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GNRO-2012/00076

July 19, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Additional Information (RAI) Set 21 dated June 20, 2012
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCE: NRC Letter, "Requests for Additional Information for the Review of the Grand Gulf Nuclear Station, License Renewal Application," dated June 20, 2012 (GNRI-2012/00136) (ML12151A368)

Dear Sir or Madam:

Entergy Operations, Inc. is providing, in Attachment 1, the response to the referenced Request for Additional Information (RAI). Attachment 2 includes an updated listing of regulatory commitments for license renewal that includes revised commitment 30 required in response to RAIs in this letter.

This letter contains no new commitments. If you have any questions or require additional information, please contact Christina L. Perino at 601-437-6299.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 19th day of July, 2012.

Sincerely,

MP/jas

Attachment(s): (see next page)

Attachment(s): 1. Response to Request for Additional Information (RAI)
2. List of Regulatory Commitments

cc: with Attachment(s)

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Attachment 1 to

GNRO-2012/00076

Response to Request for Additional Information (RAI)

The format for the RAI responses below is as follows. The Request for Additional Information (RAI) is listed in its entirety as received from the Nuclear Regulatory Commission (NRC) with background, issue and request subparts. This is followed by the Grand Gulf Nuclear Station (GGNS) RAI response to the individual question.

RAI 3.1.2.1-1

Background. SRP-LR Section A.1.2.1, item 7, states that applicable aging effects to be considered for license renewal include those that could result from normal plant operation, including plant/system operating transients and plant shutdown.

License renewal application (LRA) Tables 3.1.2-1 and 3.1.2-3, state that carbon steel and low alloy steel components including nozzles, nozzle safe ends and extensions, nozzle flanges, reactor vessel upper head, piping, flow elements, thermal sleeves, and valve bodies exposed externally to indoor air do not require any aging effect to be managed. The related aging management review (AMR) items cite generic note G, indicating this environment is not in the generic aging lessons learned (GALL) Report for the aging effects of this component and material combination. Also, the associated plant-specific note, 102, states that high component surface temperature precludes moisture accumulation that could result in corrosion.

Issue. In its review, the staff found that identical material and environment combinations were found in the GALL Report, in systems other than the reactor coolant system. The staff noted that the basis for not managing any aging effects is that the temperature of the components under consideration is above the dew point. The GALL Report states that the aging effect of loss of material due to exposure of steel surfaces to indoor air, which can result in condensation but only rarely, should be considered. The staff also noted that during refueling outages, these components will be at ambient temperatures for prolonged periods of time, which may or may not be above the dew point.

Request. Provide the technical basis to justify why there are no aging effects requiring management for the subject components given that, during normal plant events such as refueling outages, these components will be at or near ambient temperatures.

RAI 3.1.2.1-1 RESPONSE

Loss of material is not a significant aging effect for steel components of the reactor vessel and reactor coolant pressure boundary with high operating temperatures (> 212°F) that have external surfaces exposed to indoor air. During normal operation, these components are at temperatures where condensation is not possible. Without the presence of moisture, corrosion is not possible. Although these components are at or near (but seldom if ever below) ambient temperatures during shutdown conditions, such as refueling outages, these conditions are comparatively brief. Since the dew point inside containment during outages is typically below the ambient temperature (humidity is normally less than 100% inside containment during outages), actual condensation on reactor coolant system piping is not a significant concern. Any minor moisture accumulated during shutdown is quickly evaporated during startup. Operating experience has shown that these components are not subject to loss of material due to corrosion.

RAI 3.2.2-1

Background. LRA Section 4.3.2 discusses the time-limited aging analysis (TLAAs) associated with assumed thermal cycle count for allowable secondary stress range reduction factor in non-Class 1 piping and non-piping components. The LRA states that these TLAAs are dispositioned in accordance with 10 CFR 54.21 (c)(1)(i), that the existing analyses remain valid for the period of extended operation.

Issue. The staff reviewed the applicant's AMR results in the associated LRA Tables within LRA Sections 3.2, 3.3 and 3.4, and noted that the results did not include all applicable AMR line items for the TLAAs associated with metal fatigue of non-Class 1 piping and non-piping components. For low-pressure core spray system, high-pressure core spray system, standby-liquid control system, suppression pool makeup system and standby-gas treatment system, Updated Final Safety Analysis Report (UFSAR) Table 3.2-1 indicates these systems are non-Class 1 and the staff noted that there may be components that have been analyzed for cumulative fatigue damage. It is not clear to the staff why those components that may have been analyzed for cumulative fatigue damage, as discussed in LRA Section 4.3.2, are not included as AMR items in applicable tables in LRA Sections 3.2, 3.3 and 3.4.

Request. Revise the applicable LRA Tables in Sections 3.2, 3.3, and 3.4 to include all AMR items that address cumulative fatigue damage for non-Class 1 piping and non-piping components, or justify why AMR items are not needed for cumulative fatigue damage in LRA Sections 3.2, 3.3, and 3.4 that are associated with non-Class 1 piping and non-piping components.

RAI 3.2.2-1 RESPONSE

Cumulative fatigue is evaluated when system operating temperatures are high enough to induce the aging effect. Fatigue has been identified as a TLAA in LRA Sections 3.2, 3.3, and 3.4 for non-Class 1 components exposed to elevated operating temperatures. However, the low pressure core spray system, high pressure core spray system, standby liquid control system, suppression pool makeup system and standby gas treatment system are standby systems, and the non-Class 1 portions of these systems have normal temperatures well below the temperature threshold for fatigue. Thus, there are no fatigue time-limited aging analyses for these systems and no fatigue AMR line items.

RAI 3.3.1.82-1

Background. LRA Table 3.3.1, items 82 and 96, associated with elastomer seals and components, was not used. The justification for not using the item is, "[w]ear of elastomer components is considered an event driven condition rather than an aging effect. If the elastomer component is properly designed, installed and maintained, contact with other surfaces leading to wear will not occur."

GALL Report Section IX.F defines wear "as the removal of surface layers due to relative motion between two surfaces or under the influence of hard, abrasive particles. Wear occurs in parts that experience intermittent relative motion, frequent manipulation, or in clamped joints where relative motion is not intended, but may occur due to a loss of the clamping force."

Issue. The conclusion that properly designed, installed, and maintained components will not experience wear is not consistent with the GALL Report definition of wear. Within the definition of the term "wear" in GALL Report Section IX.F, there are three factors to consider that could cause age-related wear due to the design of the joint, including (a) relative motion between two surfaces under the influence of hard abrasive particles, (b) frequent manipulation, or (c) in clamped joints where relative motion is not intended but may occur due to a loss of the clamping force.

It is unclear to the staff whether there are any components within the scope of license renewal that are designed in such a way that they could be impacted by the three age-related factors considered in the definition of wear.

