NMC
Committed to Nuclear Excellence

Palisades Nuclear Plant
Operated by Nuclear Management Company, LLC

August 27, 2005

10 CFR 54

U. S. Nuclear Regulatory Commission
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Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

Supplementary Information for the Palisades Application for Renewed Operating License Resulting from Aging Management Review Audit

During the period August 1 through 4, 2005, an NRC team conducted an on-site audit of Aging Management Review (AMR) described in the Application for Renewed Operating License – Palisades Nuclear Plant, submitted on March 31, 2005. During that audit a number of written questions were asked by the team, and verbal and/or written responses were provided by NMC. The NRC audit team requested that the NMC responses to a number of the team's questions be documented in a docketed letter. This letter fulfills that request.

Enclosure 1 provides the text of, and the NMC response to, each NRC request. The questions in Enclosure 1 are from written questions provided by the audit team. Each question was discussed extensively with the auditors during interviews, often with wider scope than indicated by the written question. The NMC responses contain specific information which the auditors requested be documented in a letter, and do not necessarily address every subject raised during the course of the interviews.

Enclosure 2 provides revised Tables 2.3.2-1 and 3.2.2-1 for the Engineered Safeguards System.

Please contact Mr. Darrel Turner, License Renewal Project Manager, at 269-764-2412, or Mr. Robert Vincent, License Renewal Licensing Lead, at 269-764-2559, if you require additional information.

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Summary of Commitments

This letter contains one new preliminary commitment (i.e., subject to acceptance in the NRC SER for the renewed operating license), as follows:

> 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.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 27, 2005.

Paul A. Harden
Site Vice President, Palisades Nuclear Plant
Nuclear Management Company, LLC

Enclosures (2)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC
License Renewal Project Manager, Palisades, USNRC

ENCLOSURE 1

Supplementary Information for the Palisades Application for Renewed Operating License Resulting from Aging Management Review Audit

(102 Pages)

Enclosure 1
Supplementary Information for the Palisades Application for Renewed Operating License Resulting from Aging Management Review Audit

NRC Question 1

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. [NMC Tracking No. 48]

NMC Response to NRC Question 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 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.

NRC Question 2

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. [NMC Tracking No. 49]

NMC Response to NRC Question 2

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.

NRC Question 3

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. [NMC Tracking No. 50]

NMC Response to NRC Question 3

(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.

NRC Question 4

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) [NMC Tracking No. 51]

NMC Response to NRC Question 4

(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.

NRC Question 5

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

Provide appropriate material, environment, aging effect and aging management program for each structure/component of metal enclosed bus. [NMC Tracking No. 52]

NMC Response to NRC Question 5

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).

NRC Question 6

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? [NMC Tracking No. 53]

NMC Response to NRC Question 6

(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.

NRC Question 7

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? [NMC Tracking No. 54]

NMC Response to NRC Question 7

(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.

NRC Question 8

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. [NMC Tracking No. 55]

NMC Response to NRC Question 8

(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.

NRC Question 9

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 [NMC Tracking No. 56]

NMC Response to NRC Question 9

(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.

NRC Question 10

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. [NMC Tracking No. 419]

NMC Response to NRC Question 10

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

NRC Question 11

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. {NMC Tracking No. 422]

NMC Response to NRC Question 11

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.

NRC Question 12

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. [NMC Tracking No. 423]

NMC Response to NRC Question 12

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.

NRC Question 13

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. [NMC Tracking No. 424]

NMC Response to NRC Question 13

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.

NRC Question 14

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. [NMC Tracking No. 425]

NMC Response to NRC Question 14

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."

NRC Question 15

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. [NMC Tracking No. 426]

NMC Response to NRC Question 15

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.

NRC Question 16

On page 3-54 of the PNP LRA, Water Chemistry 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. [NMC Tracking No. 427]

NMC Response to NRC Question 16

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.

NRC Question 17

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. [NMC Tracking No. 428]

NMC Response to NRC Question 17

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.

NRC Question 18

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? [NMC Tracking No. 429]

NMC Response to NRC Question 18

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.

NRC Question 19

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. [NMC Tracking No. 431]

NMC Response to NRC Question 19

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.

NRC Question 20

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. [NMC Tracking No. 433]

NMC Response to NRC Question 20

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.

NRC Question 21

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. [NMC Tracking No. 434]

NMC Response to NRC Question 21

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.

NRC Question 22

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 radwaste system are addressed . On what basis is item 3.3.1-05 (LOM, MIC, pitting & CC *in air*) associated with this MEAP? [NMC Tracking No. 436]

NMC Response to NRC Question 22

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.

