

**REQUEST FOR ADDITIONAL INFORMATION**  
**BY THE OFFICE OF NUCLEAR REACTOR REGULATION**  
COMANCHE PEAK UNITS 1 & 2 LICENSE RENEWAL APPLICATION REVIEW  
VISTRA OPERATIONS COMPANY LLC  
COMANCHE PEAK, UNITS 1, 2  
DOCKET NO. 05000445, 05000446  
ISSUE DATE: 6/29/2023

**Set 2**

**RAI B.2.3.16-1**

**Regulatory Basis:**

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

**Background:**

License Renewal Application (LRA) Supplement 1 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23096A302) added the following aging management review (AMR) items associated with the diesel engine fire pump heat exchangers to LRA Table 3.3.2-7:

- Loss of material of copper alloy tubes exposed internally to treated water (AMR Item 3.4-1, 016)
- Reduction of heat transfer of copper alloy tubes exposed internally to treated water (AMR Item 3.4-1, 018)
- Loss of material of carbon steel tubesheet exposed internally to treated water (AMR Item 3.4-1, 015)
- Loss of material of carbon steel channel head exposed internally to treated water (AMR Item 3.4-1, 015)

Each of the above AMR items cite generic note E (consistent material, environment, and aging effect, but different aging management program (AMP) credited) and plant-specific note 2. Plant-specific note 2 states, "The Fire Water System (B.2.3.16) AMP is substituted for the Water Chemistry (B.2.3.2) AMP and One-Time Inspection (B.2.3.19) AMP."

**Issue:**

Revision 2 of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report" (ML103490041), and Revision 2 of NUREG-1800, "Standard Review Plan for Review of License Renewal [SRP-LR] Applications for Nuclear Power Plants" (ML103490036), do not include AMR items for heat exchanger components (e.g., heat exchanger tubes) that credit the Fire Water System AMP as the program to manage the effects of aging.

LRA Supplement 1 and LRA Supplement 2 (ML23114A377) did not make changes to the “Discussion” column of AMR Items 3.4-1, 015, 016 (only refers to copper alloy piping components in the Fire Protection System), and 018 in LRA Table 3.4-1 to indicate that these AMR items are used to manage diesel engine fire pump heat exchanger components.

LRA Supplements 1 and 2 did not make changes (e.g., enhancements) to Section A.2.2.16 in LRA Appendix A or Section B.2.3.16 in LRA Appendix B related to the Fire Water System AMP managing loss of material and reduction of heat transfer of the copper alloy heat exchanger tubes, and managing loss of material of the carbon steel heat exchanger tubesheet and channel head. Specifically, neither the LRA nor Revision 2 of LUM00020-REPT-053, “Fire Water System Aging Management Program Basis Document,” describe how the Fire Water System AMP will manage these aging effects for the diesel engine fire pump heat exchanger components.

The staff notes that one subsequent license renewal applicant stated that inspection of the heat exchanger tube bundle for degradation is not practical due to the small tube diameter (ML21091A187).

Request:

Please provide information discussing how the Fire Water System AMP will manage loss of material and reduction of heat transfer of the copper alloy heat exchanger tubes and managing loss of material of the carbon steel heat exchanger tubesheet and channel head. At a minimum, the discussion should include whether inspections of the heat exchanger tubes are practical, what inspections will be performed (i.e., scope, frequency, acceptance criteria, corrective actions), and whether the program will be enhanced to include these inspections in an existing or new procedure.

**RAI B.2.3.16-2**

Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

Background:

The Preventative Actions program element for GALL Report AMP XI.M29, “Aboveground Metallic Tanks,” in Appendix M of License Renewal (LR) Interim Staff Guidance (ISG), LR-ISG-2012-02, “Aging Management of Internal Surfaces, Fire Water Systems, Atmospheric Storage Tanks, and Corrosion under Insulation” (ML13227A361), states, in part, “For outdoor tanks... sealant or caulking is applied at the external interface between the tank and concrete or earthen foundation to mitigate corrosion of the bottom surface of the tank by minimizing the amount of

water and moisture penetrating the interface, which could lead to corrosion of the bottom surface.”