Request.

a. State whether any elastomeric components within the scope of license renewal, which are designed with relative motion are exposed to an internal or external environment that includes hard abrasive particles.

b. State whether there are any elastomeric components within the scope of license renewal that are susceptible to wear that over time, due to their frequent manipulation, could challenge the CLB function(s) of the component.

c. State whether there are any elastomeric components within the scope of license renewal designed with clamped joints where relative motion is not intended; however the components are susceptible to wear over time due to a loss of the clamping force and could challenge the CLB function(s) of the component due to wear.

d. If an aging effect requiring management (AERM) is applicable based on the configurations or aging mechanisms described in requests (a) through (c), discuss how the AERM will be managed.

RAI 3.3.1.82-1 RESPONSE

Elastomers at GGNS are used for flexible duct connections in HVAC systems and for expansion joints in system containing water. These two uses will be addressed separately.

Duct Flexible Connections
Elastomers at GGNS are used for flexible duct connections in the following systems [system code].

- Standby gas treatment system [T48], LRA Table 3.2.2-6.
- Control room ventilation system [Z51], LRA Table 3.3.2-17.
- Various other HVAC systems, LRA Table 3.3.2-18.
- Miscellaneous ductwork with an intended function for 10 CFR 54.4(a)(2).
    - Containment cooling [M41], LRA Table 3.3.2-19-10.
    - Drywell cooling [M51], LRA Table 3.3.2-19-11.

- Fuel handling area ventilation [T42], LRA Table 3.3.2-19-31.
- Turbine building ventilation [U41], LRA Table 3.3.2-19-32.
- Control building HVAC [Z17], LRA Table 3.3.2-19-34.
- Control room HVAC [Z51], LRA Table 3.3.2-19-36.

a. Elastomers used for flexible duct connections at GGNS are exposed to an indoor air environment, internal and external. This environment at GGNS does not include hard abrasive particles.

b. Wear of elastomers over time due to frequent manipulation could occur in ventilation systems that cycle frequently. The flexible duct connections in GGNS HVAC systems are considered susceptible to wear caused by relative motion due to loss of clamping force (see item c. below). No additional aging management program would be needed for this aging mechanism.

c. Elastomers in the GGNS HVAC systems are conservatively considered susceptible to wear caused by relative motion due to loss of clamping force.

d. The External Surfaces Monitoring Program and the Internal Surfaces in Miscellaneous Piping and Ducting Components Program will manage the aging effect (loss of material – wear) for elastomer flexible duct connections in HVAC systems.

Expansion Joints

Elastomers used in expansion joints in the following systems exposed to water are subject to aging management review.

- Drywell chilled water [P72], LRA Table 3.3.2-19-26.
- Circulating water [N71], LRA Table 3.4.2-2-18.

For the condensate and refueling water storage and transfer system (P11), the LRA was amended in response to RAI 2.3.4.1-2 to delete the expansion joint line items from Table 3.4.2-2-18 as these expansion joints are periodically replaced and therefore not subject to aging management review.

The external environment for systems P72 and N71 is air – indoor. The internal environment is treated water (system code P72) or raw water (system code N71).

a. Expansion joints exposed to air – indoor (external) and treated water (internal) are not exposed to an environment with hard abrasive particles. Expansion joints exposed to raw water are susceptible to loss of material due to erosion (LRA Table 3.3.1 item 3.3.1-32.5). LRA Table 3.4.2-2-18 is amended to add this aging effect.

b. Elastomer components would be subject to frequent manipulation if system operation cycled frequently.

- The drywell chilled water system normally has two chillers and one pump in operation.

(LRA Section 2.3.3.19; UFSAR Section 9.2.11)

- The circulating water system is in continuous operation. (LRA Section 2.3.4.2; UFSAR Section 10.4.5)

These systems do not cycle frequently during normal operations. Therefore, expansion joints in these systems are not susceptible to wear over time due to frequent manipulation.

c. Expansion joints in the drywell chilled water system and the circulating water system are bolted on and thus are not susceptible to wear from loss of clamping force.

d. The Internal Surfaces in Miscellaneous Piping and Ducting Components Program will manage loss of material due to erosion for elastomer expansion joints exposed to raw water (internal) (LRA Table 3.4.2-2-18 for the circulating water system).

LRA Changes

License Renewal Application changes are shown below. Additions are underlined and deletions are shown with strikethrough.

Section 3.2.2.1.6, Standby Gas Treatment System, is revised to add the following aging effect requiring management.

Aging Effects Requiring Management

The following aging effects associated with the standby gas treatment system require management.

- change in material properties
- cracking
- loss of material
- loss of material – wear
- loss of preload

Table 3.2.2-6, Standby Gas Treatment System, is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F1.AP-113	3.3.1-82	C
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F1.AP-103	3.3.1-96	C

Section 3.3.2.1.17, Control Room Ventilation, is revised to add the following aging effect requiring management.

Aging Effects Requiring Management

The following aging effects associated with the control room ventilation system require management.

- change in material properties
- cracking
- fouling
- loss of material
- loss of material – wear
- loss of preload

Section 3.3.2.1.18, Heating, Ventilation and Air Conditioning, is revised to add the following aging effect requiring management.

Aging Effects Requiring Management

The following aging effects associated with the heating, ventilation and air conditioning systems require management.

- change in material properties
- cracking
- fouling
- loss of material
- loss of material – wear
- loss of preload

Section 3.3.2.1.19, Miscellaneous Auxiliary Systems in Scope for 10 CFR 54.4(a)(2), is revised to add the following aging effect requiring management.

Aging Effects Requiring Management

The following aging effects associated with the nonsafety-related components affecting safety-related systems require management.

- change in material properties
- cracking
- cracking – fatigue
- loss of material
- loss of material – wear
- loss of preload

Table 3.3.1, Items 3.3.1-32.5, 3.3.1-82 and 3.3.1-96 are revised as follows.

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-32.5	Elastomer seals and components exposed to raw water	Hardening and loss of strength due to elastomer degradation; loss of material due to erosion	Chapter XI.M20, "Open-Cycle Cooling Water System"	No	Cracking, ~~and~~ change in material properties, and loss of material due to erosion in elastomer components of the circulating water system (Table 3.4.2-2-18) is managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components Program. There are no elastomer components exposed to raw water in the auxiliary systems in the scope of license renewal.

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-82	Elastomers elastomer: seals and components exposed to air – indoor, uncontrolled (external)	Loss of material due to wear	Chapter XI.M36, "External Surfaces Monitoring of Mechanical Components"	No	~~This item was not used. Wear of elastomer components is considered an event driven condition rather than an aging effect. If the elastomer component is properly designed, installed and maintained, contact with other surfaces leading to wear will not occur.~~ Consistent with NUREG-1801. Loss of material due to wear in elastomer components exposed to air –indoor (external) is managed by the External Surfaces Monitoring Program.

