1801.

Request

Provide additional information to justify why the DAEC LRA is not taking an exception to NUREG-1801, Rev. 1, when the applicant's LRAP-M002 document states it will not increase sampling due to an abnormal chemistry condition as indicated in NUREG-1801.

RAI B.3.38-1

Background

The scope of the Thermal Aging and Neutron Irradiation Embrittlement of CASS AMP in NUREG-1801, Rev. 1, Section XI.M13 indicates that the method to determine susceptibility includes evaluating the ferrite content of the material. NUREG-1801, Rev. 1, Section XI.M13 continues to explain that it is acceptable to evaluate the ferrite content by using the Hull's equivalent factors as described in NUREG/CR-4513, Rev 1.

Issue

The DAEC LRA, Appendix B, Section B.3.38 indicates that the applicant's Thermal Aging and Neutron Irradiation Embrittlement of CASS Program is consistent with the NUREG-1801, Rev. 1 Section XI.M13 and does not take any exceptions. In addition, the alloy for the CASS materials considered under the applicant's Thermal Aging and Neutron Irradiation Embrittlement of CASS Program is 351 Grade CF8, which has a maximum molybdenum concentration of 0.5 wt. percent as per the latest ASTM standard. The 1976 ASTM standard does not provide a maximum value for the 351 CF8 alloy. The applicant described in their Thermal Aging and Neutron Irradiation Embrittlement of basis document (LRAP-M013) that the Hull's equivalent factors were used to calculate the percent ferrite in their plant-specific CASS material. The applicant used 0.0 wt. percent for molybdenum in their calculations. Secondly, the applicant stated that it based the nitrogen concentrations used in the Hull's equivalent equations on the values found in NUREG/CR-4513, Rev 1. The applicant used 0.04 wt. percent for nitrogen, however, the nitrogen concentration in NUREG/CR-4513, Rev 1. can be as low as 0.028 wt. percent. Using a molybdenum and nitrogen concentration of 0.0 and 0.04 wt. percent, respectively led to a final ferrite concentration of 23.28 wt. percent. However, if the molybdenum and nitrogen concentration of 0.5 and 0.028 wt. percent would have been used, respectively, the ferrite concentration of 28.93 wt. percent would have been calculated. It is unclear to the staff the basis for choosing the molybdenum and the nitrogen concentrations of 0.0 and 0.04 wt. percent, respectively for use in the Hull's equivalent factors.

Request

Provide additional information that justifies use of 0.0 wt. percent for molybdenum in Hull's equivalent factors when the maximum concentration of 0.5 wt. percent is possible. Provide additional information that justifies use of 0.04 wt. percent nitrogen in Hull's equivalent factors when NUREG/CR-4513, Rev 1. indicates that nitrogen may be as low as 0.028 wt. percent. Furthermore, if updated values for molybdenum and nitrogen indicate that the ferrite content is greater than 25 percent, provide additional information describing what additional actions will be taken regarding flaw evaluation to be consistent with the GALL Report.

RAI B.3-38-2

Background

The detection of aging effects of the Thermal Aging and Neutron Irradiation Embrittlement of CASS AMP in NUREG-1801, Rev. 1, Section XI.M13 indicates that a supplemental inspection covering the components of interest may be used. In addition, the guidance indicates that the inspection technique used should be capable of detecting the critical flaw size with adequate margin, which will be based on service loading conditions and service-degraded material properties. NUREG-1801, Rev. 1 Section XI.M13 indicates that an acceptable enhanced VT-1 inspection would achieve a 0.0005-in resolution with the conditions of the inservice examination bounded by those used to demonstrate the resolution of the inspection technique.

Issue

The DAEC LRA, Appendix B, Section B.3.38 indicates that the applicant's Thermal Aging and Neutron Irradiation Embrittlement of CASS Program is consistent with the NUREG-1801, Rev. 1 Section XI.M13 and does not take any exceptions. It was indicated in the applicant's basis document LRAP-M013, Thermal Aging and Neutron Irradiation Embrittlement of CASS, in Section 3.4.2, that this AMP will use enhanced VT-1 inspections on the affected components during the 10-year inservice inspection program during the license renewal term. The applicant further stated that this enhanced VT-1 program would be able to detect the critical flaw size for this degradation process with adequate margin. The applicant's basis document did not provide any further information on the techniques that will be used for detecting tight cracks that may form in the CASS material from thermal and neutron irradiation embrittlement.

Request

Describe how the visual inspection used in this program will achieve the 0.0005-in flaw size resolution as indicated in NUREG-1801, Rev. 1 Section XI.M13. If not, provide additional information that demonstrates that the enhanced VT-1 technique will be able to detect the critical flaw size associated with thermal aging and neutron irradiation embrittlement of cast austenitic stainless steel.

RAI B.3.15-1

Background

The evaluation and technical basis described in the Closed-Cycle Cooling Water System Program in NUREG-1801, Rev. 1, Section XI.M21indicates that the closed cycle cooling water system may rely upon the EPRI TR-107396 document to manage cooling water chemistry to minimize exposure to aggressive environments and ensure correct application of corrosion inhibitors.

Issue

The DAEC LRA, Appendix B, Section B.3.15 indicates that the applicant's Closed-Cycle Cooling Water System Program is consistent with NUREG-1801, Rev. 1 Section XI.M21 and does not take any exceptions. In addition, the applicant indicates that it maintains the closed-cycle cooling water system corrosion chemistry within specified limits of EPRI TR-107396. This EPRI document is citied throughout the Closed-Cycle Cooling Water System basis document, LRAP-M021. However, the reference for the EPRI TR-107396 shown in the basis document is actually EPRI TR-1007820, which is the revision to EPRI TR-107396. It is unclear to the staff, which EPRI document the applicant plans to use to monitor the closed-cycle cooling water system.

Request

Provide additional information depending on whether the applicant plans to use the EPRI TR-107396 or the EPRI TR-1007820 document to manage the closed-cycle cooling water systems. If the applicant plans on using the EPRI TR-107396, provide additional information how the use of the initial version of the EPRI Closed Cooling Water Chemistry Guideline captures the most recent operating experience. If the applicant plans on using the EPRI TR-1007820, indicate if there are any changes that the applicant plans on making to the operating procedures to incorporate the new operational experience captured in the latest version of the EPRI Closed Cooling Water Chemistry Guideline document.

