NRR-DMPSPEm Resource

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Sent: Tuesday, January 09, 2018 1:45 PM
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Subject: FINAL REQUESTS FOR ADDITIONAL INFORMATION FOR THE SAFETY REVIEW OF THE RIVER BEND STATION LICENSE RENEWAL APPLICATION (CAC NO. MF9757) – SET 7
Attachments: RAI Set 7 Enclosure - CLEAN Final_with ERO's edits_010818.pdf

Docket No. 50-458

By letter dated May 25, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17153A282), Entergy Operations, Inc. (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," to renew the operating license NPF-47 for River Bend Station.

On December 11, 18, 19, 2017 and January 3, 2018, the U.S Nuclear Regulatory Commission (NRC) staff sent Entergy Operations, Inc. the draft Requests for Additional Information (RAIs) for technical review packages (TRPs) 120.1 (Erosion of Main Steam Line Flow Restrictors), 28 (Fire Water System), 30 (Aboveground Metallic Tanks), 9 (Boiling Water Reactor Vessel Internals), 104 (Transmission Conductors and Switchyard Buses), and 12 (Internal Coatings) respectively. Entergy Operations, Inc. subsequently informed the NRC staff that clarification calls were needed to discuss the majority of the information requested. The clarification calls between NRC staff and Entergy Operations, Inc. representatives were held on January 3, 2018, for TRPs 120.1, 28, 30, and 12. During these calls the subject information requests were discussed. Some of the draft RAIs in TRPs 120.1, 28, and 30 were modified based on these discussions as follows:

For TRP 120.1, RAI 4.7.1-1 was discussed and modified. For TRP 28, the original RAIs B.1.20-3, B.1.20-4, B.1.20-5, B.1.20-6, and B.1.20-7, plus 3.3.1-1 and 3.3.2.2.8-1 were discussed; RAIs B.1.20-3, B.1.20-5, B.1.20-6, and 3.3.1-1 were subsequently modified. No modifications were made to the rest of RAIs in TRP 28. Additionally, the original RAIs B.1.20-2 through B.1.20-7 were renumbered as B.1.20-1 through B.1.20-6 to reflect the current state of RAIs. For TRP 30, both RAI B.1.1-2 and B.1.1-2 were discussed and modified. Finally, for TRP 12, RAI B.1.11-2a, a follow-up RAI to a previous RAI B.1.11-2, was discussed but not modified. The final RAIs are enclosed.

David Lach of your staff agreed to provide a response to all but one of the final RAIs within 30 days of the date of this email. With respect to the response to RAI B.1.11-2a, we acknowledge that Entergy verbally requested the response to be provided within 60 days of the date of this e-mail. Please provide that request in written formal correspondence to the NRC staff. The NRC staff will be placing a copy of this email in the NRC's Agencywide Documents Access and Management System.

Sincerely,

Emmanuel Sayoc, Project Manager *(Albert Wong for)*
License Renewal Projects Branch (MRPB)

Division of Materials and License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosure:
As stated

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Subject: FINAL REQUESTS FOR ADDITIONAL INFORMATION FOR THE SAFETY REVIEW OF THE RIVER BEND STATION LICENSE RENEWAL APPLICATION (CAC NO. MF9757) – SET 7
Sent Date: 1/9/2018 1:44:40 PM
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REQUEST FOR ADDITIONAL INFORMATION
LICENSE RENEWAL APPLICATION
RIVER BEND STATION, UNIT 1
DOCKET NO.: 50-458
CAC NO.: MF9757
Office of Nuclear Reactor Regulation
Division of Materials and License Renewal

10 CFR § 54.21(a)(3) of 10 CFR requires an applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the staff must make to issue a renewed license (10 CFR § 54.29(a)) is that actions have been identified and have been or will be taken with respect to the managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under § 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis (CLB). As described in SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report. In order to complete its review and enable making a finding under 10 CFR § 54.29(a), the staff requires additional information in regard to the matters described below.

RAI 3.3.1-1 (TRP 28 Fire Water System)

Background

LRA Table 3.3.1, items 3.3.1-64, 3.3.1-66, 3.3.1-130, and 3.3.1-131, which cite generic notes B and D, do not cite flow blockage due to fouling as an aging effect requiring management in the Discussion column of Table 3.3.1, nor in LRA Table 3.3.2-7.