LRA Supplement 1 (ML23096A302) revised Table A-3 in LRA Appendix A and Section B.2.3.16 in LRA Appendix B to add the following enhancement: “Caulking or sealant shall be installed at the interface between the steel FWSTs and the respective concrete foundation ring. The caulking/sealant will be visually inspected on a refueling outage interval with acceptance criteria of no drying, cracking, or missing caulking/sealant. Flaws in the caulking/sealant are repaired/replaced.”

The Description of the Program for GALL Report AMP XI.M29 in Table 3.0-1 of Appendix J in LR-ISG-2012-02 states, "External visual examinations are sufficient to monitor degradation of the protective paint, coating, and caulking, or sealant (when supplemented with physical manipulation), or uncoated surfaces." However, the enhancement added in LRA Supplement 1 did not discuss whether the visual examinations would be supplemented with physical manipulation.

The Acceptance Criteria program element for GALL Report AMP XI.M29 in Appendix M of LR-ISG-2012-02 state, “Drying, cracking, or missing sealant and caulking are unacceptable and need to be evaluated using the corrective action program. The evaluation will determine the need to repair the sealant and caulking.” However, the enhancement added in LRA Supplement 1 did not discuss unacceptable sealant or caulking inspections being evaluated using the corrective action program. In addition, because flaws in sealant and caulking can allow intrusion of moisture and potential degradation, the staff notes that the Technical Bases for Changes column in Table 2-29 of NUREG-2221, "Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192" (ML17362A126), states, in part, "...the corrective action should include a determination for the need for examinations [of the tank's surface]..." which would be applicable for the initial period of extended operation if sealant or caulking were found to have flaws.

Issue:

LRA Supplement 1 did not discuss whether the condition of the FWST bottoms would be assessed prior to installing caulking or sealant at the interface between the steel FWSTs and the respective concrete foundation ring. The staff notes that the current absence of caulking or sealant may have allowed water and moisture to penetrate the interface, which could lead to corrosion of the bottom surface.

LRA Supplement 1 did not discuss whether the visual examinations of the caulking or sealant would be supplemented with physical manipulation as noted in Appendix J of LR-ISG-2012-02.

Also, LRA Supplement 1 did not discuss unacceptable sealant or caulking inspections being evaluated using the corrective action program as noted in Appendix M of LR-ISG-2012-02, including whether the evaluation would include a determination for the need for examinations of the tank's surface.

Request:

Please address the following:

1. Will the condition of the FWST bottoms be assessed prior to installing caulking or sealant? If so, how will the FWST bottoms be assessed? If corrosion of the FWST bottoms is detected, how may the FWST inspections change for the period of extended operation (e.g., more frequent FWST bottom wall thickness measurements)?

2. Was physical manipulation of the sealant or caulking considered as a supplement to the visual inspections?
3. If degraded sealant or caulking is detected, will they be evaluated using the corrective action program, including a determination for the need for examinations of the tank's surface?

### **RAI B.2.3.16-3**

#### Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

#### Background:

License Renewal (LR) Interim Staff Guidance (ISG), LR-ISG-2013-01, "Aging Management of Loss of Coating or Linting Integrity for Internal Coatings/Linings on In-Scope Piping, Piping Components, Heat Exchangers, and Tanks" (ML14225A059), added AMP XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks." In Appendix C of LR-ISG-2013-01, the Scope of Program element for AMP XI.M42 states,

The aging effects associated with fire water tank internal coatings/linings are managed by GALL Report AMP XI.M27, "Fire Water System," instead of this AMP. However, where the fire water storage tank internals are coated, the Fire Water System Program and FSAR [Final Safety Analysis Report] Summary Description of the Program should be enhanced to include the recommendations associated with training and qualification of personnel and the "corrective actions" program element.

The Corrective Actions program element in Appendix C of LR-ISG-2013-01 includes the corrective actions that the Fire Water System AMP should be enhanced to include.

Table A-3 in LRA Appendix A and Section B.2.3.16 of LRA Appendix B include an enhancement to the Fire Water System AMP to include recommendations from AMP XI.M42 related to corrective actions.

The last sentence in the sixth paragraph under Program Description in Section B.2.3.16 of LRA Appendix B states, "In the event the fire water tank fails to meet the acceptance criteria for coating or the tank (e.g., peeling, delamination, blistering, flaking, cracking, or rust), the program requires corrective actions consistent with LR-ISG-2013-01 Appendix C Element 7."