RAI B.3.15-2

Background

The preventive actions, described in the Closed-Cycle Cooling Water System Program in NUREG-1801, Rev. 1, Section XI.M21 indicates that the guidance in EPRI TR-107396 may be used to monitor closed cooling water chemistry to minimize exposure to aggressive environments.

Issue

The DAEC LRA, Appendix B, Section B.3.15 indicates that the applicant's Closed-Cycle Cooling Water System Program is consistent with the NUREG-1801, Rev. 1 Section XI.M21 and does not take any exceptions. In addition, the applicant indicates that its prevention and monitoring practices are based on the guidance from EPRI Closed Cooling Water Chemistry Guidelines and good industry practices. The EPRI Closed Cooling Water Chemistry Guideline indicates that an action level 1 or level 2 should be followed when one control parameter is not in compliance with the guidelines. However, the EPRI Closed Cooling Water Chemistry Guideline indicates that more aggressive actions may be necessary if multiple control parameters are not in compliance with the guidelines. The staff could not determine if there are procedures at DAEC that describe what actions are take if more than one control parameter is out of compliance with the EPRI Closed Cooling Water Chemistry Guideline.

Request

Provide additional information describing if any specific actions different than the Level 1 or Level 2 actions would be taken if more than one control parameter are out of compliance with the EPRI Closed Cooling Water Chemistry Guidelines.

RAI B.3.15-3

Background

The parameters monitored/inspected, described in the Closed-Cycle Cooling Water System Program in NUREG-1801, Rev. 1, Section XI.M21 indicates that the guidance in EPRI TR-107396 may be used to monitor corrosion inhibitor system to mitigate general, crevice, and pitting corrosion as well as stress corrosion cracking.

Issue

The DAEC LRA, Appendix B, Section B.3.15 indicates that the applicant's Closed-Cycle Cooling Water System Program is consistent with the NUREG-1801, Rev. 1 Section XI.M21 and does not take any exceptions. In addition, the applicant indicates that it maintains the closed-cycle cooling water system corrosion chemistry within specified limits of EPRI Closed Cooling Water Chemistry Guidelines. The EPRI Closed Cooling Water Chemistry Guideline in Table 5-1 indicates that azoles are a monitored parameter unless it can be documented that there are no copper alloys in the system. The LRA indicates in Section 3.3.1.22 that the reactor building closed cooling water system contains copper. However, the basis documents do not appear to indicate that azoles are used in the reactor building closed cooling water system. It is not clear to the staff why azoles are not used in the reactor building closed cooling water system when it contains copper components.

Request

Provide additional information describing why azoles are not used and monitored in the reactor building closed cooling water system as suggested in the EPRI Closed Cooling Water Chemistry Guidelines.

RAI B.3.11-1

Background

In its review of operating experience, the staff noted that CAP010488 was submitted on June 28, 1994 with the One Line Description of "V27-180 Reactor Cleanup." The Detailed Description section of CAP010488 stated that:

1. Verify CMARS are written & applicable weld are repaired during RFO13
2. Verify that the operations exams welds during class 1 leak test QDR 94007 conversion

Issue

The staff found a need to clarify how the corrective action was closed. As applicable, the staff also needs to clarify how effective the applicant's BWR Reactor Water Cleanup (RCWU) System Program has been in terms of detecting and managing the effects of SCC in the RWCU system.

Request

1. Clarify whether the weld repair is related with the occurrence of SCC in the RWCU system. Describe the location of the weld including the weld was located inboard or outboard of the second isolation valve.
2. If applicable, describe how the weld was repaired and clarify whether an additional SCC indication has been observed in the repaired weld.
3. Describe how effective the BWR Reactor Water Cleanup System Program has been in terms of detecting and managing the SCC in the RWCU system: Please, use the aforementioned and other available operating experience for the response as applicable.

RAI B.3.11-2

Background

In LRA Section B.3.11, the applicant stated that the BWR Reactor Water Cleanup Program is an existing program with one exception that the applicant's program implements the requirements of NRC Generic Letter (GL) 88-01 as modified by BWRVIP-75 and BWRVIP-75 specifies an inspection frequency that differs from the requirements given in GL 88-01. The applicant also stated that the program includes the RWCU [reactor water cleanup system] stainless steel pipe welds between the reactor and the second containment isolation valve and inspections of the appropriate welds outboard of the second isolation valve.

The staff also noted that the following reference indicates that the applicant's RWCU system had 81 non-safety-related welds under IGSCC Category G: In accordance with GL 88-01, Category G welds are the welds that are made of non-resistant material and not inspected.

> Reference: U.S. NRC Letter to the Iowa Electric Light and Power Company, NRC Generic Letter 88-01 - "NRC Position on IGSCC in BWR Austenitic Stainless Steel Piping" (TAC NOS. 69008 and 69123), May 31, 1990, including Enclosure: See pages 7 and 8 of Enclosure

The onsite program document suggested that some of the outboard welds were replaced with SCC-resistant material.

The staff also noted that GALL AMP XI.M25 recommends inspection Schedule A, B or C depending on the applicant's satisfactions of the NRC screening criteria for the RWCU piping outboard of the second isolation valve. The screening criteria include:

(a) Satisfactory completion of all actions requested in NRC GL 89-10

(b) No detection of IGSCC in RWCU welds inboard of the second isolation valves (ongoing inspection in accordance with GL 88-01)
(c) No detection of IGSCC in RWCU welds outboard of the second isolation valves after inspecting a minimum of 10% of the susceptible piping

In relation with the screening criteria, GALL AMP XI.M25 recommends the following inspection schedules:

- Schedule A: No inspection is required for plants that meet all the three criteria set forth above or if they meet only criterion (a) and piping is made of material that is resistant to IGSCC.
- Schedule B: For plants that meet only criterion (a): Inspect at least 2% of the welds or two welds every refueling outage, whichever sample is larger
- Schedule C: For plants that do not meet criterion (a): Inspect at least 10% of the welds every refueling outage

Issue

The LRA or on-site documentation does not clearly describe what inspections are performed on the piping outboard of the second isolation valve in the applicant's program in terms of inspection extent and schedule.

