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GNRO-2012/00054

May 30, 2012

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

SUBJECT: Response to Request for Additional Information (RAI) dated May 3, 2012
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCE: NRC Letter, "Request for Additional Information for the Review of the Grand Gulf Nuclear Station, License Renewal Application," dated May 3, 2012 (Accession No. ML12109A213, GNRI-2012/000106)

Dear Sir or Madam:

Entergy Nuclear 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 commitments 17 and 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 30th day of May, 2012.

Sincerely,

Jeremy Browning GMAO GGNS
acting SVP for Mike Perito

MP/jas

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

cc: (see next page)

cc: with Attachment(s)

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Attachment 1 to

GNRO-2012/00054

Response to Request for Additional Information (RAI)

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

RAI B.1.27-1

Background. GALL Report AMP XI.S5, "Masonry Walls," program element "detection of aging effects," states that in general, masonry walls should be inspected every 5 years, with provisions for more frequent inspections in areas where significant loss of material or cracking is observed to ensure there is no loss of intended function between inspections.

Issue. The LRA states that the Masonry Wall Program, with enhancements, is consistent with the GALL Report AMP XI.S5. The LRA states that the "detection of aging effects" program element will be enhanced to clarify that detection of aging effects requires masonry walls to be inspected every 5 years, unless technical justification is provided to extend the inspection to a period not to exceed 10 years. GALL Report AMP XI.S5 does not include a provision to extend the inspection to a period not to exceed 10 years. It is unclear to the staff whether the masonry walls will be inspected at a 5 year frequency, during the period of extended operation, consistent with the recommendations in the GALL Report.

Request.

a. Clarify if masonry walls, within the scope of license renewal, will be inspected every 5 years consistent with recommendations in GALL Report AMP XI.S5.

b. If there are masonry walls that will not be inspected every 5 years, identify their location, environment to which they are exposed, and provide the technical justification and basis for exceeding the recommended 5 year inspection frequency.

RAI B.1.27-1 RESPONSE

Masonry walls within the scope of license renewal will be inspected every 5 years consistent with recommendations in NUREG-1801 Section XI.S5. The enhancement identified in License Renewal Application (LRA) Section B.1.27 Attribute 4 "Detection of Aging Effects" will be revised to remove the provision to extend the inspection interval up to 10 years.

LRA Section B.1.27, Enhancements, element 4 is revised as shown below. Deletions are shown with strikethrough.

Enhancements

The following enhancements will be implemented prior to the period of extended operation.

Elements Affected	Enhancements
3. Parameters Monitored or Inspected	The Masonry Wall Program will be enhanced to clarify that parameters monitored or inspected will include monitoring gaps between the supports and masonry walls that could potentially affect wall qualification.
4. Detection of Aging Effects	The Masonry Wall Program will be enhanced to clarify that detection of aging effects require masonry walls to be inspected every 5 years. ~~unless technical justification is provided to extend the inspection to a period not to exceed 10 years.~~

RAI B.1.42-1

Background. The GALL Report AMP XI.S6, "Structures Monitoring," "detection of aging effects" program element states that in general all structures are monitored at a frequency not to exceed 5 years (e.g., structures exposed to natural environment, structures inside primary containment, continuous fluid-exposed structures, and structures retaining fluid or pressure). The GALL Report also recommends that some structures of lower safety significance and subjected to benign environmental conditions may be monitored at an interval exceeding five years; however, they should be identified and listed, together with their operating experience. The GALL Report recommends that for plants with non-aggressive groundwater/soil the acceptability of inaccessible areas will be evaluated when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas.

Issue. The LRA states that the Structures Monitoring Program, with enhancements, is consistent with GALL Report AMP XI.S6. The applicant's "detection of aging effects" program element states that inspection frequency is every 5 years for high-risk significant structures and 10 years for low-risk significant structures, with provisions for more frequent inspections to ensure that observed conditions that have the potential for impacting the intended functions are evaluated or corrected in accordance with the corrective action process. It is not clear that the inspection frequency for all structures is in compliance with industry standard inspection frequency (e.g., as noted in ACI 349.3R-96).