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-96	Elastomers elastomer: seals and components exposed to air – indoor, uncontrolled (internal)	Loss of material due to wear	Chapter XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"	No	~~This item was not used. Wear of elastomer components is considered an event driven condition rather than an aging effect. If the elastomer component is properly designed, installed and maintained, contact with other surfaces leading to wear will not occur.~~ Consistent with NUREG-1801. Loss of material due to wear in elastomer components exposed to air –indoor (internal) is managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components Program.

Table 3.3.2-17 for control room ventilation is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F1.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F1.AP-103	3.3.1-96	A

Table 3.3.2-18 for HVAC is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F2.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F2.AP-103	3.3.1-96	A

Table 3.3.2-19-10 for Containment Cooling System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F3.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F3.AP-103	3.3.1-96	A

Table 3.3.2-19-11 for Drywell Cooling System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F3.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F3.AP-103	3.3.1-96	A

Table 3.3.2-19-31 for Fuel Handling Area Ventilation System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F2.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F2.AP-103	3.3.1-96	A

Table 3.3.2-19-32 for Turbine Building Ventilation System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F1.AP-113	3.3.1-82	C
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F1.AP-103	3.3.1-96	C

Table 3.3.2-19-34 for Control Building HVAC System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F1.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F1.AP-103	3.3.1-96	A

Table 3.3.2-19-36 for Control Room HVAC System nonsafety-related components affecting safety-related systems is revised to add the following line items.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (ext)	Loss of material – wear	External Surfaces Monitoring	VII.F1.AP-113	3.3.1-82	A
Duct flexible connection	Pressure boundary	Elastomer	Air – indoor (int)	Loss of material – wear	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.F1.AP-103	3.3.1-96	A

Table 3.4.2-2-18 for Circulating Water System nonsafety-related components affecting safety-related systems is revised to add the following line item.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Expansion joint	Pressure boundary	Elastomer	Raw water (int)	Loss of material	Internal Surfaces in Miscellaneous Piping and Ducting Components	VII.C1.AP-76	3.3.1-32.5	E

RAI 3.3.1.76-1

Background. LRA Table 3.3.1, item 76, associated with elastomeric duct flexible connection exposed internally to interior indoor air states that hardening and loss of strength due to elastomer degradation should be managed with the External Surfaces Monitoring program.

LRA Table 3.3.2-17, Control Room Ventilation System, lists an item for elastomeric duct flexible connections exposed internally to indoor air which cites LRA Table 3.3.1, item 76, generic note I and plant-specific note 306. This item states that there are no AERM and proposed AMP. Plant-specific note 306 states, "Changes of material properties and cracking in elastomers are results of exposure to ultra-violet light or elevated temperatures (> 95°F). The interior surfaces of these components are not exposed to ultra-violet light and are part of the control room HVAC system that is not exposed to elevated temperatures."

GALL Report Section IX.C states, "[h]ardening and loss of strength of elastomers can be induced by elevated temperature (over about 95°F or 35°C), and additional aging factors (e.g., exposure to ozone, oxidation, and radiation)."

Issue. The staff could not confirm that there are no aging effects for this material and environment combination for this component, material and environmental combination because 95°F is a general guideline and does not necessarily apply to all elastomeric material types.

Request. State the specific material type for these elastomeric duct flexible connections and state the basis why there are no AERM and no proposed AMP. If the specific elastomeric material type does age despite being in an environment below 95°F, state how the effects of aging will be managed.

RAI 3.3.1.76-1 RESPONSE

LRA Item 3.3.1-76 describes an elastomeric duct flexible connection exposed to indoor air consisting of neoprene coated fiberglass cloth.

Neoprene is chemically and structurally similar to natural rubber, with similar mechanical properties. It has high resistance to oils, chemicals, sunlight, weathering, aging, and ozone. It retains its properties at temperatures up to 250°F (121.1°C).

No aging effects requiring management (AERM) and no proposed aging management programs (AMP) are identified for the internal surface of these elastomers since they are not exposed to ultra-violet light or elevated temperatures (> 95°F).

RAI 3.3.2.19-3

Background. LRA Table 3.3.2-19-8 states that for Teflon flexible connections exposed internally to treated water (internal), there is no aging effect and no AMP is proposed.

Issue. While Teflon is resistant to temperatures higher than that encountered in spent fuel cooling systems, there are studies which demonstrate that certain grades of Teflon degrade when exposed to radiation.

Request. State the specific Teflon material type for these flexible connections and state the basis for why there are no AERM and, therefore, no proposed AMP. If the specific Teflon material type does age, state how the effects of aging will be managed.

RAI 3.3.2.19-3 RESPONSE

After a review of operating use information for this component, it was determined that the flexible connection in question is a single short length of material located downstream of a normally closed sample valve. After use, the flexible connection sample line is allowed to drain and empty. The flexible connection is normally isolated and drained, not fluid-filled. This nonsafety-related component therefore has no potential for physical interaction with a safety-related component. Based on these details, this flexible connection is not subject to aging management review. LRA Table 3.3.2-19-8 is revised to reflect these details. Deletions are shown with strikethrough.

Table 3.3.2-19-8: Fuel Pool Cooling and Cleanup System [10 CFR 54.4(a)(2)]

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
~~Flexible connection~~	~~Pressure boundary~~	~~Teflon~~	~~Treated water (int)~~	~~None~~	~~None~~	–	–	~~G~~

RAI 3.5.1.33-1

Background. LRA Table 3.5-1, item 33, states that seals and gaskets will be managed for loss of sealing due to wear, damage, erosion, tear, surface cracks, or other defects by the Structures Monitoring program in lieu of the Containment Leak Rate program.

The item specifically states, "[a]dditionally the items referencing this item are associated with inside containment. GGNS items referring to seals and gaskets are associated with components outside containment and are managed by the Structures Monitoring Program for cracking and change in material properties." Aging management review items that cite LRA Table 3.5.1, item 33, are included in LRA Table 3.5.2-4, seals and gaskets (doors, manways and hatches).

ASME Code Section XI, NE-1130 states, "[t]he containment system includes, all piping, pumps, and valves attached to the containment vessel, or to penetrations assemblies out to and including any valves required to isolate the system and provide a pressure boundary for the containment function."

UFSAR Table 6.2-49 footnote 1 states, "[p]enetration is sealed by a blind flange or door with double o-ring seals, double expandable seals, double gasket seals or a weld. These seals are leakage rate tested by pressurizing between the seals or gaskets. Because the guard pipe inspection ports inboard seal is a weld, Type B testing is not required." Footnote 1 applies to penetrations associated with the equipment hatch, personnel locks, fuel transfer tube, and guard pipe inspection ports. LRA Table 3.5.2-1 states that the rubber seals for the airlock doors and equipment hatch are managed for cracking and change in material properties by the Containment Leak Rate program.