Request

1. Clarify what inspections are performed on the outboard piping in terms of inspection extent and schedule.
2. Clarify whether all IGSCC Category G welds that were described in the foregoing reference were replaced with materials resistant to IGSCC.
3. Describe which screening criteria described in GALL AMP XI.M25 are met by the applicant. Provide the technical basis of the applicant's evaluation.
4. Clarify which Schedule of the GALL AMP XI.M25 (Schedule A, B or C) is relevant for the RWCU piping welds outboard of the second isolation valve.
5. Confirm whether the determination of the inspection schedule is consistent with the operating experience addressed in RAI 3.11-1.

RAI B.3.11-3

Background

In LRA Section B.3.11, the applicant stated that the BWR Reactor Water Cleanup Program is an existing program with one exception that the applicant's program implements the requirements of NRC Generic Letter (GL) 88-01 as modified by BWRVIP-75 and BWRVIP-75 specifies an inspection frequency that differs from the requirements given in GL 88-01. The applicant also stated that the program includes the RWCU [reactor water cleanup system] stainless steel pipe welds between the reactor and the second containment isolation valve and inspections of the appropriate welds outboard of the second isolation valve.

In contrast, LRA Table 3.3.2-24 for the AMR of the RWCU components indicates that Class 1 components such as flow element, pipe fittings and tubing, and valve in the system credit the BWR SCC Program to manage the effects of stress corrosion cracking.

Issue

The staff noted that the Program Description section of GALL AMP XI.M25, "BWR Reactor Water Cleanup System," stated that based on the Nuclear Regulatory Commission (NRC) criteria related to inspection guidelines for RWCU piping welds outboard of the second isolation valve, the program includes the measures delineated in NUREG-0313, Rev. 2, and NRC Generic Letter (GL) 88-01. In addition, the staff noted that the program element, scope of program, of GALL AMP XI.M25 describes the screening criteria for the determination of the inspection schedule for the RWCU piping outboard of the second isolation valve. In turn, the detailed inspection schedules for the RWCU welds outboard of the second isolation valve are described in the program element, parameter monitored/inspected.

Request

1. Clarify what portions of RWCU piping and piping welds are included in the program scope of the BWR Reactor Water Cleanup System Program to manage the effects of SCC or IGSCC. If applicable, describe what other programs are credited to manage the effects of SCC in the RWCU piping inboard of the second isolation valves.
2. In consideration of the foregoing evaluation related to the program scope and the inspection schedules for the RWCU outboard piping described in GALL AMP XI.M25, clarify whether the exception that the applicant claimed to GL 88-01 for the inspection frequency modified by BWRVIP-75 is still applicable to the BWR Reactor Water Cleanup Program.
3. If applicable, describe how the UFSAR supplement will be revised in accordance with the foregoing evaluation regarding the program exception.

RAI B.3.27-1, Inaccessible Cables

Background

Gall AMP XI.E3 under program element, “Preventive Actions” states that periodic actions are taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes, and draining water, as needed. The applicant’s AMP Basis Document LRAP-E003, “Inaccessible Medium-Voltage Cables,” aging management attribute 3.2, ‘Preventive Actions,” Section 3.2.2, DAEC Program Preventive Actions,” states that the DAEC program consists of periodically inspecting the manholes for moisture and ensuring that the sump pumps in the manholes are operational. Section 3.2.2 further states that the sump pumps will drain the water as necessary and the sump pumps will keep the water below the level of the cables during normal seasonal conditions.

Issue

From the staff review of provided duct bank documentation and selected walkdowns, the staff notes that it is not clear that all manholes associated with GALL AMP XI.E3 medium voltage cables are equipped with sump pumps and associated alarms such that the operation of the sump pumps provides consistency with GALL AMP XI.E3.

Request

Provide a discussion that confirms that the Preventive Actions as stated in LRAP-E003 are consistent with the GALL AMP XI.E3 program element.

RAI B.3.27-2

Background

GALL AMP XI.E3 program element 3, Parameters Monitored/Inspected states that the specific type of test will be determined prior to the initial test, is to be a proven test for detecting deterioration of the insulation system due to wetting, such as power factor, partial discharge, or polarization index, as described in EPRI TR-103834-P1-2, or other testing that is state-of-the-art at the time the test is performed. The applicant’s AMP Basis Document LRAP-E003 Section 2.0, Description of AMP states that the testing methodology currently used is a resistance test (meggar). LRAP-E003, Section 3.3, Parameters Monitored or Inspected also states that the testing methodology currently used is an insulation resistance test (meggar). The Acceptance Criteria stated in Section 3.6 of LRAP-E003 is also based on the above specified testing.

Issue

The applicant’s basis document is not consistent with GALL AMP XI.E3 program element 3 and 6.

Request

Explain how program elements 3 and 6 as described in the basis document are consistent with associated GALL AMP XI.E3 program elements.

RAI B.3.27-3, Inaccessible Cables

Background

GALL AMP XI.E3, Program Element 1, Scope of Program states that significant moisture is defined as periodic exposures to moisture that last less than a few days (e.g., cable in standing water). Periodic exposures to moisture that last less than a few days (i.e., normal rain and drain) are not significant.

The applicant's aging management report LRAM-ECAB states in Section 5.1 that one of the conditions needed for water treeing to occur is the presence of continuous (long-term) moisture. The applicant states cables in conduit embedded in the lowest floor of the building, direct buried cables, and cables in buried duct are assumed to be exposed to long-term moisture.

Applicant basis document LRAP-E003 includes the cables subject to long-term moisture are cables that are in a duct bank, embedded conduit (building base mat only), or direct buried.

LRA AMP B.3.27 states that the program includes medium voltage cables that support a license renewal function, are subject to submergence and are energized a significant portion of their life.