The GALL Report AMP XI.M27, "Fire Water System," as modified by LR-ISG-2012-02, as well as the USAR supplement for the program, cite flow blockage due to fouling as an applicable aging effect requiring management.

Issue

Even though the Fire Water System program, as well as the USAR supplement for the program include provisions to manage flow blockage due to fouling, LRA Tables 3.3.1 and 3.3.2-7 do not cite flow blockage due to fouling as an aging effect requiring management.

Request

State whether flow blockage due to fouling will be managed for components citing items 3.3.1-64, 3.3.1-66, 3.3.1-130, and 3.3.1-131, and generic notes B and D.

1. If flow blockage due to fouling will not be managed, state the basis for not managing this aging effect.
2. If flow blockage due to fouling will be managed, what changes will be incorporated into LRA Tables 3.3.1 and 3.3.2-7 necessary to address flow blockage due to fouling?

RAI 3.3.2.2.8-1 (Recurring Internal Corrosion)

Background

LRA Section 3.3.2.2.8 states that recurring internal corrosion (RIC) was not identified in auxiliary system components based on a review of past plant operating experience. During its audit, the staff reviewed a report on the evaluation of RIC which states that piping in the fire water system experienced a number of occurrences that warrant evaluation for RIC. The report also states that while leaks and corrosion in the fire water and other systems were documented in condition reports the events were screened out based on: (a) not meeting the frequency of occurrence as described in the definition of RIC; (b) the corrosion mechanism being indeterminate; (c) the situation was corrected or mitigated by replacement with corrosion resistant materials; or (d) the components were not within the scope of license renewal.

Issue

It is not clear to the staff that the evaluation of RIC in auxiliary systems was consistent with SRP-LR Section 3.3.2.2.8. Specifically:

- SRP-LR Section 3.3.2.2.8 discusses "aging effects with the same aging mechanism," but it does not address RIC on a system-by-system basis nor imply that occurrences of corrosion should be separated into unique groups related to specific systems. The staff acknowledges that it is appropriate to categorize occurrences with the same material, environment, aging effect/mechanism, and program combination. For example, it could be possible that the water from shallow wells is more corrosive than that from the deep wells. If the source of water for system A was from the shallow wells, the source of water from system B was from the deep wells, and there is a basis for concluding that one well source was more corrosive than the other; a case could be made that aging effects in the two systems are unique from a RIC consideration.
- An indeterminate aging mechanism is not a sufficient basis to exclude an occurrence from consideration. During its review of plant-specific operating experience, the staff reviewed eight condition reports, as well as several condition reports related to the piping downstream of the jockey pump, and noted that there have been many instances of through-wall leakage in fire water system piping. Even if the aging mechanism is not known in some of these occurrences, it appears evident that loss of material resulting in through-wall corrosion has exceeded the criteria for RIC to be applicable to the Fire Protection – Water System program.
- Replacement of piping (with either like-for-like or corrosion resistant materials) should not result in removing an occurrence from consideration. Unless the corrective actions address all of the similarly susceptible components by either a global material change or overall change to the environment, the aging effect/mechanism will still be active and should be addressed as RIC.

Request

In order to demonstrate that RIC is not applicable to in-scope auxiliary components, provide the complete list of occurrences of 50 percent or greater internal loss of material within the evaluated time period. The list should describe the occurrence, aging mechanism or assumed aging mechanism, and date of discovery. In light of the discussion in the issue portion of this RAI, provide a basis for why each occurrence should not be considered an appropriate data point for consideration of RIC.

Alternatively, if after evaluating the occurrences in light of the discussion in the issue portion of this RAI it is determined that RIC has occurred in the in-scope auxiliary systems, state the aging

mechanism and applicable AMP(s) In addition, state what changes will be incorporated in the LRA sufficient to address the recommendations in SRP-LR Section 3.3.2.2.8.

