Phyllis

From: Clark, Phyllis
Sent: Wednesday, October 12, 2016 5:44 AM
To: 'mchisum@entergy.com'
Cc: 'jjarrel@entergy.com'; 'dfrey@entergy.com'; 'lmurr91@entergy.com'; 'GYOUNG4 @entergy.com'; 'Dlach@entergy.com'; 'ataylo1@entergy.com'; 'aharris@entergy.com'; 'Milster, Leia Elizabeth'; Ramirez, Frances C; Speer, Chris; Diaz-Sanabria, Yoira K; Wittick, Brian; Morey, Dennis; RidsNrrDlr Resource; RidsNrrDlrRpb1 Resource; RidsNrrDlrRerb Resource; RidsNrrDlrRarb Resource; RidsNrrDlrRasb Resource; RidsNrrDlrRsrg Resource; RidsNrrPMWaterford Resource; 'RidsRgn4MailCenter@nrc.gov'; Folk, Kevin; Keegan, Elaine; Mitchell, Jeffrey; Buford, Angela; Prinaris, Andrew; Wong, Albert; Huynh, Alan; Akhavannik, Huda; Sweat, Tarico; Medoff, James; Gavula, James; Lopez, Juan; Cuadrado de Jesus, Samuel; Min, Seung K; Obadina, Sarah; Sadollah, Mohammad; Rogers, Billy; Brittner, Donald; Fu, Bart; Allik, Brian; Lehman, Bryce; Gardner, William; Thomas, George; Mink, Aaron; Doutt, Clifford; Holston, William; Yoo, Mark; Pulvirenti, April; McIntyre, David; Burnell, Scott; Moreno, Angel; Kennedy, Kriss; Scott, Catherine
Subject: REF: WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – RAIs SET 2 (TAC NO. MF7492)
Attachments: Waterford 3 LRA Set 2 Enclosure (Final 30 Day Response Time) (10 11 2016....docx

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Mr. Michael R. Chisum
Site Vice President

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – SET 2 (TAC NO. MF7492)

Dear Mr. Chisum:

By letter dated March 23, 2016, Entergy Operations, Inc. submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license NPF-38 for Waterford Steam Electric Station, Unit 3. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing the information contained in the license renewal application and has identified areas where additional information is needed to complete the review.

The enclosed requests for additional information were discussed with Mr. Alan Harris and a mutually agreeable date for the response is within 30 days from the date of this letter. Some RAIs from the draft version were moved to Sets 3 and 4 due to different response times requested. If you have any questions, please contact me at 301-415-6447 or by e-mail at Phyllis.Clark@nrc.gov.

Sincerely,

Phyllis Clark

Phyllis Clark, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure:
As stated

cc: Listserv

ADAMS Accession No.: **ML16285A338** ***via email**

OFFICE	PM:RPB1:DLR	PM:RPB1:DLR	BC:RASB:DLR	BC:RARB:DLR	BC:RPB1:DLR	PM:RPB1:DLR
NAME	PClark	J Mitchell*	B Wittick*	D Morey*	YDiaz-Sanabria*	PClark
DATE	10/4/2016	10/6/2016	10/11/2016	10/6/2016	10/11/2016	10/11/2016

WATERFORD STEAM ELECTRIC STATION, UNIT 3
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION – SET 2
(TAC NO. MF7492)

RAI B.1.13-1

Background:

LRA Section B.1.13, Exception No. 5, states that cross-hatch testing, as described in ASTM D 3359, "Standard Test Methods for Measuring Adhesion by Tape Test," is not conducted when signs of pitting, corrosion, or failure of the coating are detected. The basis for the exception, in part, includes crediting spot wet sponge tests and dry film testing as a means to detect coating adhesion deficiencies.

Issue:

While the staff recognizes that wet sponge tests will detect coating holidays and dry film testing detects the thickness of a coating; however, it is not clear to the staff that these tests will provide sufficient insights related to adhesion of coatings. The staff recognizes that the footnote for Exception No. 5 and Enhancement No. 21 cite other methods that effectively detect coating adhesion deficiencies in low flow tank locations (e.g., Society of Protective Coatings cleaning specifications, lightly tapping the coating, ASTM D4541, "Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers").

Request:

State the basis for why spot wet sponge tests and dry film testing are effective means to identify coating adhesion deficiencies.

RAI B.1.13-2

Background:

LRA Section B.1.13, Exception No. 6, addresses trip testing preaction valves with the control valves cracked open in lieu of testing with control valves in the full open position. Enhancement No. 3 addresses internal inspections of dry sprinkler piping downstream of preaction systems.

Issue:

Exception No. 6 and Enhancement No.3 are jointly addressed in this RAI because they both address inspections or tests that are used to detect potential flow blockage of dry sprinkler piping downstream of preaction systems. GALL Report AMP XI.M27, "Fire Water System," as modified by LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation," recommends (by citing NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," Section 13.4.3.2.2) that preaction systems be tested with the control valve in the full open position. The staff's concern with Exception No. 6 is that a cracked open control valve might not provide adequate flow to detect potential flow blockage. The staff recognizes that a sufficient number of internal pipe inspections of dry piping downstream of preaction valves, as cited in Enhancement No. 3, could be an effective alternative to testing the control valves in the full open position. However, the enhancement does not state: (a) the frequency of inspections; (b) how access to the piping will be obtained (e.g., removal of a sprinkler and opening a flushing connection); and (c) the location of the removed sprinkler (i.e., most remote).

Request:

State and justify the basis for why flow rates sufficient to detect flow blockage will be achieved during preaction valve testing with the control valve cracked open. In regard to the internal visual inspections of dry piping downstream of preaction systems, state: (a) the frequency of inspections; (b) how access to the piping will be obtained (e.g., removal of a sprinkler and opening a flushing connection); and (c) the location of the removed sprinkler (i.e., most remote).

RAI B.1.13-3

Background:

The LRA Section B.1.13 states several enhancements (Enhancement Nos. 2, 7, 14, 16, 19, and 20) to the "detection of aging effects" program element of the Fire Water System program.

a. Enhancement No. 2 states that a wet pipe sprinkler system will be inspected every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line.

b. Enhancement No. 7 states that strainers will be removed every 5 years to clean and inspect for damage and corroded parts.

c. Enhancement No. 16 states that vacuum box testing will be performed on the bottom of the fire water storage tanks to identify leaks, and in the event the bottom of the fire water tank is uneven, the station will perform a suitable NDE technique rather than vacuum box testing to identify leaks.

d. Enhancement 19 states that augmented flow tests or flushing and wall thickness measurements will be conducted for fire water piping experiencing recurring internal corrosion.

e. Enhancement No. 20 states that alternative actions will be taken prior to returning a fire water storage tank to service without repair or replacement of degraded coatings.