Issue. The staff recognizes that LRA Table 3.5.1, item 33, states that the seals and gaskets are "outside containment;" however, the seals and gaskets can be outside containment and still be associated with the containment penetration boundary. It is clear that seals associated with the airlock and equipment hatch are being managed by the Containment Leak Rate Program. However, it is not clear that the seals or gaskets associated with the fuel transfer tube, and guard pipe inspection ports are being managed by the Containment Leak Rate Program or whether they are considered long lived passive items. It is also not clear whether some of the seals and gaskets (doors, manways and hatches) which are included in LRA Table 3.5.2-4 and cite LRA Table 3.5.1, item 33, are associated with the containment penetration boundary and should be managed by the Containment Leak Rate Program instead of the Structures Monitoring Program.

Request. State how the seals or gaskets associated with the fuel transfer tube, and guard pipe inspection ports are being managed, or state if they are not considered to be long lived passive items.

State whether any of the seals and gaskets (doors, manways and hatches) which are included in LRA Table 3.5.2-4 and cite 3.5.1-33 are associated with the containment penetration function. If they are, state the basis for using the Structures Monitoring Program in lieu of the Containment Leak Rate Program, or revise the LRA to reflect that the Containment Leak Rate Program will be used to manage their aging.

RAI 3.5.1.33-1 RESPONSE

There are no seals or gaskets associated with the guard pipe inspection ports. The sealing of the guard pipe inspection port is accomplished by welding. The seal for the fuel transfer tube is included in LRA Table 3.5.2-1, line item "rubber seal for airlock doors, equipment hatch." The seals and gaskets (doors, manways and hatches) which are included in LRA Table 3.5.2-4 and cite item 3.5.1-33 are not associated with containment penetrations.

For clarification, LRA Table 3.5.2-1, line item for "Rubber seal for airlock doors, equipment hatch" is revised as shown below to specifically identify inclusion of the seal associated with the fuel transfer tube. Additions are shown with underline.

Table 3.5.2-1:	**Containment Building**							
Structure and/or Component or Commodity	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Rubber seal for airlock doors, equipment hatch, <u>fuel transfer tube</u>	PB, SSR	Elastomer	Air – indoor uncontrolled	Cracking Change in material properties	CII-IWE Containment leak rate	II.B4.CP-40	3.5.1-26	B

RAI 3.5.1.33-2

Background. LRA Section B.1.42, Structures Monitoring Program, Enhancement 4, states that the program will be enhanced to include physical manipulation of vibration isolaters, if the vibration isolation function is suspect. LRA Table 3.5.2-4 contains AMR items for roof membranes, and seals and gaskets (doors, manways, and hatches) being managed for cracking and change in material properties. The AMR items reference LRA Table 3.5-1, item 33 which states that the Structures Monitoring Program will manage the aging effects. The staff noted that neither the Structures Monitoring Program nor the implementing procedures contain a requirement to augment the visual examinations of roof membranes, and seals and gaskets (doors, manways, and hatches) with physical manipulation.

The "detection of aging effects" program element of GALL Report AMPs XI.M36 and XI.M38 recommend that 10 percent of available surface area of flexible polymeric components be manipulated; however neither the program nor the implementing procedures contain a requirement to conduct this sample size inspection.

Issue. The staff believes that physical manipulation of flexible elastomeric and polymeric materials is necessary, as recommended by GALL Report AMPs XI.M36 and XI.M38, to determine if hardening, loss of strength, or cracking is occurring. In addition, a lower bound of manipulation in relation to the available surface area should be provided to ensure that an adequate representative sample of the material is inspected.

Request. Enhance the Structures Monitoring Program to include physical manipulation of 10 percent of the available surface area of flexible roof membranes, and seals and gaskets (doors, manways, and hatches), or state the basis for why there is a reasonable assurance that the components will meet their CLB intended function(s) absent physical manipulation.

RAI 3.5.1.33-2 RESPONSE

The Structures Monitoring Program will be enhanced to include instructions to augment the visual examinations of roof membranes, and seals and gaskets (doors, manways, and hatches) with physical manipulation of at least 10 percent of available surface area. LRA Sections A.1.42 and B.1.42 are revised to add the following enhancement. Additions are shown with underline.

LRA Section A.1.42:

- Include instructions to augment the visual examinations of roof membranes, and seals and gaskets (doors, manways, and hatches) with physical manipulation of at least 10 percent of available surface area.

LRA Section B.1.42, Structures Monitoring, Enhancements:

Elements Affected	Enhancements
4. Detection of Aging Effects	e) Include instructions to augment the visual examinations of roof membranes, and seals and gaskets (doors, manways, and hatches) with physical manipulation of at least 10 percent of available surface area.

RAI 3.5.2.4-2

Background. UFSAR Chapter 9, page 9A-28, 9A.5.2.3n, states, "[t]he blowout shaft, Fire Zone 1A124, consists of the remaining horizontal separation distance, which contains concrete joint sealant (Rodofoam II)."

LRA Table 3.5.2-4 includes the following items:

- Flood retention materials (spare parts), wood, sand, sealant
- Penetration sealant (flood radiation)
- Seismic isolation joint

Issue. It is not clear to the staff whether this concrete joint sealant fulfills an intended license renewal function or if it is periodically replaced. In addition, the above AMR items from LRA Table 3.5.2-4 do not appear to include the concrete joint sealant.

Request. State whether the concrete joint sealant (Rodofoam II) has an intended license renewal function. If it does have an intended license renewal function, state whether it is a long lived passive component. If both of these responses are positive, state what AMR item includes this item.

RAI 3.5.2.4-2 RESPONSE

The concrete joint sealant (Rodofoam II) has license renewal intended functions of "fire barrier" (FB) and "support for Criterion (a)(1) equipment" (SSR). The concrete joint sealant (Rodofoam II) is a long lived passive component subject to aging management review as indicated in LRA Table 3.5.2-4 by component "Seismic isolation joint." As shown in Table 3.5.2-4, the Fire Protection Program is credited to manage aging effects.

RAI 3.5.2.4-3

Background. The GALL Report states that aluminum components exposed to outdoor air can be susceptible to loss of material due to pitting and crevice corrosion depending on the outdoor environmental conditions. SRP-LR Section 3.4.2.2.3 states that loss of material is applicable for plants with outdoor environments high in chlorides, such as those near a saltwater coastline, near a highway treated with salt, with chlorides in the soil, or that have a cooling tower where the water is treated with chlorine.