RAI 3.6.2.2.3-1 (TRP 104 Transmission Conductors and Switchyard Buses)

Background
Section 3.6.2.2.3 of SRP-LR, "Loss of Material due to Wind Induced Abrasion and Fatigue, Loss of Conductor Strength due to Corrosion, and Increased Resistance of Connection due to Oxidation or Loss of Pre-load" states that: "Loss of Material due to Wind Induced Abrasion and Fatigue, Loss of Conductor Strength due to Corrosion, and Increased Resistance of Connection due to Oxidation or Loss of Pre-load could occur in transmission conductors and connections, and in switchyard bus and connections. The GALL Report recommends further evaluation of a plant-specific AMP to ensure that this aging effect is adequately managed."

In LRA 3.6.2.2.3, the applicant references SRP-LR for further evaluation of the above aging mechanisms and effects for transmission conductors and connections, and switchyard bus and connections.

Table 3.6.1 of the LRA, line item number 3.6.1-6 identifies the component as: "Switchyard bus and connections composed of aluminum, copper, bronze, stainless steel, galvanized steel, exposed to air-outdoor." The corresponding item in Table 3.6.2 of the LRA identifies the material as: "Aluminum, steel, steel alloy."

Table 3.6.1 of the LRA, item 3.6.1-20, describes the component as "transmission conductors." The corresponding Table 3.6.2, item 3.6.1-20 lists the component as "transmission connectors."

Issue

- The staff noted a discrepancy between LRA table 3.6.1 and table 3.6.2 in describing the material for switchyard bus and connections for line item 3.6.1-6. Table 3.6.2 of the LRA is inconsistent with table 3.6.1 in that it has omitted copper, bronze, stainless steel, and galvanized steel in the list of materials that make up this component. It is not clear whether this discrepancy is based on a plant-specific evaluation which has determined a lack of such material for switchyard bus and connections at RBS.

- The staff also noted a discrepancy in the applicant's LRA Table 3.6.2, Item 3.6.1-20 that lists the component as "transmission connectors." This item corresponds to the associated Table 3.6.1, item 3.6.1-20, which describes the component as "transmission conductors."

Request

1. Clarify the discrepancy between LRA table 3.6.1 items 3.6.1-6 with the corresponding table 3.6.2 components that omitted copper, bronze, stainless steel, and galvanized steel in the list of material that make up this component.

2. Justify the discrepancy or revise LRA Table 3.6.2, items 3.6.1-20, "Component Type" column to reflect the appropriate description as "Transmission conductors," consistent with Table 3.6.1, item 3.6.1-20.

RAI 4.7.1-1 (TRP 120.1 Erosion of Main Steam Line Flow Restrictors)

Background
During the audit, the staff noted that General Electric Hitachi (GEH) performed an analysis (GEH Proprietary Report 003N4606, as incorporated in RBS Specific Report RBS-ME-16-00008, Rev. 0) for the erosion rate of the main steam line flow restrictors to evaluate the associated Time-Limited Aging Analysis (TLAA) discussed in the LRA Section 4.7.1. The TLAA has been evaluated in accordance with 10 CFR 54.21(c)(ii).

LRA Sections 4.7.1 and the USAR supplement for the TLAA in LRA Section A.2.5.1 state that:

> "Entergy evaluated the erosion rate for the main steam flow restrictors. The evaluation considered the specific material for the flow restrictors and determined the expected erosion rate. The evaluation determined the expected erosion rate would be much less than the conservative value in the USAR. Using the lower expected corrosion rate, the increase in flow restrictor diameter after 60 years would result in a choked flow increase of less than the 5 percent value identified as acceptable in USAR Section 5.4.4.4."

SRP-LR Section 4.7.3.1.2, states that an applicant may revise the TLAA by recognizing and reevaluating any overly conservative conditions and assumptions. This section also states that the applicant shall provide a sufficient description of the analysis and document the results of the reanalysis to show that it is satisfactory for the 60 year period.

SRP-LR Section 4.7.2.2, which contains the FSAR supplement acceptance criteria for plant-specific TLAAs, states, "the specific criterion for meeting 10 CFR 54.21(d) is: The summary description of the evaluation of TLAAs for the period of extended operation in the FSAR supplement is appropriate such that later changes can be controlled by 10 CFR 50.59. The description contains information associated with the TLAAs regarding the basis for determining that the applicant has made the demonstration required by 10 CFR 54.21(c)(1)."