The Structures Monitoring Program also states that for high radiation areas, operationally sensitive areas inaccessible due to congestion, portions of structures that are underground/underwater, concealed by the presence of other permanent structures or that cannot be safely inspected without an extraordinary expenditure of plant resources need not be inspected and the reason for not inspecting these structures is to be recorded. The program further notes that inspections will be performed of inaccessible areas in environments where observed conditions in accessible areas exposed to the same environment indicate significant degradation is occurring. It is not clear what conditions in accessible areas will result in inspections of inaccessible areas.

Request.

a. Provide information to confirm that the inspection frequency criteria identified in the Structures Monitoring Program and criteria identified in industry standards (e.g., as noted in ACI 349.3R-96) are aligned, or provide justification for not meeting the industry-recommended inspection frequency.

b. Provide information to confirm that criteria in the Structures Monitoring Program relative to inspection requirements for inaccessible areas and criteria in GALL Report AMP XI.S6 are aligned.

RAI B.1.42-1 RESPONSE

a. American Concrete Institute (ACI) 349.3R-96, Chapter 6, states in part: "The frequency at which periodic evaluations are conducted within the evaluation procedure should be defined by the plant owner. Frequencies should be based on the aggressiveness of environmental conditions and physical conditions of the plant structures."
As indicated in LRA Table 3.0-2, the ground water/soil environment at Grand Gulf Nuclear Station (GGNS) is non-aggressive. As shown in LRA section B.1.42, Enhancements, Element 1, to confirm that the ground water/soil environment remains non-aggressive, periodic sampling, testing, and analysis of the ground water chemistry for pH, chloride, and sulfate on a frequency of at least once every five years will be performed. Following ACI

349.3R-96 recommendations, Entergy defined the frequency at which periodic evaluations are conducted. As stated in the enhancement identified in LRA Section B.1.42, the Structures Monitoring Program (SMP) will be enhanced to require inspections every five years for structures and structural components within the scope of license renewal unless technical justification is provided to extend the inspection interval up to ten years. The stated frequency will ensure that age-related degradation is identified and that appropriate mitigative actions can be implemented. ACI 349.3R-96, also states that in general, all safety-related structures should be visually inspected at intervals not to exceed ten years. Accordingly, GGNS SMP with the enhancement will ensure that in-scope structures at GGNS are inspected at least once every ten years during the period of extended operations. Therefore, the GGNS Structures Monitoring Program inspection frequency and the inspection frequency identified in industry standards (e.g., as noted in ACI 349.3R-96) are aligned.

b. The NUREG-1801 Report recommends that for plants with non-aggressive groundwater/soil the acceptability of inaccessible areas be evaluated when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas. The NUREG-1801 Report states that for groundwater/soil to be aggressive groundwater/soil must exceed the following limits; chloride > 500 parts per million (ppm), Potential Hydrogen (pH) < 5.5 and sulfate > 1500 ppm. As indicated in LRA Table 3.0-2, the ground water/soil environment in GGNS is non-aggressive (chloride<500 ppm, pH>5.5, and sulfate <1500 ppm). As discussed in response to Part a above, GGNS will confirm the non-aggressive environment by performing periodic sampling, testing and analyzing the ground water at least every 5 years. The structures in inaccessible areas (below grade, underwater, and high radiation dose area) are not exposed to any harsher environment than those in accessible area. If normally inaccessible areas (i.e., high radiation areas, buried or submerged structures) become accessible due to required plant activities, an inspection of these areas will be conducted. Consistent with NUREG-1801, Section XI.S6, inspections will be performed of inaccessible areas in environments where observed conditions in accessible areas exposed to the same environment indicate that significant degradation is occurring that could lead to loss of structural integrity. The Structures Monitoring Program relative to inspection requirements for inaccessible areas and criteria in NUREG-1801, Section XI.S6 are aligned.

RAI B.1.42-2

Background. GALL Report AMP XI.S6, "Structures Monitoring," "acceptance criteria" notes that ACI 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete Structures," provides an acceptable basis for developing acceptance criteria for concrete structural elements, steel liners, joints, coatings, and waterproofing membranes. The plant-specific structures monitoring programs are to contain sufficient detail on acceptance criteria to conclude that this program attribute is satisfied.