In LRA Table 3.5.2-4, the applicant stated that for aluminum vents and louvers exposed to air-outdoor, there are no aging effects and no AMP is proposed. The AMR items cite generic note I. The AMR items also cite a plant-specific note which states that sulfur dioxide vapors or other similar substances do not chemically pollute the ambient outdoor environment at GGNS and the external environment does not contain saltwater or high chloride content; therefore, aging management is not required for aluminum and stainless steel components exposed to the external environment. However, LRA Section 3.4.2.2.2 states that the applicant has a cooling tower treated with hypochlorite.

Issue. It is unclear to the staff why these aluminum components exposed to outdoor air are not being managed for loss of material given that the applicant's outdoor air environment contains cooling tower vapor which contains chlorides.

Request. Explain why loss of material is not an applicable aging effect for aluminum vents and louvers exposed to outdoor air. If these aluminum components are not susceptible to loss of material, resolve the inconsistency with LRA Section 3.4.2.2.2.

RAI 3.5.2.4-3 RESPONSE

The aluminum vents and louvers in an air-outdoor environment will be treated as susceptible to an aging effect of loss of material. The LRA Table 3.5.2-4 line item for the aluminum vents and louvers component exposed to air-outdoor environment is revised as shown below. Plant-specific Note 503 is also deleted since it is no longer required. Additions are shown with underline and deletions with strikethrough.

Table 3.5.2-4: Bulk Commodities								
Structure and/or Component or Commodity	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Vents and louvers	SNS, SRE, SSR	Aluminum	Air-outdoor	~~None~~ Loss of material	~~None~~ Structures Monitoring	III.B2.TP-6 III.B4.TP-6	3.5.1-93	~~I, 503~~ A

Plant Specific Notes:

~~503. Vapors of sulfur dioxide or other similar substances do not chemically pollute the ambient outdoor environment at GGNS and the external environment does not contain saltwater or high chloride content. Therefore aging management is not required for aluminum and stainless steel components exposed to the external environment.~~

Attachment 2 to

GNRO-2012/00076

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Additions are shown with underline and deletions with strikethrough.

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
1	Implement the 115 kilovolt (KV) Inaccessible Transmission Cable Program for Grand Gulf Nuclear Station (GGNS) as described in License Renewal Application (LRA) Section B.1.1	Prior to November 1, 2024	GNRO-2011/00093	B.1.1
2	Implement the Aboveground Metallic Tanks Program for GGNS as described in LRA Section B.1.2	Prior to November 1, 2024	GNRO-2011/00093	B.1.2
3	Enhance the Bolting Integrity Program for GGNS to clarify the prohibition on use of lubricants containing MoS_2 for bolting, and to specify that proper gasket compression will be visually verified following assembly. Enhance the Bolting Integrity Program to include consideration of the guidance applicable for pressure boundary bolting in Regulatory Guide (NUREG) 1339, Electric Power Research Institute (EPRI) NP-5769, and EPRI TR-104213. Enhance the Bolting Integrity Program to include volumetric examination per American Society of Mechanical Engineers (ASME) Code Section IX, Table IWB-2500-1, Examination Category B-G-1, for high-strength closure bolting regardless of code classification.	Prior to November 1, 2024	GNRO-2011/00093	B.1.3

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
4	Enhance the Boraflex Monitoring Program for GGNS to perform periodic surveillances of the boraflex neutron absorbing material on at least a five year frequency using Boron-10 Areal Density Gage for Evaluating Racks (BADGER) testing. RACKLIFE analysis will continue to be performed each cycle. This analysis will include a comparison of the RACKLIFE predicted silica to the plant measured silica. This comparison will determine if adjustments to the RACKLIFE loss coefficient are merited. The analysis will include projections to the next planned RACKLIFE analysis date to ensure current Region I storage locations will not need to be reclassified as Region II storage locations in the analysis interval.	Prior to November 1, 2024	GNRO-2011/00093	B.1.4
5	Implement the Buried Piping and Tanks Inspection Program for GGNS as described in LRA Section B.1.5.	Prior to November 1, 2024	GNRO-2011/00093	B.1.5

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
6	Enhance the Boiling Water Reactor (BWR) Vessel Internals Program for GGNS as follows. (a) Evaluate the susceptibility to neutron or thermal embrittlement for reactor vessel internal components composed of CASS, X-750 alloy, precipitation-hardened (PH) martensitic stainless steel(e.g., 15-5 and 17-4 PH steel), and martensitic stainless steel (e.g., 403, 410 and 431 steel). (b) Inspect portions of the susceptible components determined to be limiting from the standpoint of thermal aging susceptibility, neutron fluence, and cracking susceptibility (i.e., applied stress, operating temperature, and environmental conditions). The inspections will use an inspection technique capable of detecting the critical flaw size with adequate margin. The critical flaw size will be determined based on the service loading condition and service-degraded material properties. The initial inspection will be performed either prior to or within 5 years after entering the period of extended operation. If cracking is detected after the initial inspection, the frequency of re-inspection will be justified based on fracture toughness properties appropriate for the condition of the component. The sample size will be 100% of the accessible component population, excluding components that may be in compression during normal operations.	Prior to November 1, 2024	GNRO-2011/00093	B.1.11

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
7	Enhance the Compressed Air Monitoring Program for GGNS to apply a consideration of the guidance of ASME OM-S/G-1998, Part 17; ANSI/ISA-S7.0.01-1996; EPRI NP-7079; and EPRI TR-108147 to the limits specified for air system contaminants. Enhance the Compressed Air Monitoring Program to include periodic and opportunistic inspections of accessible internal surfaces of piping, compressors, dryers, aftercoolers, and filters to apply consideration of the guidance of ASME OM-S/G-1998, Part 17 for inspection frequency and inspection methods of these components in the following compressed air systems. • Automatic Depressurization System (ADS) air • Division 1 Diesel Generator Starting Air (D1DGSA) • Division 2 Diesel Generator Starting Air (D2DGSA) • Division 3 Diesel Generator Starting Air (D3DGSA), also known as the HPCS Diesel Generator • Instrument Air (IA)	Prior to November 1, 2024	GNRO-2011/00093	B.1.12/RAI B.1.12-1

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
8	Enhance the Diesel Fuel Monitoring Program to include a ten-year periodic cleaning and internal inspection of the fire water pump diesel fuel oil tanks, the diesel fuel oil day tanks for Divisions I, II, III, and the diesel fuel oil drip tanks for Divisions I, II. These cleanings and internal inspections will be performed at least once during the 10-year period prior to the period of extended operation and at succeeding 10-year intervals. If visual inspection is not possible, a volumetric inspection will be performed. Enhance the Diesel Fuel Monitoring Program to include a volumetric examination of affected areas of the diesel fuel tanks if evidence of degradation is observed during visual inspection. The scope of this enhancement includes the diesel fuel oil day tanks (Divisions I, II, III), the diesel fuel oil storage tanks (Divisions I, II, III), the diesel fuel oil drip tanks (Divisions I, II), and the diesel fire pump fuel oil storage tanks, and is applicable to the inspections performed during the 10-year period prior to the period of extended operation and at succeeding 10-year intervals.	Prior to November 1, 2024	GNRO-2011/00093	B.1.16
9	Enhance the External Surfaces Monitoring Program to include instructions for monitoring of the aging effects for flexible polymeric components through manual or physical manipulation of the material, including a sample size for manipulation of at least 10 percent of available surface area. Enhance the External Surfaces Monitoring Program as follows. 1. Underground components within the scope of this program will be clearly identified in program documents. 2. Instructions will be provided for inspecting all underground components within the scope of this program during each 10-year period, beginning 10 years prior to entering the period of extended operation.	Prior to November 1, 2024	GNRO-2011/00093	B.1.18