Issue
LRA Sections 4.7.1 and A.2.5.1 do not appear to include sufficient information or analysis details to demonstrate the applicant's basis for dispositioning the TLAA in accordance with 10 CFR 54.21(c)(1)(ii) other than providing the 5 percent acceptance criterion for flow increase used in the analysis. Such details are necessary to satisfy SRP-LR Section 4.7.3.1.2, SRP-LR Section 4.7.2.2, and 10 CFR 54.21(d).

Request

Clarify which assumptions and conservatisms have changed in the new GEH main steam line flow restrictor wear and flow analysis and describe how those assumptions or conservatisms have changed from the prior wear and flow analysis used in the CLB to assess the flow restrictors. As part of this clarification, provide the wear-dependent flow rate used in the new analysis and the calculated percent increase in steam flow value for the restrictors, as projected to the end of the period of extended operation. Amend the USAR Supplement in LRA Section A.2.5.1 to include this type of information, as necessary. Alternatively, submit the referenced GEH report, along with an appropriate proprietary affidavit for withholding information pursuant

to 10 CFR 2.390, and amend the USAR Supplement section to reference the applicable GEH report for the TLAA, as necessary.

RAI B.1.1-1 (TRP 30 Aboveground Metallic Tanks)

Background

LRA Section B.1.1 states the following in regard to preventive actions for managing aging effects associated with the condensate storage tank (CST).

> Preventive measures to mitigate corrosion were applied during construction, such as using the appropriate materials and use of a protective multi-layer vapor barrier beneath the tank. The inner volume of the concrete ring foundation is filled with clean dry sand, which is sloped downward from the tank center to the tank exterior. The protective multi-layer vapor barrier beneath the tank serves as a seal at the concrete-to-tank interface.

GALL Report AMP XI.M29, “Aboveground Metallic Tanks,” as modified by LR-ISG-2012-02, "Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion Under Insulation,” (hereinafter referred to as AMP XI.M29) recommends:

- That caulking or sealant be installed at the tank-to-concrete foundation interface.
- Periodic visual inspections at each outage to confirm that the caulking or sealant is intact.
- Periodic volumetric thickness examination of the bottom of the tank each 10-year period commencing 10 years prior to the end of the period of extended operation.

Issue

Although LRA Section B.1.1 states that the sand under the tank is dry, the sand could have become wetted due to moisture absorption from ground water penetrating through the vapor barrier or moisture intrusion from the tank-to-concrete foundation interface. In addition, based on a review of the CST construction drawing, the staff noted that there is an internal lip on the inside ring of the CST foundation. As a result, if water were to penetrate at either location, water could accumulate through the thickness of sand. Information Notice 86-99, Supplement 1, “Degradation of Steel Containments,” addresses loss of material from carbon steel drywells in contact with a sand bed.

During the audits the staff:

- Noted that there is no caulking installed at the tank-to-concrete foundation interface.
- Did not identify any plant-specific procedures requiring an inspection of the multi-layer vapor barrier at the interface between the CST tank sides and concrete foundation.
- Conducted a walkdown of the CST and noted that: (a) the vapor barrier installed between the tank bottom and concrete/sand bed extended in general 4 inches beyond the side of the tank; (b) the upper layer of the vapor barrier is severely weathered with fibers showing; (c) there is evidence of delamination between layers of the vapor barrier;

and (d) approximately 40 percent of the perimeter of the tank is adjacent to a curb that could allow water to accumulate above the height of the vapor barrier.

As a result of the potential for water to accumulate in the sand under the tank, lack of caulking at the tank-to-concrete interface, and the degraded condition of the edges of the vapor barrier, the staff has determined that loss of material due to pitting and crevice corrosion could be occurring on the tank bottom. AMP XI.M29 does not include any recommendations for the quantity of data points or location of the bottom thickness measurements. However, given that the preventive action recommendations of AMP XI.M29 are not met, the staff requires this information to complete its evaluation of the effectiveness of the Aboveground Metallic Tanks program.