NRC Question 23

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. [NMC Tracking No. 438]

NMC Response to NRC Question 23

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.

NRC Question 24

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 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.) [NMC Tracking No. 441]

NMC Response to NRC Question 24

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".

NRC Question 25

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. [NMC Tracking No. 449]

NMC Response to NRC Question 25

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..

NRC Question 26

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. [NMC Tracking No. 453]

NMC Response to NRC Question 26

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".

NRC Question 27

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. [NMC Tracking No. 454]

NMC Response to NRC Question 27

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.

NRC Question 28

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. [NMC Tracking No. 455]

NMC Response to NRC Question 28

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).

NRC Question 29

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. [NMC Tracking No. 456]

NMC Response to NRC Question 29

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.

NRC Question 30

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. [NMC Tracking No. 457]

NMC Response to NRC Question 30

See NMC Response to NRC Question 29.

NRC Question 31

LRA Table 3.3.2-4 (pg. 3-131), refers to Table 1 item 3.3.1-19 (compressed air) and references GALL VII.D.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. [NMC Tracking No. 458]

NMC Response to NRC Question 31

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.

NRC Question 32

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. [NMC Tracking No. 459]

NMC Response to NRC Question 32

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.

NRC Question 33

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. [NMC Tracking No. 460]

NMC Response to NRC Question 33

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.

NRC Question 34

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. [NMC Tracking No. 462]

NMC Response to NRC Question 34

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).

NRC Question 35

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. [NMC Tracking No. 463]

NMC Response to NRC Question 35

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."

NRC Question 36

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. [NMC Tracking No. 464]

NMC Response to NRC Question 36

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.

NRC Question 37

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. [NMC Tracking No. 467]

NMC Response to NRC Question 37

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).

NRC Question 38

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] [NMC Tracking No. 468]

NMC Response to NRC Question 38

See NMC Response to NRC Question 29.

NRC Question 39

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. [NMC Tracking No. 479]

NMC Response to NRC Question 39

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."

NRC Question 40

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. [NMC Tracking No. 481]

NMC Response to NRC Question 40

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.

NRC Question 41

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. [NMC Tracking No. 483]

NMC Response to NRC Question 41

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.

NRC Question 42

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 expressly excludes components in the main steam system. [NMC Tracking No. 484]

NMC Response to NRC Question 42

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.

NRC Question 43

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. [NMC Tracking No. 486]

NMC Response to NRC Question 43

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.

NRC Question 44

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. [NMC Tracking No. 489]

NMC Response to NRC Question 44

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."

NRC Question 45

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. [NMC Tracking No. 490]

NMC Response to NRC Question 45

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.

NRC Question 46

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 [NMC Tracking No. 491]

NMC Response to NRC Question 46

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.

NRC Question 47

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 use of One Time Inspection for this line item. [NMC Tracking No. 494]

NMC Response to NRC Question 47

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.

NRC Question 48

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. [NMC Tracking No. 495]

NMC Response to NRC Question 48

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).

NRC Question 49

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. [NMC Tracking No. 497]

NMC Response to NRC Question 49

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.

NRC Question 50

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. [NMC Tracking No. 498]

NMC Response to NRC Question 50

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.

NRC Question 51

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." [NMC Tracking No. 499]

NMC Response to NRC Question 51

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.

NRC Question 52

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. [NMC Tracking No. 504]

NMC Response to NRC Question 52

The reviewer's observation that the "cracking" aging effect with a standard note H is 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).

NRC Question 53

(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. [NMC Tracking No. 505]

NMC Response to NRC Question 53

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.

NRC Question 54

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. [NMC Tracking No. 506]

NMC Response to NRC Question 54

"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.

NRC Question 55

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. [NMC Tracking No. 509]

NMC Response to NRC Question 55

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.

NRC Question 56

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. [NMC Tracking No. 510]

NMC Response to NRC Question 56

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".

NRC Question 57

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. [NMC Tracking No. 515]

NMC Response to NRC Question 57

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.

NRC Question 58

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. [NMC Tracking No. 517]

NMC Response to NRC Question 58

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."

NRC Question 59

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. [NMC Tracking No. 519]

NMC Response to NRC Question 59

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.

NRC Question 60

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. [NMC Tracking No. 520]

NMC Response to NRC Question 60

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.

NRC Question 61

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. [NMC Tracking No. 521]

NMC Response to NRC Question 61

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".