Issue:

a. NFPA 25 Sections 14.2.2 (as cited in AMP XI.M27, as modified by LR-ISG-2012-02) and Section A.14.2.2 require that each building's wet pipe system be inspected every 5 years. During the audit, the staff verified that there is only one wet pipe sprinkler system in each protected building. Enhancement No. 2 does not state that the wet pipe systems in each building will be inspected every 5 years.

b. AMP XI.M27, as modified by LR-ISG-2012-02, recommends that strainer inspections be conducted every refueling outage interval or when the system has been actuated. The staff also noted that NFPA 25 Section 10.2.1.7 states that mainline strainers are inspected every 5 years as stated in the enhancement. Subsequent to the issuance of LR-ISG-2012-02, the staff concluded that absent flow in the system, an inspection would not provide an effective indicator of potential flow blockage in the system; however, several actuations of a system could occur during any given 5-year period. The LRA does not state that the strainers will be inspected after every actuation.

c. The staff noted that vacuum box testing is consistent with NFPA 25 Section 9.2.7 (6); however, the staff lacks sufficient detail to evaluate, "a suitable NDE technique."

d. Enhancement No.19 does not address whether wall thickness measurements will be conducted in addition to flow tests and flushes or in addition to only flushes. The enhancement did not state several considerations for managing recurring internal corrosion as cited in SRP-LR Section 3.3.2.2.8 (e.g., number of inspections, criteria for additional inspections). In addition, there is an inconsistency between LRA Section 3.3.2.2.8, "Loss of Material due to Recurring Internal Corrosion," which states that inspections will occur on a refueling outage interval and Enhancement 19, which states that inspections will be conducted every 5 years.

e. The "acceptance criteria" program element of GALL Report AMP XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks," recommends that blister size and frequency should not be increasing between inspections. The acceptance criteria also recommends that a coatings specialist evaluate blisters. Enhancement No. 20 would permit the alternative return-to-service actions to be used even though the size and frequency of blisters could be increasing; and the enhancement allows a coating inspector rather than a coating specialist to evaluate the conditions for use of the alternative.

Request:

a. State whether each building's wet pipe system will be inspected every 5 years. If each building's wet pipe system will not be inspected every 5 years, state the basis for why there will be adequate inspections of the wet pipe systems to detect potential degradation (e.g., loss of material, flow blockage).

b. State whether strainers will be inspected whenever the system has been actuated or state the basis for why inspecting the strainers every 5 years regardless of the number of times the system is actuated will be effective in detecting potential flow blockage.

c. State the specific techniques that will be used as an alternative to vacuum box testing.

d. State whether wall thickness measurements will be conducted in addition to flow tests and flushes or in addition to only flushes.

   State: (a) the minimum number of inspections that will occur in each 5-year interval; (b) the criteria to be used to determine that additional inspections are warranted (e.g., extent of degradation at individual corrosion sites, rate of degradation change, trend of through-wall leaks); (c) how inspections of components that are not easily accessed will be conducted; (d) how leaks in buried or underground piping will be detected; and (e) how many additional inspections will be conducted within an inspection interval when through-wall leakage is detected or inspection results reveal pipe wall thickness below minimum wall.

   State whether inspections will be conducted every 18 months or every 5 years and correct the internal inconsistency between LRA Section 3.3.2.2.8 and Enhancement No.19.

e. State the basis for using: (a) the return-to-service alternative even though the size and frequency of blisters could be increasing; and (b) a coating inspector rather than a coating specialist to evaluate the conditions for use of the alternative.

RAI B.1.13-4

Background:

LRA Section B.1.13, Enhancement No. 22, in the acceptance criteria program element states that adhesion results can be quantified by conducting visual inspections, wet sponge testing, or dry film testing.

Issue:

It is not clear to the staff that visual inspections, wet sponge testing, or dry film testing methods are capable of quantifying adhesion results.

Request:

State what method(s) will be used to quantify adhesion results.

RAI B.1.13-5

Background:

LRA Section B.1.13, Enhancement No. 25, in the corrective actions program element states that obstruction evaluations will be conducted if there is evidence of “excessive” discharge of material during routine flow tests.

Issue:

AMP XI.M27, as modified by LR-ISG-2012-02, recommends the use of the criteria in NFPA 25 Section 14.3, “Obstruction Investigation and Prevention,” which uses the term “obstructive” rather than “excessive.” The staff’s concern is that the term “excessive” is not defined.

Request:

State the criteria for determining that the presence of material in the discharge from flow tests is excessive.

RAI B.1.13-6

Background:

The staff reviewed FSAR supplement description of the program against the recommended description for this type of program as described in SRP-LR Table 3.0-1 of LR-ISG-2012-02 and noted that certain aspects of the recommended FSAR Supplement content were not included.

Issue:

The licensing basis for this program for the period of extended operation may not be adequate if this information is not incorporated into the FSAR supplement for the Fire Water System program.

Request:

State the basis for not including the following in the FSAR supplement: (a) the program manages the aging effects through the use of flow testing and visual inspections performed in accordance with the 2011 Edition of NFPA 25; and (b) the water-based fire protection system is monitored such that loss of system pressure is immediately detected and corrective actions initiated. Alternatively, revise LRA Section A.1.13 to include the above aspects.

RAI 3.3.1-1 (FWS AMR-1)

Background:

LRA Table 3.3.1, item 3.3.1-64 addresses copper alloy heat exchanger tubes. Loss of material due to general, pitting, and crevice corrosion will be managed by the Fire Water System program for these components.

Issue:

The staff recognizes that visual inspections can be capable of detecting pitting and crevice corrosion in heat exchanger tubes. However, copper alloy materials exposed to raw water are also susceptible to loss of material due to general corrosion. It is not clear to the staff how visual inspections will effectively detect general corrosion in heat exchanger tubes when the corrosion is uniform.

Request:

State and justify the method that will be used in the Fire Water System program to detect loss of material due to general corrosion in copper alloy tubes exposed to raw water.

RAI 3.3.1-2 (FWS AMR-2)

Background:

The Fire Water System program, as well as the FSAR supplement for the program, cite flow blockage due to fouling as an applicable aging effect.

Issue:

The LRA Table 2s and the "Discussion" section of LRA Table 3.3-1 associated with LRA Table 3.3.1, item 3.3.1-64, as well as other Table 3.3.1 items (i.e., 3.3.1-66, 3.3.1-130, 3.3.1-131, 3.3.1-136) do not address flow blockage due to fouling.