Issue:

The FSAR summary description of the Fire Water System program in LRA Appendix A, Section A.2.2.16 does not include the recommendations associated with the Corrective Actions program element in AMP XI.M42, as provided in LR-ISG-2013-01.

During the Fire Water System program audit, it was noted that the corrective action statement was omitted from Section A.2.2.16 in LRA Appendix A because it is an enhancement in Table A-3 in LRA Appendix A.

The staff notes that this appears to be a different approach than that taken for the recommendations associated with training and qualification of personnel. Consistent with LR-ISG-2013-01, the applicant included the recommendations associated with training and qualification of personnel in both Section A.2.2.16 in LRA Appendix A and Section B.2.3.16 of LRA Appendix B, even though there is an enhancement. As previously noted, the applicant included the recommendations associated with corrective actions in Section B.2.3.16 of LRA Appendix B, even though there is an enhancement.

The staff notes that guidance in SRP-LR for FSAR Supplements (e.g., 3.3.2.5) states that the program description should be sufficiently comprehensive (i.e., contain future aging management activities, including enhancements and commitments), such that later changes can be controlled by 10 CFR 50.59. The staff also notes that including the information in the FSAR summary description now, will ensure the information is not inadvertently omitted if the commitments in LRA Appendix A, Table A-3 are deleted once the enhancements are implemented.

Request:

If the FSAR summary description of the Fire Water System program (Section A.2.2.16 in LRA Appendix A) will not include the corrective action information, as prescribed in LR-ISG-2013-01, please provide information regarding the constraints to ensure that later changes to the program, associated with enhancements contained in LRA Appendix A, Table A-3, can be controlled by 10 CFR 50.59.

**RAI B.2.3.16-4**

Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

Background:

Table 4a, "Fire Water System Inspection and Testing Recommendations," in Appendix D of LR-ISG-2012-02, recommends that operational testing of water spray fixed systems follow Section 10.3.4.3, "Discharge Patterns," of National Fire Protection Association (NFPA) 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems." Section 10.3.4.3 of NFPA 25 requires (1) the water discharge patterns from open spray nozzles be observed, (2) testing with air if water cannot be discharged on protected property, and (3) cleaning and retesting of nozzles if obstructions occur.

Section B.2.3.16 in LRA Appendix B includes an exception related to deluge systems that cannot be tested with water and have no provisions to be tested with air. For Section 10.3.4.3 of NFPA 25, the "Fire Water System Inspections and Tests" table in Section B.2.3.16 in LRA Appendix B that provides additional detail on the enhancements states that no enhancements are required and "Due to the nature of the protected property such that water cannot be discharged, in addition to the inspections above, nozzles are tested with air to ensure the nozzles are not obstructed." This appears to indicate that all the operational tests performed in accordance with Section 10.3.4.3 of NFPA 25 are performed with air.

Issue:

The staff noted that Revision 1 of LUM00020-REPT-053, "Fire Water System Aging Management Program Basis Document," states "water cannot be discharged through some spray nozzles" when referring to the operational tests. This appears to indicate that water may be discharged through some spray nozzles. Therefore, it is unclear whether there are operational tests performed in accordance with Section 10.3.4.3 of NFPA 25 that are performed with water.

GALL Report AMP XI.M27 in Appendix L of LR-ISG-2012-02 states, "Results of flow testing (e.g., buried and underground piping, fire mains, sprinkler) are monitored and trended." However, during the audit of the Fire Water System AMP, the applicant stated that sprinkler system inspections are not trended because there are no applicable items to trend.

Request:

Please provide information discussing whether some operational tests performed in accordance with Section 10.3.4.3 of NFPA 25 are performed with water. If so, please provide information discussing whether items such as pressure, discharge time, deposits, etc. could be monitored and trended to provide timely indication of changes in the system that could impact its ability to perform its intended function.

**RAI 3.2.2.2.3.2-1**

Regulatory Basis:

10 CFR 54.21(a)(3) 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 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 10 CFR 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. In order to complete its review and enable making a

finding under 10 CFR 54.29(a), the staff requires additional information about the matter described in the request for additional information.