Issue

The time frame for significant moisture/long-term moisture/submergence is not defined in the LRA or the associated basis document.

Request

Explain how AMP B.3.27, LRAM-ECAB and LRAP-E003 are consistent as stated in the LRA with the definition of significant moisture as stated in GALL AMP XI.E3, Program Element 1, "Scope of Program."

RAI B.3.27-4, Inaccessible Cables

Background

GALL AMP XI.E3, Program Element 1, Scope of Program states that the program applies to inaccessible medium-voltage cables (2KV – 35KV) within the scope of license renewal that are exposed to significant moisture simultaneously with significant voltage.

The applicant's basis document LRAP-E003 Table 7.2 lists all medium voltage cables and their applicability to LRA AMP B.3.27. Cable X00403D is listed as medium voltage, having a license renewal function, energized more than 25 percent of the time and routed as embedded/duct bank and therefore meeting the conditions for scoping for license renewal per 10 CFR 54.4.

Issue

The scope of the applicant's inaccessible cables program is not consistent with the scope associated with GALL AMP XI.E3 program element.

Request

Provide a discussion including manufacturer's documentation that cable X00403D is designed for submerged service to justify its exclusion from the scope of license renewal.

RAI B.3.27-5

Background

Gall AMP XI.E3, Program Element 4, Detection of Aging Effects states that the first tests for license renewal are to be completed before the period of extended operation. GALL AMP XI.E3 also states that the first inspection for license renewal is to be completed before the period of extended operation. The applicant's basis document LRAP-E003 Section 3.4, Detection of Aging Effects states that this is an existing testing activity and therefore the first test has already been performed.

Issue

The implementation schedule (this test has already been performed) is not consistent with the GALL AMP XI.E3 (prior to the period of extended operation).

Request

Please explain how the schedule specified under LRAP-E003, Detection of Aging Effects meets the implementation schedule in GALL AMP XI.E3.

RAI B.3.27-6

Background

GALL AMP XI.E3 states that significant voltage exposure is defined as being subjected to system voltage for more than twenty-five percent of the time.

The LRA UFSAR supplement states that medium voltage cables energized a significant portion of their life are in-scope. The LRA AMP B.3.27 also states that the program includes medium voltage cables that are energized a significant portion of their life. The applicant's basis document LRAP-E003 states that continuously energized is defined as the feeder breaker being closed greater than 75 percent of the time. The applicant's aging management report LRAM-ECAB states that continuously energized means energized greater than 25 percent of the time.

Issue

LRA UFSAR supplement, basis document LRAP-E003, and LRA AMP B.3.27 are inconsistent with LR SRP Table 3.6-2, "FSAR Supplement for Aging Management of Electrical and Instrumentation and Control System," and GALL AMP XI.E1 which states that significant voltage exposure is defined as being subjected to system voltage for more than 25 percent of the time.

Request

Explain how LRA UFSAR supplement, basis document LRAP-E003, and LRA AMP B.3.27 are consistent with LR SRP Table 3.6-2, "FSAR Supplement for Aging Management of Electrical and Instrumentation and Control System," and GALL AMP XI.E3 which state that significant voltage exposure is defined as being subjected to system voltage for more than 25 percent of the time.

RAI-B.3.26-1

Background

LR-SRP Table 3.6.2, "FSAR Supplement for Aging Management of Electrical and Instrumentation and Control System," states that a fuse holders within the scope of license renewal will be tested at least once every 10 years and the first test for license renewal should be completed before the period of extended operation. LRA Appendix A, Table A-1, "Duane Arnold License Renewal Commitments," Item 18 specifies the establishment of the fuse holder program prior to the period of extended operation.

Issue

LRA Section B.3.26 states that the program is consistent with GALL AMP XI.E5. However, LRA Appendix A, "Duane Arnold UFSAR Supplement," Section 18.1.26, "Fuse Holders Program," does not include a frequency of inspection (every 10 years). LRA Appendix A, Table A-1, "Duane Arnold License Renewal Commitments," Item 18 is not consistent with the LR SRP.

Request

Provide a discussion as to why LRA Appendix A does not need to be consistent with LR SRP Table 3.6.2 with regard to including an inspection frequency.

RAI-B.3.26-2

Background

GALL AMP XI.E5 states that the fuse holder AMP needs to account for the following aging stressors if applicable: fatigue, mechanical stress, vibration, chemical contamination, and corrosion. XI.E5 element 3 states that the monitoring includes thermal fatigue in the form of high resistance caused by ohmic heating, thermal cycling, or electrical transients, mechanical fatigue caused by frequent removal/replacement of the fuse or vibration, chemical contamination, corrosion, and oxidation.

Issue

LRA AMP B.3.26 does not discuss as to why some of the aging stressors identified in GALL XI.E5 are not applicable to LRA AMP B.3.26.

Request

Explain why the additional aging stressors identified by GALL AMP XI.E5 are not applicable to Duane Arnold for LRA AMP B.3.26 or LRA Section 3.6.

RAI-B.3.26-3

Background

GALL AMP XI.E5 program element 3 states that the monitoring includes thermal fatigue in the form of high resistance caused by ohmic heating, thermal cycling, or electrical transients, mechanical fatigue caused by frequent removal/replacement of the fuse or vibration, chemical contamination, corrosion, and oxidation.

Issue

Duane Arnold report LRAM-EFH, "Aging Management Review for Fuse Holders," Section 2.4, "Operating Environments and Exposures," Item 2.4.1, Environmental Conditions," states that all fuse holders are located inside a cabinet, panel, or other electrical enclosure to protect the fuse holder from moisture. Item 2.4.1, also states that fuse holders will be exposed to ambient temperature conditions inside the electrical enclosure. However, LRAM-EFH Section 5.1 under "Corrosion" states that fuse holders are protected by their location within a controlled environment.

Request

Provide a discussion as to why there is a difference between identified fuse holder environmental conditions within LRAM-EFH.