Request:

State whether flow blockage due to fouling will be managed for components cited in LRA Table 3.3.1, items 3.3.1-64, 3.3.1-66, 3.3.1-130, 3.3.1-131, and 3.3.1-136.

RAI 3.3.1-3 (FWS AMR-3)

Background:

LRA Table 3.3.1, item 3.3.1-131 addresses steel flame arrestors and piping exposed internally to outdoor air. Loss of material due to general, pitting, and crevice corrosion and flow blockage due to fouling will be managed for these components by the Internal Surfaces in Miscellaneous Piping and Ducting Components program.

Issue:

The staff noted that the Internal Surfaces in Miscellaneous Piping and Ducting Components program proposes to manage the effects of aging for steel flame arrestors and piping through the use of periodic visual examinations of a representative sample of the population of steel components exposed to outdoor air. Flow blockage due to fouling is managed for portions of the fire water systems by periodic visual inspections and tests (e.g., deluge valve tests). While the flame arrestors would not be subject to the specific inspections or tests for flow blockage due to fouling; the LRA does not state the purpose (beyond pressure boundary) of the piping. For example, there is a significant quantity of steel deluge valve piping downstream of the

deluge valves that is exposed to outdoor air. Flow blockage due to fouling of the deluge piping is managed by periodically sending water through the pipe. This testing would not be conducted if the aging effects are managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components program.

Request:

State the purpose (e.g., deluge piping) of the steel piping associated with the fire protection system exposed to outdoor air for which aging effects are proposed to be managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components program. If flow blockage due to fouling should be managed for this piping, state the inspections or tests that will be conducted to manage this aging effect.

RAI B.1.15-1

Background:

GALL AMP XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD," states that that the program "has been shown to be generally effective in managing aging effects in Class 1, 2, or 3 components and their integral attachments in light-water cooled power plants." It provides specific operating experience examples in the "operating experience" program element.

LRA Section B.1.15, Operating Experience section states that, "In January 2010, surface examination for the nozzle-to-top head dome weld was not completed in the second ISI Program Interval as required by ASME Section XI." During the NRC staff's onsite audit, the staff performed a plant-operating experience review and noted that, in addition to missing an item in 2010, the applicant had also missed a Code required examination in 2012. The missed item, related to Line 2RC3/4-56, was documented in NRC Integrated Inspection Report 05000382/2012005.

Issue:

It is not clear to the staff that the program will be effective in managing aging during the Period of Extended Operation (PEO) if Code required examinations are missed.

Request:

Describe programmatic controls that are in place to ensure that the scope of AMP B.1.15 and the ISI IWB, IWC, and IWD inspections are implemented in accordance with requirements of 10 CFR 50.55a.

RAI B.1.30-1

Background:

LRA Table 3.4.2-5-1, "Blowdown System, Nonsafety-Related Components Affecting Safety-Related Systems," includes accumulators, filter housings, piping, pump casings, valve bodies, and ***tanks*** as component types that will be managed for loss of material using the Periodic Surveillance and Preventive Maintenance program. This is consistent with LRA

Drawing G164, Sheet 5, “Flow Diagram Miscellaneous Reactor Auxiliary Systems,” that shows various components, including blowdown tank BD-MTNK-0001 as highlighted and within the scope of license renewal. In contrast, the program description table in LRA Section B.1.30, “Periodic Surveillance and Preventive Maintenance,” states that accumulators, filter housings, piping, pump casings, and valve bodies in the blowdown system will be managed for loss of material. The associated “scope of program” program element states that the program includes the specific components listed in the program description table. In addition, the associated enhancement states that the program procedures will be revised to incorporate the activities listed in the program description table.

Issue:

It is unclear to the staff if tanks in the blowdown system are included within the scope of the Periodic Surveillance and Preventive Maintenance program or if the associated aging effects will be managed by a different program.

Request:

Reconcile the apparent discrepancy between the component types listed in LRA Table 3.4.2-5-1 but not included in the program description table in LRA Section B.1.30, “Periodic Surveillance and Preventive Maintenance,” and update the LRA as appropriate.

RAI B.1.30-2

Background:

LRA Table 3.3.2-6, “Control Room HVAC System,” shows elastomer ducting being managed for various aging effects, including changes in material properties, by the Periodic Surveillance and Preventive Maintenance program. LRA Section B.1.30 includes a program description table for this program that includes activities to visually inspect the internal and external surfaces of the portable smoke-ejector duct in the control room heating, ventilation and, air conditioning (HVAC) system.

The “parameters monitored or inspected” program element states that polymeric components are inspected for cracking, crazing, scuffing, dimensional changes, discoloration and hardening as evidenced by loss of suppleness. However, the “detection of aging effects” program element only states that established techniques such as visual inspections are used.

Issue:

It is unclear to the staff if physical manipulation will be used to augment visual inspection of the elastomeric portable smoke-ejector duct in the control room HVAC system. The “parameters monitored or inspected” program element states that polymeric components are inspected for hardening as evidenced by loss of suppleness (i.e. physical manipulation). However, the program description table states that the inspection will consist of a visual inspection and the “detection of aging effects” program element states that established techniques such as visual inspections are used, indicating that physical manipulation will not be used to augment visual inspections.

Request:

Clarify whether physical manipulation will be used to augment visual inspection of the elastomeric portable smoke-ejector duct, and if it will be used, then revise the program description table and any corresponding program elements of the Periodic Surveillance and Preventive Maintenance program to reflect this aspect. If physical manipulation will not be used to augment visual inspection of the elastomeric portable smoke-ejector duct, justify the adequacy of a visual inspection to manage the change in material properties.

RAI B.1.34-1

Background:

LRA Section B.1.34 describes the Reactor Vessel Surveillance Program as an existing program consistent with GALL Report AMP XI.M31, "Reactor Vessel Surveillance." The "detection of aging effects" program element of GALL Report AMP XI.M31 states that the program withdraws one capsule at an outage in which the capsule receives a neutron fluence of between one and two times the peak reactor vessel wall neutron fluence at the end of the period of extended operation and tests the capsule in accordance with the requirements of ASTM E185-82.

GALL Report AMP XI.M31 states that, in accordance with 10 CFR Part 50, Appendix H, an applicant submits its proposed withdrawal schedule for approval prior to implementation. Specifically, III.B.3 of 10 CFR Part 50, Appendix H states that a proposed withdrawal schedule must be submitted with a technical justification as specified in §50.4 and that the proposed schedule must be approved prior to implementation.