NRC Question 62

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. [NMC Tracking No. 522]

NMC Response to NRC Question 62

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."

NRC Question 63

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. [NMC Tracking No. 523]

NMC Response to NRC Question 63

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."

NRC Question 64

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. [NMC Tracking No. 524]

NMC Response to NRC Question 64

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."

NRC Question 65

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. [NMC Tracking No. 526]

NMC Response to NRC Question 65

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.

NRC Question 66

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. [NMC Tracking No. 527]

NMC Response to NRC Question 66

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."

NRC Question 67

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. [NMC Tracking No. 528]

NMC Response to NRC Question 67

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."

NRC Question 68

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. [NMC Tracking No. 529]

NMC Response to NRC Question 68

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.

NRC Question 69

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. [NMC Tracking No. 530]

NMC Response to NRC Question 69

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".

NRC Question 70

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. [NMC Tracking No. 531]

NMC Response to NRC Question 70

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..

NRC Question 71

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. [NMC Tracking No. 532]

NMC Response to NRC Question 71

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.

NRC Question 72

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). [NMC Tracking No. 533]

NMC Response to NRC Question 72

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.

NRC Question 73

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). [NMC Tracking No. 534]

NMC Response to NRC Question 73

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.

NRC Question 74

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). [NMC Tracking No. 535]

NMC Response to NRC Question 74

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.

NRC Question 75

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. [NMC Tracking No. 536]

NMC Response to NRC Question 75

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.

NRC Question 76

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. [NMC Tracking No. 537]

NMC Response to NRC Question 76

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.

NRC Question 77

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. [NMC Tracking No. 538]

NMC Response to NRC Question 77

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.

NRC Question 78

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. [NMC Tracking No. 539]

NMC Response to NRC Question 78

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.

NRC Question 79

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. [NMC Tracking No. 540]

NMC Response to NRC Question 79

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..

NRC Question 80

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. [NMC Tracking No. 541]

NMC Response to NRC Question 80

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 - Carbon Steel, Protected" on page 3-315 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.

NRC Question 81

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. [NMC Tracking No. 542]

NMC Response to NRC Question 81

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...".

NRC Question 82

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. [NMC Tracking No. 543]

NMC Response to NRC Question 82

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...".

NRC Question 83

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. [NMC Tracking No. 544]

NMC Response to NRC Question 83

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.

NRC Question 84

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. [NMC Tracking No. 546]

NMC Response to NRC Question 84

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."

NRC Question 85

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. [NMC Tracking No. 571]

NMC Response to NRC Question 85

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 140°F. Cracking should not have been cited for stainless steel at less than 140°F, 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.

NRC Question 86

LRA Table 3.3.2-6 (pg. 3-144), refers to Table 1 item 3.4.1-02 and references GALL VIII.D1.3-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 carbon steel 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. [NMC Tracking No. 572]

NMC Response to NRC Question 86

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.

NRC Question 87

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. [NMC Tracking No. 573]

NMC Response to NRC Question 87

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.

NRC Question 88

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 carbon steel 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. [NMC Tracking No. 574]

NMC Response to NRC Question 88

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.

NRC Question 89

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. [NMC Tracking No. 576]

NMC Response to NRC Question 89

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.

NRC Question 90

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. [NMC Tracking No. 578]

NMC Response to NRC Question 90

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.

NRC Question 91

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. [NMC Tracking No. 579]

NMC Response to NRC Question 91

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.

NRC Question 92

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. [NMC Tracking No. 580]

NMC Response to NRC Question 92

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".

NRC Question 93

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. [NMC Tracking No. 581]

NMC Response to NRC Question 93

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.

NRC Question 94

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.) [NMC Tracking No. 582]

NRC Response to NRC Question 94

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.

NRC Question 95

On 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. [NMC Tracking No. 583]

NMC Response to NRC Question 95

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.