It should be noted that the low-frequency electromagnetic testing (LFET) technique can be capable of scanning the entire bottom of the tank in order to detect discrete locations where augmented bottom thickness measurements should be conducted. The staff's evaluation of the use of this technique for stainless steel tanks is documented in NUREG-2172, "Safety Evaluation Report Related to the License Renewal of Calloway Plant, Unit 1," Section 3.0.3.2.8.

The staff cannot complete its review of the Aboveground Metallic Tanks program without reviewing the changes to LRA Section B.1.1 necessary to address potential loss of material on the bottom external surfaces of the CST.

Request

1. State the periodicity, method, and extent of the inspections of the multi-layer vapor barrier interface between the CST tank sides and concrete foundation.
2. State the quantity and location of data points for the periodic bottom thickness measurements. In addition, state the basis for why the quantity and location of data points will be sufficient to detect loss of material due to pitting or crevice corrosion.
3. If the LFET technique will be used, state the criteria for followup discrete tank thickness measurements.
4. If other scanning techniques will be used, state the basis for the effectiveness of these techniques in detecting loss of material due to pitting or crevice corrosion and the criteria for followup discrete tank thickness measurements.

RAI B.1.1-2 (TRP 30 Aboveground Metallic Tanks)

Background

LRA Section A.1.1 does not state that periodic visual inspections will be conducted to monitor the condition of the sealant (i.e., in this case, the vapor barrier interface between the CST tank sides and concrete foundation) installed at the CST tank-to-concrete foundation interface.

10 CFR 54.21 (d) states, "[t]he FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging…"

GALL Report AMP XI.M29, as modified by LR-ISG-2012-02, Table 3.0-1, "FSAR Supplement for Aging Management of Applicable Systems," states that periodic visual inspections should be conducted to monitor the condition of the sealant (i.e., in this case, the vapor barrier interface between the CST tank sides and concrete foundation) installed at the CST tank-to-concrete foundation interface.

Issue

The licensing basis for this program for the period of extended operation will not be consistent with staff-issued guidance documents if the USAR supplement does not include these inspections.

In addition, due to the potential for water to accumulate in the sand under the tank, lack of caulking at the tank-to-concrete interface, and the degraded condition of the edges of the vapor barrier, the staff has determined that the level of detail in the USAR supplement associated with ultrasonic thickness measurements of the CST tank bottom is not sufficient. As discussed in RAI B.1.1-1, additional detail on the quantity of data points and location of the bottom thickness measurements should be included in the USAR supplement for the Aboveground Metallic Tanks program.

The staff cannot complete its review of the Aboveground Metallic Tanks program USAR Supplement without reviewing the changes to LRA Section A.1.1 necessary to address inspections of the vapor barrier and additional detail associated with bottom thickness measurements of the CST.

Request

State the basis for why LRA Section A.1.1 does not cite the periodic visual inspections of the vapor barrier at the CST tank to concrete foundation interface. Alternatively, what changes will be incorporated into LRA Section A.1.1 to include these requirements?

What changes will be incorporated into the USAR supplement associated with the quantity of data points and location of the bottom thickness measurements? If a scanning technique will be used, include the criteria for followup discrete tank thickness measurements.

RAI B.1.10-3 (TRP 9 BWR Vessel Internals)

Background

The applicant provides its response to specific applicant action items (AAIs) on specific EPRI BWRVIP reports in Appendix C of the LRA. The “scope of program” element and program evaluation report for the AMP identify that the applicant is using the inspection and evaluation guidelines in EPRI Technical Report (TR) BWRVIP-139-A as the basis for inspecting components in the plant’s steam dryer assembly. The staff issued its basis for using the guidelines in BWRVIP-139-A, and Appendix B of the report, to manage aging in BWR steam dryer assembly components in a staff-issued safety evaluation dated November 8, 2016 (ML16180A462). The staff’s safety evaluation includes three AAIs that would need to be responded to in order to justify use of TR BWRVIP-139-A for aging management of the steam dryer assemblies during the period of extended operation.

Issue

The applicant has not included any responses to the AAIs for the TR BWRVIP-139-A methodology in Appendix C of the LRA.

Request

Provide responses to the AAIs or justify why Appendix C of the LRA does not include any responses to the AAIs that apply to EPRI Report BWRVIP-139-A and Appendix B of the report.