During the audit, the staff noted that the applicant identified a need to withdraw and test Capsule 277° at 48 EFPY to represent the fluence exposure for the period of extended operation, as recommended in Reference 4-11 of the LRA (i.e., WCAP-18002-NP, Revision 0, "Waterford Unit 3 Time-Limited Aging Analysis on Reactor Vessel Integrity," July 2015).

Issue:

The staff noted that the applicant did not submit a capsule withdrawal schedule for Capsule 277° for NRC approval in accordance with 10 CFR Part 50, Appendix H. The staff finds that the absence of a staff-approved capsule withdrawal schedule for this capsule is inconsistent with GALL AMP XI.M31.

Request:

Explain why the proposed Reactor Vessel Surveillance Program is consistent with GALL AMP XI.M31 in the absence of a staff-approved withdrawal schedule for Capsule 277°. Alternatively, include in the program submittal of a withdrawal schedule for Capsule 277° to obtain NRC approval in accordance with 10 CFR Part 50, Appendix H.

RAI B.1.34-3

Background:

Table 3.0-1 of SRP-LR, Revision 2 includes an example FSAR supplement for the summary description of an aging management program consistent with GALL Report AMP XI.M31, "Reactor Vessel Surveillance." LRA Section A.1.34 describes the FSAR supplement for the applicant's Reactor Vessel Surveillance Program.

Issue:

In contrast with the FSAR supplement in SRP-LR, Revision 2, the staff noted that LRA Section A.1.34 does not include important attributes of the program

Request:

Justify why the applicant's FSAR supplement for the program summary description does not include the following important program attributes consistent with the FSAR supplement in Table 3.0-1 of SRP-LR, Revision 2:

a) any changes to the capsule withdrawal schedule, including spare capsules, must be approved by the NRC prior to implementation, and
b) untested capsules placed in storage must be maintained for future insertion.

Alternatively, revise LRA Section A.1.34 to include these program attributes in the FSAR supplement.

RAI B.1.36-1

Background:

LRA Table 3.3.2-3, "Component Cooling and Auxiliary Component Cooling Water System," includes a single item that only manages loss of material for the wet cooling tower distribution nozzles. The staff notes that the wet cooling tower basins are open to the atmosphere and are susceptible to environmental debris. In addition, the staff notes that the piping upstream of wet cooling tower distribution nozzles is wetted and dried during various operational modes. As discussed in Standard Review Plan – License Renewal, Section 3.2.2.2.5 the wetting and drying of steel components can accelerate corrosion and fouling that could result in plugging of spray nozzles and flow orifices.

Issue:

The wet cooling tower distribution nozzles in LRA Table 3.3.2-3 are not being managed for flow blockage due to fouling. During its audit of the Service Water Integrity aging management program, the staff noted that PM00005814-01 includes inspection of the wet tower distribution

nozzles for damage and plugging; however, these activities do not appear to be credited in the LRA through an aging management review item.

Request:

Explain why flow blockage does not need to be managed for the wet cooling tower distribution nozzles, or include a new AMR item to manage this aging effect for these components.

RAI B.1.36-2

Background:

Components in the nonsafety-related wet cooling tower chemical addition and filtration system are not within the scope of license renewal. Design Basis Document W3-DBD-4, "Component Cooling Water, Auxiliary Component Cooling Water," states that "siphon breaker holes" in the suction piping for the wet basin filtration pumps eliminate the potential for inadvertently removing water from the wet cooling tower basins due to pressurized leaks, which could divert the water outside of the basins. The staff notes that the wet cooling tower basins are open to the atmosphere and are susceptible to environmental debris, and the water in the wet cooling tower basins is classified as "raw water."

Issue:

LRA Section 2.1.1.2 "Application of Criterion for Nonsafety-Related SSCs Whose Failure Could Prevent the Accomplishment of Safety Functions" discusses various aspects associated with functional and physical failures of nonsafety-related components. However, these discussions do not include considerations that would be associated with blockage of the siphon breaker holes as a potential failure in the wet cooling tower chemical addition and filtration system. The "failure" (i.e., plugging) of the siphon breaker holes in the suction piping could occur during normal operation of the associated system without being detected, which could allow inadvertent removal of water from the wet cooling tower basins. It is not clear to the staff that failure (i.e., plugging) of the siphon hole could not prevent satisfactory accomplishment of an auxiliary component cooling water system intended function.

Request:

Explain why the siphon breaker holes in the wet cooling tower chemical addition and filtration system can be excluded from the scope of license renewal or provide aging management review item(s) to manage the effects of aging for the associated components.

RAI B.1.36-3

Background:

LRA Section B.1.36, "Service Water Integrity," includes an enhancement to revise associated program procedures to monitor the auxiliary component cooling water (ACCW) basins for biological fouling by visual inspection as well as analysis of water for biological activity. LRA Section B.1.36 also states that this program manages components as described in the Waterford 3 response to NRC Generic Letter 89-13 ["Service Water System Problems Affecting

Safety-Related Equipment"]. Waterford's response to Generic Letter 89-13, dated January 29, 1990, for Action I states that "LP&L [the prior licensee] monitors the ACCW basins for biological fouling by visual inspection as well as analysis of water for biological activities on a weekly basis."

Issue:

The staff notes that NEI 99-04, "Guidelines for Managing NRC Commitment Changes," states "Regulatory commitments may involve new actions as well as existing actions credited by licensees in responding to NRC requests. For example, responses to an item in an NRC bulletin crediting an existing program, practice or plant feature as meeting the intent of the requested action is a regulatory commitment." Unless Waterford is no longer monitoring the ACCW basins by visual inspection and by analysis of water for biological activity, as stated in Waterford's response to Generic Letter 89-13, the need for an enhancement to the Service Water Integrity program to do the same thing is unclear to the staff.

Request:

With regard to activities at Waterford 3 related to monitoring ACCW basins for biological fouling, reconcile the need for the current LRA enhancement with regard to the Waterford 3 response to Generic Letter 89-13 dated January 29, 1990.

RAI B.1.36-6

Background:

Aging management program evaluation report WF3-EP-14-00010, Revision 0, "Aging Management Review Summary," Section 1.2 states that tables in each aging management review report summarize the results by component type. It also states that the aging management review report results are unchanged in the aging management review summary except for minor editorial changes, with no effect on the results.

Aging management program evaluation report WF3-ME-14-00009, Revision 1, "Aging Management Review of the Component Cooling and Auxiliary Component Cooling Water Systems," Section 4 states that the technical evaluation to demonstrate that the effects of aging will be managed is accomplished by establishing a clear relationship among the components under review, the aging effects being managed, and the credited programs. Section 4.5 states that the One-Time Inspection program will manage loss of material in the carbon steel circulating water intake piping. This is also reflected in the "Aging Management Review Results" table in Attachment 2. In addition, the Attachment 2 table also indicates that the tank in this system is managed for loss of material by the Water Chemistry-Closed Treated Water Systems program.