The LRA states that the Structures Monitoring Program, with enhancements, is consistent with GALL Report AMP XI.S6. The LRA "acceptance criteria" program notes that the program will be enhanced to prescribe acceptance criteria considering information provided in industry codes, standards, and guidelines including NEI 93-03, ACI 201.1R-92, ANSI/ASCE 11-99, and ACI 349.3R-96. The Structures Monitoring Program basis document EN-DC-150, "Condition Monitoring of Maintenance Rule Structures," Section 5.15, "Acceptance Criteria," refers to Attachment 9.25, "Pre-Screen/Acceptance Criteria" in which Section 1.1 notes that first-tier acceptance criteria corresponding to Section 5.1 of ACI 349.3R are provided in Attachment 9.4, "Condition Monitoring of Maintenance Rule Structures – Reinforced Concrete Inspection Checklist," of EN-DC-150. Attachment 9.4 provides a check list that identifies by either yes or no that a condition is, or is not present.

Issue. Since a yes-no check list is used to provide Tier One Criteria, the staff is uncertain how acceptance criteria referenced in the basis documents for the Structures Monitoring Program meet criteria provided in the GALL Report AMP XI.S6 "acceptance criteria" program element.

Request. Provide quantitative criteria to demonstrate that acceptance criteria in the Structures Monitoring Program meet the Tier One through Three criteria in GALL Report AMP XI.S6, or provide a technical basis for deviations from criteria identified in ACI 349.3R-96.

RAI B.1.42-2 RESPONSE

The acceptance criteria of the Grand Gulf Nuclear Station (GGNS) Structures Monitoring Program, as noted in LRA Section B.1.42, with "enhancements" aligns with the criteria provided in the NUREG-1801 Report Section XI.S6 "acceptance criteria" program element. Quantitative criteria to demonstrate that the acceptance criteria in the GGNS Structures Monitoring Program meet the Tier One through Tier Three criteria of NUREG-1801 Report Section XI.S6 are addressed in the GGNS Structures Monitoring Program procedure. The guidelines provided in ACI 349.3R-96 focus on "common" conditions that have a higher probability of occurrence and are not meant to be all inclusive. The criteria primarily address the classification and treatment of visual inspection findings, as visual inspections have the greatest usage. The guidelines of ACI 349.3R-96 are presented in a three-tiered hierarchy that allows for certain conditions to be considered "acceptable" if their dimensions or observed effects are not severe and they are within first-tier limits. If observations exceed the initial first-tier quantitative limit, further evaluation is needed to determine acceptability. Observations exceeding a second-tier set of quantitative limits, or found "unacceptable" in the first-tier evaluation, require further technical evaluation and analysis to validate the existing condition, or repair to preserve structural integrity. The GGNS Structures Monitoring Program recording criteria, identified by specific inspection forms, aligns with the first-tier criteria from Section 5.1 of ACI 349.3R-96. The forms are presented in a "Yes/No" format and items receiving a positive response do not require further review. This positive response indicates that the findings are within the first-tier criteria of ACI 349.3R-96, are considered "acceptable," and no further action is warranted. However, the inspector is required to sign off on the inspection checklist and forward to the program administrator for additional review. Should any visual observation of a component receive a

negative response, then the second-tier criteria identified in ACI 349.3R-96 are invoked. Therefore, the screening criteria identified in the structures monitoring program align with the second-tier criteria provided in Section 5.2 of ACI 349.3R-96. The responsible engineer will review these criteria and determine if the indications exceed the criteria provided, and if so, provide further technical evaluations, which is consistent with the third-tier of ACI 349.3R-96. If the indications do not exceed the second-tier criteria the structural integrity of the concrete, in accordance with ACI 349.3R-96, is not impacted and no further action would be warranted.

RAI B.1.42-3

Background. During a walkdown of the auxiliary building, a crack was observed in the south stairwell exterior concrete wall that was noted (CR-GGN-2002-01540) to run from about 228' elevation to about 166' elevation. The crack width was on the order of 0.01" with some locations along the crack length exhibiting chipping. Plant personnel were uncertain whether the crack extended completely through the exterior concrete wall and noted that exterior monitoring of the concrete surface was done from lower elevations using binoculars.

Issue. Section 3.5, "Evaluation Techniques," of ACI 349.3R-96 states that the scope of the visual examinations of structures should include all exposed surfaces of the structure; joints and joint material, interfacing structures and materials, such as abutting soil; embedments; and attached components, such as base plates and anchor bolts and that these components should be directly viewed (maximum 600 mm focal distance), and photographs or video images taken of all discontinuities, defects, and significant findings, if possible. This section also states that direct viewing can require the installation of temporary ladders, platforms, or scaffolding and use of binoculars, fiberscopes, and other optical aids is recommended if needed to gain better access, augment the inspection, or further examine discontinuities. Such equipment should have suitable resolution capabilities under ambient or enhanced lighting. Table IWA-2211-1, "Visual Examinations," identifies a maximum direct examination distance of 2 feet for VT-1 examinations.