Enclosure 2

Revised LRA Table 3.2.2-1
Revised LRA Table 2.3.2-1

(8 Pages)

Enclosure 2
Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG - 1801 Volume 2 Line Item	Table 1 Item	Notes
SIRW Tank	Fluid Pressure Boundary	Aluminum	Treated Water (Int)	Cracking	Water Chemistry Program	V.D1.8-a	3.2.1-15	F, 210
					One-Time Inspection Program	V.D1.8-a	3.2.1-15	F, 210
Safety Injection Tank	Fluid Pressure Boundary	Carbon Steel w/SS clad lining	Containment Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.D1.7-a	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Treated Water (Int)	Loss of Material	Water Chemistry Program			H
					One-Time Inspection Program			H
SDC HX Shell	Fluid Pressure Boundary	Carbon Steel	Plant Indoor Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.D1.5-b	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Treated Water (Int)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
SDC HX Channel Head	Fluid Pressure Boundary	Carbon Steel w/SS clad lining	Plant Indoor Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.D1.5-b	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Treated Water (Int)	Loss of Material	Water Chemistry Program			H
					One-Time Inspection Program			H

Enclosure 2

Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

SDC HX Tube Sheet	Fluid Pressure Boundary	Carbon Steel w/SS clad lining	Treated Water (Ext)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
			Treated Water (Int)	Loss of Material	Water Chemistry Program			H
					One-Time Inspection Program			H
SDC HX Tubes	Fluid Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
			Treated Water (Int)	Loss of Material	Water Chemistry Program	V.D1.5-a	3.2.1-13	A
					One-Time Inspection Program			G
	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation	Closed Cycle Cooling Water Program			H
			Treated Water (Int)	Heat Transfer Degradation	Water Chemistry Program			H
					One-Time Inspection Program			H
SIRWT HX Shell	Fluid Pressure Boundary	Carbon Steel	Plant Indoor Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.D1.6-d	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Steam (Int)	Loss of Material	Water Chemistry Program			G, 211
					One-Time Inspection Program			G, 211

Enclosure 2
Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

SIRWT HX Tubes	Fluid Pressure Boundary	Stainless Steel	Steam (Ext)	Cracking	Water Chemistry Program			G, 211
					One-Time Inspection Program			G, 211
				Loss of Material	Water Chemistry Program			G, 211
					One-Time Inspection Program			G, 211
	Heat Transfer	Stainless Steel	Steam (Ext)	Heat Transfer Degradation	Water Chemistry Program			G, 211
					One-Time Inspection Program			G, 211
	Fluid Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking	Water Chemistry Program			H
					One-Time Inspection Program			G
				Loss of Material	Water Chemistry Program			H
					One-Time Inspection Program			G
	Heat Transfer	Stainless Steel	Treated Water (Int)	Heat Transfer Degradation	Water Chemistry Program			G, 211
					One-Time Inspection Program			H
Cont. Spray Pump HX shell	Fluid Pressure Boundary	Cast Iron	Plant Indoor Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.E1-a	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Treated Water (Int)	Loss of Material	Closed Cycle Cooling Water Program			H, 212
					One-Time Inspection Program			H, 212

Enclosure 2

Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

Cont. Spray Pump coils	Fluid Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking	Closed Cycle Cooling Water Program			H
				Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation	Closed Cycle Cooling Water Program			H
	Fluid Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material	Water Chemistry Program	V.D1.5-a	3.2.1-13	A
					One-Time Inspection Program			G
	Heat Transfer	Stainless Steel	Treated Water (Int)	Heat Transfer Degradation	Water Chemistry Program			H
					One-Time Inspection Program			H
LPSI Pump HX shell	Fluid Pressure Boundary	Cast Iron	Plant Indoor Air (Ext)	Loss of Material	Boric Acid Corrosion Program	V.E1-a	3.2.1-17	A
					System Monitoring Program	V.E1-b	3.2.1-10	A
			Treated Water (Int)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	F
LPSI Pump coils	Fluid Pressure Boundary	Stainless Steel	Treated Water (Ext)	Cracking	Closed Cycle Cooling Water Program			H
				Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation	Closed Cycle Cooling Water Program			H
	Heat Transfer	Stainless Steel	Treated Water (Int)	Heat Transfer Degradation	One-Time Inspection Program			H
					Water Chemistry Program	V.D1.5-a	3.2.1-13	E
	Fluid Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material	One-Time Inspection Program			G
					Water Chemistry Program	V.D1.5-a	3.2.1-13	E

Enclosure 2
Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

PCP Seal Cooler Coils	Heat Transfer	Stainless Steel	Treated Water (Ext)	Heat Transfer Degradation	Closed Cycle Cooling Water Program			H
	Fluid Pressure Boundary	Stainless Steel	Treated Water (Ext)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B
	Fluid Pressure Boundary	Stainless Steel	Treated Water (Int)	Cracking	Water Chemistry Program			H
					One-Time Inspection Program			H
				Loss of Material	Water Chemistry Program	V.D1.5-a	3.2.1-13	E
					One-Time Inspection Program			H
PCP Seal Cooler Shell	Fluid Pressure Boundary	Stainless Steel	Treated Water (Int)	Loss of Material	Closed Cycle Cooling Water Program	V.D1.5-a	3.2.1-13	B