LRA Table 3.3.2-3, "Component Cooling and Auxiliary Component Cooling Water System," does not show carbon steel piping as being managed by the One-Time Inspection program nor the carbon steel tank as being managed by the Water Chemistry – Closed Treated Water Systems. In addition, LRA Table 3.3.2-3 shows that carbon steel piping with internal coatings will be managed for loss of material and loss of coating integrity by the Coating Integrity program. However, aging management program evaluation report WF3-ME-14-00009, does not

list carbon steel piping with internal coatings as a component type in its Attachment 1, "Components Subject to AMR," or Attachment 2, "Aging Management Review Results."

Issue:

The LRA is not consistent with the relevant basis document such that the staff cannot understand what aging effect the piping specified above is subject to or how it will be managed.

Request:

Reconcile the apparent discrepancies discussed in the "Background" section above associated with aging management program evaluation report WF3-ME-14-00009 and LRA Table 3.3.2-3.

RAI B.1.10-1

Background:

The "detection of aging effects" program element of GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," as modified by LR-ISG-2011-03, "Changes to the Generic Aging Lessons Learned (GALL) Report Revision 2, Aging Management Program XI.M41, 'Buried and Underground Piping and Tanks,'" and LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation" states, in part:

> "The entire population of in-scope piping that has tightly adhering insulation is visually inspected for damage to the moisture barrier with the same frequency as for other types of insulation inspections."

The enhancement to the "detection of aging effects" program element in License Renewal Application (LRA) Section B.1.10, "External Surfaces Monitoring" on page B-45 states, in part:

> "[T]he entire population of in-scope *accessible* piping component surfaces that have tightly adhering insulation will be visually inspected for damage to the moisture barrier with the same frequency as for other types of insulation inspections."

Issue:

The GALL Report AMP states that the entire population of in-scope piping components with tightly adhering insulation will be visually inspected, but the enhancement to the applicant's External Surfaces Monitoring program specifies visual inspection of the "entire population of in-scope *accessible* piping component surfaces that have tightly adhering insulation." The applicant's use of the word "accessible" suggests excluding inaccessible components from inspections.

Request:

Describe usage of the term "accessible" in this enhancement and explain why it is adequate.

RAI B.1.10-2

Background:

During the July 2016 Aging Management Program (AMP) audit of the Waterford 3 (WF3) License Renewal Application (LRA), recent plant-specific operating experience regarding corrosion on external surfaces of structures and components was reviewed, along with recent site activities to resolve these situations. Review of this information has shown that external corrosion of steel components exposed to an outdoor air environment is a significant issue at WF3. Waterford 3 Licensee Event Report 2014-004-03 states that through-wall corrosion was identified on the Emergency Diesel Generator Feed Tank vent lines where the vent lines pass through the roof. The corrosion was identified by an NRC inspector and it was unknown how long the through-wall corrosion had existed. A fleet procedure change is being developed that could potentially address the plant-specific operating experience.

Issue:

As presented to the staff during the audit, the fleet procedure does not address all components within the scope of license renewal.

Request:

Describe how the fleet procedure will be used to manage aging effects during the period of extended operation.

RAI B.1.10-3

Background:

The "acceptance criteria" program element of GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," as modified by LR-ISG-2011-03, "Changes to the Generic Aging Lessons Learned (GALL) Report Revision 2, Aging Management Program XI.M41, 'Buried and Underground Piping and Tanks,'" and LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation" states, in part:

> "For flexible polymers, a uniform surface texture and uniform color with no dimensional change is expected. Any abnormal surface condition may be an indication of an aging effect for metals and for polymers."

The enhancement to the "acceptance criteria" program element in License Renewal Application (LRA) Section B.1.10, "External Surfaces Monitoring" on page B-46 states, in part:

> "Revise External Surfaces Monitoring Program procedures to include the following acceptance criteria.
>
> […]
>
> - Flexible polymeric materials should have a uniform surface texture and color with no cracks and no *unanticipated* dimensional change, no abnormal surface with the material in an as new condition with respect to hardness, flexibility, physical dimensions, and color."

Issue:

The GALL Report AMP states that no dimensional change is expected for flexible polymers, but the enhancement to the applicant's External Surfaces Monitoring program states that "flexible polymeric materials should have […] no unanticipated dimensional change." The word "unanticipated" was deleted from the AMP in ISG-2012-02. The applicant's usage of the word in this enhancement suggests that there are anticipated dimensional changes for polymeric materials.

Request:

Describe usage of the word "unanticipated" in this enhancement and explain why it is adequate.

RAI 3.3.2.3.15.4-1

Background:

LRA Table 3.4.1, item 3.4.1-14 addresses steel piping, piping components, and piping elements exposed to steam and treated water, which will be managed for loss of material due to general, pitting, and crevice corrosion using the "Water Chemistry Control – Primary and Secondary" and "One-Time Inspection" programs.

LRA Table 3.3.2-15-4, "Auxiliary Steam System, Nonsafety-Related Components Affecting Safety-Related Systems," states that carbon steel traps, valve bodies, and piping exposed to steam will be managed for loss of material by the "Water Chemistry Control – Primary and Secondary." The subject AMR items ***do not*** cite plant-specific note 301, which states that "[t]he One-Time Inspection Program will verify effectiveness of the Water Chemistry Control - Primary and Secondary Program."

Issue:

It is unclear to the staff if carbon steel traps, valve bodies, and piping exposed to steam will be managed for loss of material by (a) Water Chemistry Control – Primary and Secondary program; or (b) the Water Chemistry Control – Primary and Secondary and One-Time Inspection programs.

Request:

Reconcile the apparent discrepancy regarding the program(s) managing loss of material of carbon steel traps, valve bodies, and piping exposed to steam.

RAI 2.1-1

Background:

10 CFR 54.4, "Scope," states, in part:

(a) Plant systems, structures and components [SSCs] within the scope of this part are –

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions – (i) the integrity of the reactor coolant pressure boundary; (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition; or (iii) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.

(2) All nonsafety-related systems, structures and components whose failure could prevent satisfactory accomplishment of any of the functions identified in (a)(1)(i), (ii), or (iii) of this section.