Background:

The following Table 1 items address loss of material (LOM) by pitting and crevice corrosion, or stress corrosion cracking (SCC), for stainless steel exposed to outdoor air in Engineered Safety Features, Auxiliary, and Steam and Power Conversion Systems:

3.2-1, 004 3.3-1, 004 3.4-1, 002  
3.2-1, 007 3.3-1, 006 3.4-1, 003

License Renewal Application (LRA) further evaluation Sections 3.2.2.2.3.2, 3.3.2.2.5, and 3.4.2.2.3 identify select instances for which LOM due to pitting and crevice corrosion are considered possible and managed for the Table 1 items listed above using the External Surfaces Monitoring of Mechanical Components Aging Management Program. These instances are for areas of the Condensate Storage Tank, Reactor Makeup Water Storage Tank, and Refueling Water Storage Tank. The discussions for these instances note that contaminants in outdoor air could collect on these component surfaces. Other than for these select instances, however, these Table 1 items are identified as aging effects not requiring management. This is based on location criteria for judging the amount of halide likely to be present, along with having no expectation of the halide amount increasing. Three aging management review items associated with item 3.4-1, 003 cite generic note I (aging effect not applicable). The items addressing SCC (3.2-1, 007; 3.3-1, 004; 3.4-1, 002) are all identified as not applicable.

Issue:

Guidance for initial license renewal (LR), such as NUREG-1800 (Reference 1), allows an applicant to conclude that managing LOM or SCC is not applicable based on the component's proximity to outdoor air with the potential for halogens to be present (e.g., distance from a saltwater coastline or highway treated with salt). However, this was changed in more recent guidance for subsequent license renewal (SLR), which can be considered as relevant operating experience during the first period of extended operation, rather than specific to a subsequent period of extended operation. As described in supplemental guidance for SLR (Reference 2), the staff concluded that the LR screening may not account for all relevant factors. The staff therefore concluded that the most accurate and practical method for determining the susceptibility to LOM and SCC of these materials to the plant-specific environments is to review the available plant-specific operating experience and perform a one-time inspection. In addition to the changes to guidance for stainless steel, the staff explained in NUREG-2221 (Reference 3) that LOM due to pitting and crevice corrosion should also be managed for nickel alloys exposed to air.

Given these changes to the guidance, the staff seeks further clarification on the basis for excluding LOM due to pitting corrosion, crevice corrosion, and SCC as aging effects requiring management at Comanche Peak for stainless steel components exposed to outdoor air. The staff also seeks clarification on whether there are nickel alloy components exposed to outdoor air in Engineered Safety Features Systems, Auxiliary Systems, or Steam and Power Conversion Systems that would be susceptible to LOM based on the further evaluation applied to stainless steel.

Request:

1. With respect to LRA Sections 3.2.2.2.3.2, 3.3.2.2.5, and 3.4.2.2.3, please state the basis for concluding that LOM due to pitting and crevice corrosion for stainless steel in outdoor air is

not an applicable aging effect requiring management, other than for the instances identified in the LRA, considering the changes in the staff guidance under SLR for these reviews. Alternatively, if appropriate, revise the LRA to reflect that that LOM due to pitting and crevice corrosion will be managed for additional components.

2. With respect to LRA Sections 3.2.2.2.6, 3.3.2.2.3, and 3.4.2.2.2, please state the basis for not treating SCC of stainless steel in outdoor air as an applicable aging effect in cases for which LOM due to pitting or crevice corrosion is applicable. Alternatively, if appropriate, revise the LRA to include SCC as an applicable aging effect for these components.
3. Please discuss whether aging management for LOM due to pitting and crevice corrosion for nickel alloy components exposed to outdoor air is applicable considering the guidance for stainless steel in LRA Sections 3.2.2.2.3.2, 3.3.2.2.5, and 3.4.2.2.3 and the changes to this guidance for SLR. If appropriate, revise the LRA to reflect that this aging effect will be managed for nickel alloys.