RAI B.1.11-2a (a follow-up RAI to RAI B.1.11-2, TRP 12 Internal Coatings)

Background

The response to RAI B.1.11-2 states:

> During the preparation of this RAI response, it was noted that further review of lined components not otherwise within the scope of license renewal is necessary to determine whether internal lining failure debris could be transported into and adversely affect safety-related systems or components. This condition has been entered into the RBS corrective action program. LRA changes, if any, resulting from review of this condition will be provided no later than March 1, 2018.

Issue

The staff cannot complete its review of the Coating Integrity program until the full scope of components associated with the Coating Integrity program are known.

Request

State whether managing loss of coating integrity or loss of material has been identified for any additional internally coated components.

If additional components have been identified, what changes will be incorporated into the LRA (e.g., Table 2s, LRA Section B.1.11, LRA Section A.1.11)?

RAI B.1.20-1 (TRP 28 Fire Water System)

Background

LRA Section B.1.20 states an exception to conducting flow testing in accordance with NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," Section 6.3.1, "Flow Tests." The basis for the exception is that fire hoses are tested every 3 years and main drain tests are conducted on 20 percent of the standpipes and risers every refueling outage.

Issue

The staff lacks sufficient information to conclude that the proposed alternatives to NFPA 25, Section 6.3.1 provide a sufficient basis for the exception. During the audit, the staff reviewed the fire hose test procedure. The acceptance criteria for the test is that after flowing 2 to 3 gallons into a container with the valve partially open, the test personnel verifies that the "flow is free of any blockage." The staff noted that: (a) the valve is only partially opened and as a result, it is possible that insufficient flow velocity would be established to result in fouling products transferring to the bucket; and (b) the results cannot be trended because there is no quantification of the fouling products. The results of flow tests conducted in accordance with NFPA 25, Section 6.3.1 can be trended (i.e., design pressure, flow) and therefore provide advance warning of potential fouling issues. The main drain tests are insufficient as a basis for the exception because AMP XI.M27, "Fire Water System," recommends that both main drain tests and the Section 6.3.1 flow tests be conducted.

The staff cannot complete its review of the Fire Water System program without reviewing the changes to LRA Section B.1.20 necessary to address potential enhancements to the program and changes to the basis for this exception.

Request

State what alternative testing with quantitative (capable of being trended) results will be conducted in lieu of flow testing the hydraulically most remote hose connection at each zone of an automatic standpipe system. What changes will be incorporated into LRA Section B.1.20 to address this testing?

RAI B.1.20-2 (TRP 28 Fire Water System)

Background

LRA Section B.1.20, Enhancement No. 2 lists several deluge sprinkler systems for which the inspection procedures will be revised to conduct an internal visual inspection.

LRA Section B.1.20, Enhancement No. 17 lists several pressure-reducing valves for which the inspection procedures will be revised to inspect, test, and maintain the valves in accordance with NFPA 25 Section 6.3.1.4.

Issue

During the audit, the staff confirmed that all of the deluge sprinkler systems listed in Enhancement No. 2 are addressed in the plant-specific nozzle inspection procedure. However, this procedure also includes several other deluge sprinkler systems that are not included in the enhancement; for example, systems protecting components in the turbine, auxiliary control, and fire protection buildings. LRA Section 2.4.3 states that these buildings provide physical support, shelter, and protection for SSCs that have intended functions consistent with 10 CFR 54.4. The staff lacks sufficient information to conclude that the deluge sprinkler systems listed in Enhancement No. 2 include all those with intended functions within the scope of 10 CFR 54.4.

The staff lacks sufficient information to confirm that the pressure-reducing valves listed in Enhancement No. 17 include all those with intended functions within the scope of 10 CFR 54.4.

Request

For the deluge sprinkler system:

1. State whether the list of deluge sprinkler systems cited in Enhancement No. 2 includes all deluge sprinkler systems with intended functions within the scope of 10 CFR 54.4.
2. If there are additional deluge sprinkler systems with intended functions within the scope of 10 CFR 54.4, what changes will be incorporated into Enhancement No. 2?
3. If there are additional deluge sprinkler systems with intended functions within the scope of 10 CFR 54.4 and they will not be included within the scope of Enhancement No. 2, state how loss of material and flow blockage will be managed for these deluge sprinkler systems.

