Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: GALL VI.A.1-a (3.6.1-02)
Identified radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics as aging effect/mechanism

Provide a basis why those aging mechanism are not applicable to Palisades.

Final Response: This aging effect (radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics) mechanism is applicable and is hereby added to the Palisades Table 3.6.2-1 for the Electrical cables and connections not subject to 10CFR 50.49 EQ, on LRA page 3-414. It is also added as an additional bullet under Aging Effects Requiring Management in Section 3.6.2.1.1 on page 3-402.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: GALL VI.A.1-b (3.6.1-03)
Identified radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics as aging effect/mechanism

Provide a basis why those aging mechanism are not applicable to Palisades.

Final Response: This aging effect (radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics) is applicable and is hereby added to the Palisades Table 3.6.2-1 for the Electrical Cables and connections used in instrumentation circuits, on LRA page 3-415. It is also added as an additional bullet under Aging Effects Requiring Management in Section 3.6.2.1.2 on page 3-403.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: GALL VI.A.1-a (3.6.1-02) (Electrical and I&C Penetration Assemblies - Cable and Connections)
Identified radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics as aging effects.
(1) Provide a basis why those aging mechanism are not applicable to Palisades.
(2) Discuss how seals, epoxy, etc. associated with Penetration assemblies will be managed.

Final Response: (1) This aging effect (radiolysis and photolysis (ultraviolet [uv] sensitive materials only) of organics) mechanism is applicable and is hereby added to the Palisades Table 3.6.2-1 for the Electrical portion of the Non-EQ electrical and I&C penetration assemblies, on LRA page 3-415. It is also added as an additional bullet under Aging Effects Requiring Management in Section 3.6.2.1.3 on page 3-404.

(2) As noted in the Palisades LRA, page 2-268 and Table 2.4.3-1, page 2-227, the seals and penetrations are addressed in the civil / structural discipline.

The containment electrical penetrations are tested by a Containment Building Penetration Local Leak Rate Test as described in the LRA Section B2.1.8, page B-58, Containment Leakage Testing Program. The scope of the Palisades Containment Leakage Testing Program satisfies the requirements of 10 CFR 50, Appendix J, Option B.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: Fuse Holders (ISG-5)
Identified aging effects of metallic portion of fuse holders include fatigue/ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, chemical contamination, corrosion, and oxidation. The environment for fuse holders is air indoor/adverse localized environment.

1. Identify environment and aging effect for all components of fuse holders (metallic and insulation portions)

2.Provide an AMP with ten elements or justification of why an AMP is not required for fuse holders (metallic and insulation portions)

Final Response: (1) These aging effects (fatigue/ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, chemical contamination, corrosion, and oxidation) and environment (air indoor/adverse localized environment) are applicable and are hereby added to the Palisades Table 3.6.2-1 for the Fuse Holders, on LRA pg. 3-416. It is also added as an additional bullet under Aging Effects Requiring Management in Section 3.6.2.1.4 on page 3-405.

(2) NMC performed a review of fuse holders in the plant that are not inside active equipment. From this review it was determined that there were 36 fuses installed in junction boxes. From this population, it was determined that 12 bolted fuse holders (installed in 1981) are cycled once per refueling outage. The bolted fuse connectors are not susceptible to the relaxation or fatigue that is experienced by fuse clips. The other 24 fuses that have clips are not cycled with any frequency. In conclusion the fuses, with clips, of the fuse holders subject to the AMR, are not routinely removed for maintenance and / or surveillance. Therefore, NMC does not consider fatigue due to mechanical stress to be an aging effect requiring management at Palisades.

All of these fuse holders are installed in metal junction boxes, which are seismically mounted on their support structure, separate from sources of vibration. Therefore, Palisades does not consider vibration to be an applicable aging mechanism.

The junction boxes are located inside rooms that have a controlled environment that protects the panels from the weather, and no sources of potential mechanical system leakage are located in proximity to the junction boxes. With regard to internal moisture, a review of plant-specific operating experience did not reveal any instance of aging as a result of the formation of condensation internal to the panels. All the junction boxes were inspected and the surface condition of the fuse clips showed no signs of corrosion. Additionally, there was no sign of moisture. Therefore, NMC does not consider corrosion to be an applicable aging mechanism.

In conclusion, NMC did not find any aging effects (fatigue/ohmic heating, thermal cycling, electrical transients, frequent manipulation, vibration, chemical contamination, corrosion, and oxidation) that require management for in-scope fuse holders.

This conclusion that no aging management program is required for fuse holders from fatigue, mechanical stress, vibration, or corrosion on the metallic clamps of the fuse holder was reached by a previous applicant (Farley). This position was accepted by the Staff as documented in the SER for the associated license renewal application.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: Non-Segregated Phase Bus and Connections (ISG-17)
Identified bus/connections, insulation/insulators, and enclosure assembly are the structure and or components of metal enclosed bus. The material for this bus is various metals, porcelain, xenoy, thermo-plastic organic polymers. The environment of metal enclosed bus is air-indoor and outdoor. Aging effects requiring management includes embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance, loss of material/general corrosion, loosening of bolted connections/thermal cycling and ohmic heating, hardening and loss of strength/elastomer degradation

1.Provide appropriate material, environment, aging effect and aging management program for each structure/component of metal enclosed bus

Final Response: These aging effects (embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance, loss of material/general corrosion, loosening of bolted connections/thermal cycling and ohmic heating, hardening and loss of strength/elastomer degradation), material (various metals, porcelain, glass (Note: Palisades does not have xenoy or thermo-plastic organic polymers) and environment (air-indoor and outdoor) are hereby added to the Palisades Table 3.6.2-1 for the Non-Segregated Phase Bus and Connections, on LRA pg. 3-416. Under Component type, Non-Segregated Phase Bus and Connections (ISG-17) add the following: (bus/connections, insulation/insulators, and enclosure assembly).

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: High-Voltage Transmission Conductors (ISG-2)
Identified transmission conductors and connections required an AMR. The aging effects include loss of material/wind induced abrasion and fatigue, loss of conductor strength /corrosion, increased resistance of connection/oxidation or loss of preload.
1. Explain why transmission connections are not required an AMR. Identify all aging effects associated with high-voltage transmission conductors and connections.
2. You have identified on Page B-95 of the LRA that routine switchyard inspection detects loose connection in the switchyard. It appears that you have an AMP to manage the loose connections. Why this AMP is not credited to manage the aging effects for high voltage connections

Final Response: (1) In the LRA Table 3.6.2-1 on LRA pg. 3-416, the Component Type High Voltage transmission Conductors (ISG-2) is hereby changed to High-Voltage Transmission Conductors and Connections (ISG-2). To the listed aging effects for this line item, the following is added: loss of material/wind induced abrasion and fatigue, loss of conductor strength /corrosion, increased resistance of connection/oxidation or loss of preload) will be added. Conforming changes are also made to Section 3.6.2.1.6 on page 3-406, and the section 3.6.2.1.6 title on page 3-401.

(2) The plant experience documented in the Palisades LRA on page B-95 was based on the fact that there was corrective action document that documented a site-specific experience. Note: there was no other site-specific experience to document any other problems with high-voltage connections. This document, with a time of discovery of August 7, 2001, noted that there was a loose connection in the switchyard disconnect for 29R8 on the east side of the Z phase. A review of the work order history, for disconnect 29R8, determined that the contact on the east side of the Z phase for 29R8 was worked on March 31, 2001. Therefore, the problem noted was due to poor workmanship from the work performed by work order and not due to any aging mechanisms.

The Palisades transmission conductor component type includes both the transmission conductors and the hardware used to secure the conductors to the insulators. The materials for aluminum cable-steel reinforced (ACSR) transmission conductors are aluminum and steel, and the environment is outdoor weather. Based on industry guidance, potential aging effects and aging mechanisms are loss of conductor strength due to general corrosion (atmospheric oxidation of metals) and loss of material due to wear from wind loading.

Corrosion in ACSR conductors is a very slow acting mechanism. Corrosion rates are dependent on air quality. Palisades is located in a mostly agricultural area with no significant nearby industries that could contribute to corrosive air quality. Corrosion testing of transmission conductors at Ontario Hydroelectric showed a 30 percent loss of composite conductor strength of an 80-year-old ACSR conductor. The Institute of Electrical and Electronic Engineers National Electrical Safety Code (NESC) requires that tension on installed conductors be a maximum of 60% of the ultimate conductor strength. Therefore, assuming a 30% loss of strength, there would still be significant margin between what is required by the NESC and the actual conductor strength. In determining actual conductor tension, the NESC considers various loads imposed by ice, wind, and temperature as well as length of conductor span. The transmission conductors in scope for license renewal are short spans located within the high voltage switchyard. The Palisades line near the plant is designed for heavy loading; therefore, the Ontario Hydroelectric heavy loading zone study is aligned with respect to loads imposed by weather conditions.

The Ontario Hydroelectric test envelops the conductors at Palisades, demonstrating that the material loss on the Palisades ACSR transmission conductors is acceptable for the period of extended operation. This illustrates with reasonable assurance that transmission conductors at Palisades will have ample strength to perform their intended function throughout the renewal term; therefore, loss of conductor strength due to corrosion of the transmission conductors is not an aging effect requiring management.

Loss of material due to mechanical wear can be an aging effect for strain and suspension insulators that are subject to movement. Experience has shown that transmission conductors do not normally swing and that when they do swing because of substantial wind, they do not continue to swing for very long once the wind has subsided. Wear has not been identified during routine inspection. Therefore, loss of material due to wear is not an aging effect requiring management for transmission conductors.

NMC reviewed industry operating experience and NRC generic communications related to the aging of transmission conductors in order to ensure that no additional aging effects exist beyond those identified above. NMC also reviewed plant-specific operating experience, including nonconformance reports, licensee event reports, and condition reports, and documented interviews with transmission engineering personnel. This review did not identify unique aging effects for transmission conductors beyond those identified above.

In conclusion, no aging management program is required for the Palisades transmission conductors and connections aging effects of loss of conductor strength and loss of material (mechanical wear).

This conclusion that no aging management program is required for transmission conductor aging effects of loss of conductor strength and loss of material (mechanical wear) has been reached by numerous previous applicants (Oconee, Turkey Point, North Anna and Surry, Peach Bottom, St. Lucie, Fort Calhoun, McGuire and Catawba, Farley and Virgil C. Summer). This position was accepted by the NRC as documented in SERs for the associated license renewal applications.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: High-Voltage Switchyard Bus and Connections (ISG-2)
Identified the same aging effects as high-voltage transmission conductors and connections.
1. Identify all aging effects associated with high-voltage switchyard bus and connections.
2. You have identified on Page B-95 of the LRA that routine switchyard inspection detects loose connection in the switchyard. It appears that you have an AMP to manage the loose connections. Why this AMP is not credited to manage the aging effects for high voltage connections

Final Response: (1) These aging effects (loss of material/wind induced abrasion and fatigue, loss of conductor strength /corrosion, increased resistance of connection/oxidation or loss of preload) are hereby added to the Palisades Table 3.6.2-1, for High-Voltage Switchyard Bus and Connections, on LRA pg. 3-417. Conforming changes are also made to Section 3.6.2.1.7 on page 3-407 under Aging Effects Requiring Management.

(2) The plant experience documented in the Palisades LRA on page B-95 was based on the fact that there was a corrective action document that documented a site-specific experience. Note: there was no other site-specific experience to document other problems with high-voltage connections at Palisades. This document, with a time of discovery of August 7, 2001, noted that there was a loose connection in the switchyard disconnect for 29R8 on the east side of the Z phase. A review of the work order history, for disconnect 29R8, determined that the contact on the east side of the Z phase for 29R8 was worked on March 31, 2001. Therefore, the problem noted was due to poor workmanship from the work performed by work order and not due to any aging mechanisms.

As stated in Table 3.6.2-1 of the LRA the switchyard bus and connections subject to an AMR (1) are constructed of aluminum, copper, and stainless steel (bolting), (2) are exposed to an atmosphere/ weather (same as Air- Outdoor) environment consisting of temperatures up to 40 deg. C (105 deg. F), precipitation, and negligible radiation, (3) provide electrical connections to specific sections of an electrical circuit to deliver voltage, current or signals, and (4) require no AMP. There are no aging effects from the outdoor environment (consisting of temperatures up to 40 deg. C (105 deg. F) and precipitation) that would cause the loss of the capability to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals.

In conclusion Palisades determined that an environment consisting of temperatures up to 40 deg. C (105 deg F) and precipitation has no significant aging effect on aluminum, copper, and stainless steel from (the component parts from which the switchyard bus and connections are constructed. Therefore, no AMP is required for High-Voltage Switchyard Bus and Connections.

This conclusion that no aging management program is required for high voltage switchyard bus and connections; aging effects, on aluminum, copper, and stainless steel, of loss of conductor strength and loss of material (mechanical wear) has been reached by previous applicants (Oconee, Turkey Point, North Anna and Surry, Peach Bottom, St. Lucie, Fort Calhoun, McGuire and Catawba, Farley and Virgil C. Summer). This position was accepted by the NRC as documented in SERs for the associated license renewal applications.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: High Voltage Insulators
Identified loss of material/mechanical wear due to wind blowing on transmission conductors, surface contamination, and cracking are aging effects of high voltage insulators.
1. Identify all aging effects associated with high voltage insulators.
2. Explain why no AMP is required.

Final Response: (1) These aging effects (loss of material/mechanical wear due to wind blowing on transmission conductors) are hereby added to the Palisades Table 3.6.2-1 for the High-Voltage Insulators, on LRA page 3-417. A conforming change is also made to Section 3.6.2.1.9 on page 3-408 under Aging Effects Requiring Management.

The high-voltage insulators (including high voltage strain and suspension insulators), that perform the function of insulating and supporting electrical transmission conductors and are subject to an AMR, (1) are constructed of porcelain, galvanized metal, and cement, (2) are exposed to an outdoor weather environment consisting of temperatures up to 40 deg. C (105 deg. F), precipitation, and negligible radiation, (3) insulate and support an electrical conductor, and (4) require no AMP. NMC did not identify any aging effects from the outside environment (consisting of temperatures up to 40 deg. C (105 deg. F) and precipitation) that would cause the loss of the capability to insulate or support its associated electrical conductor.

Regarding the potential for contamination of insulators, the buildup of surface contamination is gradual and in most areas such contamination is washed away by rain. Surface contamination can be a problem in areas where there are high concentrations of airborne particles, such as near facilities that discharge soot, or near the seacoast where salt spray is prevalent. Palisades is located in an area with moderate rainfall where airborne particle concentrations are comparatively low; consequently, the rate of contamination buildup on the insulators is not significant. At Palisades, as in most areas of the Michigan transmission system, contamination build-up on insulators is not a problem due to rainfall periodically "washing" the insulators. The glazed insulator surface aids this contamination removal. Additionally, there is no nearby heavy industry or other producers of industrial effluents, which could cause excessive contamination. There is no salt spray at Palisades as the plant is far from any ocean. Therefore, surface contamination is not an applicable aging effect for the insulators in the service conditions they are exposed to at Palisades.

Regarding high voltage porcelain insulator cracking, porcelain is essentially a hardened, opaque glass. As with any glass, if subjected to enough force, it will crack or break. The most common cause for cracking or breaking of an insulator is being struck by an object (e.g., a rock or bullet). Cracking and breaking caused by physical damage is not an aging effect and is not subject to an AMR. Cracks have been known to occur with insulators when the cement that binds the parts together expands enough to crack the porcelain. This phenomenon, known as cement growth, occurs mainly because of improper manufacturing processes or materials, which make the cement more susceptible to moisture penetration, and the specific design and application of the insulator. The string insulators which have experienced porcelain cracking caused by cement growth are isolated to bad batches (specific, known brands and manufacture dates) of string insulators used in strain application. The post insulators most susceptible to this aging effect are multicone (post) insulators used in cantilever applications. Research of Palisades corrective action documents revealed no instance of insulator cracking or failure related to cement growth in the Palisades switchyard. Accordingly, cracking due to cement growth is not an applicable aging effect for the high voltage insulators in the service conditions they are exposed to at Palisades.

Regarding mechanical wear, this is an aging effect for strain and suspension insulators in that they are subject to movement. Movement of the insulators can be caused by wind blowing the supported transmission conductor, causing it to swing from side to side. If this swinging is frequent enough, it could cause wear in the metal contact points of the insulator string and between an insulator and the supporting hardware. Although this mechanism is possible, experience has shown that the transmission conductors do not normally swing and that when they do, due to a substantial wind, do not continue to swing for very long once the wind has subsided.

Wind loading that can cause a transmission line and insulators to vibrate or sway is considered in the design and installation. The loss of material due to wear concern will not cause a loss of intended function of the insulators at Palisades; therefore, loss of material due to wear is not an applicable aging effect for insulators.

Palisades operating experience was reviewed to validate aging effects for switchyard insulators. This review included corrective action documents for any documented instances of switchyard insulator aging, in addition to interviews with Palisades engineering and maintenance personnel. No instance of aging related problems with in-scope switchyard insulators due to contaminants, cracking, cement growth, or mechanical wear was uncovered.

In conclusion Palisades determined that an environment consisting of temperatures up to 40 deg. C (105 deg. F) and precipitation has no significant aging effect on porcelain, galvanized metal, and cement (the component parts from which high voltage insulators are constructed). Therefore, no AMP is required for the Palisades High-Voltage Insulators.

This conclusion that no aging management program is required for high voltage insulator aging effects (on porcelain, cement and galvanized metal insulators), of loss of material/mechanical wear due to wind blowing on transmission conductors or surface contamination, has been reached by previous applicants (Oconee, Turkey Point, North Anna and Surry, Peach Bottom, St. Lucie, Fort Calhoun, McGuire and Catawba, Farley and Virgil C. Summer). This position was accepted by the NRC as documented in the SERs for the associated license renewal applications.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: Cable Connections
Identified aging effects of cable connections include loosening of bolted connection due to thermal cycling, ohmic heating, electrical transient, vibrations, chemical contamination, corrosion and oxidation.
1. Identify environment and aging effects of cable connections
2. Provide an AMP or justify why an AMP is not required for cable connection

Final Response: (1) The material (various metals used for electrical contacts), environment (air-indoor and outdoor) and aging effects (include loosening of bolted connection due to thermal cycling, ohmic heating, electrical transient, vibrations, chemical contamination, corrosion and oxidation) are hereby added to the Palisades Table 3.6.2-1 for the Electrical cables and connections not subject to 10CFR 50.49 EQ, on LRA pg. 3-414. Conforming changes are also made to Section 3.6.2.1.1 on page 3-402 under Aging Effects Requiring Management. The program for this line item is the Non-EQ Electrical Commodities Condition Monitoring Program.

(2) In Enclosure 2 of a letter dated August 25, 2005, NMC provided a revised LRA Section B2.1.12, Non-EQ Electrical Commodities Condition Monitoring Program that incorporated a number of changes resulting from the Aging Management Program and Aging Management Review audits. Specific changes have been incorporated into Parameters Monitored/Inspected, Detection of Aging Effects, Acceptance Criteria, and Corrective Actions sections of the program in response to this question.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Clarify on boron concentration and sampling frequencies and its differences with the EPRI guidelines.

Final Response: Same as below. Sampling is now the same for boron as standard. 6/23/05

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Explain what is the impact of power escalation from 30% to 35 % for sulfate limiting sulfur at concentration to 20 ppb.

Final Response: We have switched back to the 30% level sampling for boron.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-41 of the PNP LRA, GALL Item VII.I1-b is associated with 3.3.1-05. Please confirm that this was the intended reference.

Final Response: 3.3.1-05 is the intended reference. Note "C" applies.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Is there an INCONEL 182 weld to be evaluated for PNP?

Final Response: Yes, welds are evaluated with their component. Also, see LR-AMR-PCS Section 6.2.4.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: In light of recent operating experience with degradation in steam generator tubes and tube-to-tubesheet welds (IN 05-09), what has the applicant determined to be appropriate for management of aging effects in this region?

Final Response: IN 05-09 is being reviewed by the appropriate organizations at Palisades. We currently manage the tubes and tube-to-tubesheets welds with the Steam Generator Tube Integrity and the Water Chemistry programs.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: GALL recommends a plant-specific program to manage FAC for the feed rings of CE steam generators. Please clarify the basis for concluding that the conditions for FAC do not exist at PNP for this component.

Final Response: The feed ring is not included in the scope of license renewal and, therefore, the LRA does not specify the FAC Program. Refer to the NMC response to NRC RAI 2.3.4-1 in NMC letter dated July 1, 2005.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-40 of the PNP LRA, GALL Item IV.C2.3-g is associated with 3.1.1-26. Please confirm that this was the intended reference.

Final Response: The intended reference is 3.1.1-26. The LRA references to 3.1.1-27 are hereby corrected in two places on Page 3-37 for IV.C2.4-g and one place on Page 3-40 for IV.C2.3-g.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: In the Discussion column of Table 3.1.1, the LRA states that 3.1.1-39 is not applicable to PNP. In each case where this item number is used in Table 2, provide an alternative number that is applicable to PNP.

Final Response: Item number 3.1.1-39 appears in Table 3.1.2-1. 3.1.1-38 is the correct GALL Volume 1 reference for the Boric Acid Corrosion Program. Four line items on LRA Page 3-37 and one line item on page 3-40 incorrectly reference 3.1.1-39. The reference for these five line items is hereby changed to 3.1.1-38.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: PNP LRA 3.1.2.2.3.3 states that PNP does not have baffle former bolts. The review team understands that this is not the case. Please confirm that there are no bfb or correct this.

Final Response: Palisades is one of two Combustion Engineering plants without susceptibility to cracking of the baffle-former plate bolts. The discussion in LRA Section 3.1.2.2.3.3, however, is incomplete.

The second paragraph of LRA Section 3.1.2.2.3.3 is hereby revised in its entirety to state: "This issue is not applicable to Palisades. Palisades is one of only two Combustion Engineering designed plants that uses bolts to attach the core shroud panels (i.e., the baffle plates) to the former plates. These bolts are less susceptible to IASCC because: (1) the material used in these bolts is annealed 316 stainless steel, which is not cold worked; (2) the bolt stress from preload, as a percentage of yield strength, is much less than that of the susceptible plants; (3) the differential pressure across the core shroud panels does not result in tensile loads on the panel (i.e., the baffle bolts) during normal operation; and (4) the core shroud panel design allows for some flexing of the former plate relative to the core barrel, thus reducing the load on the panel bolts."

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-57 of the PNP LRA, Manway Cover Diaphragm and Primary Divider Plate are associated with IV.D1.1-i but no program is identified that is consistent with XI.M1. Please clarify the basis for the application of WC only.

Final Response: The diaphragm, in conjunction with the manway cover, provides the pressure boundary intended function. The ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program is hereby added to the Manway Cover Diaphragm line item to manage cracking of the diaphragm. The NUREG 1801 Volume 2, Table 1, and Note entries for this program are IV.D1.1-i, 3.1.1-44, and C, respectively. The note for the Water Chemistry Program is changed from E to C.

The Primary Divider Plate does not perform a system pressure boundary function; it divides the hot leg from the cold leg in the steam generator. As such, another AMP is not required.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-54 of the PNP LRA, Water Chemistry is is not identified as an AMP used to manage this aging effect for the core support barrel integral upper flange, as it is in GALL. The project team recognizes that the use of the WC program may be inferred, but this is a discrepancy. Either "Note A" is not appropriate or the AMP should be applied.