#### References:

1. NUREG-1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," December 2010, ML103490036. (Section 3.2.2.2.3.2, for example)
2. "GALL-SLR and SRP-SLR Supplemental Staff Guidance," March 2016, ML16041A090, Item C.
3. NUREG-2221, "Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192," December 2017, ML17362A126. (Page 2-190, for example)

#### **RAI B.2.3.15-1**

#### Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

#### Background:

Section 4.1.2 in Revision 1 of LUM00020-REPT-070, "Comanche Peak Nuclear Power Plant Units 1 and 2 License Renewal Masonry Walls Aging Management Program [AMP] Basis Document," states, "Masonry walls that perform a fire barrier intended function are also managed by the Fire Protection Program [Ref. 9.3], consistent with the operating experience reflected in subsequent license renewal guidance NUREG-2191 [Ref. 9.23] Item VII.G.A-626."

Aging Management Review (AMR) item VII.G.A-626, 3.3-1, 179 in Volume 1 of NUREG-2191, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report" (ADAMS Accession No. ML17187A031), addresses cracking and loss of material of masonry



walls that are structural fire barrier walls exposed to air managed by both the Fire Protection AMP and the Masonry Walls AMP.

Section B.2.3.33, "Masonry Walls," of Appendix B of the License Renewal Application (LRA) states, "Masonry walls that perform a fire barrier intended function are also managed by the Fire Protection (B.2.3.15) AMP." This statement is consistent with both NUREG-2191 and Revision 2 of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report" (ML103490041).

Issue:

License Renewal Application (LRA) Tables 3.3-1, "Summary of Aging Management Programs for Auxiliary Systems," and 3.5.2-15, "Fire Barrier Commodity Group – Summary of Aging Management Evaluation," do not cite AMR item VII.G.A-626, 3.3-1, 179 for the masonry block "concrete block (removable) for opening," and "wall, floor, and ceiling," commodities.

LRA Table 3.5.2-15 cites AMR item III.A3.T-12, 3.5-1, 070 with plant-specific note 3, which states, "The Masonry Walls (B.2.3.33) AMP and Fire Protection (B.2.3.15) AMP credit and communicate with each other," is cited for the masonry block commodities noted above.

The staff notes that stating two AMPs credit and communicate with each other does not clearly reflect that the commodity is managed by both the AMPs.

During the audit of the Fire Protection AMP, the applicant stated that visual inspections of masonry walls that perform a fire barrier intended function are performed by the Masonry Walls AMP and the Fire Protection AMP. Therefore, the LRA does not appear to accurately reflect the management of masonry walls that perform a fire barrier intended function because the Fire Protection AMP is not cited. In addition, since the Fire Protection AMP is not cited, the LRA does not appear to be consistent with the operating experience reflected in NUREG-2191 (AMR item VII.G.A-626, 3.3-1, 179).

Request:

Given that it appears that the Fire Protection AMP, along with the Masonry Walls AMP, manages masonry block "concrete block (removable) for opening," and "wall, floor, and ceiling," commodities, please provide the basis for not crediting the Fire Protection AMP in the LRA. Alternatively, revise the LRA to also credit the Fire Protection AMP.

**RAI B.2.3.15-2**

Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (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 U.S. Nuclear Regulatory Commission (NRC) 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 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 10 CFR 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. 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 in the requests for additional information.

Background:

Revision 2 of NUREG-1800 includes AMR items for managing reinforced concrete structural fire barriers by both the Fire Protection AMP and the Structures Monitoring AMP (VII.G.A-90, 3.3-1, 060; VII.G.A-92, 3.3-1, 061; and VII.G.A-91, 93, 3.3-1, 062).

LRA Supplement 1 (ML23096A302) revised the following tables to add concrete curbs with intended functions of direct flow and fire barrier.

- Table 2.4-3, “Diesel Generator Building Components Subject to Aging Management Review”
- Table 3.5.2-3, “Diesel Generator Buildings – Summary of Aging Management Evaluation”
- Table 2.4-4, “Electrical and Control Building Components Subject to Aging Management Review”
- Table 3.5.2-4, “Electrical and Control Building – Summary of Aging Management Evaluation”

Tables 3.5.2-3 and 3.5.2-4 cite AMR Items III.A3.TP-25, 3.5-1, 054; III.A3.TP-26, 3.5-1, 066; and III.A3.TP-28, 3.5-1, 067 for the concrete curbs. These AMR items cite only the Structures Monitoring AMP. The associated plant-specific notes 7 (Table 3.5.2-3) and 8 (Table 3.5.2-4) state, “The Structures Monitoring (B.2.3.34) AMP and Fire Protection (B.2.3.15) AMP credit and communicate with each other.”