RAI B.3.14-1

Background

In DAEC LRA 4.3.2, Reactor Vessels Internal Fatigue, states that the shroud support is considered part of the vessel. Table 4.3.2 presents fatigue usage factor for the shroud support. Section 7, Attachment 7.1, "List of Equipment with Aging Management Program Scope," of DAEC Program Basis document for the BWR Vessel Internals (LRAP-M0009), identifies the shroud support covered under this program.

Issue

The staff notes that Attachment 7.1 of LRAP-M0009 does not identify fatigue as an aging effect considered for the shroud support.

Request

Explain how the BWR Vessel Internals program is addressing this possible aging effect, or why it is not necessary to evaluate it under the BWR Vessel Internals program.

RAI B.3.14-2

Background

The DAEC Program Basis document for the BWR Vessel Internals (LRAP-M0009) uses PCP 1.16, "Plant Chemistry Procedures 3200 Manual, Chemistry BWRVIP Program," as the implementing document to apply mitigation in accordance to the DEAC Water Chemistry Program. The BWR Vessel Internals program also implements the "Program Engineering ASME Section XI Administrative manual, BWRVIP Administrative Document," Revision 14.

Issue

The staff notes PCP 1.16 references BWRVIP-130 for implementing recommendations, and the BWRVIP Administrative Document Section 5.15 references BWRVIP-190 as the water chemistry guideline.

Request

State the correct BWRVIP for the water chemistry guidelines applicable to the BWR Vessel Internals program that will be implemented to be consistent with NUREG-1801 X1.M9, Scope.

RAI B.3.13-1

Background

In Section 3.5.2 of DAEC Program Basis document for the BWR Vessel ID Attachment welds (LRAP-M0004), the applicant states that the BWR Vessel ID Attachment welds program will follow the requirements of ASME Section XI, IWB, and the guidelines of BWRVIP-48-A.

Issue

The staff notes that Section 3.5.2 does not specify how indications will be monitored or trended to ensure sample expansion and/or inspections are performed for meeting the stated requirements and guidelines.

Request

Clarify how any discovered indications will be monitored or trended to ensure sample expansion and/or inspections are performed for meeting the stated requirements and guidelines, and be consistent with NUREG-1801 X1.M4 Monitoring and Trending.

RAI B.3.13-2

Background

In Section 3.4.2 of DAEC Program Basis document for the BWR Vessel ID Attachment welds (LRAP-M0004), the applicant states that the BWR Vessel ID Attachment welds program will follow the guidelines of BWRVIP-48-A. NUREG-1801 X1.M4 Detection of Aging Effects, permits BWRVIP-48 as an acceptable guidance to follow. For nondestructive examination (NDE), BWRVIP-03 is mentioned as appropriate.

Issue

The staff notes that Section 3.4.2 does not specify if BWRVIP-03 will be implemented for appropriate NDE techniques per NUREG-1801 X1.M7 Detection of Aging Effects.

Request

State if the guidelines for appropriate NDE techniques per BWRVIP-03 will be followed.

RAI B.3.13-3

Background

In Section 3.6.2 of DAEC Program Basis document for the BWR Vessel ID Attachment welds (LRAP-M0004), the applicant states that the BWR Vessel ID Attachment welds program will evaluate any indication detected in accordance with ASME Section XI and applicable approved BWRVIPs.

Issue

The staff notes that Section 3.6.2 does not specify which specific applicable BWRVIPs will be implemented for this program per NUREG-1801 X1.M4 Acceptance Criteria.

Request

State the applicable BWRVIPs that will be implemented as guidance to be consistent with NUREG-1801 X1.M4 Acceptance Criteria.

RAI B.3.13-4

Background

The DAEC Program Basis document for the BWR Vessel ID Attachment Welds (LRAP-M0004) uses PCP 1.16, “Plant Chemistry Procedures 3200 Manual, Chemistry BWRVIP Program,” as the implementing document to apply mitigation in accordance to the DEAC Water Chemistry Program. The BWR Vessel ID Attachment Welds program also implements the “Program Engineering ASME Section XI Administrative manual, BWRVIP Administrative Document,” Revision 14.

Issue

The staff notes PCP 1.16 references BWRVIP-130 for implementing recommendations, and the BWRVIP Administrative Document Section 5.15 references BWRVIP-190 as the water chemistry guideline.

Request

State the correct BWRVIP for the water chemistry guidelines applicable to the BWR Vessel ID Attachment Welds program that will be implemented to be consistent with NUREG-1801 X1.M4, Scope.

RAI B.3.12-1

Background

In Section 3.6.2 of DAEC Program Basis document for the BWR SCC (LRAP-M0007), the applicant states that the DAEC BWR SCC program will evaluate any indication detected in accordance with IWB-3600 of the applicable Edition/Addenda of ASME Section XI, and the applicable BWRVIPs to determine acceptance and/or disposition.

Issue

The staff notes that Section 3.6.2 does not specify which applicable BWRVIPs will be implemented for this program per NUREG-1801 X1.M7 Acceptance Criteria.

Request

State the applicable BWRVIPs that will be implemented as guidance to be consistent with NUREG-1801 X1.M7 Acceptance Criteria.

RAI B.3.12-2

Background

The DAEC Program Basis document for the BWR SCC (LRAP-M0004) uses PCP 1.16, “Plant Chemistry Procedures 3200 Manual, Chemistry BWRVIP Program,” as the implementing document to apply mitigation in accordance to the DEAC Water Chemistry Program. The BWR SCC program also implements the “Program Engineering ASME Section XI Administrative manual, BWRVIP Administrative Document,” Revision 14.

Issue

The staff notes PCP 1.16 references BWRVIP-130 for implementing recommendations, and the BWRVIP Administrative Document Section 5.15 references BWRVIP-190 as the water chemistry guideline.

Request

State the correct BWRVIP for the water chemistry guidelines applicable to the BWR SCC program that will be implemented to be consistent with NUREG-1801 X1.M7, Scope.

RAI B.3.10-1

Background

In DAEC LRA Section B3.10, the applicant states that the monitoring and control of reactor coolant water chemistry is in accordance with applicable BWRVIP reports, which are implemented by the DAEC water chemistry program. Furthermore, Section 2.0 of the DAEC Program Basis document for BWR penetrations (LRAP-M008) states that water chemistry is controlled per the EPRI guidelines of BWRVIP-130 BWR water chemistry guidelines – 2004 revision.