Issue:

During the on-site scoping and screening methodology audit, the staff reviewed the license renewal application, license renewal implementing documents and current licensing basis documentation applicable to identifying structures to be included within the scope of license renewal in accordance with 10 CFR 54.4(a). In addition, the staff performed walkdowns of the safety-related nuclear island and reactor building that were included within the scope of license renewal in accordance with 10 CFR Part 54.4(a)(1). The staff determined that the nonsafety-related west side access facility, which is immediately adjacent to, and in contact with, the reactor building was not included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

Request:

The staff requests that the applicant provide a basis for not including the nonsafety-related west side access facility within the scope of license renewal in accordance with 10 CFR 54.4(a)(2).

If an engineering evaluation or analysis is cited as the basis for not including the west side access facility within the scope of license renewal, indicate how it was performed and documented, and how the evaluation or analysis considers the effects of aging.

If the review of this issue concludes that the west side access facility will be included within the scope of license renewal, describe additional scoping evaluations performed to address the 10 CFR 54.4(a) criteria. List additional SSCs included within the scope of license renewal as a result of the review, structures and components for which aging management reviews were performed, and any additional information related to material and environment combinations. For each structure and component for which aging management reviews were performed, describe the aging management programs to be credited for managing the identified aging effects.

RAI B.1.28-1

Background:

LRA Section B.1.28, "One-Time Inspection," states that the one-time program activity will verify the effectiveness of several programs by confirming the insignificance of aging effects by verifying that unacceptable loss of material or cracking is not occurring or is, "so insignificant that a plant-specific aging management program is not warranted."

LRA Section B.1.28 states that the he One-Time Inspection Program will be consistent with the program described in NUREG- 1801, Section XI.M32, “One-Time Inspection.”

The “acceptance criteria” program element of GALL Report AMP XI.M32 “One-Time Inspection” states: “Any indication or relevant conditions of degradation detected are evaluated. Acceptance criteria may be based on applicable ASME or other appropriate standards, design basis information, or vendor-specified requirements and recommendations. For example, ultrasonic thickness measurements are compared to predetermined limits.”

SRP-LR Section A.1.2.3.6 states that quantitative or qualitative acceptance criteria of the program and its basis should be described and that the criteria should ensure the intended functions are maintained.

Issue:

It is not clear to the staff that these statements related to the “acceptance criteria” program element are consistent because the GALL recommends evaluating any indication while the AMP evaluates significant indications. It is also unclear to the staff how the applicant will determine if an indication is significant.

The staff lacks sufficient information to understand how it will be determined that cracking and loss of material is acceptable or will be so insignificant that intended functions will be maintained during the period of extended operation and an aging management program is not warranted.

Request:

With regard to the “acceptance criteria” program element of the LRA AMP activity, explain how it will be determined that cracking or loss of material found is acceptable or so insignificant that an aging management program is not warranted? Include the acceptance criteria for both stainless steel and concrete structures and components in the explanation that would demonstrate consistency with the corresponding program element of the GALL Report AMP; or justify the exception being taken to the GALL Report AMP.

RAI 4.1-1

Background:

FSAR Table 3.9-9 identifies that the plant design includes the following large bore (greater than 4 inch nominal pipe size), Class 1 valves in the plant design:

- 8” LPSI (low pressure safety injection) header-to-reactor coolant loop inside containment isolation valves
- 12” safety injection tank outlet check valves,
- 12” safety injection header check valves
- 14” reactor coolant loop shutdown cooling upstream suction isolation valves,
- 14” reactor coolant loop shutdown cooling suction inside containment isolation valves.

FSAR Section 3.9.1.1.2 states that these valves were designed to the applicable requirements in the 1971 Edition of ASME Section III, inclusive of the 1972 Winter Addenda, and were analyzed for the applicable cyclic loading conditions identified in FSAR Table 3.9-3. FSAR Section 5.4.12 also confirms that cyclical loading analyses (i.e., fatigue analyses) for these types of valves were included in the CLB. In addition, fatigue analyses for the Class 1 piping are referenced in FSAR Section 5.4.3.

During the AMP audit (July 25 -28, 2016), the applicant stated that the large bore Class 1 valves are included in the scope of the metal fatigue analysis for the Class 1 piping, as described in LRA Section 4.3.1.7.

Issue:

Although LRA Section 4.3.1.7 references the metal fatigue analysis bases for Class 1 piping in FSAR Section 5.4.3, it does not specifically mention that the metal fatigue analyses (cyclical loading and design transient analyses) for the large bore Class 1 valves are within the scope of the metal fatigue analysis for Class 1 piping components. In addition, LRA Section 4.3.1.7 does not refer to the metal fatigue analysis bases for the large bore Class 1 valves that are described in either FSAR Section 3.9.1.1.2 or FSAR Section 5.4.12. Therefore, the LRA does not clearly identify that the metal fatigue analyses for these valves are TLAAs and are within the scope of the metal fatigue TLAA assessment for Class 1 piping in LRA Section 4.3.1.7.

Request:

Clarify where the metal fatigue TLAA for large bore Class 1 valves is located in the LRA. Amend the LRA accordingly if it is determined that: (a) the LRA needs to be amended to include a new metal fatigue TLAA section for the large bore Class 1 valves or (b) LRA Section 4.3.1.7 needs to be administratively amended to include the large bore Class 1 valves and to reference either FSAR Section 3.9.1.1.2 or 5.4.12.

RAI 3.1.1.34-1

Background:

LRA Table 3.1.1, item 3.1.1-34 addresses cracking due to stress corrosion cracking (SCC) in stainless steel or steel with stainless steel cladding pressurizer relief tank and associated components (tank shell and heads, flanges, and nozzles) exposed to treated borated water greater than 60 °C (140 °F). LRA item 3.1.1-34 also refers to the aging management guidance in SRP-LR Table 3.1-1, ID 34 stating that the aging effect is managed by using GALL Report AMP XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD" for ASME components, and AMP XI.M2, "Water Chemistry." The LRA further indicates that LRA item 3.1.1-34 is not applicable to the applicant's facility because the pressurizer relief tank is nonsafety-related and is not subject to the requirements specified in ASME Code, Section XI, Subsections IWB, IWC, and IWD.

In addition, LRA Table 3.1.1, item 3.1.1-80 addresses cracking due to SCC for stainless steel or steel with stainless steel cladding pressurizer relief tank and associated components (heads, flanges, and nozzles) which are non-ASME Section XI components exposed to treated borated water greater than 60 °C (140 °F). LRA item 3.1.1-80 also refers to the aging management guidance in SRP-LR Table 3.1-1, ID 80 stating that the aging effect is managed by using GALL Report AMP XI.M2, "Water Chemistry," and AMP XI.M32, "One-Time Inspection."