LRA Supplement 1 revised Tables 2.4-11, “Yard Structure Components Subject to Aging Management Review,” and 3.5.2-11, “Yard Structures – Summary of Aging Management Evaluation,” to add reinforced concrete berm/dike with an intended function of fire barrier. AMR items VII.G.A-92, 3.5-1, 061 and VII.G.A-93, 3.5-1, 062 were cited. Generic note E and plant-specific note 9 were cited, which states, “The Fire Protection (B.2.3.15) AMP alone manages the aging of the berm/dike around the auxiliary boiler fuel oil storage tank. The berm/dike is located outside the protected area and has a conservative fire barrier intended function.” However, LRA Supplement 1 revised the Discussions for AMR items VII.G.A-92, 3.3-1, 061 and VII.G.A-93, 3.3-1, 062 in LRA Table 3.3-1 to indicate that the Fire Protection AMP is used to manage the reinforced concrete berm/dike. Therefore, it appears that LRA Table 3.5.2-11 may have cited the incorrect AMR items for the reinforced concrete berm/dike.

Issue:

Not crediting both the Structures Monitoring AMP and the Fire Protection AMP for the concrete curbs and the reinforced concrete berm/dike is not consistent with the recommendation in Revision 2 of NUREG-1800 (VII.G.A-90, 3.3-1, 060; VII.G.A-92, 3.3-1, 061; and VII.G.A-91, 93, 3.3-1, 062), and it does not appear to be consistent with the applicant’s treatment of concrete and reinforced concrete commodities in LRA Table 3.5.2-15 that credit both the Structures Monitoring AMP and the Fire Protection AMP.

Request:

Please provide the basis for not also crediting the Fire Protection AMP in the LRA for managing the reinforced concrete curbs and for not also crediting the Structures Monitoring AMP in the LRA for managing the reinforced concrete berm/dike. Alternatively, revise the LRA, consistent with the recommendation in Revision 2 of NUREG-1800, to credit both the Fire Protection AMP and the Structures Monitoring AMP for the reinforced concrete curbs and the reinforced concrete berm/dike.

### **RAI 3.5.2.2.1.2-1**

#### Regulatory Basis:

Title 10 of the Code of Federal Regulations Section 54.21(a)(3) requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function will be maintained consistent with the current licensing basis (CLB) for the period of extended operation. As described in the SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL-LR Report when evaluation of the matter in the GALL-LR Report applies to the plant.

#### Background:

LRA Section 3.5.2.2.1.2 states that local area temperatures may be elevated above general area temperatures due to process piping that carry high temperature fluids, and that the Reactor Containment Building (RCB) penetration and reactor coolant piping insulation contributes to keeping the local concrete temperatures of the RCB and Primary Shield Wall (PSW) below 200°F during normal plant operation. As such, this insulation has a license renewal intended function as described in Table 2.4-1 and is subject to AMR as listed in Table 3.5.2-1.

Table 2 item associated with AMR item 3.5-1, 095 (GALL-LR Report item III.B1.1.TP-8) in LRA Table 3.5.2-1 lists a component of thermal insulation (high temperature penetration) with material of stainless steel that does not require aging management.

GALL-LR Report item III.B1.1.TP-8 (AMR item 3.5-1, 095) lists a component (Aluminum, galvanized steel and stainless-steel support members; welds; bolted connections; support anchorage to building structure) exposed to air-indoor uncontrolled environment. This component does not include thermal insulation.

#### Issue:

Thermal insulation (high-temperature penetration) is used to keep the local concrete temperatures of the RCB and PSW below 200°F during normal plant operation. It is unclear how the thermal insulation can use GALL-LR Report item III.B1.1.TP-8, and it is unclear why the thermal insulation does not require aging management.

#### Request:

Evaluate applicability of GALL-LR Report item III.B1.1.TP-8 used for Table 2 item associated with AMR item 3.5-1, 095 in Table 3.5.2-1 and clarify what aging management program is used to adequately manage aging effects for the stainless-steel thermal insulation. Provide justification if aging management of the stainless-steel thermal insulation is not needed.