Issue

Program XI.M8 for BWR penetrations of the GALL report states that the monitoring and control of reactor coolant water chemistry is made in accordance with the guidelines of BWRVIP-29. The applicant states in Section 2.0 of LRAP-M008 that this is not considered an exception relative to the NUREG-1801 program description of the XI.M2 program. However, the staff considers this is an exception to the GALL XI.M8 program.

This issue also affects Element 2 (preventive actions) of this program. Moreover, in the BWRVIP administrative document, the applicant states that the DAEC implements the water chemistry guidelines per plant chemistry procedure (PCP) 1.9. The applicant referenced another procedure (PCP 1.16) in LRAP-M008.

Request

1. Clarify the BWRVIP used for water chemistry guidelines and justify acceptability if BWRVIP-29 is not used.
2. Clarify which PCP is used to implement the water chemistry guidelines.

RAI B.3.10-2

Background

In Section 3.4 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that alternatives for categories B-F and B-J have been incorporated into the DAEC BWR penetrations program. These alternatives are based on a risk-informed methodology.

However, the alternatives are approved only for the current ten-year interval.

Issue

Element 4 of program XI.M8 for BWR penetrations of the GALL report states that the evaluation guidelines of BWRVIP-49-A and BWRVIP-27-A recommend that the inspection requirements currently in ASME Section XI continue to be followed.

Request

Clarify how the inspections described in BWRVIP-27-A and BWRVIP-49-A will be implemented during the period of extended operation and modify your application as necessary.

RAI B.3.10-3

Background

In Section 3.4.2 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that further details for examination are described in DAEC AMP LRAP-M001, ASME XI, Inservice Inspection, Subsections IWB, IWC, and IWD.

Issue

The staff noted that LRAP-M001 document does not refer to the DAEC program basis document dedicated to BWR penetrations, LRAP-M008.

Request

Explain how the requirements of LRAP-M008 are taken into account in LRAP-M001.

RAI B.3.10-4

Background

In Section 3.4.2 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that the guidelines in BWRVIP-03 are also being followed.

Issue

The staff did not find any reference to this BWRVIP report in the implementing documents it reviewed.

Request

Explain how the guidance of this BWRVIP report for detection of aging effects is taken into account in your AMP for BWR penetrations.

RAI B.3.10-5

Background

In Section 3.6.2 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that the evaluation of crack growth is in accordance with article IWB-3000 of ASME XI with guidance from BWRVIP-14, BWRVIP-59 and BWRVIP-60.

Issue

The staff did not find any reference to these three BWRVIP reports in the implementing documents it reviewed.

Request

Explain how the guidance of these BWRVIP reports for acceptance criteria is taken into account in your AMP for BWR penetrations.

RAI B.3.10-6

Background

In Section 3.10.2 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that DAEC operating experience demonstrates that the current Inservice and Augmented Inspection programs are effective in managing the aging effect of cracking in the BWR penetration nozzles.

Issue

The applicant based its statement especially on the finding of indications in welds not included in the BWR penetrations program.

Request

Explain how the operating experience deducted from these indications can be applied for the BWR penetrations program and identify any operating experience specific to the BWR penetration nozzles.

RAI B.3.10-7

Background

In Section 2.2 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that the DAEC BWR penetrations program is an existing program and is part of the ASME Section XI Inservice inspection program.

In Section 3.1.2 of LRAP-M008, the applicant does not provide a description of the welds concerned by the BWRVIP-27-A and BWRVIP-49-A and included in its BWR penetrations program.

In attachment 7.1 of LRAP-M008, the applicant provides a list of equipment taken into account in the BWR penetrations program with particular references.

Issue

The staff reviewed the implemented documents such as the BWRVIP and the inservice inspection administrative documents but could not find a clear description of the welds included in the BWR penetrations program for those addressed by BWRVIP-49-A. Moreover, the references for welds concerned by the BWRVIP-27-A do not correspond to those of attachment 7.1 of LRAP-M008.

Request

Clarify which welds addressed by BWRVIP-27-A and BWRVIP-49-A are included in the BWR penetrations program.

RAI B.3.10-8

Background

In Attachment 7.1 of the DAEC Program Basis document for BWR penetrations (LRAP-M008), the applicant states that the aging effects for the components are SCC/IGA.

Issue

The components concerned by the BWR penetrations program are stainless steel and their environment is reactor coolant. Thus, the aging effect is IGSCC, not IGA.

Request

Discuss your plan to modify your basis document accordingly.

RAI 4.3.1-1

Background

LRA Section 4.3.1 states that in 1998 DAEC performed re-assessment of DAEC RPV to remove excess conservatism from the existing fatigue calculations for all RPV components, and to incorporate transient cycles projected to occur at 40 years based on actual plant operation as of that time.

Issue

It is not clear to the staff what difference was between the cumulative usage factor (CUF) of the original design values and the reassessed values. The staff was unable to find CUF results reported in the UFSAR.

Request

1. Provide a side-by-side comparison of the CUF of the original design values and the reassessed values for the components identified in LRA Table 4.3-2.
2. Describe the conservatisms that were removed for the 1998 reevaluation.
3. Provide justification that some locations in LRA Table 4.3-2 are exempted for fatigue evaluations.
4. Confirm that the CUF values shown in LRA Table have accounted for the extended power uprate (EPU) operating conditions.

RAI 4.3.1-2

Background

LRA Section 4.3.1 states that the transient cycle projections were made using forward projection methodology that uses trending from 1998 through 2005 time period of plan operation. Furthermore, the applicant indicates that for selected events, additional conservatism was added beyond the mathematically projected number of cycles to accommodate potential variation in plant performance late in plant life, as well as to allow for additional events where the projected number of cycles was very low and the likelihood of additional events could not be ruled out.

Issue

Seven-year as basis for making long-term transient cycle projection does not seem sufficient. In addition, it is not clear what conservatism has been used in the cycle projections.