Issue:

The staff noted that LRA Table 3.1.2-5-1 describes detailed management review results (called Table 2 items) for nonsafety-related components affecting safety-related systems in the reactor coolant system. Even though LRA Table 3.1.2-5-1 includes Table 2 AMR items for non-safety-related tanks, these items for tanks do not address aging management of cracking in the pressurizer relief tank. Therefore, additional information is necessary to confirm which Table 2 AMR item is used to manage cracking due to SCC for the pressurizer relief tank.

Request:

Clarify why the AMR results for tanks in LRA Table 3.1.2-5-1 do not address cracking due to SCC for the pressurizer relief tank. As part of the response, clarify which LRA table (e.g., Table 3.1.2-X) includes a Table 2 AMR item used to manage cracking due to SCC for the pressurizer relief tank and associated components.

RAI 3.1.1.80-1

Background:

LRA Table 3.1.1, item 3.1.1-80 addresses cracking due to stress corrosion cracking (SCC) for stainless steel or steel with stainless steel cladding pressurizer relief tank and associated components (heads, flanges, and nozzles) which are non-ASME Section XI components exposed to treated borated water greater than 60 °C (140 °F). LRA item 3.1.1-80 also refers to the aging management guidance in SRP-LR Table 3.1-1, ID 80 stating that the aging effect is managed by using GALL Report AMP XI.M2, "Water Chemistry," and AMP XI.M32, "One-Time Inspection."

In addition, LRA Table 3.1.2-3 describes aging management review (AMR) results for reactor coolant pressure boundary (RCPB) components. LRA Table 3.1.2-3 indicates that the following non-ASME Class 1 component types are associated with LRA item 3.1.1-80 and are susceptible to cracking due to SCC: (a) valve body, (b) piping, (c) tubing and (d) flow element.

Issue:

The LRA does not clearly indicate whether these non-ASME Class 1 components are ASME Code Class components that are subject to the existing periodic inservice inspections specified in ASME Code, Section XI. Additional information is necessary to clearly identify aging management activities for these non-ASME Class 1 components.

Request:

Clarify whether the non-ASME Class 1 components (valve body, piping, tubing and flow element) discussed above are ASME Code Class components (e.g., ASME Code Class 2 or 3 components) subject to the existing periodic inservice inspections. If so, justify why the LRA does not identify the periodic inservice inspections in the aging management review results for these components.

RAI 3.1.1.81-1

Background:

LRA Table 3.1.1, item 3.1.1-81 addresses cracking due to stress corrosion cracking (SCC) for stainless steel pressurizer spray head exposed to reactor coolant, which is managed by the One-Time Inspection Program and Water Chemistry Program. During its review of components susceptible to SCC, the staff noted that LRA Section 2.3.1.3 (Page 2.3-14) indicates that reactor coolant pump (RCP) thermal barrier heat exchanger tubes are part of reactor coolant pressure boundary and are subject to aging management review.

The staff also noted that Waterford Unit 3 UFSAR Section 5.2.5.1.5, "Heat Exchanger" indicates that leakage of reactor coolant through the RCP thermal barrier can be detected by the monitoring of component cooling water radiation and surge tank level.

Issue:

The RCP thermal barrier heat exchanger tubes maintain the integrity of reactor coolant pressure boundary. However, the LRA does not clearly identify which AMR item is used to manage cracking in these heat exchanger tubes. In addition, the LRA does not address whether applicant's operating experience confirms that cracking is not occurring in these heat exchanger tubes.

Request:

Clarify which AMR item is used to manage cracking for the RCP thermal barrier heat exchanger tubes. In addition, clarify whether applicant's operating experience, including the component cooling water monitoring activities specified in the UFSAR, confirms that cracking is not occurring in these heat exchanger tubes.

RAI 4.3.1-1

Background:

LRA Table 4.3-1 provides the list of transients that will be monitored by the Fatigue Monitoring Program. This table includes the number of cycle occurrences, 60-year projected number of cycles, and the analyzed cycle limit.

The LRA states that FSAR Table 3.9-3, "Transients and Operative Conditions for Code Class 1 Non-NSSS Piping," lists the transients used as inputs to the piping stress analyses.

Both tables include the transient, "Loss of Charging," as a transient that was used in the stress analyses and will be monitored during the period of extended operation by the Fatigue Monitoring program.

Issue:

FSAR Table 3.9-3 states that the cycle limit of the "Loss of Charging" is 100. LRA Table 4.3-1 states that the cycle limit of this transient is 200. The staff is concerned that the applicant will not monitor the most conservative cycle limit that was used in the stress analyses.

Request:

Clarify the discrepancy between the two cycle limits. Justify that the Fatigue Monitoring Program will ensure that the cycle limits of these analyses will not be exceed during the period of extended operation.

RAI 4.3.2-1

Background:

LRA Section 4.3.2.3 discusses the Non-Class 1 Heat Exchangers with Fatigue Analysis. The LRA states that a fatigue analysis was completed for the Class 2 portions of the letdown and regenerative heat exchangers. The LRA states that the cycle limits for these analyses are represented in LRA Table 4.3-1 and will be monitored by the Fatigue Monitoring Program. The applicant dispositioned these fatigue analyses in accordance with 10 CFR 54.21(c)(1)(iii).

Issue:

The LRA did not clarify which transients are used as inputs for the fatigue analyses of the Class 2 portions of the letdown and regenerative heat exchangers. The staff is unclear if these transients are within the scope of the Fatigue Monitoring Program.

Request:

Identify which transients were used in the fatigue analyses of the Class 2 portions of the letdown and regenerative heat exchangers. Confirm that these transients will be monitored under the Fatigue Monitoring Program.

RAI 4.3.3-1

Background:

LRA Section 4.3.3 discusses the applicant's evaluation of the effects of the reactor water environment on fatigue life. The LRA states that environmental screening evaluations were performed for the sample set of Combustion Engineering components provided in NUREG/CR-6260. The LRA states that using bounding environmental correction factors (F_{en}), two locations have a projected 60-year environmentally-adjusted cumulative usage factor (CUF_{en}) greater than the design limit of 1.0. The LRA further states that for these two locations, refined environmental evaluations will be performed prior to the period of extended operation as part of the Fatigue Monitoring Program.

Issue:

The LRA does not provide enough information on how the bounding F_{en} values were calculated. The staff is unclear how the applicant will ensure that these F_{en} values will remain bounding for the period of extended operation. The staff is also unclear what refinement methods will be used for the CUF_{en} evaluations.

Request:

a) Describe how the bounding F_{en} values were determined for evaluating the NUREG/CR-6260 locations for environmental fatigue. Justify how it will be assured that the variables and inputs for these F_{en} values will remain bounding throughout the period of extended operation.

b) Describe what method(s) will be used to refine the CUF_{en} evaluations. Justify that the refinements will be appropriate.