### **RAI 4.2.1-1**

#### Regulatory Basis:

10 CFR 54.21(c) requires an applicant to evaluate time-limited aging analyses and demonstrate that the analyses remain valid for the period of extended operation, the analyses have been projected to the end of the period of extended operation, or that the effects of aging on the intended function(s) will be adequately managed 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 time-limited aging analyses (TLAAs) that have been identified to require review under 10 CFR 50.21, such that there is reasonable assurance that any changes made to the plant's CLB in order to comply with

this paragraph are in accord with the Act and the Commission's regulations. 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.

Background:

SRP-LR Section 4.2.3.1.1 states that for a disposition in accordance with 10 CFR 54.21(c)(1)(ii), the new or updated reactor pressure vessel (RPV) neutron fluence analysis is evaluated to consider whether the applicant identifies the staff-approved methodology used to determine the neutron fluence, and whether the methodology follows the guidance in NRC RG 1.190.

In Section 4.2.1 of the license renewal application (LRA), the applicant disposes the TLAA by projecting the fluence analyses to the end of the period of extended operation pursuant to 10 CFR 54.21(c)(1)(ii). In Attachment W1 to Supplement 2 to the LRA, the applicant states that fluence projections were performed with a methodology that is consistent with that described in WCAP-18124-NP-A, Revision 0 and WCAP-18124-NP-A, Revision 0, Supplement 1-NP-A, Revision 0.

Issue:

The letter accompanying the NRC staff safety evaluation for WCAP-18124-NP, Revision 0 states that the NRC staff has found that WCAP-18124-NP, Revision 0 "is acceptable for referencing in licensing application provided that the limitations and conditions stipulated in the Section 4.0 and applicability defined in the enclosed NRC final SE are met along with the proper documentation." Item 2 in Section 4.0 of the NRC staff SE states: "Least squares adjustment is acceptable if adjustments to the M/C ratios and to the calculated spectra values are within the assigned uncertainties of the calculated spectra, the dosimetry measured reaction rates, and the dosimetry reaction cross-sections. Should this not be the case, the user should re-examine both measured and calculated values for possible errors. If errors cannot be found, the values causing the inconsistency should be disqualified." However, the LRA does not specify whether least-squares adjustment was used in calculating RPV fluence values.

Request:

Clarify whether least-squares adjustment was applied to RPV neutron fluence values used in reactor vessel neutron embrittlement TLAAs. If so, provide the evaluation performed to determine whether individual values should be disqualified.

**RAI 4.2.1-2**

Regulatory Basis:

10 CFR 54.21(d) requires an applicant to provide an FSAR supplement for the facility that contains a summary description of the evaluation of time-limited aging analyses for the period of extended operation determined by 10 CFR 54.21(c).

Background:

SRP-LR Section 4.2.2.2 states that the specific criterion for meeting 10 CFR 54.21(d) is that the summary description of the evaluation of TLAAs for the period of extended operation in the FSAR supplement is sufficiently comprehensive such that later changes can be controlled by 10 CFR 50.59. It also states that 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).

Section A.3.2.1, "Neutron Fluence Analysis" of Appendix A to the license renewal application (LRA) contains the portion of the FSAR supplement pertaining to neutron fluence analysis.

Issue:

Section A.3.2.1 of Appendix A to the LRA does not describe the method of evaluation for the neutron fluence analysis. Although this information is provided in the LRA itself, the FSAR supplement is not sufficiently comprehensive such that later changes can be controlled by 10 CFR 50.59.

Additionally, Section A.3.2.1 of Appendix A to the LRA does not state whether the method has been approved by the NRC or whether it is consistent with RG 1.190. Although this information is provided in the LRA itself, the FSAR supplement does not contain information associated with the TLAA's regarding the basis for determining that the applicant has made the demonstration required by 10 CFR 54.21(c)(1).

Request:

Revise the FSAR supplement to describe the method of evaluating the neutron fluence and state whether the methodology is consistent with RG 1.190 and has been approved by the NRC. Submit the revised FSAR supplement pages on the docket for review.