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
10	Enhance the Fatigue Monitoring Program to monitor and track all critical thermal and pressure transients for all components that have been identified to have a fatigue Time Limited Aging Analysis (TLAA). Enhance the Fatigue Monitoring Program to perform a review of the GGNS high energy line break analyses and the corresponding tracking of associated cumulative usage factors to ensure the GGNS program adequately manages fatigue usage for these locations. Fatigue usage calculations that consider the effects of the reactor water environment will be developed for a set of sample reactor coolant system components. This sample set will include the locations identified in NUREG/CR-6260 and additional plant-specific component locations in the reactor coolant pressure boundary if they are found to be more limiting than those considered in NUREG/CR-6260. F_{en} factors will be determined using the formulae sets listed in Section 4.3.3. If necessary following this analysis, revised cycle limits will be incorporated into the Fatigue Monitoring Program documentation. Enhance the Fatigue Monitoring Program to provide updates of the fatigue usage calculations on an as-needed basis if an allowable cycle limit is approached, or in a case where a transient definition has been changed, unanticipated new thermal events are discovered, or the geometry of components have been modified. The program revision will include providing for the consideration of the recirculation pump fatigue analysis exemption validity if cycles that were input into the exemption evaluation exceed their limits.	Two years prior to November 1, 2024	GNRO-2011/00093 GNRO-2012/00063	B.1.19/ RAI B.1.19-1, RAI 4.3-11

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
11	Enhance the Fire Protection Program to require visual inspections of the Halon/CO2 fire suppression system at least once every fuel cycle to examine for signs of corrosion. Enhance the Fire Protection Program to require visual inspections of fire damper framing at least once every fuel cycle to check for signs of degradation. Enhance the Fire Protection Program to require visual inspection of concrete curbs, manways, hatches, manhole covers, hatch covers, and roof slabs at least once every fuel cycle to confirm that aging effects are not occurring. Enhance the Fire Protection Program to require an external visual inspection of the CO2 tank at least once every fuel cycle to examine for signs of corrosion.	Prior to November 1, 2024	GNRO-2011/00093 GNRO-2012/00042	B.1.20/ RAI B.1.20-2

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
12	Enhance the Fire Water Program to include inspection of hose reels for degradation. Acceptance criteria will be enhanced to verify no unacceptable degradation. Enhance the Fire Water Program to include one of the following options. (1) Wall thickness evaluations of fire protection piping using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material will be performed prior to the period of extended operation and at periodic intervals thereafter. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function. OR (2) A visual inspection of the internal surface of fire protection piping will be performed upon each entry to the system for routine or corrective maintenance. These inspections will be capable of evaluating (a) wall thickness to ensure against catastrophic failure and (b) the inner diameter of the piping as it applies to the design flow of the fire protection system. Maintenance history shall be used to demonstrate that such inspections have been performed on a representative number of locations prior to the period of extended operation. A representative number is 20% of the population (defined as locations having the same material, environment, and aging effect combination) with a maximum of 25 locations. Additional inspections will performed as needed to obtain this representative sample prior to the period of extended operation.	Prior to November 1, 2024	GNRO-2011/00093	B.1.21/RAI B.1.2~~5~~1-5

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
12 (cont.)	Enhance the Fire Water Program to include a visual inspection of a representative number of locations on the interior surface of below grade fire protection piping in at least one location at a frequency of at least once every 10 years during the period of extended operation. A representative number is 20% of the population (defined as locations having the same material, environment, and aging effect combination) with a maximum of 25 locations. Acceptance criteria will be revised to verify no unacceptable degradation. Enhance the Fire Water Program to test or replace sprinkler heads. If testing is chosen a representative sample of sprinkler heads will be tested before the end of the 50-year sprinkler head service life and at 10-year intervals thereafter during the period of extended operation. Acceptance criteria will be no unacceptable degradation. NFPA-25 defines a representative sample of sprinklers to consist of a minimum of not less than 4 sprinklers or 1 percent of the number of sprinklers per individual sprinkler sample, whichever is greater. If replacement of the sprinkler heads is chosen, all sprinklers that have been in service for 50 years will be replaced. Enhance the Fire Water Program to include visual inspection of spray and sprinkler system internals for evidence of degradation. Acceptance criteria will be enhanced to verify no unacceptable degradation.		GNRO-2012-00064	
13	Enhance the Flow-Accelerated Corrosion Program to revise program documentation to specify that downstream components are monitored closely to mitigate any increased wear when susceptible upstream components are replaced with resistant materials, such as high Cr material.	Prior to November 1, 2024	GNRO-2011/00093	B.1.22
14	Enhance the Inservice Inspection - IWF Program to address inspections of accessible sliding surfaces.	Prior to November 1, 2024	GNRO-2011/00093	B.1.24/ RAI B.1.24-1