Final Response: The core support barrel integral upper flange appears in Table 3.1.2-3 on 3-51. Both the Reactor Vessel Internals Inspection Program and Water Chemistry Program are credited for management of the core support barrel integral upper flange. Both reference Table 1 Item 3.1.1-45, and Note A is properly applied.

To determine the source of the question, the other references to 3.1.1-45 in Table 3.1.2-3 were reviewed for inconsistencies. Several inconsistencies were found that warrant correction, as follows:

On LRA Page 3-54, Water Chemistry Program is hereby added to manage cracking (3.1.1-45) of the spacer shim, instrument sleeve (IV.B3.1-a), with Note A .

On LRA Pages 3-54 and 3-55, for the three Changes in Dimensions entries (IV.B3.1-b items), 3.1.1-45 is hereby changed to 3.1.1-11.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-54 of the PNP LRA, GALL volume 1 associates item B3.1-b with 3.1.1-11, which addresses changes in dimension/void swelling and is discussed in section x.x.x, above. Please review the classification (note) of this AMR.

Final Response: This question supplements NRC Question 16 above. The response to question 16 changed the subject line on page 3-54 (i.e., Volume 2 item B3.1-b) to a Table 1 Item number of 3.1.1-11.

All Table 3.1.2-3 line items referencing 3.1.1-11 for Changes in Dimensions were then reviewed, including those changed by the response to NRC Question 16. A total of 15 line items, including those in the previous paragraph, reference 3.1.1-11 for Changes in Dimensions, as follows:

Two line items on Page 3-49
Two line items on Page 3-50
Two line items on Page 3-51
Three line items on Page 3-52
Three line items on Page 3-53
Two line items on Page 3-54
One line item on Page 3-55.

The notes for each of these fifteen line items are hereby changed to E, 113.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On pages 3-49, -50, and-51 of the PNP LRA, GALL recommends loose parts monitoring IAW GALL AMP XI.M14 in addition to ISI. The LRA states that this AMR is managed in a manner consistent with the GALL Report. How is this recommendation met?

Final Response: The bolted connections in the reactor vessel internals are managed for the effects of loss of preload by the ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program (ISI). The management of loss of preload by ISI provides reasonable assurance that degradation would be detected prior to the loss of the intended function.

NMC does not rely upon a Loose Parts Monitoring Program as suggested by NUREG-1801, Table 1, item 3.1.1-48, since this approach would require a failure of the bolting intended function in order to be effective.

The Table 3.1.2-3 entries for the three line items addressed by this question on pages 3-49, 3-50 and 3-51are inconsistent. All three line items for Loss of Preload on these pages are hereby changed to notes E, 103. In addition, the NUREG 1801 Volume 2 citation of V.B3.2-g on page 3-49 is hereby changed to IV.B3.2-g.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Other

Information Request: On page 3-75 of the PNP LRA, Water Chemistry is is not identified as an AMP used to manage this aging effect for the SIRWT HX Tubes, Cont. Spray Pump coils, LPSI Pump coils, SDC HX Tubes. The staff finds a WC program consistent with XI.M2 to be appropriate. The project team recognizes that the use of the WC program may be inferred but the AMP should be applied explicitly.

Final Response: Please specify the aging effect and the surface (internal) or (external). This question was superseded by Question 3.2.2-15-P on 8/2/05.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Section 3.3.2.2.2 states that the elastomers for the ventilation systems are evaluated for cracking and changes in material due to thermal and radiation exposure. However the SRP states that loss of material due wear could occur on components in the ventilation system. LRA Table 3.3.2-9 (pg. 3-165, 166) does not address loss of material for elastomers. Clarify the differences between the SRP and LRA aging effects of elastomers.

Final Response: NMC has determined that these elastomer components are not long-lived components requiring aging management.. See the NMC response to NRC RAI B2.1.20-1(b), B2.1.20-1(c) and B2.1.20-2(b) in letter dated July 25, 2005, for further information.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Confirm that system monitoring and OTI AMPs does or will be enhanced to address change of material properties?

Final Response: The only equipment that this applies to is the elastomers that are being addressed as part of the RAI's we have received and responded to from the NRC. We are in the process or removing this material from aging management so that this "change in material properties will not need to be addressed under the system monitoring or OTI program.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: Table 3.3.1-03 is not applicable to LRA Table 3.3.2-11 (pg. 3-175) for carbon steel heat exchanger in air.

Final Response: LRA Table 3.3.2-11, page 3-175, Table 1 item 3.3.1-03 is not applicable for the carbon steel heat exchanger. This Table 1 item 3.3.1-03 is hereby revised to read 3.3.1-05.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: PNP LRA 3.3.2.2.4 states AE not applicable. If it is applicable to a different component from the one cited in GALL, discussion of how the AE is managed is appropriate.

Final Response: LRA Section 3.3.2.2.4 is hereby revised to add the following at the end of the existing text:

"SCC/IGA is an AERM for the components of Chemical and Volume Control System (CVCS) that are constructed with stainless steel in the environment of treated water in Containment where the temperatures of the CVC are >140°F. Also, SCC/IGA is an AERM for the heat traced piping of the CVC located in the Auxiliary Building with temperatures greater than the threshold of 140°F to sustain SCC/IGA. Not all CVCS components have temperatures >140°F.

Stress corrosion cracking/intergranular attack, including crack initiation and growth, is managed where applicable using the ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection, Closed Cycle Cooling Water, One Time Inspection and/or the Water Chemistry Programs."

The following conforming changes are also hereby provided:

On page 3-198, a new plant specific note 303 is hereby added that reads "Cracking is applicable for applications greater than 140°F."

In LRA Table 3.3.2-1, on pages 3-118 through 3-121, new note 303 is hereby added to every row that has an existing note associated with the AERM, cracking.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Please clarify how the Bolting Integrity Program is used to manage fasteners in the compressed air, service water, and domestic water systems

Final Response:

The Bolting Integrity Program is an existing program that manages the aging effects associated with bolting through the performance of periodic inspections. The program also includes repair/replacement controls for ASME Section XI related bolting and generic guidance regarding material selection, thread lubrication and assembly of bolted joints. The program considers the guidelines delineated in NUREG-1339 for a bolting integrity program, EPRI NP-5769 (with the exceptions noted in NUREG-1339) for safety related bolting, and EPRI TR-104213 for non-safety related bolting.

The Bolting Integrity Program has been created to permit direct comparison with
NUREG-1801. The program is considered to be an existing program since most of the activities addressed by the program are already being performed. The program credits activities performed under three separate aging management programs for the inspection of bolting. The three aging management programs are: (1) ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program, (2) Structural Monitoring Program, and (3) System Monitoring Program.

The scope of the credited programs for bolting is summarized below.
- The ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program provides the requirements for inservice inspection of ASME Class 1, 2, and 3 piping, supports, and their integral attachments, which includes pressure retaining and support bolting. This program specifically discusses the inspection and lubrication of the reactor vessel head closure studs. The program supplements the ASME Section XI (Code Case N491-2), Subsection IWF requirements, by applying the inspection requirements of Subsection IWB, Category B-G-1 to high yield strength (>150 ksi) bolting used in Nuclear Steam Supply System (NSSS) component supports.
- The System Monitoring Program provides the requirements for the inspection of
non-safety related bolting within the scope of license renewal.
- The Structural Monitoring Program provides the requirements for the inspection of all structural bolting within the scope of license renewal. Other bolting and fasteners are also included within the scope of this program, such as those used in supports for cable trays, conduits and cabinet supports.

NUREG-1801 states that, "It is noted that hot torquing of bolting is a leak preventive measure once the joint is brought to operating temperature and before or after it is pressurized." The attributes of the Palisades Bolting Integrity Program are adequate to manage loss of preload without hot torquing. Therefore, hot torquing to establish a pre-load will not be credited for aging management of bolting.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-139 of the PNP LRA, drip pans of the chemical addition system and on 3-175 and -177, heat exchangers and pumps of the radwate system are addressed . On what basis is item 3.3.1-05 (LOM, MIC, pitting & CC *in air*) associated with this MEAP?

Final Response: The carbon steel drip pans (LRA Table 3.3.2-5, page 3-139) have an internal environment of raw water and should not cite Table 1 item 3.3.1-05. The drip pans are being managed by the One Time Inspection Program. The NUREG 1801 Volume 2, Table 1 and Note information for this raw water environment and component are hereby changed to VII.C1.1-a, 3.3.1-17, and C respectively.

The bronze heat exchanger components (LRA Table 3.3.2-11, page 3-175) have an internal and external environment of treated water, and should not cite Table 1 item 3.3.1-05. These bronze heat exchanger components are being managed by the One Time Inspection Program . The NUREG 1801 Volume 2 and Table 1 items are hereby removed, and Standard Note is changed from E to J.

Similarly, the copper alloy heat exchanger components (LRA Table 3.3.2-11, page 3-175) with the same internal and external environment of treated water should not cite Table 1 item 3.3.1-05. These copper alloy heat exchangers components are being managed by the One Time Inspection Program. The NUREG 1801 Volume 2 and Table 1 items are hereby removed, and Standard Note is changed from E to J. Plant Specific Note 368 is added to these copper alloy heat exchanger components as well.

The bronze pumps (LRA Table 3.3.2-11, page 3-177) have an internal environment of treated water and should not cite Table 1 item 3.3.1-05. The NUREG 1801 Volume 2 item and Table 1 Item numbers associated with the One Time Inspection Program are hereby deleted. The existing notes are hereby replaced with 331, 368, J.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Please clarify the basis for assigning 3.3.1-05 to components other than those made of CS. This appears in most of the auxiliary systems.

Final Response: 3.3.1-5 in GALL Table 3 (Vol. 1) last column titled "Item Number in GALL" list applicable 3.x.2 sections of Gall (Vol. 2) sections that are applicable to 3.3.1-5. A review of these sections reveals materials other than carbon steel are applicable. Examples are copper/nickle (VII.F3.2-a), and stainless steel (VII.F3.4-a).

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-139 of the PNP LRA, steam traps of cast iron are addressed. Please explain why this item was not assigned 3.3.1-29.

Final Response: LRA page 3-139 does not list traps. It is believed the auditor was referring to LRA Page 3-150 line item for traps which has a Table 1 item of 3.3.1-05 for Loss of Material - Selective Leaching.

Based on review, it is concluded that the Table 1 line item of 3.3.1-05 is correct for loss of material. As indicated in Table 3 of NUREG 1801, 3.3.1-05 is for various components, including the external surfaces of carbon steel components. Although the component in question is cast iron, plant specific note 399 indicates that cast iron components were evaluated as carbon steel, except for selective leaching.

Selective leaching is also applicable for this line item, and will be managed under the One Time Inspection Program. For carbon steel in air, the Table 1 line item 3.3.1-05 is the best choice even though the AERM of selective leaching is different. Given that the component type exists in GALL at VII H2.2-a, and the Table 1 item is correct when considering our carbon steel and cast iron note, then the only difference is the AERM of selective leaching. Hence, the Volume 2 line item, the Table 1 line item and Standard Note of H are concluded to be the best fit as stated.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Review basis doc. to confirm that system monitoring program actually checks fouling.

Final Response: The System Monitoring Program manages degradation of external surfaces. This would include fouling of heat transfer surfaces of cooling coils/fins of air handling units.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Other

Information Request: Accumulators, Filters/Strainers, Heat Exchangers, and Pumps of CS and pumps of cast iron are associated with VII.G.7-a but the OTI program is identified to manage loss of material. That is consistent with GALL v1 Table 3. Clarify the basis for assigning Note E (instead of Note A or Note C for components not associated with RCP oil collection.)

Final Response: Same Question as 3.3.1-06-01-S. See the response to Question as 3.3.1-06-01-S

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On pages 3-248 and -249 of the PNP LRA, Accumulators, Filters/Strainers, Heat Exchangers, and Pumps of CS and pumps of cast iron are assiciated with VII.G.7-a but the OTI program is identified to manage loss of material. That is consistent with GALL v1 Table 3. Clarify the basis for assigning Note E (instead of Note A or Note C for components not associated with RCP oil collection.)

Final Response: The component types identified in the question differ from the GALL Volume 2 line item cited, but are the same materials, have the same environments, have the same aging effects, and credit the same plant-specific One-Time Inspection Program for managing loss of material. This combination should result in a Note "C". Therefore, the Standard notes for all line items on LRA pages 3-248 and 3-249, that cite GALL VII.G.7-a, are hereby changed to Note "C".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: AERM should be Loss of Material for the IF (This Line Item is repeated -Typo?), This affects LRA

Final Response: Please provide a page number & identify the source of the question. Question was withdrawn or accepted by Saba on 8/2/05. Question withdrawn or accepted "as is" by Saba on 8/2/05 without discussion.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Section 3.3.2.2.10 states that the stainless steel sheathing for the Boron Carbide will be aged managed for loss of material due to pitting or crevice corrosion cracking via the water chemistry program consistent with GALL item VIIA2.1c. However LRA Table 3.5.2-2 does not list stainless steel sheathing associated with the boron carbide. Also, GALL item VIIA2.1c identifies crack initiation and growth as an aging effect for this material/environment combination. Clarify why this aging effect is not applicable to the PNP stainless steel sheathing.

Final Response: The stainless steel sheathing is include in component type "Spent Fuel Storage Rack - Auxiliary Building, Stainless Steel, Borated Water" in LRA Table 3.5.2-2 on page 3-341. The boron carbide portion of the rack is included on the same page. Crack initiation and growth due to SCC does not apply at Palisades since the SFP is maintained below the 140F threshold temperature. This temperature threshold is per EPRI Structural Tools revision 1, report ID 100295, Section 3.3..2.3.4 and Table 3-2. It is further supported by the draft January 2005 edition of GALL, Table IX.D page IX-13. Per System Operating Procedure SOP-27, section 4.1, temperature of the SFP is maintained between 75F and 125F. SFP temperature alarms are set at 125F high and 140F high-high to ensure the temperature requirements are maintained.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.5.2-2 refers to GALL Item VII.A1.1-a, which is for carbon steel "new fuel storage racks". However, LRA Table 3.5.2-2 (pg. 3-331), identifies the material as Aluminum. Explain how the referenced GALL Item is equivalent to the LRA Table Item for aging effects and AMP.

Final Response: See similar response 3.3.1-11W1 (Palisades #505). The components are the same but Palisades new fuel racks are aluminum whereas the GALL racks are carbon steel. The aging effects, accordingly are not the same. Thus, note "F: Material not in NUREG 1801 for this component" is used. Per discussion with the originator of questions 3.3.1-11W1, it was noted that since both the material and environment are different that the aligned GALL line item VII.A1.1-a, the reference to it and the associate Table 1 item would be deleted. It was agreed to leave the note F intact since there is no better note that fit the circumstances. The correction to delete the GALL line item alignment will be docketed and will be tracked as part of that question rather than duplicating it here.

Also, at the request of the author of this question, it is noted that the MEAP combination for this component does exist in the January 2005 draft of the GALL as line item III.B2-5. Also, this component is included (component ID BAM-07-AL-PRO) in attachment 9.2 of the Palisades Boric Acid Corrosion Program Basis Document, LRAMPBD-04-BAC.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Based on FSAR Table 9-7, the spent fuel pool heat exchanger tube and tubesheets are constructed of stainless steel and the shells are made of carbon steel. LRA Table 3.3.2-14 states that the SFP Heat Exchanger Shell and Channel Heads are carbon steel and stainless steel, exposed to treated water. They are managed by closed cycle cooling water and water chemistry. It is not clear how each AMP contributes toward managing the aging effects of the stated components.

Final Response: The SFP HX Shells (Carbon Steel) have an internal environment of treated water and an external environment of air. The internal aging mechanisms are managed by the Closed Cycle Cooling Water Program and the external aging mechanisms are managed by the Boric Acid Corrosion and the System Monitoring Program.

The SFP HX Channelheads (Stainless Steel) have an internal environment of treated water and an external environment of air. The internal aging mechanisms are managed by the Closed Cycle Cooling Water Program and the Water Chemistry Program. There are no external aging mechanisms due to not being in an aggressive environment

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Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Based on FSAR Table 9-7, the spent fuel pool heat exchanger tube and tubesheets are constructed of stainless steel and the shells are made of carbon steel. LRA Table 3.3.2-14 states that the SFP Heat Exchanger Tube and Tubesheets are carbon steel and stainless steel, exposed to treated water. They are managed by closed cycle cooling water and water chemistry. It is not clear how each AMP contributes toward managing the aging effects of the stated components.

Final Response: The SFP HX Tubesheets (Carbon Steel w/ss clad) have an internal environment of treated water and an external environment of treated water. The internal aging mechanisms are managed by the Closed Cycle Cooling Water Program and the Water Chemistry Program, while the external aging mechanisms are managed by the Closed Cycle Cooling Water Program.

The SFP HX Tubes (Stainless Steel) have an internal environment of treated water and an external environment of treated water. The internal aging mechanisms are managed by the Closed Cycle Cooling Water Program and the Water Chemistry Program, while the external aging mechanisms are managed by the Closed Cycle Cooling Water Program.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 shows that heat transfer degradation is managed by the CCW program (pg. 3-144, 3-145, and 3-146). Clarify how this program is used to manage heat transfer degradation for carbon steel and copper alloy heat exchangers.

Final Response: The Closed Cycle Cooling Water Program is an existing program that manages aging effects in closed cycle cooling water systems that are not subject to significant sources of contamination, in which water chemistry is controlled and heat is not directly rejected to the ultimate heat sink. The program includes (a) maintenance of system corrosion inhibitor concentrations to minimize degradation, and (b) periodic or one-time testing and inspections to assess SSC aging.

The program scope includes activities to manage aging in the Component Cooling Water (CCS) System, Emergency Diesel Generator (EDG) Jacket Cooling Water (Emergency Power System), and Shield Cooling System (SCS).

The program is based on requirements delineated in EPRI TR-107396, "Closed Cooling Water Chemistry Guideline," and relies on mitigative measures to minimize corrosion through the addition of corrosion inhibitors and maintenance of water chemistry within specified limits.

The program credits the One-Time Inspection Program for the inspection of selected Shield Cooling System and Emergency Diesel Generator system heat exchangers and a representative sample of stagnant portions of the system piping. The inspections will check for fouling and evidence of corrosion or cracking. Nondestructive examinations will be used, if practical and warranted, to verify pipe wall thickness at selected locations where loss of material has been experienced.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 shows that CCW manages loss of material of stainless steel component in treated water (ext) (pg. 3-129). Cracking is not identified as an aging effect this MEAP combination. Justify the omission of cracking as an AERM.

Final Response: Cracking due to stress corrosion cracking (SCC)/intergranular attack (IGA) is a potential aging mechanism if the following exist: "O2>100 ppb OR corrosive environment (Chlorides or fluorides or sulfates > 150 ppb) AND temperatures > 140 degrees F." Cracking due to SCC/IGA is not a potential aging mechanism for the exterior of the waste gas compressors (C-50A/B) cooler tubes, at Palisades, due to not have temperatures > 140 degrees F. (Refer; M-259 HB-24, Normal Temp is between 90-115F)

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2.-3 states that loss of material and selective leaching of the copper alloys in heat exchangers in treated water is consistent with GALL VII.C2.3-a and .4-a. However, GALL identifies that to be consistent, the material is carbon steel and cast iron. Clarify how the differences in materials in the LRA are consistent with GALL.

Final Response: LRA Table 3.3.2-3, page 3-126, Component Type Heat Exchanger is revised as follows:

The NUREG 1801 Volume 2, Table 1 and Note information for copper alloy Heat Exchanger components in an external treated water environment that are being managed by the Closed Cooling Water Program (existing GALL reconciliation VII.C2.4-a, 3.3.1-15 and notes 323, C) are hereby changed to VII.C1.3-a, 3.3.1-17, and 323, E, respectively.

The NUREG 1801 Volume 2, Table 1 and Note information for copper alloy Heat Exchanger components in an external treated water environment that are being managed by the One-Time Inspection Program (existing GALL reconciliation VII.C2.3-a, 3.3.1-15 and notes 301, C) are hereby changed to VII.C1.3-a, 3.3.1-29 and notes 301, E, respectively..

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 (pg. 3-124) shows that CCW manages loss of material of carbon steel and copper alloys in Raw Water and references GALL VII.C1.3-a, b which refers to the OCCW AMP. Justify the use of CCW in lieu of OCCW.

Final Response: The Component Cooling Water Heat Exchanger AERMs being managed for loss of material of carbon steel and copper alloys in raw water are being managed by the Open Cycle Cooling Water Program and by the Closed Cycle Cooling Water Program, not in lieu of the Open Cycle Cooling Water Program.

GALL Vol 2, for Auxiliary Systems, only list the internals of heat exchangers in the Open Cycle Cooling Water Systems (Service Water) Section VII, C1.3-a & C1-3-b. Note that the Structure and/or Component States "Heat Exchanger (between open-cycle and closed-cycle cooling water systems". LRA Table 3.3.2-3 utilized Section VII.C1-3-a to match the component, material , & environments for evaluation. Note E was intended to reflect that the component was being managed by a different program than refected in the GALL.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 (pg. 3-124) shows that CCW manages Heat Transfer Degradation for copper alloys in Raw Water and references GALL VII.C1.3-b which refers to the OCCW AMP for managing buildup of deposits. Justify the use of CCW in lieu of OCCW.

Final Response: The Component Cooling Water Heat Exchanger AERMs being managed for buildup of deposit of copper alloys in raw water are being managed by the Open Cycle Cooling Water Program and by the Closed Cycle Cooling Water Program, not in lieu of the Open Cycle Cooling Water Program.

GALL Vol 2, for Auxiliary Systems, only list the internals of heat exchangers in the Open Cycle Cooling Water Systems (Service Water) Section VII, C1.3-a & C1-3-b. Note that the Structure and/or Component States "Heat Exchanger (between open-cycle and closed-cycle cooling water systems". LRA Table 3.3.2-3 utilized Section VII.C1-3-a to match the component, material , & environments for evaluation. Note E was intended to reflect that the component was being managed by a different program than refected in the GALL.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 (pg. 3-127) shows that CCW manages loss of material for brass and copper alloys in Treated Water (Int) and references GALL VII.C1.3-a which refers to the OCCW AMP. Clarify how CCW manages loss of material for brass and copper alloys.

Final Response:

GALL Vol 2, for Auxiliary Systems, only list the internals of heat exchangers in the Open Cycle Cooling Water Systems (Service Water) Section VII, C1.3-a & C1-3-b. Note that the Structure and/or Component States "Heat Exchanger (between open-cycle and closed-cycle cooling water systems". LRA Table 3.3.2-3 utilized Section VII.C1-3-a to match the component, material , & environments for evaluation. Note E was intended to reflect that the component was being managed by a different program than refected in the GALL.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-12 (pg. 3-185) shows that OCCW manages loss of material for Cast Iron and Copper Alloys in Raw Water (Int) and references GALL VII.C1.2-a which describes selective leaching as a mechanism. Clarify how OCCW manages loss of material for Cast Iron and Copper Alloys in raw water. (3.3.1-29-XX-s)

Final Response: The term "loss of material" encompasses various mechanisms. Based on the characteristics of these mechanisms, there may be more than one program needed to manage loss of material. The OCCW Program manages loss of material aging mechanisms for cast iron and copper alloys, but is not credited with managing selective leaching. The details of how these programs manage aging effects are presented in Appendix B of the Palisades LRA.