**RAI B.2.3.34-1**

Regulatory Basis:

Title 10 of the *Code of Federal Regulations* Section 54.21(a)(3) requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function will be maintained consistent with the current licensing basis (CLB) for the period of extended operation. As described in the SRP-LR, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL-LR Report when evaluation of the matter in the GALL-LR Report applies to the plant.

Background:

The Structures Monitoring and the Inspection of Water-Control Structures Associated with Nuclear Power Plants aging management programs (AMPs) provide an enhancement to the "Parameters Monitored or Inspected" program element which relates to visually inspecting concrete structures for unique cracking such as "craze", "mapping" or "patterned" cracking to determine the presence of alkali-silica gel.

LRA Table 3.5-1 indicates that the ASME Section XI, Subsection IWL AMP will continue to inspect and monitor for cracking and indications of Alkali-Silica Reaction (ASR) - induced or similar degradation. The staff reviewed the Westinghouse proprietary procedure TX-ISI-IWL, Revision 6, and finds that the procedure implements the inspection of pattern cracking and exudation, which are related to the ASR.

GALL-LR Report does not clearly define visual indications of aggregate reactions. However, the GALL-SLR Report provides visual indications of aggregate reactions, such as "map" or "patterned" cracking, alkali-silica gel exudations, surface staining, expansion causing structural deformation, relative movement or displacement, or misalignment/distortion of attached components, which are applicable to the initial period of extended operation.

Issue:

ASR, or reaction with aggregates, has more characteristics than what has been enhanced or implemented in the Comanche Peak LRA AMPs mentioned above.

The enhanced Structures Monitoring, enhanced Inspection of Water-Control Structures Associated with Nuclear Power Plants, and the ASME Section XI, Subsection IWL AMPs may not be adequate to detect the indications of aggregate reactions, based on operating experience gained since the GALL-LR was developed.

Request:

1. Evaluate and update the enhancements to the “Parameters Monitored or Inspected” program element for the Structures Monitoring and the Inspection of Water-Control Structures Associated with Nuclear Power Plants AMPs to ensure that the AMPs are capable of detecting visual indications of aggregate reactions, such as “map” or “patterned” cracking, alkali-silica gel exudations, surface staining, expansion causing structural deformation, relative movement or displacement, or misalignment/distortion of attached components.
2. Provide the enhancement to the “Parameters Monitored or Inspected” program element for the ASME Section XI, Subsection IWL AMP to ensure that the AMP is capable of detecting visual indications of aggregate reactions, such as “map” or “patterned” cracking, alkali-silica gel exudations, surface staining, expansion causing structural deformation, relative movement or displacement, or misalignment/distortion of attached components. Otherwise, provide justification why the enhancement is not needed.

**RAI 4.3.3-1**

Regulatory Basis:

Pursuant to 10 CFR 54.21(c), the LRA must include an evaluation of time-limited aging analyses (TLAAs). The applicant must demonstrate that (i) the analyses remain valid for the period of extended operation, (ii) the analyses have been projected to the end of the period of extended operation, or (iii) the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Background:

LRA Section 4.3.3 addresses the TLAA on allowable stresses for ASME Code Section III, Class 2 and 3 and ANSI B31.1 piping systems. The TLAA evaluation in LRA Section 4.3.3 explains that the TLAA demonstrates the applicable cycles for 60 years of operation for ASME Code Class 2 and 3 and ANSI B31.1 piping systems remain below the 7000 cycle limit.

Issue:

In contrast with the TLAA evaluation, the title and TLAA disposition of LRA Section 4.3.3 do not include ANSI B31.1 piping. In addition, the updated safety analysis report (USAR) supplement description in LRA Section A.3.3.3 does not include a reference to ANSI B31.1 piping. Given the inclusion of ANSI B31.1 piping in some areas of the application and not in other relevant areas, it is unclear whether the disposition of the TLAA applies to ANSI B31.1 piping as well.

Request:

Given the inclusion of ANSI B31.1 piping in the TLAA evaluation in LRA Section 4.3.3, provide justification for why the ANSI B31.1 piping is not referenced in the title and TLAA disposition of LRA Section 4.3.3 and the USAR supplement (LRA Section A.3.3.3). If it cannot be justified,

revise the LRA to resolve this inconsistency. As part of the response, clarify whether the ANSI B31.1 piping is included in the TLAA on allowable stresses.