Request

1. Provide justification that cycle projections based on the most recent 7 years of plant data is adequate.
2. Describe the conservatism exercised in the cycle projections and quantify as much as possible.

RAI 4.3.1-3

Background

LRA Table 4.3.1 shows the transients and cycles used for the CUF calculation as well as the cycles accrued over the past 30 some years, and 60-year cycle projections.

Issue

The transients shown in LRA Table 4.3-1 are not the same as those shown in UFSAR Table 5.3-7.

Request

1. Provide justification that the transients and number of cycles defined in LRA Table 4.3-1 is acceptable when it is distinct from those defined in the UFSAR.
2. Provide justification that the CUF of the original design analyses can be used as the basis for making CUF projections now since the transients used for license renewal are different from those constitute the current licensing basis.

RAI 4.3.2-1

Background

LRA (Supplement 1) Section 4.3.2 states that no fatigue analysis of the entire reactor vessel internals (RVI) was performed because the DAEC RVI is not Class 1 pressure boundary components, except for the shroud support, which is considered part of the vessel.

Issue

Even though being non-pressure boundary components, Class 1 components are subject to fatigue requirements. For old vintage plants, there may be cases where explicit fatigue usage evaluation are not required, Reactor Vessel Internals were implicitly designed for low cycle fatigue based upon the reactor coolant system design transient projections for 40 years.

Request

Provide basis to justify why fatigue requirements are not addressed for the RVI components except for the shroud support.

RAI 4.3.3-1

Background

LRA (Supplement 1) Section 4.3.3 states, “A fatigue analysis exemption evaluates an envelope of material, temperature, pressure and mechanical load parameters (relative to the instrument piping design data) against the conditions stipulated in the Code to demonstrate that analysis for cyclic operation is not required”.

Issue

Clarification is necessary to enable the staff to make its review.

Request

Describe the criteria used by the “fatigue analysis exemption evaluation” to exempt locations from fatigue analysis.

RAI 4.3.3-2

Background

In LRA (Supplement 1) Section 4.3.1.4, the applicant disposes the TLAA for Class 1, 2 and 3 piping components in accordance with both 10 CFR 54.21(c)(1)(i) and 10 CFR 54.21(c)(1)(ii).

Issue

The regulatory disposition statements should be part specific if not all parts of the analysis group consistently fall in the same disposition class.

Request

In the regulatory disposition statement, identify which parts of the piping components are managed in accordance with 10 CFR 54.21(c)(1)(i) and which are managed in accordance with 10 CFR 54.21(c)(1)(ii).

RAI 4.3.4-1

Background

The opening sentence of LRA (Supplement 1) Section 4.3.4 states that Generic Safety Issue GSI-166 was later renumbered as GSI-190.

Issue

It should be noted that GSI-190 was established to address the residual concerns of GSI-78 and GSI-166 regarding the environmental effects of fatigue on pressure boundary components for 60-years of plant operation. Clearly, GSI-190 is not a renumbered document of GSI-166.

Request

Please correct the affected statement of LRA appropriately.

RAI 4.3.4-2

Background

LRA (Supplement 1) Section 4.3.4 describes the environmental fatigue evaluation and the results are presented in LRA Table 4.3.4-1, including the F_{en} values determined for each component or location evaluated.

At some point in LRA (Supplement 1) Section 4.3.4, the applicant states, "Bounding F_{en} values are determined, or F_{en} values are computed for each load pair in the detailed fatigue calculation for each component". The applicant also states, "HWC conditions were assumed to exist for 72.4% of the time, and NWC conditions to exist 27.6% of the time".

Issue

It is known that F_{en} depends on material, strain rates, sulphur content, temperature and the dissolved oxygen (DO) concentration of the reactor water. However, this information is not provided in the LRA.

Request

1. Summarize DAEC's experience in control of DO level in the reactor water since the plant startup. Describe all water chemistry programs DAEC has used, including procedures and requirements used for managing DO concentration as well as the inception date of each water chemistry program.
2. Provide a historic summary of the DO level since plant startup. Estimate the fraction of time of the DAEC operating history thus far that the DO level exceeded 0.05 ppm.
3. Describe how reactor water samples were taken, including the sampling locations. If samples were taken from a single location, justify that the DO data discussed in Part (b) are applicable to all NUREG/CR-6260 locations in DAEC for the F_{en} calculations.
4. Specify the data of dissolved oxygen (DO), strain rate, sulphur content, and temperature used for each load pair in the calculation of F_{en}.
5. Provide basis that supports the use of the condition that, "72.4% of the time the plant is under HWC chemistry condition and 27.6% of the time the plant is under the NWC chemistry condition".
6. Explain how F_{en} is evaluated when the component has experienced different levels of DO concentration levels.
7. Provide the reference document that was used for calculating F_{en} of Nickel alloys.

RAI B.4.2-1

Background

LRA Section 4.3 states that the DAEC Metal Fatigue of Reactor Coolant Pressure Boundary Program will monitor the numbers of cycles of the design transients and assure action is taken prior to any analyzed numbers of transients being exceeded.

Issue

However, the LRA provides no description or discussion regarding how DAEC has been and will be monitoring the severity of pressure and thermal (P-T) activities during plant operations. It is essential that all thermal and pressure activities (transients) are bounded by the design specifications (including P-T excursion ranges and temperature rates) for an effective and valid AMP.

Request

1. Describe the methods that DAEC uses for tracking thermal transients and confirm that all monitored transient events are bounded by the design specifications.
2. Specify the time (years) over which actual transient monitoring and cycle tracking activities took place. If there have been periods for which transient events were not monitored since the initial plant operation, specify the affected time frame, and provide justification to demonstrate that the estimated cycles for this unmonitored period are conservative.
3. Provide a histogram of cycles accrued for plant startup, plant shutdown, and Loss of feedwater (FW) heater, FW heater bypass transients.

RAI B.4.2-2

Background

LRA B.4.2.5, on operating experience, states that inconsistencies in RPV fatigue cycle assumptions were identified in November 2006 during a review of RPV and piping calculations. The applicant states that this issue was addressed in the corrective action program and the corrective actions included revising the fatigue calculations as part of the license renewal project.