Request. Provide information to verify that sufficient visual resolution capability is being used during visual examinations of structures to detect and quantify forms of degradation that can potentially impact intended functions of the structures.

RAI B.1.42-3 RESPONSE

The Grand Gulf Nuclear Station (GGNS) Structures Monitoring Program manages the effects of aging on in-scope structures using visual inspections to detect and quantify the extent of degradation that can potentially impact intended functions of the structures. The program requires use of appropriate tools such as feeler gage, tape measure, flashlight, camera, and binoculars during the inspections. However, to clarify use of the required visual resolution capability, the Structures Monitoring Program described in LRA Section B.1.42 will be enhanced as follows.

1) Require direct visual examination to be conducted 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.
2) 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.

LRA Section B.1.42, Enhancements, Element 4 is revised as shown below. Additions are shown with underline.

Elements Affected	Enhancements
4. Detection of Aging Effects	The Structures Monitoring Program will be enhanced to clarify that detection of aging effects will: (a) Include inspection requirements for vibration isolators will be enhanced to include augmented inspections by feel or touch to detect hardening, if the vibration isolation function is suspect. (b) Require inspections every five 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 ten years. (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. (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.

RAI B.1.42-4

Background. During a walkdown of the auxiliary building (e.g., Elevation 93', Stair 1T02), water leakage was observed, apparently resulting from groundwater infiltration from ineffective/degraded expansion/isolation joints between the Turbine Building and the Auxiliary Building. It was also noted on several surfaces in this area that rust colored stains were present, apparently resulting from high humidity conditions causing rusting of metallic base plates and anchor bolts. In addition, a search of GGNS operating experience identified several non-conformance reports (e.g., MNCR 83-0653, MNCR 97-0151, GGCR1997-0172-00) noting that concerns had been expressed relative to water leaking into the plant through small cracks in the concrete and construction joints.

Issue. Since this has been a continuing problem, it is unclear to the staff how the Structures Monitoring Program, or other plant-specific programs, will address the leakage to ensure that aging effects, especially in inaccessible areas and plant internal steel components exposed to groundwater leakage, will be effectively managed to ensure that there is no loss of intended function.

Request. Provide information on how the in-leakage of groundwater will be addressed under your corrective action program.

RAI B.1.42-4 RESPONSE

The Grand Gulf Nuclear Station (GGNS) Structures Monitoring Program, GGNS system walkdowns and the corrective action process work together to provide adequate assurance that identification and appropriate actions are initiated to address in-leakage of groundwater in GGNS structures. The Structures Monitoring Program requires inspectors to forward inspection documents and initiate corrective actions where discoloration, such as staining from corrosion of reinforcing steel, may be observed on concrete surfaces especially in areas where in-leakage may be occurring so that appropriate actions are taken. In addition, during system walkdowns external surfaces of structures and components are monitored to identify degraded conditions, which would include identifying water in-leakage in license renewal structures. Ground water in-leakage continues to be effectively addressed by the site corrective action process and where applicable, evaluated under the GGNS engineering review process. Corrective action at GGNS includes guidance on sealing the locations where water in-leakage is identified, either in the construction joints or cracks in the structure. Emphasis by GGNS management to prevent water in-leakage continues to be part of the site's plan to effectively manage groundwater intrusion. As an additional protective measure ground floor slabs have been coated, including any attachments, to minimize the effects of in-leakage of groundwater on concrete and steel structures.

The incident cited in this request for additional information (RAI), for example, identified ground water in-leakage in a stairwell of the turbine building and the adjoining auxiliary building. The turbine building in-leakage source was determined to be the construction joints where water stop seals may have been degraded. A condition report was initiated and an evaluation was performed on the condition. The evaluation of this in-leakage determined that the liquid was clear and without indications of iron oxide that would indicate that the concrete reinforcement steel was degrading. This demonstrated that corrosion of the inaccessible reinforcement steel was not occurring. In addition, the small cracks identified during the inspection were determined to have no detrimental effects on structural integrity of the building. The corrective actions identified in this RAI demonstrate that the GGNS Structures Monitoring Program and System Walkdowns performed by site personnel is effective in monitoring condition of site structures and that the subsequent corrective action initiated through this effort is indicative of the

programs effectiveness. The resulting corrective actions that were initiated to seal this area against further in-leakage, demonstrates that the corrective action process together with the before mention programs are effective in managing in-leakage of groundwater and will continue to be effective during the period of extended operations.