As indicated in the request, selective leaching in valves and dampers of cast iron and copper alloys in the raw water environment is the mechanism at issue. Selective leaching is managed by the One Time Inspection Program for cast iron and a limited set of copper alloy heat exchanger tubes. The remainder of the copper alloy components at Palisades contain less than 15 percent zinc and, therefore, are not subject to selective leaching.

As indicated in the request, the GALL Volume 2 line item in question is VII.C1.2-a. This Volume 2 line item is referenced by GALL Volume 1 item 3.3.1-17, as well as by item 3.3.1-29. The differences between the two Volume 1 items appears to be that 3.3.1-17 is for all loss of material except selective leaching, managed by OCCW, and 3.3.1-29 is for selective leaching managed by some other program. In Palisades' case, this other program is One Time Inspection Program.

Plant specific notes 301 and 399 in the LRA provide assistance in determining where selective leaching is included under a particular line item where the AERM column only indicates loss of material. However, to further facilitate review, LRA Table 3.3.2-12, page 3-185, valves & dampers, fluid pressure boundary, cast iron, raw water, loss of material, One-Time Inspection Program, Table 1 item 3.3.1-17 is hereby changed to read 3.3.1-29. In addition, LRA plant specific note #304 is added to this line item.

Note 304 on page 3-198 is hereby changed to read, "This component contains less than 15% zinc; therefore, selective leaching is not a potential aging mechanism".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-16 (pg. 3-195) shows that OTI manages loss of material for Copper Alloy in Raw Water (Int) and references GALL VII.C1.1-a which describes selective leaching as a mechanism. Clarify how OTI manages loss of material for Copper Alloys in raw water.

Final Response: See the NMC response to Question 26, including the change to add plant specific Note 304. Note 304 is hereby added to the Notes Column on LRA Table 3.3.2-16 (page 3-195) to accompany the existing note "E" for copper alloy pipe & fittings and copper alloy valves & dampers.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-8 (pg. 3-158, 159, 161), refers to Table 1 item 3.3.1-18 (buried piping) and references GALL VII.H1.1-b. The LRA indicates that the environments are plant indoor air and raw water. The environments identified in GALL VII.H1.1-b are soil and groundwater. Explain how the Table 1 item is used for the plant air raw water environments.

Final Response: In LRA Table 3.3.2-8, on pages 3-158, 159, & 161, the NUREG 1801 Volume 2, Table 1 and Note information for Diesel Fuel Oil components in plant indoor air that are being managed by the System Monitoring Program (existing GALL reconciliation VII.H1.1-b, 3.3.1-18, note A) are hereby changed to VII.I.1-b, 3.3.1-05 and note A, respectively.

In LRA Table 3.3.2-8, on page 3-159, the environment Raw Water (Ext) for components Diesel Fuel Oil pipe and fittings is hereby changed to Soil (Ext).

In LRA Section 3.3.2.1.8, Environment, Raw Water (Ext) is hereby changed to Soil (Ext).

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-4 (pg. 3-130, 131, 133, 135), refers to Table 1 item 3.3.1-19 (compressed air) and references GALL VII.D1.1-a, 2-a, 3-a, 5-a, and 6-a. The LRA indicates that the AMP is OTI. The AMP listed in the GALL sections the compressed air monitoring program. The compressed air monitoring program incorporates "air quality" measuring and maintenance. Explain how OTI is used for carbon steel components in air.

Final Response: This response addresses NRC Questions 29 and 30.

NMC will develop a new Compressed Air Program for Palisades. This program will manage aging in carbon steel components within the compressed, saturated or moist air environments of the Compressed air systems. Compressed Air System descriptions for LRA Appendices A and B will be submitted for NRC review and approval by October 31, 2005. In addition, LRA Appendix A and B descriptions of the One-Time Inspection Program, revised to delete reference to management of compressed air components, will be provided.

Accordingly, in LRA Table 3.3.2.4, Compressed Air System, on pages 3-130 through 3-135, the Aging Management Program for all line items with an environment of Air (Int), is hereby changed to Compressed Air Program. For each affected line item, the associated notes for carbon steel, cast iron and galvanized steel components are hereby changed to Note “A” instead of Note “E”. The associated notes for non-carbon steel components (aluminum, brass, bronze, stainless steel, copper alloys) in the Air (Int) environment will retain the existing Standard Note “F” because those materials do not appear in GALL Section VII D, Compressed Air System.

Finally, in LRA Section 3.3.2.1.4, on page 3-87, the Compressed Air Program is hereby added to the bulleted list of aging management programs credited for the Compressed Air System.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Tables 3.3.2-4 (pg. 3-131, 132, 134, 135) and 3.3.2-10 (pg. 3-171), refer to Table 1 item 3.3.1-19 (compressed air) and references GALL VII.D1.5-a. The LRA indicates that the AMP is OTI. The AMP listed in the GALL sections the compressed air monitoring program. The compressed air monitoring program incorporates "air quality" measuring and maintenance. Explain how OTI is used for cast iron and galvanized components in air.

Final Response: See NMC Response to NRC Question 29.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-4 (pg. 3-131), refers to Table 1 item 3.3.1-19 (compressed air) and references GALL VII.D1.5-a. The LRA indicates that the AMP is Boric Acid Corrosion Program. Explain how the GALL item and Table 1 item applies the indicated MEAP.

Final Response: In LRA Table 3.3.2-4, on page 3-131, the NUREG 1801 Volume 2 and Table 1 line items cited for cast iron strainers crediting the Boric Acid Corrosion Program (existing VII.D.5-a, 3.3.1-19) are hereby changed to VII.I.1-a and 3.3.1-14, respectively.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-10 (pg. 3-171), refers to Table 1 item 3.3.1-19 (compressed air) and references GALL VII.D1.1-a, 2-a, 3-a, 5-a, and 6-a. The LRA indicates that the AMP is Bolting Integrity Program. Explain how the GALL item and Table 1 item applies the indicated MEAP.

Final Response: In LRA Table 3.3.2-10, on page 3-171, the component type Misc. Mechanical (fasteners, manifold, monitor) is hereby changed to Fasteners, since there are no AERM for the copper alloy "manifold" or the stainless steel "monitor." For carbon steel components which cite the Bolting Integrity Program to manage Loss of Material, the Bolting Integrity Program is hereby changed to System Monitoring Program; and the corresponding entries for NUREG 1801 Volume 2 (existing VII.C.1-a, 2-a, 3-a, 5-a, 6-a), Table 1 (existing 3.3.1-19), and note (existing E) are hereby replaced with a single line of VII.I.1-b, 3.3.1-05, and note A, respectively.

In LRA Table 3.3.2-10, also on Page 3-171, the NUREG 1801 Volume 2 and Table 1 entries for the Loss of Preload AERM of carbon steel fasteners managed by the Bolting Integrity Program are hereby deleted. The notes for the Loss of Preload AERMs for carbon steel and copper alloy fasteners, are hereby changed to 324, H.

In LRA Table 3.3.2-10, also on Page3-171, for the Loss of Material AERM for copper alloy fasteners, Bolting Integrity Program is hereby changed to Boric Acid Corrosion Program.

In LRA Table 3.3.2-10, on page 3-172, first line item, the component type Misc. Mechanical (fasteners, manifold, monitor) is hereby changed to Fasteners, and the associated notes are changed to 324, H.

Finally, in LRA Table 2.3.3-10, on page 2-136, Misc. Mechanical (fasteners, manifold, monitor) is hereby changed to Fasteners.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-8 (pg. 3-160) references GALL VII.H1.4-b and specifies that Note A applies. GALL VII.H1.4-b is for external surfaces of carbon steel tanks in air. However, LRA is used for external surfaces of cast iron pumps in air, which is not consistent to the GALL reference. Explain the use of Note A in this application.

Final Response: In LRA Table 3.3.2-8, on page 3-160, for pumps in plant indoor air that are being managed by the System Monitoring Program, the NUREG 1801 Volume 2, Table 1, and Note entries (existing VII.H1.4-b, 3.3.1-23, A) are hereby changed to VII.I.1-b, 3.3.1-05 and notes 399, A, respectively.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-8 (pg. 3-160) references GALL VII.H1.4-b. GALL VII.H1.4-b is for external surfaces of carbon steel tanks in air that identifies the aging effects of loss of material. However, LRA is used for cast iron pumps in oil for loss of material and selective leaching. Explain the applicability of this GALL item to cast iron pump in oil for selective leaching and loss of material.

Final Response: The Diesel Fuel Oil pumps in plant indoor air that are being managed by the Diesel Fuel Monitoring and Storage Program and One Time Inspection Program and reads GALL item VII.H1,4-b with an Table 1 item of 3.3.1-23 and note of A should read "note of F and 399."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Tables 3.3.2-1 (pg 3-119), 3.3.2-2 (pg 3-122), 3.3.2-3 (pg 3-126), 3.3.2-5 (pg 3-139), 3.3.2-7 (pg. 3-153), 3.3.2-8 (pg 3-158), 3.3.2-9 (pg 3-167), 3.3.2-11 (pg 3-176), 3.3.2-14 (pg 3-189), and 3.3.2-15 (pg 3-192) reference GALL VII.I.2-a for loss of preload. GALL VII.I.2-a addresses the loss of material for carbon and low alloy steel. Explain the applicability of this GALL item to loss of preload for these components.

Final Response: The Tables list items that are being managed by the Bolting Integrity Program and cite NUREG 1801 Volume 2 Item VII.I.2-a with a reference note 324. Note 324 states "Loss of preload is included here in response to recent NRC RAIs on non-primary system, high temperature bolting that may experience loss of preload. The Palisades Bolting Integrity Program manages potential bolting AERMs and event driven degradation. GALL reconciliation is based on Loss of Material."

In discussions with the audit team, it was agreed that line items for Loss of Preload AERMs, shown in LRA Section 3.3 tables for non-safety related systems, would not cite NUREG 1801 Volume 2 or Table 1 items, and would indicate a Standard note H.

Accordingly, for all Loss of Preload AERMs listed in LRA Sections 3.3 and 3.4 tables, the NUREG 1801 Volume 2 and Table 1 entries are hereby deleted, and the notes are changed to H. The following LRA Section 3.3 Tables were affected by this change: 3.3.2-1 (page 3-119), 3.3.2-2 (page 3-122), 3.3.2-3 (page 3-126), 3.3.2-5 (page 3-139), 3.3.2-6 (page 3-143), 3.3.2-7 (page 3-153), 3.3.2-8 (page 3-158), 3.3.2-9 (page 3-167), 3.3.2-11 (page 3-176), 3.3.2-13 (page.3-187), 3.3.2-14 (page 3-189), and 3.3.2-15 (page 3-192). The following LRA Section 3.4 Tables were affected by this change: 3.4.2-1 (page 3-220), 3.4.2-2 (page 3-224), 3.4.2-3 (page 3-228), 3.4.2-4 (page 3-235), 3.4.2-5 (page 3-240), 3.4.2-6 (page 3-244), and 3.4.2-7 (page 3-248).

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-6 (pg. 3-150) references GALL VII.I.2-b. GALL VII.I.2-b is for carbon and low alloy steel in moist air to manage crack initiation and growth through the bolting integrity program. However, the LRA is used for cast iron traps in air and manages loss of material by system monitoring. Explain the consistency of the LRA to this GALL Item.

Final Response: In LRA Table 3.3.2-6, page 3-150, the NUREG 1801 Volume 2 and Table 1 entries for traps in plant indoor air that are being managed by the System Monitoring Program (existing VII.I.2-b, 3.3.1-24 and note of 399, A) is hereby changed to VII.I.1-b, 3.3.1-05 and notes 399, A. Note 399 states, "At Palisades, cast iron aging mechanisms are evaluated as carbon steel except for selective leaching."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-11 (pg. 3-174, 176), 3.3.2-12 (pg. 3-181, 182, 185), and 3.3.2-15 (pg. 3-192, 193) refer to Table 1 item 3.3.1-29 (selective leaching). The affected materials are carbon steel for which selective leaching does not apply. Explain how the Table 1 item is used for carbon steel.

Final Response: Table 1 item 3.3.1-29 (selective leaching) does not apply to these tables due to the material of the components is carbon steel. Therefore, the Table 1 entries in LRA Tables 3.3.2-11, -12, and -15, for a material of carbon steel and NUREG 1801 Volume 2 entry of VII.C3.1-a are hereby changed from 3.3.1-29 to 3.3.1-17. Also, the two NUREG 1801 Volume 2 entries of VII.C3.2-a on page 3-185 are hereby revised to VII.C3.1-a.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 (pg. 3-126) shows cracking as an aging effect copper alloy heat exchangers in treated water. (Cracking is not identified as an aging effect for copper alloys in GALL Rev. 1). Provide the basis for this aging effect and explain how CCW manages copper alloy cracking in treated water.

Final Response: The line item components are the Shield Cooling Heat Exchanger tubes & tubesheets.

Cracking due to stress corrosion cracking (SCC) is a potential aging mechanism if the following exist: "O2 > 100 ppb AND fluid contains ammonia or ammonium compounds". Cracking due to SCC is a potential aging mechanism for the shield cooling heat exchanger (E-64), at Palisades, due the component has fluid(s) that contain ammonia or ammonium compounds and O2>100ppb. (Mechanical Tools)

The Closed Cycle Cooling Water Program is an existing program that manages aging effects in closed cycle cooling water systems that are not subject to significant sources of contamination, in which water chemistry is controlled and heat is not directly rejected to the ultimate heat sink. The program includes (a) maintenance of system corrosion inhibitor concentrations to minimize degradation, and (b) periodic or one-time testing and inspections to assess SSC aging.

The program scope includes activities to manage aging in the Component Cooling Water (CCS) System, Emergency Diesel Generator (EDG) Jacket Cooling Water (Emergency Power System), and Shield Cooling System (SCS).

The program is based on requirements delineated in EPRI TR-107396, “Closed Cooling Water Chemistry Guideline,” and relies on mitigative measures to minimize corrosion Palisades Nuclear Plant
Application for Renewed Operating Licenses Appendix B - Aging Management Programs through the addition of corrosion inhibitors and maintenance of water chemistry within specified limits.

The program credits the One-Time Inspection Program for the inspection of selected Shield Cooling System and Emergency Diesel Generator system heat exchangers and a representative sample of stagnant portions of the system piping. The inspections will check for fouling and evidence of corrosion or cracking. Nondestructive examinations will be used, if practical and warranted, to verify pipe wall thickness at selected locations where loss of material has been experienced.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-3 (pg. 3-123) shows that the CCW manages loss of material of carbon steel components in air (int). Explain how the CCW manages loss of material in CS components in air (int).

Final Response: The component identified by this line item is the Component Cooling Water (CCW) Surge Tank and addressed the internal air in the tank (above the water line). The Closed Cycle Cooling Water Program takes credit for internal One Time Inspections of CCW components. During the inspection, the area above the water line in the tank will be inspected for aging degradation.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Tables 3.3.2-4 (pg. 3-133), 3.3.2-7(pg. 3-153), 3.3.2-10 (pg. 3-171, -172), 3.3.2-7(pg. 3-153), 3.3.2-12 (pg. 3-179), 3.3.2-13 (pg. 3-187) shows loss of preload as an aging effect for copper alloy, carbon steel, low alloy brass, and stainless steel components in air. (Loss of preload is not identified as aging effect for these materials in GALL Rev. 1). Provide the basis for this aging effect and explain how the Bolting Integrity Program manages these materials' loss of preload in air.

Final Response: This aging effect has been included in response to recent NRC positions taken with other applicants for license renewal. See also the NMC Response to NRC RAI B.2.1.3-1(c) in letter dated August 12, 2005.

The Bolting Integrity Program is an existing program that manages the aging effects associated with bolting through the performance of periodic inspections. The program also includes repair/replacement controls for ASME Section XI related bolting and generic guidance regarding material selection, thread lubrication and assembly of bolted joints. The program considers the guidelines delineated in NUREG-1339 for a bolting integrity program, EPRI NP-5769 (with the exceptions noted in NUREG-1339) for safety related bolting, and EPRI TR-104213 for non-safety related bolting.

The Bolting Integrity Program has been created to permit direct comparison with NUREG-1801. The program is considered to be an existing program since most of the activities addressed by the program are already being performed. The program credits activities performed under three separate aging management programs for the inspection of bolting. The three aging management programs are: (1) ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program, (2) Structural Monitoring Program, and (3) System Monitoring Program.

The System Monitoring Program provides the requirements for the inspection of non-safety related bolting within the scope of license renewal as follows: "Degradation of bolted connections is detected by visual inspections of the bolted components during system walkdowns. Bolted connections are inspected for missing fasteners and degradation such as damaged threads and evidence of corrosion. The minimum walkdown frequency is annual for those systems and components that are accessible during normal plant operation. Systems and components that are only accessible during plant outages, are inspected at least once per refueling interval. The inspection frequency may be increased based on the safety significance, production significance, discovery and/or operating experience of each system."

In discussions with the audit team, it was agreed that line items for Loss of Preload AERMs, shown in LRA Section 3.3 tables for primary systems, would not cite NUREG 1801 Volume 2 or Table 1 items, and would indicate a Standard note H. Accordingly, for all Loss of Preload AERMs listed in LRA Section 3.3 tables, the NUREG 1801 Volume 2 and Table 1 entries are hereby deleted, and the notes are changed to H. The following LRA Tables were affected by this change: 3.3.2-4 (pg. 3-133), 3.3.2-7(pg. 3-153), 3.3.2-10 (pg. 3-171, -172), 3.3.2-12 (pg. 3-179), 3.3.2-13 (pg. 3-187).

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-4 (pg. 3-132, 133) shows cracking and loss of material as aging effects for brass, copper alloy, and stainless steel components in air. (Cracking and loss of material is not identified as aging effects for brass, copper alloys, and stainless steel components in GALL Rev. 1). Provide the basis for these aging effects and explain how OTI manages brass, copper alloy, and stainless steel cracking and loss of material in air. [MEAP 4 Accepts this]

Final Response: See NMC Response to NRC Question 29.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 (pg. 3-142) shows Heat Transfer Degradation as an aging effect for carbon steel coolers in oil (ext) and is managed by OTI. Explain how the OTI manages heat transfer degradation for carbon steel coolers in oil.

Final Response: The line item in question is the Fire Pump Lube Oil Coolers that have oil of the shell side and raw water (fire protection water) on the tube side. The One-Time Inspection Program is a new program that addresses potentially long incubation periods for certain aging effects, including various corrosion mechanisms, cracking, and selective leaching, and provides a means of verifying that an aging effect is either not occurring or progressing so slowly as to have negligible effect on the intended function of the structure or component. Hence, the One-Time Inspection Program provides methods for verifying an aging management program is not needed, verifying the effectiveness of an existing program, or determining that degradation is occurring which will require evaluation and corrective action.

The program includes (a) determination of appropriate inspection sample size, (b) identification of inspection locations, (c) selection of examination technique, with acceptance criteria, and (d) evaluation of results to determine the need for additional inspections or other corrective actions.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 (pg. 3-143) shows loss of material as an aging effect for galvanized steel filter/strainers with filtration and fluid pressure boundary IF in atmosphere/weather (ext) and is managed by System Monitoring Program (SMP). Explain how the SMP manages loss of material for galvanized steel filter/strainers in atmosphere/weather (ext).

Final Response: The line item in question is the Emergency Diesel Generator Air Intake Filters that are located in the Diesel Generator Air intake/exhaust air plenum. The System Monitoring Program is an existing plant-specific program that manages aging effects for normally accessible, external surfaces of piping, tanks, and other components and equipment within the scope of License Renewal. These aging effects are managed through visual inspection and monitoring of external surfaces & filters for leakage and evidence of material degradation.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 (pg. 3-151) shows that the Diesel Fuel Monitoring and Storage Program manages loss of material of carbon steel components in air (int). Explain how the Diesel Fuel Monitoring and Storage Program manages loss of material in CS components in air (int).

Final Response: The line item in question is the valves (with a internal air environment) located on the EPS fuel oil tanks. When the Diesel Fuel Oil Monitoring and Storage Program drain the tanks for internal inspection the opportunity is provided for these valves to be inspected.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 (pg. 3-150, 151, 152) shows cracking as an aging effect for brass, copper alloy, and bronze components in oil. (Cracking as an aging effect for these materials in GALL Rev. 1). Provide the basis for this aging effect and explain how Diesel Fuel Monitoring and Storage Program and OTI manage brass, copper alloy, and bronze cracking in oil.

Final Response: Cracking due to stress corrosion cracking (SCC) for copper alloys in an air/gas environment is a potential aging mechanism if the following exist: "Gas is not dried air, N2 CO2, H2 or fluorocarbons AND Component susceptible to wetted environment AND A potential for concentrating contaminants exists." Cracking due to SCC is a potential aging mechanism for the diesel generator starting air pressure control valves, at Palisades, due to the gas is not dried air, N2, CO2, H2 or fluorocarbons, is susceptible to a wetted environment, and has a potential for concentrating contaminants. (Mech Tools)

Cracking due to stress corrosion cracking (SCC) for copper alloys in an oil environment is a potential aging mechanism if the following exist: "Potential for water pooling / separation AND O2 > 100 ppb". Cracking due to SCC is a potential aging mechanism for the diesel generator fuel oil valves, at Palisades, due to the potential for water pooling / separation and O2 > 100 ppb. (Mech Tools)

The Diesel Fuel Monitoring and Storage Program is an existing program that assures the continued availability and quality of fuel oil to be used in diesel generators and diesel fire pumps. The program includes (a) monitoring and trending of fuel oil chemistry to maintain fuel oil quality and mitigate corrosion, (b) periodic draining, cleaning, and internal inspection of fuel oil storage tanks, and (c) verification of program effectiveness by a one-time measurement of fuel oil storage tank bottom thickness confirming the absence of an aging effect. Fuel oil quality is maintained by monitoring and controlling fuel oil contamination in accordance with the guidelines of the American Society for Testing Materials (ASTM) Standards D 1796, D 2276, D 2709, and D 4057.

Exposure to fuel oil contaminants, such as water and microbiological organisms, is minimized by periodic draining and cleaning of tanks and by verifying the quality of new oil before its introduction into the storage tanks. However, corrosion may occur at locations in which contaminants may accumulate, such as tank bottoms. Draining the fuel oil tanks and verifying the quality of new oil prevents water pooling / separation of fuel oil from entering the process piping components and the potential of SCC.

The One-Time Inspection Program is a new program that addresses potentially long incubation periods for certain aging effects, including various corrosion mechanisms, cracking, and selective leaching, and provides a means of verifying that an aging effect is either not occurring or progressing so slowly as to have negligible effect on the intended function of the structure or component. Hence, the One-Time Inspection Program provides methods for verifying an aging management program is not needed, verifying the effectiveness of an existing program, or determining that degradation is occurring which will require evaluation and corrective action.

For verification of the effectiveness of the Water Chemistry Program and the Closed Cycle Cooling Water Program for stagnant or low flow areas and for verification of the effectiveness of the Diesel Fuel Monitoring and Storage Program, a visual examination or other appropriate NDE methodology, in accordance with the ASME code and 10 CFR 50 Appendix B, will be used to verify that degradation due to the applicable aging effects is not occurring

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-7 (pg. 3-157) shows loss of material as an aging effect for cast iron valves/dampers in atmosphere/weather (ext) and is managed by System Monitoring Program (SMP) and Fire Protection Program. Explain how these programs manage loss of material for cast iron valves/dampers in atmosphere/weather (ext).