Issue

It is not clear to the staff what does the term “RPV fatigue cycle” means. In addition, the LRA does not discuss the effects of the cited inconsistence on the fatigue results.

Request

1. Explain the terminology “RPV fatigue cycle”.
2. Summarize the corrective actions taken and the impact of the transient cycle inconsistence issue on fatigue results.

RAI B.4.2-3

Background

LRA Section B.4.2.1 shows the program description of the DAEC Metal Fatigue of Reactor Coolant Pressure Boundary Program.

Issue

The applicant devoted this section entirely for discussing environmental fatigue evaluation. While addressing the reactor water environment on fatigue life is important, the most vital part of the Metal Fatigue of Reactor Coolant Pressure Boundary Program is to track the transient cycles and fatigue usage. However, this important part of the program is missing in the program description.

Request

Please consider including monitoring/tracking of transient cycles, and fatigue usage, in the program description.

RAI B.4.2-4

Background

The onsite basis document shows that the DAEC AMP Element 4 states, “The DAEC thermal cycle monitoring program is performed periodically, on a frequency of at least once every fuel cycle”.

Issue

GALL X.M1 AMP program element 4 requires that the AMP program provides periodic update of fatigue usage calculations. While updating transient cycles is important, tracking cycles alone, as Element 4 indicated it will do, is insufficient in situations in which unanticipated events occurred or structural geometry/configuration was modified. Under these circumstances, stress state is most likely changed, which will affect fatigue usage. Therefore, updating cycles alone is not enough fully meeting the AMP requirements.

Request

Describe how DAEC would address fatigue in the case where unanticipated situations such as structural configuration changes or unexpected transients occur.

RAI B.3.30.-1

Background

the Lubricating Oil Analysis Program is to ensure the oil environment in the mechanical systems is maintained to the required quality. This includes the integrity of the incoming as well as the in-service lubricating oil is free of contaminants. To this end GALL XI.M39 calls for a number of parameters to be monitored/inspected, through various tests. For components with periodic oil changes these include tests to identify particle count and water in the lubricating oil. For components that do not have regular oil changes tests also for viscosity, neutralization number, flash point are to be performed. These parameters are monitored to verify the suitability of oil for continued use. In addition, analytical ferrography and elemental analysis are also to be performed to identify wear particles.

Issue

The applicant in the LRA B.3.30.3 states there no exceptions to the ten elements of the GALL XI.M39. In LRAP-M039, DAEC Lubricating Analysis Program Basis Document, paragraph 3.3.2, the applicant maintains the DAEC parameters monitored or inspected are identified as listed in the GALL. In paragraph 3.6.2 of the same document, however, the applicant does not list the flash point as a test to be performed.

Request

1. Justify the deletion of the flash point test is not an exception to GALL.
2. Are there any other tests that are or could be performed to verify the suitability of oil for continued use?

RAI B.3.30.-2

Background

The GALL, XI.M39 Lubricating Oil Analysis Program in program element #3, identifies specific parameters to be monitored or inspected. For example, these range from viscosity to neutralization number, flash point, particle count, etc. In program element #1, Scope of Program, the GALL recommends to obtain samples from lubricated oil components periodically.

Issue

In program element #3, of the LRA (B.3.30.4) the applicant defines an enhancement to that element. The applicant will enhance the program element by adding a Diesel Fire Pump 1P-049 to this element. In aging management scope of activities the LRA "should include the specific … components" subject to license renewal.

Request

Justify why the pump, and other components are not listed in the scope of the program.

RAI B.3.21.-1

Background

In the LRA B.3.21, of the External Surface Monitoring Program, the applicant states this to be an existing program and consistent with the ten elements of GALL, XI.M36 program. The applicant also states that elements, Scope of the Program, Parameters Monitored or Inspected, Monitoring and Trending, and Acceptance Criteria need enhancements.

Issue

In TABLE A-1 of the Supplement 1, dated January 22, 2009, the applicant makes a commitment to the existing program, to assure revision of "the inspection program to address inspector qualifications, types of components, degradation mechanisms, aging effects, acceptance criteria, and inspection frequency."

Request

The LRA has no enhancements related to aging effects program element, yet there is a commitment to this effect. Identify the specific enhancement related to aging effects as discussed in the commitment.

RAI B.3.21.-2

Background

GALL in element #1, Scope of Program discusses inaccessible areas that need to be inspected at intervals to provide reasonable assurance that aging effects will be managed. In addition, the same element discusses how to inspect insulated external surfaces so that there is a reasonable assurance the effects of aging will be managed.

Issue

There are no apparent discussions in the current system engineering walkdown procedure regarding inaccessible areas and the inspection of insulated external surfaces. The LRA enhancements do not address these aspects.

Request

Please provide specific enhancement details to this program element regarding walkdowns of inaccessible areas and insulated external surfaces.

RAI B.3.21.-3

Background

The supporting documentation to this AMP, LRAP-M036, Revision 3 in this program element discusses the application of specific (class I, II, III) insulation in systems of piping having higher temperatures which would then preclude a wetted external surface.

Issue

Depending on the leak rate, the insulated external surface could be exposed to a wetted environment. The assumption that high temperature will preclude the formation of a wetted external surface for the extended period may not be valid.

Request

Please provide additional basis for apparent exclusion of insulating classes I, II, III from the inspection walkdowns.

RAI B.3.21.-4

Background

GALL program element #5, Monitoring and Trending, states, “Deficiencies are documented using approved processes and procedures such that results can be trended.” The supporting documentation to this AMP, LRAP-M036, Revision 3 in the Monitoring and Trending program element states the External Surfaces Monitoring Program uses a plant-specific instructions/checklist for the license renewal aging management walkdowns.

Issue

The current walkdown procedure, apparently does not include a plant-specific checklist for the licensing renewal AMP. The enhancement for Monitoring and Trending program element, however, addresses qualifications of inspection personnel and periodic reviews to determine program effectiveness.

Request

Please clarify the enhancements regarding the inclusion of procedural requirements for the license renewal aging management walkdowns.