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
14 (cont.)	Enhance the Inservice Inspection - IWF Program to; clarify that parameters monitored or inspected will include corrosion; deformation; misalignment of supports; missing, detached, or loosened support items; improper clearances of guides and stops; and improper hot or cold settings of spring supports and constant load supports. Accessible areas of sliding surfaces will be monitored for debris, dirt, or indications of excessive loss of material due to wear that could prevent or restrict sliding as intended in the design basis of the support. Elastomeric vibration isolation elements will be monitored for cracking, loss of material, and hardening. Structural bolts will be monitored for corrosion and loss of integrity of bolted connections due to self-loosening and material conditions that can affect structural integrity.High-strength structural bolting (actual measured yield strength greater than or equal to 150 ksi or 1,034 MPa in sizes greater than 1 inch nominal diameter) susceptible to stress corrosion cracking (SCC) will be monitored for SCC. Enhance the Inservice Inspection - IWF Program to clarify that detection of aging will include: a) Monitoring structural bolting (American Society for Testing Materials (ASTM) A-325, ASTM F1852, and ASTM A490 bolts) and anchor bolts will be monitored for loss of material, loose or missing nuts, loss of pre-load and cracking of concrete around the anchor bolts. b) Volumetric examination comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 should be performed for high strength structural bolting to detect cracking in addition to the VT-3 examination. This volumetric examination may be waived with adequate plant-specific justification.			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
14 (cont.)	c) Identification of component supports that contain high strength bolting (actual measured yield greater than or equal to 150 ksi) in sizes greater than 1 inch nominal diameter. The extent of examination for support types that contain high-strength bolting will be as specified in ASME Code Section XI, Table IWF-2500-1. GGNS will examine high-strength structural bolting on the frequency specified in ASME Code Section XI, Table IWF-2500-1. Enhance the Inservice Inspection - IWF Program acceptance criteria to include the following as unacceptable conditions. a) Loss of material due to corrosion or wear, which reduces the load bearing capacity of the component support; b) Debris, dirt, or excessive wear that could prevent or restrict sliding of the sliding surfaces as intended in the design basis of the support; and c) Cracked or sheared bolts, including high strength bolts, and anchors.		GNRO-2012/00055 GNRO-2011/00093	
15	Enhance the Inspection of Overhead Heavy Load and Light Load Handling Systems Program to include monitoring of rails in the rail system for the aging effect "wear", and structural connections/bolting for loose or missing bolts, nuts, pins or rivets. Additionally, the program will be clarified to include visual inspection of structural components and structural bolts for loss of material due to various mechanisms and structural bolting for loss of preload due to self-loosening. Enhance the Inspection of Overhead Heavy Load and Light Load Handling Systems Program acceptance criteria to state that any significant loss of material for structural components and structural bolts, and significant wear of rails in the rail system, is evaluated according to ASME B30.2 or other applicable industry standard in the ASME B30 series.	Prior to November 1, 2024	GNRO-2011/00093	B.1.25

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
16	Implement the Internal Surfaces in Miscellaneous Piping and Ducting Components Program as described in LRA Section B.1.26.	Prior to November 1, 2024	GNRO-2011/00093	B.1.26
17	Enhance the Masonry Wall Program to clarify that parameters monitored or inspected will include monitoring gaps between the supports and masonry walls that could potentially affect wall qualification. Enhance the Masonry Wall Program to clarify that detection of aging effects require masonry walls to be inspected every 5 years.	Prior to November 1, 2024	GNRO-2011/00093	B.1.27/ B.1.27-1
18	Implement the Non-EQ Cable Connections Program as described in LRA Section B.1.28	Prior to November 1, 2024	GNRO-2011/00093	B.1.28
19	Enhance the Non environmentally Qualified (Non-EQ) Inaccessible Power Cables (400V to 35kV) Program to include low-voltage (400V to 2kV) power cables. Enhance the Non-EQ Inaccessible Power Cables (400V to 35kV) Program to include condition-based inspections of manholes not automatically dewatered by a sump pump being performed following periods of heavy rain or potentially high water table conditions, as indicated by river level. Enhance the Non-EQ Inaccessible Power Cables (400V to 35kV) Program to clarify that the inspections will include direct observation that cables are not wetted or submerged, that cables/splices and cable support structures are intact, and that dewatering/drainage systems (i.e., sump pumps) and associated alarms if applicable operate properly.	Prior to November 1, 2024	GNRO-2011/00093	B.1.29
20	Implement the Non-EQ Instrumentation Circuits Test Review Program as described in LRA Section B.1.30.	Prior to November 1, 2024	GNRO-2011/00093	B.1.30
21	Implement the Non-EQ Insulated Cables and Connections Program as described in LRA Section B.1.31.	Prior to November 1, 2024	GNRO-2011/00093	B.1.31

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
22	Enhance the Oil Analysis Program to provide a formalized analysis technique for particulate counting. Enhance the Oil Analysis Program to include piping and components within the main generator system (N41) with an internal environment of lube oil.	Prior to November 1, 2024	GNRO-2011/00093	B.1.32
23	Implement the One-Time Inspection Program as described in LRA Section B.1.33.	Within the 10 years prior to November 1, 2024	GNRO-2011/00093	B.1.33
24	Implement the One-Time Inspection – Small Bore Piping Program as described in LRA Section B.1.34.	Within the 6 years prior to November 1, 2024	GNRO-2011/00093	B.1.34
25	Enhance the Periodic Surveillance and Preventive Maintenance Program to include all activities described in the table provided in LRA Section B.1.35 program description.	Prior to November 1, 2024	GNRO-2011/00093	B.1.35
26	Enhance the Protective Coating Program to include parameters monitored or inspected by the program per the guidance provided in ASTM D5163-08. Enhance the Protective Coating Monitoring and Maintenance Program to provide for inspection of coatings near sumps or screens associated with the Emergency Core Cooling System. Enhance the Protective Coating Program to include acceptance criteria per ASTM D 5163-08.	Prior to November 1, 2024	GNRO-2011/00093	B.1.36
27	Enhance the Reactor Vessel Surveillance Program to ensure that the additional requirements specified in the final NRC safety evaluation for BWRVIP-86 Revision 1 are addressed before the period of extended operation.	Prior to November 1, 2024	GNRO-2011/00093	B.1.38

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
28	Enhance the Regulatory Guide (RG) 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program to clarify that detection of aging effects will monitor accessible structures on a frequency not to exceed 5 years consistent with the frequency for implementing the requirements of RG 1.127. Enhance the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program to perform periodic sampling, testing, and analysis of ground water chemistry for pH, chlorides, and sulfates on a frequency of at least every 5 years. Enhance the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program acceptance criteria to include quantitative acceptance criteria for evaluation and acceptance based on the guidance provided in ACI 349.3R.	Prior to November 1, 2024	GNRO-2011/00093	B.1.39
29	Implement the Selective Leaching Program as described in LRA Section B.1.40.	Prior to November 1, 2024	GNRO-2011/00093	B.1.40
30	Enhance the Structures Monitoring Program to clarify that the scope includes the following: a) In-scope structures and structural components. • Containment Building (GGN 2) • Control House – Switchyard • Culvert No. 1 and drainage channel • Manholes and Ductbanks • Radioactive Waste Building Pipe Tunnel • Auxiliary Building (GGN2) • Turbine Building (GGN2) b) In-scope structural components • Anchor bolts • Anchorage / embedments • Base plates • Basin debris screen and grating • Battery racks • Beams, columns, floor slabs and interior walls • Cable tray and cable tray supports • Component and piping supports • Conduit and conduit supports • Containment sump liner and penetrations	Prior to November 1, 2024	GNRO-2011/00093 GNRO-2012/00074	B.1.42/ RAI B.1.42-3, B.1.42-5, 2.1-4, 3.5.1.33-2