Final Response: The cast iron valve/damper in question is valve MV-FP204. The Fire Protection Program uses NDE techniques to maintain wall thickness for Fire Main piping and cast iron valve MV-FP204. The System Monitoring Program uses visual observation techniques to verify that the external surface of MV-FP204 is adequately managed. Accepted "as is" by Saba on 8/2/05 without discussion.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-7 (pg. 3-157) shows that the Fire Protection Program manages loss of material of cast iron components in air (int). Explain how the Fire Protection Program manages loss of material in CI components in air (int).

Final Response: The cast iron valve/dampers in question are Fire Hydrants. Periodic Fire Main Flushing is conducted with flow through the Fire Hydrants. The Fire Hydrant barrel is drained and verified to be drained after each flushing by qualified personnel to minimize loss of material due to general corrosion. Accepted "as is" by Saba on 8/2/05 without discussion.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-7 (pg. 3-153) shows that the OTI Program manages loss of material of stainless steel accumulators in oil. Explain how the OTI program manages loss of material in SS components in oil.

Final Response: The One-Time Inspection program assesses the loss of material due to aging mechanisms such as galvanic and general corrosion, MIC, pitting and crevice corrosion on the surfaces of susceptible components, as identified in the Program Basis Document. This program will select the locations to be inspected, provide the inspection criteria, evaluate the results of the inspections, and provide recommendations for additional inspections, as necessary. Accepted "as is" by Saba on 8/2/05 without discussion.

The accumulators in question are the PCP (RCP) Motor Oil Collection Tanks. Each PCP Motor has it's own small (<5gal.) dedicated tank. These tanks are Stainless Steel. The oil collected is lube oil from the PCP Motor. The lube oil collected is not expected to have any water as a contaminate. Therefore, the tank would experience no aging effects. However, Palisades conservatively decided to include the possibility of water intrusion and evaluate it as such. The One-Time Inspection Program will be used to verify that water intrusion does not exist and loss of material is not occuring.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-7(pg. 3-153) shows loss of preload as an aging effect for carbon steel components in soil (ext) and raw water (ext). (Loss of preload is not identified as aging effect for these environments in GALL Rev. 1). Provide the basis for these aging effects and explain how the Bolting Integrity Program manages loss of preload in soil.

Final Response: Palisades considers loss of Pre-load to be applicable to all fasteners even though GALL considers loss of pre-load to be applicable only to Class 1 fasteners. Palisades has decided to manage loss of pre-load in fasteners with the Bolting Integrity Program.

The ASME Section XI IWB, IWC, IWD, IWF In-service Inspection Program provides the requirements for in-service inspection of ASME Class 1, 2, and 3 piping, supports, and their integral attachments, which includes pressure retaining and support bolting. This program specifically discusses the inspection and lubrication of the reactor vessel head closure studs. The program supplements the ASME Section XI (Code Case N-491-2), Subsection IWF requirements by applying the inspection requirements of Subsection IWB, Category B-G-1 to high yield strength (≥150 ksi) bolting used in Nuclear Steam Supply System (NSSS) component supports ..."

- The System Monitoring Program provides the requirements for the inspection of non-safety related bolting within the scope of license renewal.

- The Structural Monitoring Program provides the requirements for the inspection of all structural support bolting within the scope of license renewal. Other bolting and fasteners are also included within the scope of this program, such as those used in supports for cable trays, conduits, and cabinet supports.

In their July 12, 2005 letter, the NRC sent an RAI that covers the some issue. The RAI asks us to identify if we have any buried bolting and if we do to clarify which of our aging management programs manage the bolting.

RAI B2.1.3-1(b) The LRA AMR tables and AMP B2.1.3 or AMP B2.1.5 do not identify any bolting that is exposed to soil. The applicant is requested to identify if any bolting is used in buried applications and to clarify if the bolting integrity program or the buried services corrosion monitoring program manage such bolting.

Our response to this RAI will encompass this question. The basis for the aging effects is our intention to apply the loss of pre-load aging effect to our non-safety related equipment. How we intend to age manage this program is by the making proper bolted connections. We verify that we are making proper bolted connections by periodic visual inspections.

Loss of preload is soil is an aging affect. Our response to the RAI will show if we have bolting exposed to soil and which program we age manage under.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-8 (pg. 3-158) shows that the Diesel Fuel Monitoring and Storage Program manages loss of material of carbon steel components in air (int). Explain how the Diesel Fuel Monitoring and Storage Program manages loss of material in CS components in air (int).

Final Response: The line item in question is the Fuel Oil Tanks (air space). When the Diesel Fuel Oil Monitoring and Storage Program drain the tanks for internal inspection the internal upper portion of the tanks are also inspected for aging degradation.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-9 (pg. 3-169) shows that the OTI manages loss of material for cast iron traps in steam environment. Selective leaching is not identified as an aging effect for cast iron. Justify the exclusion of this aging effect and how OTI manages cast iron aging effects in steam.m.

Final Response: Selective leaching is an aging mechanism and is included under the aging effect of loss of material. OTI is designated to manage selective leaching at Palisades.

How OTI manages these effects is part of implementation and has not been identified. Formulation of implementation procedures and methods is scheduled to begin later this year and continue on into 2006.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-9 (pg. 3-164) shows that the OTI manages loss of material for copper alloy in steam environment. Explain how OTI manages copper alloy heat exchanger aging effects in steam.

Final Response: To Table 3.3.2-9, on page 3-164, the last line item, the Water Chemistry Program is hereby added to manage Loss of Material in heat exchanger copper alloys in a steam environment. Similarly, the Water Chemistry Program is hereby added to manage Loss of Material for the following additional components in Table 3.3.2-9:

- Heat Exchanger/Carbon Steel/Steam (LRA Page 3-163)
- Pipe and Fittings/Carbon Steel/Steam (LRA Page 3-168)
- Valves and Dampers/Bronze/Steam (LRA Page 3-169)

In addition in Table 3.3.2-9, on page 3-170, for carbon steel Valves and Dampers in a steam environment, “Steam” is hereby revised to “Steam (Int)” and “System Monitoring Program” is revised to “Water Chemistry Program.”

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-12 (pg. 3-183) shows that the SMP manages cracking of rubber components in plant indoor air (ext) and not increased hardness and shrinkage. Explain why hardness and shrinkage is not an applicable aging effect for rubber in plant indoor air (ext). Additionally, explain how the SMP manages aging effects in rubber components in plant indoor air (ext).

Final Response: Palisades believes that this issue is being resolved by our resposne to RAI B2.1.20-1 to the division of engineering, and a final resolution is not possible as part of this AMR audit.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: The GALL Report recommends the use of Water Chemistry to manage the loss of material for the heat exchanger (page 3-221 and page 3-244) and (page 3-240), accumulators (page 3-243), filters/strainers (page 3-243), traps (page 3-246) and pumps (page 3-225 and page 3-245) component types exposed to a treated water environment in the Condensate, Demineralized Makeup Water, Main Air Ejector Gland Seal and Main Steam Systems. Please clarify how One Time Inspection only will manage this aging effect.

Final Response: NMC concurs that it is appropriate to include the Water Chemistry Program in addition to the One Time Inspection Program for these line items. Therefore, the following changes are hereby made as indicated below:
On pg 3-221, for the carbon steel heat exchanger in Treated Water, the Water Chemistry Program is hereby added with VIII.E.4-a as the GALL vol. 2 item, 3.4.1-02 as the Table 1 item and Note A in the Notes column. Note A is correct because it matches GALL line item VIII.E.4-a.
On pg 3-225, for the heat exchanger in treated water, the Water Chemistry Program is hereby added with VIII.E.1-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note E is changed to Note C for this line item. The use of Note C for this item is correct because it matches GALL VIII.E.1-b except that the component is different.
On pg 3-225, for the Pumps in treated water, the Water Chemistry Program is hereby added with VIII.E.5-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Notes C & 417 in the Notes column. For the One Time Inspection Program, Note E was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.5-b except that the component is different.
On pg 3-240, for heat exchangers in Treated Water, the Water Chemistry Program is hereby added with VIII.D1.2-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Notes C, 411 & 415 in the Notes column. For the One Time Inspection Program, Note D was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.D1.2-b except that the component is different. .
On pg 3-243, for Accumulators in Treated Water, the Water Chemistry Program is hereby added with VIII.F.1-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note E was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.F.1-b except that the component is different.
On pg 3-243, for Filters in Treated Water, the Water Chemistry Program is hereby added with VIII.E5-a as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note “E” was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.E5-a except that the component is different.
On pg 3-244, for heat exchangers in Treated Water, the Water Chemistry Program is hereby added with VIII.F.1-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note E was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.F.1-b except that the component is different. .
On pg 3-245, for Pumps in Treated Water, the Water Chemistry Program is hereby added with VIII.E.5-a as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note E was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.E5-a except that the component is different. .
On pg 3-246, for Traps(steam) in Treated Water, the Water Chemistry Program is hereby added with VIII.F.1-b as the GALL Vol. 2 item, 3.4.1-02 as the Table 1 item and Note C in the Notes column. For the One Time Inspection Program, Note E was changed to Note C. The use of Note C for this item is correct because it matches GALL VIII.F.1-b except that the component is different.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: The GALL Report recommends the use of Water Chemistry to manage the loss of material for the heat exchanger shell exposed to a steam environment in the Condensate system. Please clarify how One Time Inspection will manage this aging effect.

Final Response: The CST HEATER SHELL credits the Water Chemistry Program. The effectiveness of the Water Chemistry Program is verified by the One-Time inspection Program. The CONDENSER SHELL (E-10) credits the One-Time Inspection Program only. This is acceptable for the Condenser Shell because the internal surface is large and accessible to qualified personnel for inspection purposes during outages.

The Condenser shell was added by the (a)(2) effort. The Palisades One-Time Inspection Program includes a variety of inspection and testing activities that are designed to detect degradation due to aging effects prior to loss of intended function.

The examination techniques will be visual, volumetric, or other appropriately established NDE methods. The NDE will be performed by qualified personnel following procedures consistent with the ASME Code and 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: The GALL Report recommends the use of Water Chemistry augmented by One-Time Inspection to manage the loss of material for the tanks exposed to a treated water environment in the Demineralized Water Makeup system. Please clarify how using One Time Inspection only will adequately manage this aging effect.

Final Response: NMC concurs that it is appropriate to include the Water Chemistry Program in addition to the One Time Inspection Program for these line items.

Therefore, the following changes are hereby made as indicated below:

In LRA Table 3.4.2-2, on pages 3-224 and 3-225, Water Chemistry Program is hereby added to manage Loss of Material in the line items for stainless steel filters in treated water, carbon steel heat exchangers in treated water, and stainless steel pumps in treated water. In all cases, the corresponding notes for the both the Water Chemistry Program and the One-Time Inspection Program for these line items are 417, C.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: The application identifies GALL Volume 2 Item VIII.C.1-a for this item. PNP is committing to use One-Time Inspection instead of Flow Accelerated Corrosion as recommended by the GALL. The applicant has assigned of note E to this line item. It would seem more appropriate to identify a different GALL Item for this component, since the one assigned exressly excludes components in the main steam system.

Final Response: The explicit item addressed in this question was resolved during the audit.

As the discussions evolved, however, the portion of the NMC response, that the auditor wished to have docketed, related to NUREG Volume 2 item VIII.E.1-a for "Accumulators" in LRA Table 3.4.2-4 on page 3-235, rather than VII.C.1-a. For this specific follow up question, NMC agrees that there is a more appropriate GALL citation for this line item. Therefore, the NUREG 1801 Volume 2 line item for accumulators in treated water, managed by One Time Inspection Program, is hereby changed to VIII.E.1-b, and the existing note E for this line item is changed to C.

For completeness, the Water Chemistry Program is also added to manage Loss of Material in carbon steel accumulators in treated water, with NUREG 1801 Volume 2, Table 1, and Note entries of VIII.E.1-b, 3.4.1-02, and C, respectively.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: For pipes and fittings in the feedwater system, the application identifies GALL Volume 2 Items VIII.D1.3-a, VIII.G.1-c,and VIII.G.2-a. Please clarify the assignment of notes A and B to these line items. WITHDRAWN.

Final Response: QUESTION WITHDRAWN

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-235 of the PNP LRA, CS accumulators and heat exchangers are addressed. Please confirm that the GALL line item should be VIII.E.1-b and not VIII.E.1-a. Also please justify why Water Chemistry is not needed to manage this aging effect.

Final Response: In Table 3.4.2-4 on page 3-235, for carbon steel accumulators and heat exchangers in treated water, the Water Chemistry Program is hereby added to manage Loss of Material, with a corresponding note C.

In addition, the NUREG 1801 Volume 2 entry for the One Time Inspection Program, for accumulators and heat exchangers in treated water, is hereby changed to VIII.E.1-b, and the corresponding note is changed to C.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-245 of the PNP LRA, CS in steam is addressed. The component type is Pipe & Fittings in the Main Steam System. The GALL Item is for Pipe & Fittings In the Steam Turbine System. Please justify the assignment of Notes A or B for these line items. WITHDRAWN.

Final Response: QUESTION WITHDRAWN -

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-245 of the PNP LRA, CS in treated water is addressed. The component type is Pipe & Fittings in the Main Steam System. The GALL Item is for Pipe & Fittings In the Steam Generator Blowdown System. Please justify the assignment of Notes A or B for these line items. WITHDRAWN.

Final Response: QUESTION WITHDRAWN -

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-227 of the PNP LRA, CS in raw water is addressed. The applicant has listed the aging effect of loss of material for this line item. The GALL Item referenced is VIII.G.5-b which is for an aging effect of buildup of deposit and recommends Open Cycle Cooling water to manage this effect. Please clarify that this is your intent.

Final Response: In Table 3.4.2-3, on page 3-227, to the line item for heat exchangers of carbon steel in raw water, The Open Cycle Cooling Water (OCCW) Program is hereby added to manage Loss of Material. The corresponding NUREG 1801 Volume 2 and Table 1 items are VIII.G.5-b and 3.4.1-09, respectively. In addition, the referenced Table 1 Item for the One-Time Inspection Program is changed to 3.4.1-09. For completeness, the notes for both of these lines are changed to read 411 and E.

In addition, Table 3.4.2-3, on page 3-232, for management of Loss of Material in Valves & Dampers of Carbon Steel in a Raw Water (Int) environment, the Fire Protection Program, and the Open Cycle Cooling Program are added to the existing One-Time Inspection Program. The associated GALL Volume 2 and Volume 1 line items for all three programs are VIII.G.1-d and 3.4.1-03, respectively, and the notes for all three are 411, 421 and D.

Finally, on page 3-252, the referenced plant specific note for these line items (Note # 421), is hereby revised as follows: "The AFW isolation valves of backup supplies from the Fire Protection Water and Service Water are normally closed. The two isolation valves from the Fire protection Water will be age managed by the Fire Protection Program and the One-Time Inspection Program. The two isolation valves from the Service Water System will be age managed by the Open Cycle Cooling System and the One-Time Inspection program."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-229 of the PNP LRA, CS in oil is addressed. This consistent with GALL line item is missing a reference to a Table 1 item. Should this line item reference Table 1 line item 3.4.1-04? Please confirm that this is a typo.

Final Response: The Table 1 item was inadvertently omitted. On pg 3-229, for piping & fittings in oil, Table 1 item 3.4.1-04 is hereby added.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-237 of the PNP LRA, cast iron in air is addressed. The GALL recommends managing the loss of material aging effect for this material and environment combination with a plant specific AMP. Please provide the justification for not requiring a aging management program for this component type, in the Heater Extraction and Drain System

Final Response: The cast iron valve (page 3-237) in the Heater and Extraction Drain System, that is exposed to a plant indoor air external environment, is exposed to steam internally . The external surface temperature is >212 degrees Fahrenheit. The external surface is dry because of the steam temperature and the valve is located inside plant buildings. Therefore, this component has no external aging effects.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-246 of the PNP LRA, CS in steam is addressed. The component type is Valves & Dampers in the Main Steam System (page 3-246 and page 3-247). The GALL Item is for Valves in the Steam Turbine System and the Steam Generator Blowdown System. Please justify the assignment of Notes A for these line items. WITHDRAWN.

Final Response: QUESTION WITHDRAWN -

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-246 of the PNP LRA, CS in steam is addressed. Please clarify why GALL VIII.A.2-a is referenced for this line item in addition to GALL VIII.B1.2-b. WITHDRAWN

Final Response: QUESTION WITHDRAWN -

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: For heat exchangers in the Main Steam System, the applicant has selected One Time Inspection when the GALL item referenced VIII.B1.1-a recommends Water Chemistry to manage this aging effect. Please justify the of One Time Inspection for this line item.

Final Response: Palisades agrees that it is appropriate to add the Water Chemistry Program. In Table 2.4.2-6, on page 3-244, for management of Loss of Material in carbon steel heat exchangers, Water Chemistry Program line items are hereby added for both the Steam (Int) and Treated Water (Int) environments.

For the heat exchangers in Steam (int), the corresponding NUREG 1801 Volume 2, Table 1 and Notes are VIII.B.1.1-a, 3.4.1-07, and C, respectively, for both the Water Chemistry and One-Time Inspection Programs. For the heat exchangers in Treated Water (Int), the corresponding NUREG 1801 Volume 2, Table 1 and Notes are VIII.F.1-b, 3.4.1-02, and C, respectively, for both the Water Chemistry and One-Time Inspection Programs.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: For fasteners in the Main Steam and the Feedwater Systems, the applicant has referenced GALL Volume 2 item VIII.H.2-a. This item is for an aging effect of Loss of Material/General Corrosion. The aging affect listed for this line item in the application (page 3-244 and 228) is Loss of Pre-load. Please justify the use of Note C to characterize this line item. This would appear to not be consistent with GALL.

Final Response: Loss of Preload is not identified as an aging effect for non-primary systems in the Steam and Power Conversion section of GALL. Therefore, on pages 3-244 and 3-248, the NUREG 1801 Volume 2, Table 1 entries for the AERM of Loss of Preload are hereby deleted, and the corresponding Notes entries are changed to H.

The same changes are hereby made for fasteners in the following systems: Condensate & Condenser (page. 220), Demineralized Makeup Water (page 224), Feedwater (page 228), Heater Extraction & Drain (page 235), Main Air Ejector & Gland Seal (page 240), Main Steam (page 244), & Turbine Generator & Crane System (page 248).

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: For fasteners in the Turbine Generator System, the applicant has not considered loss of material for carbon steel fasteners in a plant indoor air (ext) environment. Please justify not considering this aging effect.

Final Response: Table 3.4.2-7 identifies loss of material for carbon steel fasteners in a plant indoor air (ext) environment. Loss of material is managed by the System Monitoring Program.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: For accumulators made of carbon steel in sun, weather, humidity and moisture, the GALL recommends the use of Aboveground Carbon Steel Tanks. The applicant is applying One Time Inspection and System Monitoring Program. Please clarify the use of Notes A and B for this line item. This is also applied to accumulators in the Demineralized Makeup Water System, although Notes C and D are applied because the are referencing a different GALL system.

Final Response: For the accumulators (pg 3-220) in the Condensate System, exposed to an Atmosphere/Weather external environment the note for the One-Time Inspection Program and the System Monitoring Program is hereby changed to E. The listed plant specific notes are unchanged. This component is the Condensate Storage Tank. It is located outdoors & exposed to an atmosphere/weather environment.

For the Accumulators in the Demineralized Makeup Water System (pg 3-224), exposed to an Atmosphere/Weather external environment, the notes are hereby changed to E. The plant specific notes are unchanged. This component is the Primary System Make-Up Tank (T-81). It is located above ground and it is exposed to the weather.

In both cases, Palisades uses the System Monitoring Program to manage the external surface and the One-Time Inspection Program to manage the bottom thickness, rather than the Above Ground Tank Inspection Program.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: For pumps in the Main Steam System made of carbon steel, the applicant refers to Table line item 3.4.1-13 which is for loss of material/boric acid corrosion of external services. Please justify why System Monitoring is the aging management program and not Boric Acid Corrosion

Final Response: For the pumps in the Main Steam System (page 3-245), that are exposed to a plant indoor air external environment and managed by the System Monitoring Program, the Table 1 item is hereby changed to 3.4.1-05 because the aging effect is loss of material due to general corrosion, not loss of material due to boric acid wastage. These pumps are Blowdown Pumps, located in the Turbine Building. The system monitoring program is the correct program to manage loss of material in plant indoor air on the external surface of carbon steel components.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: "On page 3-237, -239, and -242 of the PNP LRA, cast iron in steam is addressed. GALL Rev 1 item VIII.F-14 which is referenced by the applicant does not address a steam (int) environment. Please clarify the assignment of this GALL item for this line item.□"

Final Response: Discussions with the auditor clarified that this question is focused on selective leaching of cast iron components in a steam environment, as shown on pages 3-237, 3-239, and 3-242.

The components in question are: (1) cast iron valve (CK-HED400) (page 3-237) in the Heater Extraction & Drain System, (2) cast iron Blowers Fans Compressor Vacuum (Steam Jet Air Ejectors) (page 3-239), and the cast iron Valves & Dampers (Manual valves MV-AE115, 116, 117, &118) (page 3-242) in the Main Air Ejector and Gland Seal System. NMC controls the chemical makeup of steam and treated water in the Steam & Power Conversion Systems with the Water Chemistry Program (Secondary Chemistry) . The aging effects of cast iron in a steam internal environment are considered to be the same as those defined for cast iron in condensate (Treated Water). Therefore, loss of material due to selective leaching is a valid aging effect for these components. No change is required in the LRA for these components.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-245 of the PNP LRA, copper alloy piping and fittings component type is addressed. GALL Rev 1 item VII.J-7 is for an environment of air with borated water leakage. The environment in the application for this line item is Plant Indoor Air (Ext). Please clarify that the application of a Plant Indoor Air (Ext) environment was intended. If so please justify the application of GALL Iem VII.J-7 for this line item.

Final Response: Yes. Palisades has only two Air evironments inside plant buildings. They are: "Plant Indoor Air" and "Containment Air" . "Plant Indoor Air" include rooms the Intake Building, Turbine Building and Auxiliary Building. Components that are located in rooms where boric acid leakage is possible are assumed to be exposed to loss of material due to boric acid corrosion and are managed by the Boric Acid Corrosion Program. Components located in other rooms are not susceptible to boric acid corrosion. Therefore, This line item should reference GALL item VII.J-7

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-246 of the PNP LRA, SS in air is addressed. GALL Rev 1 item VIII.I-11 is for an environment of air-indoor uncontrolled on external surfaces. The environment in the application for this line item is Air (Int). Please justify the application of this GALL item considering the difference in the environment as well as the application to an internal surface. GALL R1 indicates no aging effect for the air environment on an external surface.

Final Response: Page 3-246 only has carbon steel components. Palisades LRA page 3-233 is the only page that have stainless steel with an air internal environment & GALL Rev. 1 VIII.I-11. The valves in question are small stainless steel valves MV-FW360, MV-FW386 & MV-FW388. These valves are located on instrument lines connected to the AFW Steam Supply Piping. The valves are located downstream of the normally closed steam supply control valve (CV-0522B) as shown on P&ID M-205-2. These valves are exposed to an air internal environment because the AFW Steam Supply piping is normally vented. The steam supply piping is normally dry. However, no reference was provided for this item in GALL Rev. 0. Therefore, Draft GALL Rev. 1 was used to more closely align this item.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-230 of the PNP LRA, SS in weather is addressed. The application refers to GALL Rev 1 item VIII.F1-5. There is no item by this number in the GALL Rev 1. Please clarify if this is a typo and if so provide the proper reference to GALL Rev 1.