Enclosure 2

Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

[Bolting] Fasteners	Fluid Pressure Boundary	Carbon Steel	Plant Indoor Air (Ext)	Loss of Preload	Bolting Integrity Program			H
				Loss of Material	Boric Acid Corrosion Program	V.A.1-b	3.2.1-17	A
						V.A.3-b	3.2.1-17	A
						V.A.4-b	3.2.1-17	A
						V.D1.2-b	3.2.1-17	A
						V.D1.6-d	3.2.1-17	A
			Containment Air (Ext)	Loss of Preload	Bolting Integrity Program			H
				Loss of Material	Bolting Integrity Program	V.E.2-a	3.2.1-18	A
					Boric Acid Corrosion Program	V.A.1-b	3.2.1-17	A
					Boric Acid Corrosion Program	V.A.4-b	3.2.1-17	A
					Boric Acid Corrosion Program	V.A.5-b	3.2.1-15	A
			Atmosphere/ Weather (Ext)	Loss of Material	Boric Acid Corrosion Program	V.D1.8-b	3.2.1-17	A
					Bolting Integrity Program	V.E.2-a	3.2.1-18	A
				Loss of Preload	Bolting Integrity Program			H
		Stainless Steel	Plant Indoor Air (Ext)	Loss of Preload	Bolting Integrity Program			H
			Containment Air (Ext)	Loss of Preload	Bolting Integrity Program			H

Enclosure 2

Table 3.2.2-1 Engineered Safety Features - Engineered Safeguards System - Summary of Aging Management Evaluation

Valves	Fluid Pressure Boundary	Cast Austenitic SS	Treated Water (Int)	Cracking	Water Chemistry Program			G, 207
					One-Time Inspection Program			G, 207
				Reduction of Fracture Toughness	ASME Section XI IWB, IWC, IWD, IWF Inservice Inspection Program	V.D1.1-b	3.2.1-11	E, 209
				Loss of Material	Water Chemistry Program			G, 207
					One-Time Inspection Program			G, 207
		Stainless Steel	Treated Water (Int)	Loss of Material	Water Chemistry Program			G, 207
					One-Time Inspection Program			G, 207
Piping and Fittings	Fluid Pressure boundary	Stainless Steel	Treated Water (Int)	Cracking	Water Chemistry Program	V.D1.1-a	3.2.1-15	A, 214
					One-Time Inspection Program	V.D1.1-a	3.2.1-15	A, 214
				Loss of Material	Water Chemistry Program			H, 205, 214
					One-Time Inspection Program			H, 205, 214
Pumps	Fluid Pressure boundary	Stainless Steel	Treated Water (Int)	Loss of Material	Water Chemistry Program			H, 205, 214, 215
					One-Time Inspection Program			H, 205, 214, 215
Spray Nozzles	Spray Pattern	Stainless Steel	Air (Ext)	None	None Required			F, 208, 214
Tri-Sodium Phosphate Baskets	Structure Functional Support	Stainless Steel	Containment Air (Ext)	None	None Required			J, 213, 214

Enclosure 2

Table 2.3.2-1 Engineered Safeguards System

Component Group	Intended Function
SIRW Tank	Fluid Pressure Boundary
Safety Injection Tank	Fluid Pressure Boundary
SDC HX Shell	Fluid Pressure Boundary
SDC HX Channel Head	Fluid Pressure Boundary
SDC HX Tube Sheet	Fluid Pressure Boundary
SDC HX Tubes	Fluid Pressure Boundary Heat Transfer
SIRWT HX Shell	Fluid Pressure Boundary
SIRWT HX Tubes	Fluid Pressure Boundary Heat Transfer
Cont. Spray Pump HX shell	Fluid Pressure Boundary
Cont. Spray Pump coils	Fluid Pressure Boundary Heat Transfer
LPSI Pump HX shell	Fluid Pressure Boundary
LPSI Pump coils	Fluid Pressure Boundary Heat Transfer
PCP Seal Cooler Coils	Fluid Pressure Boundary Heat Transfer
PCP Seal Cooler Shell	Fluid Pressure Boundary
[Bolting] Fasteners	Fluid Pressure Boundary
Valves	Fluid Pressure Boundary
Piping and Fittings	Fluid Pressure Boundary
Pumps	Fluid Pressure Boundary
Spray Nozzles	Spray Pattern
Tri-Sodium Phosphate Baskets	Structure Functional Support