RAI 3.1.1.74-1

Background:

LRA Table 3.1.1, item 3.1.1-74 addresses wall thinning due to flow accelerated corrosion (FAC) in steel steam generator upper assembly and separators including feedwater inlet ring and support exposed to secondary feedwater or steam. LRA item 3.1.1-74 also refers to the aging management guidance in SRP-LR Table 3.1-1, ID 74 stating that the aging effect is managed by using GALL Report AMP XI.M19, "Steam Generators," and AMP XI.M2, "Water Chemistry." LRA item 3.1.1-74 further states that the steel feedwater piping components of the Waterford Unit 3 replacement steam generator are composed of alloy steel (Cr-Mo) which is resistant to FAC.

GALL Report AMP XI.M17, "Flow-Accelerated Corrosion" states that the Nuclear Safety Analysis Center (NSAC)-202L-R2 or R3 provides general guidelines for the FAC program. The staff noted that Section 4.2.2 of NSAC-202L-R2 indicates that stainless-steel piping, or low-alloy steel piping with nominal chromium content equal to or greater than 1.25 percent is resistant to FAC.

Issue:

The LRA does not describe a sufficient technical basis for the applicant's claim that the replacement steam generator feedwater piping components are resistant to FAC (e.g., chromium content of the Cr-Mo steel).

Request:

Provide information to demonstrate that the steel feedwater piping components are resistant to FAC (e.g., chromium content of the alloy steel to support material resistance to FAC). If the chromium content of the alloy steel used to fabricate these components is below the threshold described in NSAC-202L-R2 (1.25 wt. percent), provide justification for why these feedwater piping components are resistant to FAC.

RAI B.1.26-1

Background**:**

WF3-EP-14-00009, "Aging Program Evaluation Results" – Electrical, Section 3.5.B.3.b, "Comparison to WF3 Parameters Monitored or Inspected" states that a representative sample of accessible insulated cables and connections within the scope of license renewal will be visually inspected for cable and connection jacket and connection insulation surface anomalies indicating signs of reduced insulation resistance. This document further states that this sample

of accessible cables will represent, with reasonable assurance, all cables and connections in an adverse localized environment.

Issue:

The use of a representative sample of accessible insulated cable and connections as described in WF3-EP-14-00009 does not agree with the applicant's LRA AMP or GALL Report AMP XI.E1, "Insulation Material for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Requirements." Instead, the applicant's LRA AMP as well as GALL Report AMP XI.E1, call for visual inspection of all accessible insulated cables and connections as an acceptable component sampling to cover accessible and inaccessible cables and connections in an adverse localized environment.

It is not clear to the staff that the applicant's "Non-EQ Insulated Cables and Connections Program" will be consistent with the GALL Report because the applicant's aging management program evaluation for the "Parameters Monitored or Inspected" program element describes the applicant's program as utilizing a representative sample of accessible insulated cables and connections.

Request:

Clarify the WF3-EP-14-00009, "Aging Program Evaluation Results" – Electrical, Section 3.5.B.3.b, "Comparison to WF3 Parameters Monitored or Inspected" program representative sample approach as compared with the GALL Report AMP XI.E1 and LRA AMP B.1.26 recommendation that all accessible electrical cables and connections installed in adverse localized environments are visually inspected for cable jacket and connection insulation surface anomalies indicating signs of reduced insulation resistance.

RAI B.1.24-1

Background**:**

The applicant stated in LRA AMP B.1.24 and WF3-EP-14-00009, "Aging Management Program Evaluation Results" that periodic manhole inspections will be performed to assess that cable and cable support structures are intact. The applicant proposed an exception to the "preventive actions" program element, that the inspection frequency will not be increased if water is found in the manholes during periodic manhole inspections. The applicant further stated that because of the elevation of the plant site and manholes, water cannot be prevented from entering the manholes. The applicant concluded that manhole inspections will assess cable and support damage due to exposure to significant moisture, and periodic testing will provide reasonable assurance that each cable will continue to perform its intended function through the period of extended operation. The in-scope inaccessible cables identified by the applicant are the 480V power cables for the electric motor-driven fire pump and the electric motor-driven jockey fire pump.

In addition to periodic testing, GALL Report AMP XI.E3, "Inaccessible Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements" program element "preventive actions" recommends that periodic actions are taken to prevent inaccessible power cables from being exposed to significant moisture, such as identifying and inspecting accessible

cable conduit ends and cable manholes for water collection, and draining the water, as needed. In addition, GALL Report AMP XI.E3 also recommends that the inspection frequency for water collection is established and performed based on plant-specific operating experience with cable wetting or submergence in manholes (i.e., the inspection is performed periodically based on water accumulation over time and event driven occurrences, such as heavy rain or flooding). GALL Report AMP XI.E3 further recommends that if water is found during inspection (i.e., cable exposed to significant moisture), corrective actions are taken to keep the cable dry and to assess cable degradation.

GALL Report AMP XI.E3 also notes that when an inaccessible power cable (greater than or equal to 400 volts) is exposed to wet, submerged, or other adverse environmental conditions for which it was not designed, an aging effect of reduced insulation resistance may result, causing a decrease in the dielectric strength of the conductor insulation. This can potentially lead to failure of the cable's insulation system.

GALL Report AMP XI.E3 further states that in addition to the necessary periodic actions to minimize the potential for insulation degradation, in-scope power cables exposed to significant moisture are tested to indicate the condition of the conductor insulation (including trending of degradation where applicable). The specific type of test performed is determined prior to the initial test and is a proven test for detecting deterioration of the insulation system due to wetting or submergence.

Issue:

It is not clear to the staff that with the proposed exception to the GALL Report AMP XI.E3, "preventive actions" program element that the applicant's Non-EQ Inaccessible Power Cable (≥400 V) program will provide adequate aging management of the in-scope inaccessible power cables such that both pumps will perform their intended functions during the period of extended operation. The staff's concern is that without manhole and cable inspections adjusted for water accumulation over time as recommended by GALL Report AMP XI.E3, the in-scope inaccessible power cables may experience increased aging degradation which could potentially lead to failure of the cable's insulation system.

Request:

Demonstrate that with inspection frequencies not based on water accumulation over time such that periodic actions are not taken to prevent inaccessible power cables from being exposed to significant moisture (i.e., inspecting cable manholes for water accumulation, and draining the water, as needed to limit cable exposure to significant moisture) that the electric motor driven fire pump and electric motor driven jockey pump cable aging effects will be adequately age managed such that both cables will continue to perform their intended functions during the period of extended operation.