Final Response: GALL Rev 1 item VII.F1-5 is listed in the Control Room Area Ventilation System. It identifies stainless steel ductwork with external condensation. The Palisades item in question is heat traced stainless steel pipe located outdoors between the turbine building and the condensate storage tank as shown on P&ID M-220-1(D-6). However, Neither GALL Rev. 0 or GALL Rev. 1 have a line item for stainless steel in atmosphere/weather. Therefore, the original evaluation note of G must prevail.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-225 of the PNP LRA, SS in soil is addressed. The application refers to GALL Rev 1 item VIII.G-22. The environment for this item is raw water. Did you mean to reference item VIII.G-23 for which the environment is soil. Please clarify if this is a typo and if so provide the proper reference to GALL Rev 1.

Final Response: Palisades considers that piping buried in soil is externally exposed to non-treated ground water which we consider raw water. Since the Open Cycle Cooling Water Program addresses the internal surface only. The external surface is managed by the the Buried Services Program. GALL Rev. 1 item VIII.G-23 should be used instead of GALL Rev. 1 item VIII.G-22. Whereby, the Plant Specific Program mentioned in VIII.23 is the Buried Services Program.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.2-01-W)) In LRA table 3.5.2-4 (table 2) on page 3-347 for component type HELB/MELB Component-Concrete, Protected the associated GALL revision 1 volume 2 line item is III.A3-11, which is for Masonry Walls. If the subcomponent is masonry walls, explain why GALL revision 0 volume 2 line item III.A3.3-a is not shown for this LRA AMR with a different note than H.

Final Response: associated with a masonry block wall is correct. Accordingly, the appropriate GALL alignment for this AERM should be to GALL Volume 2 (rev 0) line item III.A3.3-a with a standard note A rather than to no GALL line item with a note H as indicated in the LRA Table 3.5.4-2. A similar condition has been identified for component type "Building Framing - Concrete, Protected" on page 3-346. A more appropriate GALL alignment for the cracking AERM would also be to line item III.A3.3-a with a standard note A.

Therefore, the Cracking line items in component types “HELB/MELB Component-Concrete, Protected” on page 3-347 and "Building Framing - Concrete, Protected" on page 3-346 are hereby revised to add NUREG 1801 Volume 2 line item III.A3.3-a with note A replacing note H . Also, masonry block walls are added to the component description of component type "HELB/MELB Component-Concrete, Protected" in Tables 3.5.2-4 (page 3-347) and 2.4.4-1 (page 2-231).

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.3.1-11W1)) In LRA table 3.5.2-2 (table 2) on page 3-331 for component type Non-ASME Component Support-Auxiliary Bldg, Aluminum, Protected, explain why a GALL volume 2 line item and a table 1 item are shown with a note F.

Final Response: As indicated in plant specific note 503, component type "Non-ASME Component Support-Auxiliary Bldg, Aluminum, Protected" represents the new fuel storage racks, which is the component represented by GALL line item VII.A1.1-a. Palisades' new fuel racks are aluminum whereas the GALL line item is for carbon steel racks. Hence, note F, "Material not in NUREG 1801 for this component," is assigned.

Discussion with reviewer indicates that since neither the material nor program match, alignment with the GALL line item is not appropriate. Therefore, component type “Non-ASME Component Support-Auxiliary Bldg, Aluminum, Protected” on page 3-331 is revised to remove the GALL Volume 2 and Table 1 line item alignment, leaving the note F and 503 intact.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.3.1-13W1)) In LRA table 3.5.2-2 (table 2) on page 3-341 for component type Spent Fuel Storage Rack - Auxiliary Building, Stainless Steel, Borated Water, explain why GALL volume 2 line item III.A5.2-b and table 1 item 3.5.1-23 are not associated with this component and a note C assigned.

Final Response: "Spent Fuel Storage Rack, Auxiliary Building, Stainless Steel, Borated Water" is aligned to GALL volume 2 line item VII.A2.1-c since it is the appropriate component match (spent fuel storage racks). The associated GALL aging effect/mechanism (crack initiation and growth/SCC), however, is not applicable since Palisades SFP temperatures are below the temperature threshold for the effect. However, Palisades is managing loss of material due to crevice/pitting corrosion. Thus, note H, "Aging effect not in NUREG 1801 for this component," was utilized. Line item III.A5.2-b with a note C would also be applicable, however, since it is the same MEAP (material, environment, aging effect, program) combination, but is a different component.

To obtain a more appropriate GALL match, component type “Spent Fuel Storage Rack - Auxiliary Building, Stainless Steel, Borated Water” on page 3-341 is revised to align with GALL line item III.A5.2-b with a note C replacing note H.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-02W1) The applicant states in LRA further evaluation section 3.5.2.2.1.7 that cracking from cyclic loading and crack initiation and growth from SCC is not applicable for penetration sleeves, penetration bellows, and dissimilar metal welds at PNP Unit 1. The applicant gives reasons why it believes these aging effects are not applicable. The GALL report specifies the Containment Inservice Inspection (IWE) and containment leak rate test (Appendix J) aging management programs to manage the cracking of these components. However, Containment ISI and Leak rate testing may not be sufficient to detect cracks and therefore, the GALL recommends further evaluation of these programs to manage cracking of penetrations due to cyclic loading or SCC. The GALL volume 2 line item associated with this table 1 item is II.A3.1-c. This GALL line item states that penetration cracking from cyclic loading shall be managed if a current license basis fatigue analysis does not exist. Provide confirmation that a CLB fatigue analysis exists.

Final Response: LRA section 4.6.2 provides a discussion of the design of containment penentrations and provides an evaluation of environmental and operational load cycles. The results of that evaluation is that the design of the containment liner complies with the provisions of ASME code Paragraph N-415.1 for not requiring a fatigue analysis for design load cycles. Thus, there is no plant specific CLB fatigue analysis at Palisades.

However, LRA section 3.5.2.2.1.7 discusses the Palisades design configuration and states that it does not include bellows as a containment pressure boundary component. It also discusses how the design of the liner and penetration are such that stress levels of the liner and penetrations are low. It references LRA sections 4.6.1 and 4.6.2 that provides a more detailed discussion of liner stresses and cyclic loadings. The results of those evaluations is that due to Palisades low stress design configuration and the low number of cycles, fatigue is not an applicable aging effect for Palisades and that further evaluation of inspection methods to detect fatigue related aging effects are not required.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-03W1)) In LRA table 3.5.2-3 (table 2) on page 3-344 for component type Containment Shell & Base Slab - Containment Bldg, Stainless Steel, Protected (fuel transfer tube and closure flange), explain or show with drawings how it is physically possible to perform the inspection of the stainless steel transfer tube with dissimilar metal weld to carbon steel penetration. Clarify that the dissimilar metal weld will never be exposed to an environment other than air, such as treated water.

Final Response: GALL line item II.A3.1-a says to use ISI (IWE) and LRT (App J) to age manage, which we aligned to in the LRA. As a containment pressure boundary weld, it is part of the ASME Section XI IWE program. However, this weld is located in an area considered inaccessible for inspection and is exempted by subsection IWE-1220(b), "Components Exempted From Examination" which includes "..embedded or inaccessible portions of containment vessels, parts, and appurtenances that met the requirement of the original Construction Code." Note, also, that the GALL does indicate that "IWE examination category E-F, surface examination of dissimilar metal welds, is optional".

With regards to ensuring the environment is dry, this area is in an air environment protected from water intrusion from either fuel transfer tilt pits (aux bldg and containment pits) by expansion joints at each end of transfer tube. The expansion joints are in scope of LR.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-05W1) In LRA table 3.5.2-3 (table 2) on page 3-342 for component type Containment Shell & Base Slab - Containment Bldg, Carbon Steel, Protected (air locks, equipment hatch, liner plate, penetrations), the GALL item is II.A3.2-b. GALL item II.A3.2-b calls out appendix J and plant technical specs. The PNP AMP listed is Containment Leakage Testing Program. Explain why the Plant Technical Specs are not listed since this line item is called out as consistent with GALL.

Final Response: Palisades Technical Specification section 3.6 prescribes the testing requirements for the containment pressure boundary, including air locks. This should have been included in Table 3.5.2-3 for component type "Containment Shell & Base Slab - Containment Bldg, Carbon Steel, Protected (air locks, equipment hatch, liner plate, penetrations)" along with Containment Leakage Testing Program.

To clarify, a new plant specific note 597 is here added to GALL item II.A3.2-b on page 3-342 for component type "Containment Shell & Base Slab - Containment Bldg, Carbon Steel, Protected (air locks, equipment hatch, liner plate, penetrations)". New note 597 states the following:

597: Aging management program also includes Palisades Plant Technical Specification section 3.6 requirements.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-06W1) In LRA table 3.5.2-3 (table 2) on page 3-343 for component type Containment Shell & Base Slab - Containment Bldg, Elastomer, Protected, the GALL item is II.A3.3-a. GALL item II.A3.3-a states that the aging effect of loss of leak tightness is monitored by10 CFR Part 50, Appendix J Leak Rate Tests for pressure boundary, seals and gaskets. However, on page 3-343 of the LRA, the aging effects Change in Material Properties and Cracking (which are mechanisms and not aging effects per the GALL line item) are shown as managed by the containment leakage testing program. Explain why Loss of Leak Tightness is not shown as an aging effect with the Containment Leakage Testing Program as the AMP and why it is shown as an AMP for change in material properties and cracking. Loss of Leak Tightness is shown as an aging effect on page 3-258 of the PNP LRA.

Final Response: The aging effect/mechanisms of Change in Material Property/irradiation, thermal exposure and Cracking/irradiation, thermal exposure, ultraviolet are what were evaluated based on guidance from the EPRI Structural Tools. The net effect of such aging effects if not managed is loss of pressure boundary as indicated as the intended function for this component type. The loss of pressure boundary intended function is considered equivalent to the GALL loss of leak tightness aging effect of GALL item II.A3.3-a so the alignment was made. The Loss of Leak Tightness aging effect on page 3-258 is associated with component type "Containment Shell & Base Slab - Containment Bldg, Carbon Steel, Protected (air locks, equipment hatch, liner plate, penetrations)" shown on page 3-342.

To clarify, a new plant specific note 598 is added to LRA table 3.5.2-3 (table 2), page 3-343 for component type "Containment Shell & Base Slab - Containment Bldg, Elastomer, Protected", GALL item is II.A3.3-a. New note 598 reads as follows:

598: The evaluated aging effect of "Change in Material Properties", if not managed, could cause failure of the intended function "Pressure boundary/ Fission product retention". This is consistent with the GALL aging effect "Loss of sealing, leakage through containment".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-07W1) In LRA table 3.5.2-3 (table 2) on page 3-342 for component type Containment Shell & Base Slab - Containment Bldg, Concrete below grade, the GALL items are II.A1.1-b, II.A1.1-c and II.A1.1-e which all state that there are no aging effects for below grade concrete if specific criteria can be met. Explain why on page 3-342 for concrete in soil are aging effects listed in table 2 with none required shown under AMP. None should also be shown under aging effect. This really is a generic question.

Final Response: The intent of providing the GALL alignments with the associated GALL aging effects were to provide completeness in the table so as to be evident to the reviewer that the GALL components and aging effects were evaluated. The plant specific notes (500 series) for each line item provides the explanation that the aging effects do not apply and why.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-08W1) In LRA table 3.5.2-3 (table 2) on page 3-342 for component type Containment Shell & Base Slab - Containment Bldg, Concrete below grade, the GALL item shown for cracking is II.A1.1-f. PNP states that no aging management program is required. However, on page 3-343 for Containment Shell & Base Slab - Containment Bldg, Concrete, Exposed, this same possible cracking is monitored by the structural monitoring program. Explain how concrete cracking can occur above grade from settlement and erosion but not below grade if settlement and erosion of the containment foundation at PNP does not occur at all.

Final Response: As discussed in LRA section 3.5.2.2.1.2, settlement is not applicable for Palisades. NUREG 1800 section 3.5.2.2.1.2 states that no further evaluation is required for settlement if the activity is included in the scope of the Structural Monitoring Program. Even though Palisades provided the basis for why settlement is not applicable, the Structural Monitoring Program is conservatively utilized to validate that determination via inspection of the accessible concrete. See plant specific note 547.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-09W1) In LRA table 3.5.2-3 (table 2) on page 3-342 for components Containment Shell & Base Slab - Containment Bldg Concrete Below Grade, the GALL item shown for cracking is II.A1.1-f. PNP states that no aging management program is required. However, the aging effect reduction in foundation strength associated with GALL item IIA1.1-g is not shown with none required under aging management programs. Explain why concrete cracking is shown as an aging effect with none required for an aging management program and yet reduction in foundation strength is not shown as an aging effect with none required shown under aging management programs. Explain why some aging effects are shown when an aging management program is not required while others are not.

Final Response: GALL item IIA1.1-g is associated with porous concrete, which Palisades does not have. The other potential aging effects are applicable to all concrete, which Palisades does have, so they are included and evaluated for completeness (see question 3.5.1-07W1).

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-12W1) In LRA table 3.5.2-3 (table 2) on page 3-342 for component types Containment Shell & Base Slab - Containment Bldg Carbon Steel, Protected, one GALL volume 2 line item shown for Loss of Material is II.A1.2-a. Although the GALL item discusses cleaning up borated water spills, it does not specifically call out the Boric Acid Corrosion Program to manage this cleanup. Justify stating in the notes for this table 2 line item that the use of the Boric Acid Corrosion Program to manage loss of material of the carbon steel liner is consistent with GALL.

Final Response: The GALL requires that boric acid spills are cleaned up in a timely manner. It is not specific as to how that is to be assured. The Boric Acid Corrosion Program is the process by which Palisades implements the GALL requirement of ensuring boric acid spills are cleaned up in a timely manner . As such, it meets the GALL requirement.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-12W2) In the further evaluation of aging management as recommended by SRP subsection 3.5.2.2.1.4 for table 1 line item 3.5.1-12, on page 3-276 of the PNP LRA under section 3.5.2.2.1.4, GALL item IIA2.1-a is referenced for four conditions that must be satisfied not to need a plant specific program. Explain why GALL item IIA2.1-a is referenced for metal PWR containments instead of IIA1.2-a for prestressed concrete PWR containments.

Final Response: The reference to GALL item IIA2.1-a in LRA section 3.5.2.2.1.4 is a typographical error. It should be IIA1.2-a as suggested by the reviewer. This is substantiated by alignment to IIA1.2-a for component type "Containment Shell & Base Slab - Containment Bldg, Carbon Steel, Protected (air locks, equipment hatch, liner plate, penetrations)" of page 3-342 of the LRA. Thus, LRA section 3.5.2.2.1.4 page 3-276 is revised to replace the reference to GALL item IIA2.1-a with item IIA1.2-a.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-16W1) In table 3.5.2.-3 (table 2) on page 3-343 of the LRA for component types Containment Shell & Base Slab- Containment Bldg, Concrete, Exposed the aging effects requiring management are cracking, cracking and expansion, and loss of material. These are associated with table 3.5.1 (table 1) item 16. However, in table 2 on page 3-342 of the LRA for component types Containment Shell & Base Slab - Containment Bldg, Concrete, Below Grade the aging effects requiring management are only cracking and expansion and loss of material that are associated with table item 16. Cracking is not shown and associated with table 3.5.1 item 16. Explain why cracking is not listed for below grade containment concrete and associated with table 1 item 3.5.1-16, but is listed for above grade containment concrete.

Final Response: There are in fact no aging effects requiring management for the below grade concrete as discussed in the associated plant specific notes and further evaluation sections of the LRA. This is consistent with ISG-3. The GALL alignments for the below grade concrete are included for completeness as discussed question 3.5.1-07W1. However, it would have been more complete, though not necessary, for the below grade concrete component type to include the alignment to table 1 item 3.5.1-16 for cracking as was done for the above grade concrete. It is worth noting that the above grade concrete is managed in accordance with ISG-3.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W1) In table 3.5.2.-1 (table 2) on page 3-311 of the LRA for component types Building Framing - Concrete, Protected, one of the aging effects shown as requiring management is loss of strength. The GALL volume 2 line item shown is III.A3.1-b. In the GALL, III.A3.1-b is for concrete exterior above and below grade. Explain why this component type and GALL line item are associated together. Also applies to table 3.5.2-1 on page 3-316 for component type Operator Access component - Concrete Protected. Also applies to table 3.5.2-6 on page 3-354 for component type Building Framing - Concrete, Protected. Also applies to table 3.5.2-9 on page 3-377 for component type Building Framing-Switchyard- Concrete Protected. Also applies to table 3.5.2-10 on page 3-382 for component type Building Framing-Boiler Buildings Area-Concrete, Protected. Also applies to table 3.5.2-10 on page 3-386 for component type Building Framing-Concrete, Protected. Also applies to table 3.5.2-10 on page 3-389 for component type Building Framing-Water Treatment Area - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-393 for component type Operator Access Component - Concrete, Protected.

Final Response: The aging effect/mechanism in question is loss of strength/leaching of calcium hydroxide, the same aging effect/mechanism for GALL item IIIA3.1-b. ISG-3 line item IIIA1.1-b specifies that the Structural Monitoring Program be used to inspect for evidence of leaching of calcium hydroxide. Although the aging effect is associated with a flowing water environment that is an exterior environment, NMC conservatively decided to utilize the Structural Monitoring Program to inspect the interior of exterior walls to ensure leaching of calcium hydroxide is not occurring due ground water migration (flow) through the concrete. Accordingly, the alignment to GALL III.A3.1-b is made.

To clarify, a new plant specific note 599 is added for each of the component types listed above to describe the applicability of the alignment to GALL item IIIA3.1-b when GALL environment is "flowing water" and the LRA has "plant indoor air". New note number 599 reads as follows:

599 : "Inspection for loss of strength due to leaching of calcium hydroxide is conservatively applied to interior or exterior (exposed) surfaces which may exhibit this aging effect/mechanism due to surface or sub-surface water flowing past or through exterior walls and detected on either exterior or interior concrete surfaces."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-20W2) In table 3.5.2.-2 (table 2) on page 3-317 of the LRA for component type ASME 1 Support - Containment - Sliding Material, Cont Cavity it is stated that no AMP is required to manage loss of material for this component. Explain how lubrite plates will not have loss of material due to wear. Lubrite plates are used to reduce friction between sliding surfaces, however, they do wear.

Final Response: As documented in the EPRI Structural Tools, it is the industry position that lubrite has no aging effects requiring management. The only potential aging effect identified is loss of material properties due to exposure to gamma radiation greater the 10E4 rads. This is higher than Palisades lubrite applications are exposed to, thus there are no aging effects requiring management. This is a position taken and accepted on numerous previous applications. The industry has provided input to the new GALL revision requesting it align with the industry position. The following was provided by the Civil/Structural working group to the NRC as the basis for why there are no aging effects for Lubrite: "Industry experience and EPRI Civil Tools indicates this aging effect is not applicable to graphite plate (lubrite). This is consistent with past approved applications. See NUREG-1759, Turkey Point SER, NUREG-1769, Peach Bottom SER, NUREG-1785, H.B. Robinson SER NUREG-1766, North Anna/Surry SER

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W3) In table 3.5.2.-1 (table 2) on page 3-309 of the LRA for component type Building Framing - Carbon Steel, Protected the material is carbon steel, the environment Plant indoor air and the aging effect Loss of Material, which agrees with GALL III.A3.2-a. However, the AMP shown is Boric Acid Corrosion Program instead of structural monitoring. Explain why the note is H instead of E, consistent with NUREG-1801 for material, environment, aging effect but a different AMP is credited.

Final Response: The aging effect/mechanism being managed by the Boric Acid Corrosion Program is loss of material/boric acid corrosion. Note "H: Aging effect not in NUREG 1801 for this component, material, and environment combination" was chosen since the GALL does not manage this aging mechanism for the component type. However, the aging effect of loss of material is still consistent with the GALL line item, so use of note E, " Consistent with NUREG 1801 for material, environment, and aging effect, but a different aging management program is credited," could also be considered appropriate.

To obtain a more appropriate GALL match, for component type “Building Framing - Carbon Steel, Protected” on page 3-309, GALL item III.A3.2-a, note H is replaced with note E.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W4) In table 3.5.2.-4 (table 2) on page 3-345 of the LRA for component type Building Framing - Carbon Steel, Protected the material is carbon steel, the environment Plant indoor air and the aging effect Loss of Material, which agrees with GALL III.A4.2-a. However, the AMP shown is Boric Acid Corrosion Program instead of structural monitoring. Explain why the note is H instead of E, consistent with NUREG-1801 for material, environment, aging effect but a different AMP is credited.

Final Response: The aging effect/mechanism being managed by the Boric Acid Corrosion Program is loss of material/boric acid corrosion. Note H, "Aging effect not in NUREG 1801 for this component, material, and environment combination," was chosen since the GALL does not manage this aging mechanism for the component type. However, the aging effect of loss of material is still consistent with the GALL line item, so use of note E, "Consistent with NUREG 1801 for material, environment, and aging effect, but a different aging management program is credited" could also be considered appropriate.

To obtain a more appropriate GALL match, for component type “Building Framing - Carbon Steel, Protected” on page 3-345, GALL item III.A4.2-a, note H is replaced with note E.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W5) In table 3.5.2.-8 (table 2) on page 3-372 of the LRA for component type Roof Flashing-Auxiliary Bldg-Galvanized, Exposed the note shown is A only. Explain why note 581 is not shown also.

Final Response: The reviewer is correct, note 581 would be appropriate here and for the two other galvanized component types that follow associated with the intake structure and switchyard relay house.

To clarify, note 581is added to the following three galvanized line items on page 3-372 of the LRA: "Roof Flashing-Auxiliary Bldg-Galvanized, Exposed", “Roof Flashing-Intake Structure Bldg-Galvanized, Exposed", and "Roof Flashing-Switchyard Relay House-Galvanized, Exposed".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W6) In table 3.5.2.-9 (table 2) on page 3-379 of the LRA for component type Tank Foundations-Building & Yard-Concrete, Exposed the environment is atmosphere/weather. For aging effect change in material properties the GALL volume 2 line item is III.A8.1-b. The GALL environment for III.A8.1-b is flowing water. Explain how an atmosphere/weather environment is the same as a flowing water environment.

Final Response: The aging effect/mechanism in question is loss of strength/leaching of calcium hydroxide, the same aging effect/mechanism for GALL item IIIA8.1-b. Although flowing water is not a permanent environment for the outdoor environment, surface runoff was conservatively assumed to occur on occasion due to rainfall so it was evaluated and aligned to this line item.

To clarify, a new plant specific note 599 is added for component type “Tank Foundations-Building & Yard-Concrete, Exposed” on page 3-379, GALL line item III.A8.1-b, to describe the applicability of the alignment when GALL environment is "flowing water" and the LRA has "atmosphere/weather". New note number 599 reads as follows:

599 : "Inspection for loss of strength due to leaching of calcium hydroxide is conservatively applied to interior or exterior (exposed) surfaces which may exhibit this aging effect/mechanism due to surface or sub-surface water flowing past or through exterior walls and detected on either exterior or interior concrete surfaces."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-20W7) In table 3.5.2.-10 (table 2) on page 3-385 of the LRA for component type Building Framing-Concrete, Exposed the environment is atmosphere/weather. For aging effect change in material properties the GALL volume 2 line item is III.A3.1-b. The GALL environment for III.A3.1-b is flowing water. Explain how an atmosphere/weather environment is the same as a flowing water environment. Also applies to table 3.5.2-10 on page 3-388 for component type Building Framing-Water Treatment Area- Concrete, Exposed.