For the pressure reducing valves:

4. State whether the list of pressure-reducing valves cited in Enhancement No. 17 includes all the pressure-reducing valves with intended functions within the scope of 10 CFR 54.4.

5. If there are additional pressure-reducing valves within the scope of 10 CFR 54.4, what changes will be incorporated into Enhancement No. 17?
6. If there are additional pressure-reducing valves with intended functions within the scope of 10 CFR 54.4 and they will not be included within the scope of Enhancement No. 17, state how flow blockage will be managed for these pressure-reducing valves.

RAI B.1.20-3 (TRP 28 Fire Water System)

Background

LRA Section B.1.20, Enhancement No. 13 states that the fire water system procedures will be revised to verify that fire hydrant barrels drain within 60 minutes after flushing or flow testing.

GALL Report AMP XI.M27, as modified by LR-ISG-2012-02, recommends that NFPA 25 Section 7.3.2, "Hydrants," be met. NFPA Section 7.3.2 states that each hydrant shall be opened fully and water flowed until foreign material has cleared and that flow is maintained for at least one minute.

Issue

An exception to meeting the AMP XI.M27, as modified by LR-ISG-2012-02, recommendations in regard to NFPA 7.3.2 was not stated. As a result, the staff lacks sufficient information to complete its evaluation of the consistency of fire hydrant testing to AMP XI.M27, as modified by LR-ISG-2012-02.

The staff cannot complete its review of the Fire Water System program without reviewing the changes to LRA Section B.1.20 Enhancement No. 13.

Request

State the basis for not meeting the recommendation to ensure that each hydrant has been opened fully and water flowed until foreign material has cleared and that flow is maintained for at least one minute. Alternatively, what changes will be incorporated into the enhancement(s) to the Fire Water System program to include these recommendations?

RAI B.1.20-4 (TRP 28 Fire Water System)

Background

LRA Section B.1.20, Enhancement Nos. 6, 15, and 16 state that: (a) internal Fire Water Storage Tank (FWST) inspections will be conducted in accordance with NFPA 25 Sections 9.2.6 and 9.2.7; and (b) ultrasonic thickness measurements of the FWSTs will be conducted when there is evidence of pitting or corrosion.

AMP XI.M27, as modified by LR-ISG-2012-02, states regardless of conditions observed on the internal surfaces of the tank, bottom-thickness measurements should be taken on each tank during the first 10-year period of the period of extended operation.

During the staff's review of plant-specific documents the staff noted that there is an internal lip on the inside ring of the FWST foundation where water could accumulate through the thickness of sand.

During the walkdown of the FWSTs the staff noted that: (a) there is an approximately 3/8-inch thick layer of grout installed at the tank to concrete interface; (b) the grout is missing in some locations; (c) at one location where the grout is missing, a fibrous material was detected

approximately ½-inch inside the tank bottom ring; and (d) there is no caulking or sealant applied at the tank-to-concrete interface.

Issue

Neither Enhancement Nos. 6, 15, nor 16 are consistent with AMP XI.M27, as modified by LR-ISG-2012-02, in that wall thickness measurements will only occur if there is evidence of corrosion.

As a result of the potential for water to accumulate in the sand under the tank, the degraded condition of the grout, and lack of caulking or sealant at the tank-to-concrete interface, the staff has determined that loss of material due to general, pitting and crevice corrosion could be occurring on the tank bottom. AMP XI.M27 does not include any recommendations for the quantity of data points or location of the bottom thickness measurements. However, given the potential for loss of material on the external surfaces of the bottom of the tank, the staff requires this information to complete its evaluation of the effectiveness of the Fire Water System program.

GALL Report AMP XI.M27, as modified by LR-ISG-2012-02, Table 4a, "Fire Water System Inspection and Testing Recommendations," recommends a one-time inspection for the FWSTs. The staff recognizes that the one-time inspections might not reveal any loss of material that could challenge the ability of the FWSTs to meet their intended functions throughout the period of extended operation. However, given the potential for loss of material to occur on the bottom external surface of the tanks, the staff needs to review the criteria that would be used to conclude that one-time in lieu of periodic FWST bottom thickness measurements would be conducted.