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	• Containment sump structures • Control room ceiling support system • Cooling tower drift eliminators • Cooling tower fill • CST/RWST retaining basin (wall) • Diesel fuel tank access tunnel slab • Drainage channel • Drywell floor slab (concrete) • Drywell wall (concrete) • Ductbanks • Electrical and instrument panels and enclosures • Equipment pads/foundations • Exterior walls • Fan stack grating • Fire proofing • Flood curbs • Flood retention materials (spare parts) • Flood, pressure and specialty doors • Floor slab • Foundations • HVAC duct supports • Instrument line supports • Instrument racks, frames and tubing trays • Interior walls • Main steam pipe tunnel • Manholes • Manways, hatches, manhole covers, and hatch covers • Metal siding • Missile shields • Monorails • Penetration sealant (flood, radiation) • Penetration sleeves (mechanical/ electrical not penetrating primary containment boundary) • Pipe whip restraints • Pressure relief panels • Reactor pedestal • Reactor shield wall (steel portion) • Roof decking • Roof hatches • Roof membrane • Roof slabs • RPV pedestal sump liner and penetrations • Seals and gaskets (doors, manways and hatches)			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	• Seismic isolation joint • Stairway, handrail, platform, grating, decking, and ladders • Structural bolting • Structural steel, beams columns, and plates • Sumps and Sump liners • Support members: welds; bolted connections; support anchorages to building structure • Support pedestals • Transmission towers (see Note 1) • Upper containment pool floor and walls • Vents and louvers Note 1: The inspections of these structures may be performed by the transmission personnel. However, the results of the inspections will be provided to the GGNS Structures Monitoring Program owner for review. c) Clarify the term "significant degradation" to include "that could lead to loss of structural integrity". d) Include guidance to perform periodic sampling, testing, and analysis of ground water chemistry for pH, chlorides, and sulfates on a frequency of at least every 5 years. Enhance the Structures Monitoring Program to clarify that parameters monitored or inspected include: a) inspection for missing nuts for structural connections. b) monitoring sliding/bearing surfaces such as Lubrite plates for loss of material due to wear or corrosion, debris, or dirt. The program will be enhanced to include monitoring elastomeric vibration isolators and structural sealants for cracking, loss of material, and hardening. c) Include periodically inspecting the leak chase system associated with the upper containment pool and spent fuel pool to ensure the tell-tales are free of significant blockage. The inspection will also inspect concrete surfaces for degradation where leakage has been observed, in accordance with this Program.		GNRO-2012/00054	

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont.)	Enhance the Structures Monitoring Program to clarify that detection of aging effects will: a) include augmented inspections of vibration isolators by feel or touch to detect hardening if the vibration isolation function is suspect. b) Require inspections every 5 years for structures and structural components within the scope of license renewal unless technical justification is provided to extend the inspection to a period not to exceed 10 years.		GNRO-2011/00093	
	c) Require direct visual examinations when access is sufficient for the eye to be within 24-inches of the surface to be examined and at an angle of not less than 30° to the surface. Mirrors may be used to improve the angle of vision and accessibility in constricted areas.		GNRO-2012/00054	
	d) Specify that remote visual examination may be substituted for direct examination. For all remote visual examinations, optical aids such as telescopes, borescopes, fiber optics, cameras, or other suitable instruments may be used provided such systems have a resolution capability at least equivalent to that attainable by direct visual examination.		GNRO-2012/00054	
	e) <u>Include instructions to augment the visual examinations of roof membranes, and seals and gaskets (doors, manways, and hatches) with physical manipulation of at least 10 percent of available surface area.</u>		<u>GNRO-2012/00076</u>	
	Enhance the Structures Monitoring Program acceptance criteria by prescribing acceptance criteria based on information provided in industry codes, standards, and guidelines including NEI 96-03, ACI 201.1R-92, ANSI/ASCE 11-99 and ACI 349.3R-96. Industry and plant-specific operating experience will also be considered in the development of the acceptance criteria.		GNRO-2011/00093	

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31	Enhance the Water Chemistry Control – Closed Treated Water Program to provide a corrosion inhibitor for the engine jacket water on the engine-driven fire water pump diesel in accordance with industry guidelines and vendor recommendations. Enhance the Water Chemistry Control – Closed Treated Water Program to provide periodic flushing of the engine jacket water and cleaning of heat exchanger tubes for the engine-driven fire water pump diesel in accordance with industry guidelines and vendor recommendations. Enhance the Water Chemistry Control – Closed Treated Water Program to provide testing of the engine jacket water for the engine-driven fire water pump diesels at least annually. Enhance the Water Chemistry Control – Closed Treated Water Program to revise the water chemistry procedure for closed treated water systems to align the water chemistry control parameter limits with those of EPRI 1007820.	Prior to November 1, 2024	GNRO-2011/00093 GNRO-2012/00049	B.1.44/ RAI B.1.44-1, B.1.44-2

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31 (cont.)	Enhance the Water Chemistry Control – Closed Treated Water Program to conduct inspections whenever a boundary is opened for the following systems. • Drywell chilled water (DCW – system P72) • Plant chilled water (PCW – system P71) • Diesel generator cooling water subsystem for Division I and II standby diesel generators • Diesel engine jacket water for engine-driven fire water pump • Diesel generator cooling water subsystem for Division III (HPCS) diesel generator • Turbine building cooling water (TBCW– system P43) • Component cooling water (CCW – system P42) These inspections will be conducted in accordance with applicable ASME Code requirements, industry standards, and other plant-specific inspection and personnel qualification procedures that are capable of detecting corrosion or cracking.			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31 (cont.)	Enhance the Water Chemistry Control – Closed Treated Water Program to inspect a representative sample of piping and components at a frequency of once every ten years for the following systems. • Drywell chilled water (DCW – P72) • Plant chilled water (PCW – P71) • Diesel generator cooling water subsystem for Division I and II standby diesel generators • Diesel engine jacket water for engine-driven fire water pump • Diesel generator cooling water subsystem for Division III (HPCS) diesel generator • Turbine building cooling water (TBCW – P43) • Component cooling water (CCW – P42) Components inspected will be those with the highest likelihood of corrosion or cracking. A representative sample is 20% of the population (defined as components having the same material, environment, and aging effect combination) with a maximum of 25 components. The inspection methods will be in accordance with applicable ASME Code requirements, industry standards, or other plant specific inspection and personnel qualification procedures that ensure the capability of detecting corrosion or cracking.			
32	Enhance the BWR CRD Return Line Nozzle Program to include inspection of the CRD return line nozzle inconel end cap to carbon steel safe end dissimilar metal weld once prior to the period of extended operation and every 10 years thereafter.	Prior to November 1, 2024	GNRO-2012/00029	B.1.6 / RAI B.1.6-1
33	Enhance the BWR Penetrations Program to include that site procedures which implement the guidelines of BWRVIP-47-A will be clarified to indicate that the guidelines of BWRVIP-47-A apply without exceptions.	Prior to November 1, 2024	GNRO-2012/00029	B.1.8 / RAI B.1.8-1