Final Response: The aging effect/mechanism in question is loss of strength/leaching of calcium hydroxide, the same aging effect/mechanism for GALL item IIIA3.1-b. Although flowing water is not a permanent environment for the outdoor environment, surface runoff was conservatively assumed to occur on occasion due to rainfall so it was evaluated and aligned to this line item.

To clarify, a new plant specific note 599 is added for the two component types listed above to describe the applicability of the alignment to GALL item IIIA3.1-b when GALL environment is "flowing water" and the LRA has "atmosphere/weather". New note number 599 reads as follows:

599 : "Inspection for loss of strength due to leaching of calcium hydroxide is conservatively applied to interior or exterior (exposed) surfaces which may exhibit this aging effect/mechanism due to surface or sub-surface water flowing past or through exterior walls and detected on either exterior or interior concrete surfaces."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-21W1) In table 3.5.2.-9 (table 2) on page 3-379 of the LRA for component type Tank Foundations - Building & Yard - Concrete Exposed the environment is atmosphere/weather. For aging effect cracking, loss of bond/material the GALL volume 2 line item is III.A8.1-d and the table 1 item 3.5.1-21. Table 1 item 3.5.1-21 is for inaccessible concrete areas. The GALL environment for III.A8.1-d is exposure to aggressive environment and the component is foundation below grade. For table 1 line item 3.5.1-21, further evaluation is provided in LRA section 3.5.2.2.2.2 on page 3-297. It is concluded in the further evaluation that aging management of cracking, loss of bond, and loss of material due to corrosion of embedded steel for below grade inaccessible concrete is not required at PNP. Explain the rational for the AMR association between this component and GALL volume 2 line item III.A8.1-d and table 1 line item 3.5.1-21. Also explain the assignment of note A, consistent with GALL.

Final Response: The alignment to GALL item III.A8.1-d was made due to the same component type (tank foundation) and aging effect/mechanism. It is recognized that the environments are different, but the MEAP combination is consistent with GALL line item IIIA1.1-d (with ISG-3 clarifications) such that the overall alignment was judged consistent . A clarifying note to that effect would have been helpful. A more appropriate alignment may have been with GALL line item IIIA1.1-d with a standard note C, "Component is different, but consistent with NUREG 1801 item for material, environment and aging effect. AMP is consistent with NUREG 1801 AMP".

To clarify, a new plant specific note #539 is added to component type "Tank Foundations - Building & Yard - Concrete Exposed" in table 3.5.2.-9, page 3-379 of the LRA, with aging effect cracking, loss of bond/material and GALL line item III.A8.1-d. The new plant specific 539 reads as follows:

539: "ISG-3 GALL line item A1.1-d specifies aging management for "cracking, loss bond, loss of material" using the Structural Monitoring Program for accessible above-grade exterior concrete for Class 1 structures. Palisades conservatively applies the same requirement for in-scope non-class 1 concrete as well. Conservatively using the ISG-3 requirements for non-class 1 concrete GALL line items is consistent with the GALL."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-22W1) In LRA table 3.5.2-5 on page 3-349 for component type Building Framing- Cast Iron, Raw Water there is note 582 which states: cast iron is considered consistent with carbon steel and is evaluated the same, but with the additional aging effect/mechanism of loss of material due to selective leaching also evaluated. Explain where in the structural monitoring program selective leaching is discussed and the inspection for it.

Final Response: There is a related RAI on Cast Iron and selective leaching (RAI 3.5.2-2-1(a)) and the Structural Monitoring program. The response was submitted to the NRC on 7/28/05 and provided the correction that for cast iron in raw water, selective leaching is an AERM, but the LRA should have shown One Time Inspection as the program to age manage it.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-22W2) In LRA table 3.5.2.-7 on page 3-358 for component type Building Framing - Concrete Protected, for aging effect Loss of Material, GALL volume 2 line item III.A6.1-a is referenced. Explain why item III.A6.1-a is shown since it is for a weather exposed environment while the environment shown on page 3-358 for this component type is Plant Indoor Air.

Final Response: III.A6.1-a is for loss of material (spalling, scaling) and cracking / Freeze-thaw. A review of the Palisades AMR shows that loss of material/freeze-thaw was evaluated as not being an aging effect requiring management. Thus, there should not be a GALL alignment for III.A6.1-a.

Therefore, line item III.A6.1-a is removed from component type "Building Framing - Concrete Protected", for aging effect Loss of Material in LRA table 3.5.2.-7 on LRA page 3-358.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-22W3) In LRA table 3.5.2.-7 on page 3-358 for component type Building Framing - Concrete Protected, for aging effect Loss of Strength, GALL volume 2 line item III.A6.1-b is referenced. Explain why item III.A6.1-b is shown since it is for a flowing water environment while the environment shown on page 3-358 for this component type is Plant Indoor Air.

Final Response: The aging effect/mechanism in question is loss of strength/leaching of calcium hydroxide, the same aging effect/mechanism for GALL item IIIA6.1-b. ISG-3 line item IIIA1.1-b specifies that the Structural Monitoring Program be used to inspect for evidence of leaching of calcium hydroxide. Although the aging effect is associated with a flowing water environment that is an exterior environment, Palisades conservatively decided to utilize the Structural Monitoring Program to inspect the interior of exterior walls to ensure leaching of calcium hydroxide is not occurring due to ground water migration (flow) through the concrete. Accordingly, the alignment to GALL III.A6.1-b is made.

To clarify, a new plant specific note 599 is added for component type “Building Framing - Concrete Protected” on page 3-358 of the LRA to describe the applicability of the alignment to GALL item IIIA6.1-b when GALL environment is "flowing water" and the LRA has "plant indoor air". New note number 599 reads as follows:

599 : "Inspection for loss of strength due to leaching of calcium hydroxide is conservatively applied to interior or exterior (exposed) surfaces which may exhibit this aging effect/mechanism due to surface or sub-surface water flowing past or through exterior walls and detected on either exterior or interior concrete surfaces."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-22W4) In LRA table 3.5.2.-7 on page 3-359 for component type Flood Barrier - Concrete Protected, for aging effect Loss of Strength, GALL volume 2 line item III.A6.1-b is referenced. Explain why item III.A6.1-b is shown since it is for a flowing water environment while the environment shown on page 3-359 for this component type is Plant Indoor Air.

Final Response: The aging effect/mechanism in question is loss of strength/leaching of calcium hydroxide, the same aging effect/mechanism for GALL item IIIA6.1-b. ISG-3 line item IIIA1.1-b specifies that the Structural Monitoring Program be used to inspect for evidence of leaching of calcium hydroxide. Although the aging effect is associated with a flowing water environment that is an exterior environment, NMC conservatively decided to utilize the Structural Monitoring Program to inspect the interior of exterior walls to ensure leaching of calcium hydroxide is not occurring due to ground water migration (flow) through the concrete. Accordingly, the alignment to GALL III.A6.1-b is made.

To clarify, a new plant specific note 599 is added for component type “Flood Barrier - Concrete Protected” on page 3-359 of the LRA to describe the applicability of the alignment to GALL item IIIA6.1-b when GALL environment is "flowing water" and the LRA has "plant indoor air". New note number 599 reads as follows:

599 : "Inspection for loss of strength due to leaching of calcium hydroxide is conservatively applied to interior or exterior (exposed) surfaces which may exhibit this aging effect/mechanism due to surface or sub-surface water flowing past or through exterior walls and detected on either exterior or interior concrete surfaces."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-23W1) In LRA table 3.5.2-1 on page 3-312 for component type Fuel Related Component - stainless, Borated, GALL volume 2 line item III.A5.2-b is referenced. The environment shown in the GALL is "exposed to water" with an aging effect of crack initiation and growth. The GALL has no criteria about the temperature of the water for which no aging would occur. Explain why there is no aging management program required to prevent cracking of the stainless steel liners since GALL is not concerned with the temperature of the water the liners are exposed to.

Final Response: A temperature threshold of 140F is from EPRI Structural Tools section 3.3.2.2.4 and Table 3-2. The applicability criteria for Cracking due to SCC is given as a temperature > 140F AND chlorides, or fluorides, or sulfates > 150ppb. Additionally, Table IX.D of the draft GALL also identifies 140F as the SCC threshold for SCC in treated water. It is worth noting that the loss of material due to crevice corrosion portion of the same line item (III.A5.2-b) IS considered an AERM and the water chemistry program and monitoring of the fuel pool level per the technical specifications is credited for age managing it, consistent with the GALL.

During further discussion of this component, it was noted that a more appropriate note for the cracking line item would be a note H rather than the note E in the LRA. Given the new draft GALL precedence for SCC threshold temperature, note H is acceptable.
Therefore, for component type “Fuel Related Component - Stainless, Borated” on page 3-312 of the LRA, GALL volume 2 line item III.A5.2-b, note E is replaced with note H.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-23W2) In LRA table 3.5.2-1 on page 3-312 for component type Fuel Related Component - Carbon Steel, Protected, GALL volume 2 line item III.A5.2-b is referenced. The environment shown in the GALL is "exposed to water". The LRA AMR line item has an environment of Plant Indoor Air. Explain how the Water Chemistry Program manages loss of material in a Plant Indoor Air environment.

Final Response: See plant specific note 579. The aging effect/mechanism in question is loss of material/boric acid corrosion. Although the carbon steel anchor bolts are protected from boric acid by the liner plate, Palisades conservatively credited the aging management program used for the liner plate to preclude boric acid leakage past the liner. The following comment is included in the AMR evaluation: "Anchor bolts for the Spent Fuel Pool gates, Spent Fuel Pool liner, Fuel Tilt Pool liner, and appurtenances for the Fuel Transfer Tube are protected from exposure to corrosive environments by the stainless steel liners and transfer tube. The liners and transfer tube are age managed by the SFP water chemistry program and technical specification surveillance of SFP water levels. Ensuring minimal leakage from the liners will ensure the potential boric acid wastage is minimized as well. Anchor bolt degradation could result in damage to the SFP liner which would be made evident via SFP level monitoring."

On further evaluation, it is evident that this component is redundant to component type "Building Framing - Concrete, Protected" on page 3-311 of the LRA that, in the full description of components included for this concrete type in the scoping report, includes embedded steel reinforcements and shapes. Thus, this component type can be deleted from the LRA. There is a similar component in Table 3.5.2-4, page 3-347, entitled "Fuel Related Component - Carbon Steel, Protected". It also can be deleted.

Thus, the following changes to the LRA are made:
- Delete "Fuel Related Component - Carbon Steel, Protected" from Table 3.5.2-1, page 3-312 and from Table 2.4.1-1, page 2-205 of the LRA.
- Delete "Fuel Related Component - Carbon Steel, Protected" from Table 3.5.2-4, page 3-347 of the LRA.
- Replace verbiage of note 579 on page 3-398 of the LRA with "Not used".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-24W1) In table 3.5.2-1 (table 2) on page 3-313 for component type HELB/MELB Component - Concrete, Protected, the aging effect is cracking with the referenced GALL volume 2 line item III.A3.3-a and the table 1 item 3.5.1-24. These reference items are for masonry walls. Explain why the component type has no mention of masonry walls like other component types in table 2. Also applies to table 3.5.2-1 on page 3-316 for component type Operator Access Component - Concrete Protected. Also applies to table 3.5.2-7 on page 3-357 for component type Building Framing - Concrete, Exposed. Also applies to table 3.5.2-7 on page 3-358 for component type Building Framing - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-388 for component type Building Framing - Water Treatment Area - Concrete, Exposed. Question applies to table 3.5.2-10 on page 3-393 for component type Operator Access Component - Concrete Protected also.

Final Response: As is evident from the component type naming scheme, Palisades scoped civil / structural components based on design attributes, building, material, and environment. For the concrete elements, concrete and masonry block walls were grouped together rather than separated. Thus, aging effects for both component types were evaluated where the component type includes, or could include, masonry walls. The examples listed in parentheses in the component type title in the LRA are representative, but not necessarily fully inclusive, of all included structural members in the component group.

To clarify, the following components in the following tables are revised to include masonry walls in the list of example components:

- "HELB/MELB Component - Concrete, Protected" in tables 3.5.2-1on page 3-313 and Table 2.4.1-1 on page 2-206.
- "Operator Access Component - Concrete, Protected" in Table 3.5.2-1 on page 3-316 and Table 2.4.1-1 on page 2-207.
- "Building Framing - Concrete, Exposed" in Table 3.5.2-7 on page 3-357 and Table 2.4.7-1 on page 2-239.
- "Building Framing - Concrete Protected" in Table 3.5.2-7 on page 3-358 and Table 2.4.7-1 on page 2-239.
- "Building Framing - Water Treatment Area - Concrete, Exposed" in Table 3.5.2-10 on page 3-388 and Table 2.4.10-1 on page 2-256.
- "Operator Access Component - Concrete, Protected" in Table 3.5.2-10 on page 3-393 and Table 2.4.10-1 on page 2-258..

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-25W1) In LRA table 3.5.2-1 (table 2) on page 3-309 for component type Building Framing - Concrete, Below Grade, one GALL item shown for cracking is III.A3.1-h. PNP states that no aging management program is required. However, on page 3-310 for Building Framing - Concrete, Exposed, this same possible cracking is monitored by the structural monitoring program. Explain how concrete cracking can occur above grade from settlement but not below grade if settlement of the Auxiliary Building foundation at PNP does not occur at all. Also applies to table 3.5.2-01 on page 3-311 for component type Building Framing - Concrete, Protected. Also applies to table 3.5.2-06 on page 3-353 for component type Building Framing - Concrete, Exposed. Also applies to table 3.5.2-06 on page 3-354 for component type Building Framing - Concrete, Protected. Also applies to table 3.5.2-09 on page 3-376 for component type Building Framing - Switchyard - Concrete, Exposed. Also applies to table 3.5.2-09 on page 3-377 for component type Building Framing - Switchyard - Concrete, Protected. Also applies to table 3.5.2-09 on page 3-378 for component type Missile Shield - Yard - Concrete, Exposed. Also applies to table 3.5.2-10 on page 3-381 for component type Building Framing - Boiler Buildings Area - Concrete, Exposed. Also applies to table 3.5.2-10 on page 3-382 for component type Building Framing - Boiler Buildings Area - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-385 for component type Building Framing - Concrete, Exposed. Also applies to table 3.5.2-10 on page 3-386 for component type Building Framing - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-388 for component type Building Framing - Water Treatment Area - Concrete, Exposed. Also applies to table 3.5.2-10 on page 3-389 for component type Building Framing - Water Treatment Area - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-391 for component type HVAC Component - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-392 for component type Missile Shield - Concrete, Exposed. Also applies to table 3.5.2-10 on page 3-392 for component type Missile Shield - Concrete, Protected. Also applies to table 3.5.2-10 on page 3-393 for component type Operator Access Component - Concrete, Protected.

Final Response: GALL line item III.A3.1-h is considered to be similar to GALL line item IIIA1.1-a that has an aging effect/mechanism of "loss of material (spalling, scaling) and cracking / Freeze-thaw". Accordingly, guidance was taken from ISG-3 line item IIIA1.1-a wherein inaccessible areas are exempted from inspections if air content requirements are met, subsequent inspections did not find freeze-thaw degradations, and provided that the Structures Monitoring Program is used to inspect accessible concrete for cracking due to freeze-thaw. Palisades therefore is including inspections for cracking/freeze-thaw of accessible concrete in the scope of the Structural Monitoring Program and, since the other criteria are met, inspections of inaccessible concrete is not required. Plant specific note 547 explains this in the LRA. Since it is not specifically referenced for the examples quoted, the LRA is revised to add note 547 for the components described in the question above.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-25W2) In the discussion for PNP LRA table 3.5.1 (table 1) line item 3.5.1-25 on page 3-307, the referenced LRA section for further evaluation is 3.5.2.2.1.2, which is for the containment. Explain why section 3.5.2.2.2.1 of the LRA is not referenced for further evaluation of groups 1-3, 5, 7-9 (class 1 structures).

Final Response: The reviewer is correct. SRP Table 3.5.1 incorrectly references section 3.5.2.2.1.2 for the non-containment structures when in fact section 3.5.2.2.2.1 is the appropriate SRP (and LRA) section. Therefore, Table 3.5.1 line item 25 "Discussion" column on page 3-307 is revised to refer to LRA section 3.5.2.2.2.1 for the class 1 structures instead.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-26W1) In the discussion for PNP LRA table 3.5.1 (table 1) line item 3.5.1-26 on page 3-307, the referenced LRA section for further evaluation is 3.5.2.2.1.2, which is for the containment. Explain why section 3.5.2.2.2.1 of the LRA is not referenced for further evaluation of groups 1-3, 5, 5-9 (class 1 structures).

Final Response: The reviewer is correct. SRP Table 3.5.1 incorrectly references section 3.5.2.2.1.2 for the non-containment structures when in fact section 3.5.2.2.2.1 is the appropriate SRP (and LRA) section. Therefore, Table 3.5.1 line item 26 "Discussion" column on page 3-307 is revised to refer to LRA section 3.5.2.2.2.1 for the class 1 structures instead.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-27W1) In the discussion for PNP LRA table 3.5.1 (table 1) line item 3.5.1-27 on page 3-307, the referenced LRA section for further evaluation is 3.5.2.2.1.3, which is for the containment. Explain why section 3.5.2.2.2.1 of the LRA is not referenced for further evaluation of groups 1-5 (class 1 structures).

Final Response: The reviewer is correct. SRP Table 3.5.1 incorrectly references section 3.5.2.2.1.3 for the non-containment structures when in fact section 3.5.2.2.2.1 is the appropriate SRP (and LRA) section. Therefore, Table 3.5.1 line item 27 "Discussion" column on page 3-307 is revised to refer to LRA section 3.5.2.2.2.1 for the class 1 structures instead.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-29W1) In table 3.5.2-2 (table 2) on page 3-333 of the LRA for component type Non-ASME Piping & Mechanical Component Support - Boiler Building, Concrete Protected the aging effect is loss of material with the referenced GALL volume 2 line items III.B2.2-a and III.B4.3-a and the table 1 item 3.5.1-29. GALL line items III.B2.2-a and III.B4.3-a are associated with the material of concrete and the aging effect of reduction in concrete anchor capacity. Explain how the LRA table 2 line item for this component can list the material as carbon steel and the aging effect as loss of material and still show note A, consistent with GALL.

Final Response: The carbon steel material shown for this comment is a typographical error. The material for component type “Non-ASME Piping & Mechanical Component Support - Boiler Building, Concrete Protected” on page 3-333 of the LRA is revised to replace carbon steel with concrete in the material column.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-29W2) In table 3.5.2-4 (table 2) on page 3-345 for component type Building Framing - Carbon Steel, Protected the aging effect is loss of material with the referenced GALL volume 2 line item III.B5.1-b and the table 1 item 3.5.1-29. GALL line item III.B5.1-b is associated with Table 1 line item 31 in GALL table 5. Explain why Table 1 item 3.5.1-29 is shown for this component AMR instead of 3.5.1-31.

Final Response: The reviewer is correct. In table 3.5.2-4 (table 2) on page 3-345 for component type "Building Framing - Carbon Steel, Protected", the table 1 item 3.5.1-29 associated with loss of material aging with GALL volume 2 line item III.B5.1-b is a typographical error. The table is corrected to replace the table 1 item 3.5.1-29 with table 1 item 3.5.1-31.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-29W3) In table 3.5.2-10 (table 2) on page 3-392 for component type Missile Shield - Concrete, Exposed for aging effect Reduction in Concrete Anchor Capacity GALL volume 2 line item III.B5.2-a is shown. Note A is shown, consistent with GALL. However, concrete at locations of expansion & grouted anchors, etc is not shown in the component type like it is for other similar LRA AMR line items. Explain why concrete locations of expansion & grouted anchors is not shown under the component type column if this AMR line item is to be consistent with GALL. This also applies to component type Missile Shield - Concrete Protected on LRA page 3-392 also. This also applies to component type Missile Shield - Yard - Concrete Exposed on LRA page 3-378. This also applies to component type HVAC Component - Concrete Protected on LRA page 3-391.

Final Response: As is evident from the component type naming scheme, NMC scoped civil / structural components based on design attributes, building, material, and environment. For the concrete elements, concrete was used generically and includes concrete at locations of expansion & grouted anchors. Thus, aging effects for concrete and concrete at expansion & grouted anchors were both evaluated. The examples listed in parentheses in the component type title in the LRA are representative, but not necessarily fully inclusive, of all included structural members in the component group.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-29W4) In table 3.5.2-8 (table 2) on page 3-373 for component type Seal Gasket or Filler - Auxiliary Bldg - Elastomer, Protected the two aging effects shown are change in material properties and cracking with the referenced GALL volume 2 line item III.B4.2-a and the table 1 item 3.5.1-29. GALL line item III.B4.2-a lists an aging effect of reduction or loss of isolation function with the component vibration isolation elements. Explain how this LRA AMR line item has a note A, consistent with GALL, when the component type and aging effects shown are different from the GALL line item. The intended function of vibration isolation is also not shown in the LRA AMR line item.

Final Response: The answer to this question is provided in plant specific note 593 which is included in the LRA table line item. Restating it here: "Aging effect terminology used in GALL for the Emergency Diesel Generators vibration isolation elements is slightly different, but overall deterioration is the same (e.g., cracking and change in material properties due to thermal exposure, etc.). Other elements included in this component (thermal expansion / seismic separation joint filler, gap or crack seal, etc.) are not addressed in the GALL." With regards to the intended function, the "expansion/separation" intended function is considered applicable to vibration isolation.

However, additional clarification is desired to explain the consistency between the GALL aging effect of loss of vibration isolation and that of the evaluated aging effects that support the expansion/separation intended function summarized in the LRA. Additionally, better clarification is desired to describe the other components included in the component type and that they do not align with GALL line item III.B.4a and require a note J consistent with other elastomers in the table.

Accordingly, note 593 is revised to read as follows:

593: "Commodities included in this component type "Seal, Gasket, Or Filler - Auxiliary Bldg - Elastomer, Protected" are Diesel Generator (D/G) vibration isolators, thermal expansion/seismic separation joint filler, gap or crack seal, caulk and gaskets. Of these, only the D/G vibration isolators are aligned with GALL line item III.B4.2-a with a note "A". The other components are all non-GALL items and are assigned a note "J". Note "A" is assigned since failure to age management the Change and Material Properties and Cracking aging effects would fail the Expansion/Separation intended function. This is consistent with the GALL aging effect of "Reduction or Loss of Isolation Function"."

In addition to the revised note 593, Table 3.5.2-8 on page 3-373 for component type “Seal Gasket or Filler - Auxiliary Bldg - Elastomer, Protected” is revised to include a note J in addition to the existing note A to better indicate the assignment of note J to the elastomers elements not associated with GALL line item III.B4.2-a.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-31W1) In LRA table 3.5.2.-1 (table 2) on page 3-309 for component Building Framing - Carbon Steel Protected, one of the AMPs to manage loss of material is the Structural Monitoring Program. GALL volume 2 line item III.B5.1-a is shown here corresponding to table 3.5.1 (table 1) item 3.5.1-31. However, GALL volume 1 table 5 does not relate III.B5.1-a to 3.5.1-31 but to 3.5.1-29. Explain why LRA table 1 item 3.5.1-31 is shown related to GALL volume 2 line item III.B5.1-a on page 3-309.