The staff cannot complete its review of the Fire Water System program without reviewing the changes to LRA Section B.1.20 necessary to address potential enhancements to the program associated with bottom thickness measurements.

Request

1. State the basis for not conducting tank bottom thickness measurements if there is lack of evidence of internal tank corrosion. Alternatively, what enhancements to the Fire Water System program associated with tank bottom thickness measurements being conducted regardless of the lack of evidence of internal tank corrosion will be incorporated into the program?
2. State: (a) the quantity and location of data points for the bottom thickness measurements; and (b) associated enhancement changes. In addition, state the basis for why the quantity and location of data points will be sufficient to detect loss of material due to general, pitting, or crevice corrosion.
3. State what acceptance criteria will be used to conclude that a one-time bottom thickness measurement of each FWST is adequate in lieu of periodic inspections? In addition, what changes will be incorporated in the associated enhancements?

RAI B.1.20-5 (TRP 28 Fire Water System)

Background

LRA Section B.1.20, Enhancement No. 19 states an acceptance criterion that, "[c]oating meets the plant-specific design requirements for the coating/lining and substrate for the fire water tanks."

GALL Report AMP XI.M42 states that, "[a]dhesion testing results, when conducted, meet or exceed the degree of adhesion recommended in plant-specific design requirements specific to the coating/lining and substrate."

Issue

It is not clear to the staff that the acceptance criterion in Enhancement No. 19 is applicable to adhesion testing. It is possible that the acceptance criterion could be interpreted to only apply to coating characteristics such as material type and dry film thickness.

The staff cannot complete its review of the Fire Water System program without reviewing the changes to Enhancement No. 19.

Request

Clarify the intent of the above cited acceptance criterion and what changes will be incorporated into Enhancement No. 19.

RAI B.1.20-6 (TRP 28 Fire Water System)

Background

During the audit, the staff reviewed the Fire Water Storage Tank (FWST) internal inspection results from 2011, which stated that no significant degradation was noted and the internal protective coating is in good condition. Internal inspections in 2016 revealed significant coating blistering on the tank bottom. Condition reports were appropriately initiated for the inspection results.

The "acceptance criteria" program element of AMP XI.M42 states, "[b]listers should be limited to a few intact small blisters that are completely surrounded by sound coating/lining bonded to the substrate. Blister size and frequency should not be increasing between inspections…"

The "detection of aging effects" program element of AMP XI.M42 states that, "[b]aseline coating/lining inspections occur in the 10-year period prior to the period of extended operation."

The "corrective actions" program element of AMP XI.M42 states that, "[c]oatings/linings that do not meet acceptance criteria are repaired, replaced, or removed."

Issue

Based on the staff's review of pictures attached to the inspection results for the 2016 internal visual inspection of the FWSTs, the coatings do not meet the acceptance criterion (for entry into the period of extended operation) that blisters are limited to a few intact small blisters. The 2016 inspections could satisfy the AMP XI.M42 recommendation to conduct a baseline inspection 10 years prior to the period of extended operation. As a result, the staff lacks sufficient information to conclude that the corrective actions associated with the 2016 inspection results or any other inspections conducted prior to the period of extended operation will be consistent with the "corrective actions" program element of AMP XI.M42. Lacking consistency with the "corrective actions" program element or a cited exception to the recommendations accompanied by an adequate basis, the staff lacks a basis to establish reasonable assurance that the FWSTs will meet their intended function during the period of extended operation.

During the audit, it was stated that the reason the blistering was not detected during the 2011 inspections was that the tank was not completely drained. During the staff's review of the internal inspection procedures for the FWST, it was noted that there is not a step requiring complete draining of the tank. The staff lacks sufficient information to conclude that the FWST internal inspections will be adequate unless the tank is completely drained.

Request

1. State the corrective actions that will be taken for the internal coating blistering in the FWSTs based on the 2016 inspection results or any other inspections conducted prior to the period of extended operation.
2. State that basis for why the inspections will be adequate if the tanks are not completely drained or state the changes to the Fire Water System program to require complete draining of the FWST tanks during the conduct of internal inspections.