RAI B.1.42-5

Background. NRC Information Notice 2004-05, "Spent Fuel Pool Leakage to Onsite Groundwater," notes that leakage of the spent fuel pools has occurred at Salem Unit 1 and other nuclear power plants.

Issue. During the onsite audit of the Structures Monitoring Program, the staff asked the following:

- if historical data on leakage of the spent fuel pool are available
- if leakage is present, is the leakage confined to the leak-chase system
- if leakage is not present, if the leak-chase system is routinely inspected to verify that it is clear

This information was not available during the audit, so the staff is uncertain if leakage of the spent fuel pool is occurring, and if leakage is present, that it is being confined to the leak-chase system.

Request. Provide historical data on spent fuel pool leakage obtained by monitoring the leak-chase system and note whether or not the leakage is confined to the leak-chase system. If the leakage is not confined to the leak-chase system, identify any structures or structural components potentially impacted and any plans to address the leakage. If no leakage has been reported, provide inspection results, or plans for inspection of the leak-chase system, to demonstrate that the leak-chase system is not blocked.

RAI B.1.42-5 RESPONSE

The upper containment pool and the spent fuel pool are located in the reactor building above ground level. GGNS historical data identified two separate incidences of leakage of the pools. Both situations involved the upper containment pool. The upper containment pool and the spent fuel pool leakage monitoring consist of leakage through the leak chase system drains (tell-tales). A review of the associated corrective action program documentation indicates that leakage observed in the tell-tales originated from the upper containment pool. Leakage rates from the upper containment pool were monitored for a period from October 10, 2006 to January 4, 2007. The plant data system was used to monitor leakage during this period. GGNS Operations personnel, using site procedures, monitor leakage from the upper containment pool and spent fuel pool. The upper containment pool leakage is monitored daily and leakage from the spent fuel pool is monitored weekly. If leakage is detected in the tell-tales corrective actions are initiated. Leakage from the pools is contained in the leak detection system located under the stainless steel liner plates and no leakage has been identified outside this leak detection system. Therefore no leakage from the pools will impact any structure or component. During the period of extended operation, GGNS Operations personnel will continue to measure and record upper containment pool and spent fuel pool tell-tale drain leakage on a periodic basis. GGNS System Engineering will continue to monitor and trend leakage. Abnormalities will be identified and investigated through the corrective action program to ensure issues are evaluated and corrected in a timely manner. The trending of leakage through the telltales is also used as an indicator that drainage through the leak chase system is occurring and that the tell-tale drains are not blocked and are performing as designed. To confirm that no significant blockage

of the tell-tale drains has occurred the following enhancement to Element 3 of the Structures Monitoring Program will be made. Additions are shown with underline.

LRA Section B.1.42, Enhancement Element 3 "Parameters Monitored or Inspected" :

Elements Affected	**Enhancements**
3.Parameters Monitored or Inspected	The Structures Monitoring Program will be enhanced to clarify that parameters monitored or inspected will: (a)Include the inspection for missing nuts for the structural connections. (b)Include 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.

Attachment 2 to

GNRO-2012/00054

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.	Two years prior to November 1, 2024	GNRO-2011/00093	B.1.19/ RAI B.1.19-1

#	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-2012/00049	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

#	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 a representative sample of sprinkler heads 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. 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.			
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

#	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.)	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.			
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
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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
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. ~~unless technical justification is provided to extend the inspection to a period not to exceed 10 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 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 • Containment sump structures • Control room ceiling support system	Prior to November 1, 2024	GNRO-2011/00093	B.1.42/ RAI B.1.42-3, B.1.42-5

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	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) • Seismic isolation joint • Stairway, handrail, platform, grating, decking,			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	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. Enhance the Structures Monitoring Program to clarify that detection of aging effects will:		GNRO-2012-00054	

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont.)	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. 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. 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. 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-2012-00054 GNRO-2012-00054	

#	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