Final Response: The reviewer is correct. On page 3-309, the Table 1 line item 3.5.1-31 for "Building Framing - Carbon Steel Protected", Loss of Material with GALL line item III.B5.1-a is a typographical error. The line item is revised to replace the existing Table 1 alignment of 3.5.1-31 with 3.5.1-29..

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-31W2) In LRA table 3.5.2.-1 (table 2) on page 3-315 for component Operator Access Component - Carbon Steel, Protected, one of the AMPs to manage loss of material is the Boric Acid Corrosion Program. The applicant has shown note A for this line item. However, in the same table on page 3-316 for component Operator Access Component- Galvanized, Protected the applicant has used note C for the same aging effect and AMP combination. Explain why the first referenced line item has note A and the second note C when the only difference in components appears to be galvanizing.

Final Response: Use of note C was conservative since, as the reviewer noted, the only difference is the galvanizing. As note 581 that aligns with "Operator Access Component-Galvanized, Protected" states, "Galvanized material is treated the same as carbon steel. No credit is taken for the galvanized coating." Thus, component type “Operator Access Component - Galvanized, Protected” on page 3-316 of the LRA, for the line item with loss of material and Boric Acid Corrosion Program AMP, the existing note C is revised to note A.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-31W3) In LRA table 3.5.2.-2 (table 2) on page 3-317 for component ASME Class 1 Tubing Support - Auxiliary Building, Carbon Steel, Protected, one of the AMPs to manage loss of material is the Boric Acid Corrosion Program. GALL volume 2 line item III.B1.1.1-b is shown here corresponding to table 3.5.1 (table 1) item 3.5.1-31. However, note 583 shown for this line item does not relate to III.B1.1.1-b but to III.B5.1-b. Explain why note 583 is shown for this line item.

Final Response: The statement in note 583 is also applicable to GALL item B1.1.1-b. It would have been more appropriate to not have included the specific GALL line item reference (ie., GALL III.B5-1b) and kept it generic (ie, GALL) so as to be useful for similar circumstances.

Therefore, note 583 is revised from its current statement of "GALL III.B5.1-b environment is inside PWR containment …" to the following: "GALL environment is inside PWR containment…".

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-31W4) In LRA table 3.5.2.-2 (table 2) on page 3-318 for component ASME Class 2 & 3 Piping & Mechanical Component Support - Auxiliary Building, Carbon Steel, Protected, one of the AMPs to manage loss of material is the Boric Acid Corrosion Program. GALL volume 2 line item III.B1.2.1-b is shown here corresponding to table 3.5.1 (table 1) item 3.5.1-31. However, note 583 shown for this line item does not relate to III.B1.2.1-b but to III.B5.1-b. Explain why note 583 is shown for this line item. Question also applies to the same galvanized component on page 3-319. Discrepancy also applies to component Electrical Component support - Auxiliary Bldg, Carbon Steel, Protected on page 3-324 of LRA. Also component type Electrical Component Support - Auxiliary Bldg, Galvanized, Protected on page 3-326. Also component Non-ASME Piping & Mechanical Component Support - Auxiliary Bldg, Carbon Steel, Protected on page 3-331. Also component Non-ASME Piping & Mechanical Component Support - Auxiliary Bldg, Galvanized, Protected on page 3-332.

Final Response: See question 3.5.1-31W3. The statement in note 583 is also applicable GALL items IIIB1.2.1-b, IIIB2.1-b, IIIB3.1-b, and IIIB4.1-b that are aligned to the examples given by the reviewer. It would have been more appropriate to not have included the specific GALL line item reference (ie, GALL III.B5-1b) and kept it generic (ie, GALL) so as to be useful for similar circumstances.

Therefore, note 583 is revised from its current statement of "GALL III.B5.1-b environment is inside PWR containment …" to the following: "GALL environment is inside PWR containment…".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-31W5) In LRA table 3.5.2.-4 (table 2) on page 3-348 for component HVAC Component - Carbon Steel, Protected, one of the AMPs to manage loss of material is the Boric Acid Corrosion Program. GALL volume 2 line item III.B5.1-b is shown here corresponding to table 3.5.1 (table 1) item 3.5.1-31. Explain why GALL volume 2 line item III.B4.1-b is not shown for this line item and the note A instead of C. Question also applies to the same galvanized component on page 3-348.

Final Response: The reviewer is correct. A more appropriate GALL alignment would have been to GALL IIIB4.1-b with a note A rather than IIIB5.1-b.

Therefore, for component types "HVAC Component - Carbon Steel, Protected" and "HVAC Component - Galvanized, Protected" on page 3-348, GALL volume 2 line item III.B5.1-b with a note C assigned are revised to GALL IIIB4.1-b with a note A.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-32W1) In LRA table 3.5.2.-2 (table 2) on page 3-317 for component ASME 1 Support - Containment - Sliding Material, Protected, the aging effect is loss of mechanical function. GALL volume 2 line item III.B1.1.3-a states that some of the aging mechanisms are distortion of the sliding surface and dirt build-up. Justify not having an AMP to prevent loss of mechanical function of this component due to sliding surface dirt build-up or distortion from damage or heat. Question also applies to the ASME Class 2 & 3 Piping & Mechanical Component Support - Auxiliary Bldg, Sliding Material, Protected on page 3-319 for III.B1.2.2-a. Also applies to the ASME Class 2 & 3 Piping & Mechanical Component Support - Containment Bldg, Sliding Material, Protected on page 3-321 for III.B1.2.2-a. Also applies to the ASME Class 2 & 3 Piping & Mechanical Component Support - Turbine Bldg, Sliding, Protected on page 3-323 for III.B1.2.2-a.

Final Response: As documented in the EPRI Structural Tools, it is the industry position that lubrite has no aging effects requiring management. The only potential aging effect identified is loss of material properties due to exposure to gamma radiation greater the 10E4 rads. This is higher than Palisades lubrite applications are exposed to, thus there are no aging effects requiring management. This is a position taken and accepted on numerous previous applications. The industry has provided input to the new GALL revision requesting it align with the industry position. The following was provided by the Civil/Structural working group to the NRC as the basis for why there are no aging effects for Lubrite: "Industry experience and EPRI Civil Tools indicates this aging effect is not applicable to graphite plate (lubrite). This is consistent with past approved applications. See NUREG-1759, Turkey Point SER, NUREG-1769, Peach Bottom SER, NUREG-1785, H.B. Robinson SER NUREG-1766, North Anna/Surry SER

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.1-32W2) In LRA table 3.5.2.-2 (table 2) on page 3-317 for component ASME Class 1 Tubing Support - Auxiliary Bldg, Carbon Steel Protected, one of the GALL volume 2 line items shown is III.B1.1.1-a. GALL volume 2 line item III.B1.1.1-a states that the environment is inside containment. Justify assigning the note A (consistent with GALL) for this table 2 line item when the component is in the Auxiliary Building and not in the Containment.

Final Response: Both the auxiliary building and containment environments are indoor air environments. There is little difference between the two environments other than temperature and radiation exposure. The auxiliary building environment then, is equivalent to or slightly less harsh than the containment. Since the material, environment, aging effect, and program are consistent with GALL IIIB1.1.1-a, assignment of note A is appropriate.

To better clarify, plant specific note 550 for component type “ASME Class 1 Tubing Support - Auxiliary Bldg, Carbon Steel Protected”, GALL volume 2 line item III.B1.1.1-a on page 3-317, is added to provide the clarification of why the environments are equivalent. New note 550 states the following:

550: "The environment for the GALL line item is "Inside Containment". "Inside Containment" is a plant indoor air environment equivalent to, or slightly harsher than, the auxiliary building plant indoor air environment evaluated. Thus the material, environment, aging effect, and program is consistent with the GALL line item."

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: In the May 5, 2005 letter supplementing the PNP LRA, the applicant states that Note 205 means"Palisades manages pitting and crevice corrosion." The LRA states that Note 205 means "GALL has crevice and pitting corrosion. Palisades included also general corrosion." Please clarify which note(s) are intended and what they mean.

Final Response: The verbage in Note 205 as described in the May 5, 2005 supplemental letter is correct and supersedes the verbage submitted in the LRA.

JRK added:
Note 205 was not used in the LRA; it was only used in the May 5, 2005 supplement.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: In the May 5, 2005 letter supplementing the PNP LRA, the applicant states that Note 208 means"Palisades spray nozzles are stainless steel GALL indicates carbon steel." The LRA states that Note 208 means "GALL has crevice and pitting corrosion. Palisades has included crevice, pitting, fretting, and MIC." Please clarify which note(s) are intended and what they mean.

Final Response: The verbage in Note 208 as described in the May 5, 2005 supplemental letter is correct and supersedes the verbage submitted in the LRA.

JRK added:
Note 208 was not used in the LRA; it was only used in the May 5, 2005 supplement.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-3 (pg. 3-129) shows cracking and loss of material as an aging effects for stainless steel waste gas compressor in GAS. (No aging effects is identified stainless steel in GAS in GALL Rev. 1). Provide the basis for these aging effects and explain how CCW manages them in GAS environment.

Final Response: The cracking and loss of material aging effects cited are for the gas side of the Waste Gas Compressor C-50A/B aftercooler (heat exchanger) stainless steel tubes. The tube side is Closed Cooling Water, which is provided at less than 140ºF. Cracking should not have been cited for stainless steel at less than 140ºF, but the loss of material line is valid. The loss of material is appropriate where the potential exists (on the air side) for condensation or wetting. The Closed Cycle Cooling Water Program will provide for visual inspection of these tubes for pitting and crevice corrosion.

Therefore, LRA Table 3.3.2-3 is hereby revised to delete cracking from the page 3-129 for the Waste Gas Compressor Cooler stainless steel gas interior, along with the concomitant last 4 columns.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-6 (pg. 3-144), refers to Table 1 item 3.4.1-02 and references GALL VIII.D.3-a. The LRA table is for loss of material carbon steel heat exchangers in raw water which is managed by OCCW program. The GALL item is for carbonsteel pump in treated water with wall thinning aging effect which is managed by FAC program. Explain how the GALL item and Table 1 item are consistent.

Final Response: In LRA Table 3.3.2-6, page 3-144, heat exchanger line item for carbon steel in raw water, the NUREG 1801 Volume 2, Table 1 and Note entries (existing VIII.D1.3-a, 3.4.1-02, C) are hereby changed to VII.C1.3-a, 3.3.1-17 and A, respectively.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-6 (pg. 3-151), refers to Table 1 item 3.4.1-05 and references GALL VIII.H2.2-a. The LRA table is for loss of material carbon steel valves and dampers in air which is managed by OTI program. The GALL item is for carbon steel closure bolting with the loss of material aging effect which is managed by bolting integrity. The GALL referenced Table 1 item is for loss of material of carbon steel components and identifies a plant specific program. Explain how the GALL item, GALL Table 1 item, and LRA Table 1 item are consistent.

Final Response: In LRA Table 3.3.2-6 (page 3-151), for Valves & Dampers of carbon steel in Air (Int), the second NUREG 1801 Volume 2, Table 1 and Note entries for One-Time Inspection Program, VII.H2.2-a, 3.4.1-05, and A, are hereby deleted.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: LRA Table 3.3.2-6 (pg. 3-141), refers to Table 1 item 3.4.1-08 (closure bolting) and references GALL VIII.H.2-a. The LRA table is for loss of material carbon steel accumulator in air which is managed by OTI program. The GALL item is for carbonsteel closure bolting with the loss of material aging effect which is managed by bolting integrity. Explain how the GALL item and Table 1 item are consistent.

Final Response: The Gall item and Table 1 item are not consistent for this line item. In Table 3.3.2-6, on page 3-141, the NUREG 1801 Volume 2, Table 1, and Notes for loss of material in this carbon steel accumulator in air, are hereby changed to VII.H2.2-a, 3.3.1-05 and note B.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.1-20W8) In table 3.5.2.-10 (table 2) on page 3-386 of the LRA for component type Building Framing-Sliding Material, Protected in the turbine building, the GALL volume 2 line item shown is III.A4.2-b. This line item is for RPV support shoes for PWR with nozzle supports inside the containment with an aging effect of lock-up. Explain why III.A4.2-b is referenced for this LRA AMR line item. In the basis note 5004 for this LRA AMR it is stated that Palisades' past ISI inspections of the steam generator and primary coolant pump supports have identified no recordable degradation of lubrite sliding plates. The precedent sited at Robinson was also for components in the containment. Explain how the inspection results of these different components relate to the component type vertical supports with sliding surfaces in the turbine building. Provide inspection results for the vertical supports with sliding surfaces in the turbine building to provide a basis that loss of material is not occurring.

Final Response: This sliding support is at the auxiliary building-turbine building interface. PAL FSAR Section 5.7.3 "Seismic Analysis of Other CP Co Design Class 1 Structures", Subsection 5.7.3.1.2.1 indicates that "...the auxiliary building floor slab at elevation 625 feet 0 inch was overstressed. This overstress condition was eliminated prior to the completion of construction by providing a 3-inch gap between the turbine building girders and the auxiliary building wall. Vertical supports with sliding surfaces were attached to this wall. In the east-west direction, flexible slotted bolt connections with a ±3-inch range were employed." The details for this sliding joint are shown on PAL Dwg. C-211- Detail 7. Since this joint is only required for the design basis seismic event (which have not been experience) and it is not subject to other movement/wear cycles, the aging effect does not exist and these sliding supports need not be included in an aging management program.

GALL III A4.2-b is referenced, since material, environment, and aging effect match and there is no GALL line Item for this component in GALL III A3. Structural Monitoring Program inspections of the Turbine Building were performed in 1996 and 1999. The east side of the turbine building is adjacent to the auxiliary building. No observations were identified in the area described as "Room 125/131, East Side Turbine (Entire Building Height)" for either inspection, though it is not known whether the subject sliding surfaces were accessible during those inspections. The precedents cited inside containment are conservative given the expansion/contraction cycles they have seen with respect to the turbine building.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: (3.5.2-02-W)) In LRA table 3.5.2-8 (table 2) on page 3-372 for component type Seal, Gasket or Filler - Auxiliary Bldg - Elastomer, Exposed, the only aging effect shown is cracking. Explain why change in material properties is not another aging effect for this component like it is for identical component types in other buildings.

Final Response: Review of the AMR indicates that loss of material properties was evaluated as an aging effect requiring management and the Structural Monitoring Program credited with age managing it with a standard note J applied. The LRA should include the change in material properties AERM with note J applied.

Therefore, for component type "Seal, Gasket or Filler - Auxiliary Bldg - Elastomer, Exposed" on page 3-372 of the LRA, a new "change in material properties" AERM with the Structural Monitoring Program AMP and a standard note J is added.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: (3.5.2-03W) In LRA table 3.5.2-8 (table 2) on page 3-370 for component type Fire Barrier - Water Treatment Bldg - Fire wrap, the aging effects shown are cracking and loss of material. The note shown is J. In the PNP precedent tables, note 5002 is provided for this AMR. Note 5002 makes reference to the Dresden/Quad Cities SER for a discussion on ceramic fiber with an aging effect/mechanism of separation/deterioration of metal. Note 5002 states that PNP fire wraps experience the aging effects of cracking due to vibration and loss of material due to abrasion. Provide more information on fire wraps (mineral wool batts) in how they are a material that can crack. Explain how the aging mechanism of deterioration of metal that occurred at Dresden/Quad Cities relates to the aging effects of cracking and loss of material at PNP. Applies to table 3.5.2-8 (table 2) on page 3-368 for component type Fire Barrier - Turbine Bldg - Fire wrap, Protected also. Applies to table 3.5.2-8 (table 2) on page 3-367for component type Fire Barrier - Intake Structure - Fire wrap, Protected also. Applies to table 3.5.2-8 (table 2) on page 3-365 for component type Fire Barrier - Auxiliary Bldg - Fire wrap, Protected also.

Final Response: There are two questions posed:
1. Provide more information on Fire Wraps (mineral wool batts) in how they are a material that can crack.
2. Explain how the aging mechanism of deterioration of metal that occurred at Dresden/Quad Cities relates to the aging effects of cracking and loss of material at PNP.

Response:
R1. Palisades component type "Fire Wraps (mineral wool batts)" is an abbreviated description that includes other material types, including mineral-wool batts (ceramic fiber) and cementitious fireproofing. The evaluated aging effect for mineral-wool batts is loss of material. The evaluated aging effects for cementitious fireproofing are loss of material and cracking. This is in accordance with EPRI Structural Tools Section 6.3.2 that provides descriptions for these aging effects. Cracking can occur due to vibration or delamination. Loss of material can occur due to abrasion or flaking. The mineral wool material is a thermal ceramic fiber known by trade names such as, Kaowool, Cerablanket, etc. The cementitious fireproofing material includes maranite board.

R2. GALL line items for Fire barrier penetration seals refer to Material as "Sealant". It does not describe fire wraps. Dresden/Quad Cities cite the use of ceramic fiber and cementitious fireproofing for their Fire Wrap and fireproofing components and uses "separation" as the aging effect. PNP considers "loss of material" as the aging effect due to abrasion and flaking and considers cracking of the cementitious fireproofing as the aging effect due to vibration and delamination. Although the aging effects of seperation as evaluated at Dresden/Quad Cities and cracking and loss of material as evaluated at Palisades are slightly different, the intent to protect the fire barrier intended function is the same. Aging that results in seperation, loss of material, or cracking could all expose the protected SSC to fire. Since the materials are the same, the environments are the same, the aging management programs are the same, and the intent to protect the fire barier intended function is the same, the precedent is considered applicable.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-41, for loss of material of SS RH vent in treated water, the ISI program augmented with water chemistry is proposed. Table 1 Item 3.1.1-07 deals with cracking, not loss of material, and the proposed AMPs are appropriate to cracking. Please clarify how loss of material will be managed.

Final Response: In LRA Table 3.1.2-1, on page 3-41, the AERM for the Reactor Head Vent line item is hereby changed from Loss of Material to Cracking.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-41, for cracking of SS RH vent in treated water, the ISI program augmented with water chemistry is proposed. GALL Table 1 Item 3.1.1-07 deals with cracking of small-bore piping, for which one-time inspection is also recommended. Please confirm that these component types will also be addressed using OTI or justify the omission of this program.

Final Response: In LRA Table 3.1.2-1, on Page 3-41, the One Time Inspection Program is hereby added as an additional Aging Management Program to each of the following component types which reference Table 1 Item 3.1.1-07, with appropriate standard notes as listed:

Reactor Head Vent (Note D)
Reactor Head Vent Orifice (Note B)
Sample Point (Note D)
Small Bore Stainless Steel Pipe (Note B).

The GALL Volume 2 and Table 1 items for the additional One Time Inspection lines will be the same as those used for the associated Chemistry Program line.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-43, for cracking of SS thermal sleeves in treated water, the water chemistry program augmented with ISI is proposed. Please either clarify how the thermal sleeves are to be inspected or suggest an alternative aging management regime for this component type.

Final Response: Thermal sleeve license renewal scoping was addressed in the NMC response to NRC RAI-3.1-1, in a letter dated July 1, 2005. As stated in the NMC response to RAI-3.1-1, NMC determined that thermal sleeves have no license renewal intended function and should not have been included in the LRA. Therefore, the line items for thermal sleeves are hereby deleted from the LRA in the following locations:

Table 2.3.1-1, LRA Page 2-55 and 2-56

Table 2.3.1-4, LRA Page 2-67

Table 3.1.2-1, Page 3-37 and 3-43

Table 3.1.2-4, LRA Page 3-58

LRA Page 3-63, Note 124

In addition, the following changes are made:

Section 3.1.2.2.7.1, LRA Page 3-22, first sentence of the second paragraph is revised to read, "At Palisades, this grouping includes the RTD nozzles, pressure measurement nozzles, sampling nozzle, and partial nozzle replacement."

Section 3.1.2.2.7.3, LRA Page 3-23, first sentence of the second paragraph is revised to read, "At Palisades, nickel based alloy material is identified for the pressurizer instrumentation nozzles, and heater sheaths and sleeves."

LRA Section B2.1.1, Page B-15, under Operating Experience, second sentence of the third paragraph is revised to read, "The review also considered related issues which included degradation of PCS hot leg piping and nozzles, instrument nozzles, reactor vessel head nozzles, control rod drive mechanism and thermocouple nozzles and intrusion of demineralizer resins".

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-37, for cracking of Alloy 600 cladding and thermal sleeves in treated water, the water Alloy 600 program augmented with water chemistry is proposed. Please either clarify how the cladding and the thermal sleeves are to be inspected or suggest an alternative aging management regime for these component types.

Final Response: See the NMC Response to NRC Question 92 for a discussion about thermal sleeves.

The line item for Alloy 600 Cladding in Table 3.1.2-1, page 3-37, is hereby deleted since this is a steam generator line item (IV.D1.1i) and is addressed in LRA Table 3.1.2-4. The Alloy 600 cladding in the steam generator is on the tube sheet and is addressed in Table 3.1.2-4 on LRA Page 3-60.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: Table 2 for the ESF components is organized differently from the other Table 2s, which has complicated review of ESF AMRs. Please present the date in a format that "rolls up" in a manner similar to the other Table 2s: for each component type, the materials, then the environments to which the materials are exposed, then the aging effects that require management, and finally, all programs used to manage that aging effect. (When multiple programs are applied to a single aging effect, they should be adjacent to one another in the table.)

Final Response: To facilitate the auditor's review, the information in the original LRA Table 3.2.2-1 was resorted to group the information into a more logical form to make it easier to read and understand. The resorted information provided to the auditor was identical to the information in the LRA with the following improvements: (1) It groups all the various kinds of fasteners & bolting into one category "[Bolting] Fasteners"; (2) it adds a line item for valves and groups all the different types of valves into one category "Valves"; (3) It groups all the individual line items for each specific heat exchanger tube together for that specific tube; (4) it groups the specific heat exchanger tube together with the other parts of the same heat exchanger (i.e. shell, channel head & tube sheet) for easier comparison of the internal & external environments, aging effects and programs that are applicable to the tubes; (5) It relocated multiple programs for a single aging effect adjacent to each other.

The new Table also includes incorporated comments from the auditor to: (1) Add a line item for the "Water Chemistry Program" for some components that previously had only a One-Time Inspection program credited for aging management; (2) Changed the Loss of Preload line item notes to H and deleted NUREG 1801 Volume 2 and Table 1 entries for these fasteners because loss of preload is not found in GALL Volume 2 Section V; and (3) removed reference to Note 204, which was left over from the original table.

The revised LRA Table 3.2.2-1 for the Engineered Safeguards System (ESF) is provided herein as Enclosure 2. The revised table in Enclosure 2 replaces in its entirety the original Table 3.2.2-1 in the LRA .

Enclosure 2 also includes a revised Table 2.3.2-1 which incorporates changes to conform with the revised Table 3.2.2-1.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page page 3-164, LRA Table 3.3.2-9 shows that OTI program manages "heat degradation aging effect of copper alloy heat exchangers. Explain how OTI manages this aging effect.

Final Response: Based on further review it has been determined that the correct aging management program for this component/material/environment combination is the System Monitoring Program. The components are coils in the heating ventilation and air conditioning system, and that is why the external tube/coil environment is air. In this case, the System Monitoring Program is appropriate to perform visual inspections for degradation of the external tube surfaces because those surfaces can be reached through personnel access doors.

Accordingly, the aging management program in LRA Table 3.3.2-9, page 3-164 for heat exchangers, copper alloys in air, and AERM of heat transfer degradation, is hereby changed to the System Monitoring Program. No other changes to this line item are required.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-7 (pg. 3-157) shows loss of material as an aging effect for cast iron valves/dampers in atmosphere/weather (ext) and is managed by System Monitoring Program (SMP) and Fire Protection Program. Explain how these programs manage loss of material for cast iron valves/dampers in atmosphere/weather (ext).

Final Response: The cast iron valve/damper in question is valve MV-FP204. The Fire Protection Program uses NDE techniques to maintain wall thickness for Fire Main piping and cast iron valve MV-FP204. The System Monitoring Program uses visual observation techniques to verify that the external surface of MV-FP204 is adequately managed. Accepted "as is" by Saba on 8/2/05 without discussion.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LRA Table 3.3.2-6 (pg. 3-142) shows that OTI program manages "heat transfer degradation" of carbon steel coolers with the fluid pressure boundary and heat transfer intended functions. Provide the basis for the heat transfer degradation aging effect and explain how OTI manage this AE for carbon steel coolers in oil.

Final Response: The line item in question is the FP Diesel Fire Pump lube oil cooler tubes being fouled (heat transfer degradation) with an heat transfer intended function. Provide the basis for the heat transfer degradation aging effect and explain how OTI manges this AE in oil.

Heat transfer degradation due to fouling is applicable for carbon steel heat exchanger in an oil environment. (MAER & Mech Tools)

The One-Time Inspection Program is a new program that addresses potentially long incubation periods for certain aging effects, including various corrosion mechanisms, cracking, and selective leaching, and provides a means of verifying that an aging effect is either not occurring or progressing so slowly as to have negligible effect on the intended function of the structure or component. Hence, the One-Time Inspection Program provides methods for verifying an aging management program is not needed, verifying the effectiveness of an existing program, or determining that degradation is occurring which will require evaluation and corrective action.

The program includes (a) determination of appropriate inspection sample size, (b) identification of inspection locations, (c) selection of examination technique, with acceptance criteria, and (d) evaluation of results to determine the need for additional inspections or other corrective actions.

This is a duplicate to Request No 469, except it addressed the Heat Transfer Intended Function. Please note that Palisades License Renewal Database (ALEX) duplicates component evaluation for each intended function assigned to a given component. In this case, the cooler tubes were assigned fluid pressure boundary and heat transfer.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: LR-AMR-OCC, Attachment 8,7 for domestic water systems lists PVC "piping and fittings" and "valves and dampers" in "plant indoor air (external)" environment. Explain why NO Aging Effect is identified for the PVC components in air environment. Also, identify the internal environment for these components and the aging effect associated with this ME combination.

Final Response: The following aging effects were evaluated for the PVC components of the DWS. The evaluations concluded that there were no AERM for the PVC components in an external air environment.

Ozone Exposure is a potential aging mechanism if the following exist: "Exposure to high levels of ozone that might be associated with high-voltage electrical equipment." Ozone exposure is not a potential aging mechanism for the PVC "piping and fittings" and "valves and dampers" in "plant indoor air (external)" environment at Palisades, due to not being exposed to high levels of ozone that might be associated with high-voltage electrical equipment.

Ultraviolet Exposure is a potential aging mechanism if the following exist: "Exposure to direct sunlight." Ultraviolet Exposure is not a potential aging mechanism for the PVC "piping and fittings" and "valves and dampers" in "plant indoor air (external)" environment at Palisades, due to not being exposed to direct sunlight.

The internal environment of the PVC "piping and fittings" and "valves and dampers" is raw water. Per EPRI 1003056 (Mech Tools), Appendix B, PVC has no aging effect in raw water systems.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: CAS - LR-M-212, Sheet 1 as at (B-6), (F-7), and others: For the Level Gauges that have glass, where is the material (glass) addressed?

Final Response: The level glasses are in scope for LR, component type "Pipe," and the components are subject to aging management review. NMC Palisades License Renewal evaluated materials that have aging effects. In accordance with Non-Class 1 Mechanical Implementation and Mechanical Tools, EPRI 1003056, glass has no aging effects. The glass part of the level glass was, therefore, not addressed.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: For MGS, pumps are listed as having an air internal environment and a plant indoor air external environment. Verify that these environments are correct.

Final Response: The only pumps in MGS are P-2401 and P-2402, Containment Air Sampling Pumps, and they draw air from Containment to be analyzed for hydrogen; thus both internal and external environments are air.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: There appears to be an inconsistency in evaluations between the Compressed Air Syatem (CAS) and Miscellaneous Gas System (MGS): In CAS, carbon steel components with an internal air environment are age managed for corrosion. In the MGS, there is no aging management of corrosion of carbon steel components with an air internal environment.

Final Response: The CAS has portions of the system that contains moist air and aging management of corrosion is required. MGS is dry air/gas and no aging management is required.

Air/gas is defined in LRA Table 3.0-1 as: The air/gas environment includes dry, filtered instrument air, nitrogen, and other vendor-supplied gases that may be used for analysis or calibration. Air conditions may include humidity, condensation, and contaminants.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On pages 3-73 through -77, loss of material from various components in air is of concern:
(a) in plant air, the carbon steel SDC HX shell, SIRWT HX shell, containment spray pump bolting, containment spray system valves bolting, LPSI pumps bolting, HPSI pumps bolting, SIRWT HX bolting, and the SDC HX channel head.
(b) in plant air, the cast iron Containment Spray Pump HX shell and LPSI Pump HX shell.
(c) in atmosphere/weather the carbon steel SIRWT bolting.
These are managed using the Boric Acid Corrosion Program instead of the System Monitoring Program. Please clarify how boric acid is expected to reach these components. (Some of these components are listed under containment air as well, raising the question whether they should be included under both programs.)

Final Response: The entire ESF system is filled with borated water. Therefore, any leakage from this system may result in loss of material due to Boric Acid Wastage. SUPERCEDED BY NEW ESF TABLE. ACCEPTED BY AUDITOR. (1) For Bolting exposed to Plant Indoor Air or Atmosphere/Weather loss of material due to boric acid corrosion is managed by the Boric Acid Corrosion Program as you cited. The individual bolting entries for each component were added to match GALL. Loss of material due to general corrosion is managed by the Bolting Integrity Program (See the entry titled "Fasteners" on pg 3-75). The "Fasteners" entry is intended to generically address loss of material other than boric acid for all fasteners. (2) The SDC HX Channel Head (pg3-73), Containment Spray Pump HX shell (3-74) and LPSI Pump HX shell (3-74) in Pant Indoor Air would all be susceptible to general corrosion on their external surface. Loss of material due to general corrosion is managed by the System Monitoring Program. (3) The SDC HX shell in Plant Indoor Air (pg 3-73) is susceptible to general corrosion on its external surface. Two entries down from "SDC HX Shell" a paraphrased entry exists ("SDC, SIRWT HX Shell") which is not clearly expressed. The entry should say "SDC HX Shell, SIRWT HX Shell". In either case, this entry credits the System Monitoring Program with managing loss of material due to general corrosion. SUPERCEDED BY NEW ESF TABLE. ACCEPTED BY AUDITOR.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: The referenced LRA section implies that MIC is managed by PNP using Water Chemistry and One-Time Inspection. However, the project team could find no instance where MIC was identified. Please clarify the basis for concluding that MIC need not be managed at PNP.

Final Response: The ESF System is a borated water system. Its makeup source is not susceptible to MIC Contamination. Therefore, Mic is not a potential aging mechanism. The Note needs to be revised.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-76 of the PNP LRA, loss of fracture toughness of CASS is addressed. GALL AMP XI.M13 suggests that this aging effect does not require aging management for valve bodies and that the ISI program is sufficient for managing aging of these component types. The ASME Section XI ISI program manages cracking, not loss of fracture toughness. Please change the aging effect managed using ISI or explain how the ISI will be used to manage loss of fracture toughness.

Final Response: THE NEW ESF TABLE ACCEPTED BY THE AUDITOR SUPERCEDES THIS REPONSE. A RESPONSE IS NOT REQUIRED

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-74 Table 1 item 3.2.1-13 is applied for heat transfer degradation of PCP seal cooler coils, containment spray coils, LPSI pump coils, and SDC HX tubes. This Table 1 line item addresses only loss of material. Please identify which items should be associated with heat transfer degradation, if any. WITHDRAWN

Final Response: THE NEW ESF TABLE ACCEPTED BY THE AUDITOR SUPERCEDES THIS REPONSE. A RESPONSE IS NOT REQUIRED

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Other

Information Request: On page 3-74 Table 1 item 3.2.1-13 is applied for cracking of the stainless steel containment spray and LPSI pump coils. This Table 1 line item addresses only loss of material. Please identify which items should be used to address cracking. WITHDRAWN

Final Response: QUESTION WITHDRAWN - A RESPONSE IS NOT REQUIRED

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: Table 1 item 3.2.1-13 is applied for aging effects of cracking, heat transfer degradation in addition to loss of material. This Table 1 line item addresses only loss of material. Please re-characterize the items: if the associated note indicates that the AMR is not consistent with GALL there is no need to identify an associated GALL V.2 item.

Final Response: GALL Volume 1 item 3.2.1-13 only appies to Loss of Material in a closed cycle cooling water system. Delete NUREG-1801 Vol. 1 Item references for cracking & Heat Tranfer Degradation on pg 3-74 & 3-75 in the following line items: (1) Cont. Spray, LPSI Pump Coils, (2) PCP Seal Cooler Coils, Cont. Spray Pump Coils, LPSI pump Coils, SDC HX tubes, (3) PCP Seal Cooler Coils (4) SIRWT HX Tubes, (5) on pg 3-75 SIRWT HX Tubes, Cont. Spray Pump Coils, LPSI Pump coils, SDC HX Tubes, (6) on pg 3-74 SIRWT HX Tubes, (7) on pg 3-74, Cont Spray Pump HX shell, LPSI Pump HX Shell in Treated Water/ Loss of material / One-Time Inspection Delete GALL Volume 2 References on pg 3-75 from (1) SIRWT HX Tubes (2) SIRWT HX Tubes, Cont. Spray Pump coils, LPSI Pump coils, SDC HX Tubes, (3) on pg 3-74 SIRWT HX Tubes
THE NEW ESF TABLE ACCEPTED BY THE AUDITOR SUPERCEDES THIS REPONSE. A RESPONSE IS NOT REQUIRED

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-74, cracking of PCP seal cooler coils is addressed using Table 1 item 3.2.1-13. Intended functions include heat transfer. Please clarify the effect that cracking will have on heat transfer, and why this Table 1 line item is used for an aging effect other than loss of material.

Final Response: Cracking has no effect on heat transfer. Delete NUREG-1801 Vol 2 Line Item and Table 1 item from PCP Seal Cooler Coils, SIRWT HX Tubes entry on pg 3-74 of the LRA. THE NEW ESF TABLE ACCEPTED BY THE AUDITOR SUPERCEDES THIS REPONSE. A RESPONSE IS NOT REQUIRED

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Accepted by Auditor

Information Request: On page 3-74 Table 1 item 3.2.1-13 is applied.

WITHDRAWN (SEE RESPONSE TO 13-01-P) (Handle as 3.2.1-13-02-P)

Final Response: THE NEW ESF TABLE ACCEPTED BY THE AUDITOR SUPERCEDES THIS REPONSE. A RESPONSE IS NOT REQUIRED

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: In LRA table 3.5.2.-8 (table 2) on page 3-364 for component type Fire Barrier- Auxiliary Bldg - Concrete, Protected, explain why a GALL volume 2 line item and a table 1 item are shown with a note H for the aging effect loss of material. The audit team feels that these two columns should be blank with a note H. Response needs to be docketed.

Final Response: NMC concurs. Therefore, in LRA Table 3.5.2.-8 on page 3-364, for the Loss of Material AERM of component type Fire Barrier- Auxiliary Bldg - Concrete, Protected, the NUREG 1801 Volume 2 and Table 1 entries for Fire Protection Program and Structural Monitoring Program are hereby deleted.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: In LRA table 3.5.2.-8 (table 2) on page 3-364 for component type Fire Barrier- Auxiliary Bldg - Fire Stop, Protected, explain why a GALL volume 2 line item and a table 1 item are shown with a note H for the aging effect loss of material. The audit team feels that these two columns should be blank with a note H. Also applies to LRA table 3.5.2-8 on page 3-366 for component type Fire Barrier - Intake Structure Bldg - Fire Stop, Protected for aging effect loss of material; to LRA table 3.5.2-8 on page 3-368 for component type Fire Barrier - Turbine Bldg - Fire Stop, Protected for aging effect loss of material and to LRA table 3.5.2-8 on page 3-370 for component type Fire Barrier - Water Treatment Bldg - Fire Stop, Protected for aging effect loss of material. Response needs to be docketed.

Final Response: NMC concurs. Therefore, in LRA Table 3.5.2.-8 on page 3-364, for the Loss of Material AERM of component type Fire Barrier- Auxiliary Bldg - Fire Stop, Protected, the NUREG 1801 Volume 2 and Table 1 entries for Fire Protection Program are hereby deleted.

The same deletions of NUREG 1801 Volume 2 and Table 1 information are also made to the Loss of Material AERMs of the following additional line items of Table 3.5.2-8 which have standard Note H:

- page 3-366, Fire Barrier - Intake Structure Bldg - Fire Stop, Protected
- page 3-368, Fire Barrier - Turbine Bldg - Fire Stop, Protected
- page 3-370, Fire Barrier - Water Treatment Bldg - Fire Stop, Protected

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Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: In the discussion column of Table 3.3.1, Item 24 of the PNP LRA, the applicant refers to the boric acid corrosion monitoring, one time inspection, and system monitoring programs for managing loss of material of the closure bolting. GALL Volume 1, Table 3 recommends bolting Integrity program for this line item. LRA Tables 3.3.2-1, 3.3.2-2, 3.3.2-3 , 3.3.2-5, 3.3.2-7, 3.3.2-8, 3.3.2-9, 3.3.2-11, 3.3.2-12, 3.3.2-13, 3.3.2-14, and 3.3.2-15 credits bolting integrity program for managing loss of material aging effect for carbon steel and low alloy steel fasteners in air and reference GALL VII.I.2-a and Table 3.3.1, Item 24. Please clarify this discrepancy between LRA Table 1 item 24 and the above mentioned Table 2s line items. Response needs to be docketed.

Final Response: The Discussion of Table 3.3.1, Item 24, on page 3-117, is in error. The discussion entry for this line item is hereby changed to, "See Section B2.1.3, Bolting Integrity Program, for aging management program."

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: In LRA Section 3.3.2.5, the applicant states that the Open Cycle Cooling Water program is credited for the internal environments of applicable auxiliary systems and external surfaces of carbon steel components in auxiliary systems for managing the aging effect of loss of material. However, the open cycle cooling water program is not used in Table 2 line items where this Table 1 item is addressed. Clarify this discrepancy. Response needs to be docketed.

Final Response: It is assumed the question pertains to LRA Section 3.3.2.2.5 rather than 3.3.2.5. LRA Section 3.3.2.2.5, page 3-104, 4th paragraph, erroneously includes reference to the Open Cycle Cooling Water Program. This paragraph is hereby changed to read, "For the external surfaces of carbon steel components in auxiliary systems, the System Monitoring Program is credited for managing the aging effect of loss of material. The Fire Protection Program is credited to augment the System Monitoring Program for managing external aging effects in the Fuel Oil System. Closure bolting is managed by the Bolting Integrity Program."

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-59, only water chemistry is used for loss of material from the instrument nozzles. How is the effectiveness of the wc program to be verified? (Note that ISI is also applied to this component type to manage cracking.)

Final Response: Water chemistry is verified using the ISI Program. For clarification, to the Table 3.1.2-4 line item for Wide and Narrow Range level Nozzles, Sampling and Instrument Nozzles, to the Loss of Material AERM for Treated Water, add ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program with NUREG 1801 Volume 2, Table 1 Notes IV.D1.1-c, 3.1.1-02, and Note C, respectively.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-59, cracking of instrument nozzles is managed but 3.1.1-02 is identified. Please clarify why 3.1.1-12 was not used

Final Response: 3.1.1-12 is not used because it is for primary system components. The instrument nozzles being evaluated on page 3-59 are for the secondary side of the steam generator and are constructed of low-alloy steel. Since the normal operating temperatures of the nozzles are >210F, it is not necessary to list cracking as an AERM.

Therefore, In Table 3.1.2-4, for the line item "Wide and Narrow Range level Nozzles, Sampling and Instrument Nozzles", on page 3-59, the AERM "Cracking" and its associated NUREG 1801 Volume 2, Table 1 and Notes are hereby deleted.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-41, for the PC sample heat exchanger shell, please confirm that 3.2.1-13 was intended or make some other correction to the AMR.

Final Response: 3.2.1-13 was the intended Table 1 alignment. Therefore, in Table 3.1.2-1, on page 3-41, for the line item Primary Coolant Pump Sample Heat Exchanger Shell, Loss of Material in Treated Water, the Table 1 entry is hereby changed from 3.1.1-13 to 3.2.1-13.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-44, flanges are associated with the item for bolting. An alternative Table 1 item number (and Note) is needed.

Final Response: In Table 3.1.2-2, on page 3-44, the component type "Incore Instrument Closure Flanges" is hereby changed to "CRDM/Incore Instrument Closure Flanges". The existing NUREG 1801 Volume 2, Table 1 and Notes entries of IV.A2.2-f, 3.1.1-26, and C in the Containment Air (Ext) environment are correct for these flanges.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-40, this Table 1 item is applied to pump casings of CASS. In Table 1, the item explicitly excludes CASS, and therefore should not be applied to the CASS valve bodies and pump casings.

Final Response: In Table 3.1.2-1, on page 3-40, for the Primary Coolant Pump Casing AERM, Cracking, the Table 1 and Notes entries are hereby changed from 3.3.1-36, A to 3.1.1-13, C.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-37, GALL v2 Item IV.C2.2-h appears for Alloy 600 safe ends. This GALL Item refers to stainless steel components and does not appear to be appropriate. Please clarify.

Final Response: The GALL Volume 2 items referenced are IV.C2.2-f and IV.C2.5-h, and are for stainless steel. Therefore, in LRA Table 3.1.2-1, on page 3-37, for the component type Alloy 600 Safe Ends, the existing NUREG 1801 Volume 2, Table 1 and Notes entries for both the Alloy 600 Program and Water Chemistry Program are hereby deleted. New NUREG 1801 Volume 2, Table 1 and Notes entries for both the Alloy 600 Program and Water Chemistry Program are IV.C2.5-s, 3.1.1-14, and Note E.

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-38, GALL v2 Item IV.C2.2-f appears twice for the water chemistry AMP applied to non-CASS valves. Is this a duplication, or is there a different GALL Item that was intended?

Final Response: In LRA Table 2.1.3-1, on page 3-38, for the component type Non-CASS Valves in PCS and Connected Systems, the second IV.C2.2-f entry for the Water Chemistry Program is a duplicate. This entry is hereby deleted.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-40, loss of material from the internal surface of the quench tank is managed using the system monitoring program. The environment is listed as containment air. Is this correct? According to the PNP FSAR section 4.3.8, the tank is normally filled with nitrogen, which would seem an appropriate basis for use of the system monitoring AMP in lieu of the BAC program.

Final Response: In Table 3.1.2-1, the first component type on page 3-40, Pressurizer Quench Tank, is for the tank interior environment only. No external environment should be listed. Therefore, the entries Containment Air (Ext) and the associated AERM, NUREG 1801 Volume 2, Table 1, and Notes entries are hereby deleted from this component type. The remaining entries for the Treated Water (Int) environment are unchanged.

The second line item on page 3-40, Pressurizer Quench Tank Shell and Heads, addresses the external surface of the tank, and credits the Boric Acid Corrosion Program for aging management.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-53 of the LRA, Note F implies that GALL specifies a material. It does not. GALL also recommends using water chemistry. Please provide the basis for managing this aging effect using only RVI Internals.

Final Response: The GALL Volume 2 reference is an error. Therefore, in LRA Table 3.1.2-3 on page 3-53, for the component type, Instrument Sleeve, and AERM Reduction in Fracture Toughness, the NUREG 1801 Volume 2 entry is hereby changed from IV.B3.2-e to IV.B3.3-a, and the Note is changed from F to C.

In addition, for the Reduction in Fracture Toughness AERM of component type Instrument Sleeve, the additional AMP, Water Chemistry Program, is hereby added with NUREG 1801 Volume 2, Table 1 and Notes entries of IV.B3.3-a, 3.1.1-43, and C, respectively.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-51 of the PNP LRA, GALL volume 1 associates item B3.3-a with 3.1.1-43, which addresses crack initiation and growth. dimension/void swelling, in addition to 3.1.1-45, which addresses crack initiation and growth. (Application of the RVI and WC program is consistent with GALL.)

Final Response: Discussion with the auditor indicates the line item in question is the last line item on page 3-51.

In LRA Table 3.1.2-3, on page 3-51, for the component type "Instrument Guide Tube, Guide Tube Bracket, Guide Tube Plugs, Guide Tube Plug Screw, Guide Tube Support", for the Reduction in Fracture Toughness AERM, the Table 1 entry is hereby changed from 3.1.1-45 to 3.1.1-43. In addition, for this Reduction in Fracture Toughness AERM, the additional AMP, Water Chemistry Program, is hereby added with NUREG 1801 Volume 2, Table 1 and Notes entries of IV.B3.3-a, 3.1.1-43, and C, 113, respectively.

Source: AMR Audit ☑ **Potential Docketed Response** **Status:** Closed - Response Docketed

Information Request: On page 3-56 of the PNP LRA, loss of material from the low-alloy steel tube bundle wrapper is managed using only the water chemistry program. In the precedent tables, Item D1-8 is cited, but this calls for both the water chemistry program and the SG Tube Integrity Program. Please identify how the effectiveness of the WC program will be verified.

Final Response: The effectiveness of the Water Chemistry Program will be verified through the Steam Generator Tube Integrity Program. Therefore, in Table 3.1.2-4, on page 3-56, for the Tube Bundle Wrapper Loss of Material AERM, the additional AMP, Steam Generator Tube Integrity Program, is hereby added with NUREG 1801 Volume 2, Table 1 and Notes entries of IV.D1.1-c, 3.1.1-2, and E, respectively. For the existing Water Chemistry Program entry for the Loss of Material AERM, the NUREG 1801 Volume 2, Table 1 and Notes are changed to IV.D1.1-c, 3.1.1-2, and C, respectively.

Summary Report of License Renewal Review Questions for: AMR Audit

Source: AMR Audit ☐ **Potential Docketed Response** **Status:** Closed - Other

Information Request: On page 3-76 of the PNP LRA, loss of fracture toughness of CASS is addressed. GALL AMP XI.M13 suggests that this aging effect does not require aging management for valve bodies and that the ISI program is sufficient for managing aging of these component types. The ASME Section XI ISI program manages cracking, not loss of fracture toughness. Please change the aging effect managed using ISI or explain how the ISI will be used to manage loss of fracture toughness.

Final Response: This Information Request was withdrawn by NRC during the 8/24/05 conference call.
