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GNRO-2012/00098

August 23, 2012

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

SUBJECT: Response to Requests for Additional Information (RAI) Set 30 dated July 27, 2012 and RAI B.1.34-1 in Grand Gulf Letter GNRO-2012/00043  
Grand Gulf Nuclear Station, Unit 1  
Docket No. 50-416  
License No. NPF-29

REFERENCE: 1. NRC Letter, "Requests for Additional Information for the Review of the Grand Gulf Nuclear Station, License Renewal Application," dated July 27, 2012 (GNRI-2012/00165)(ML12201B476)  
2. Response to Request for Additional Information (RAI) dated May 18, 2012, Grand Gulf Letter GNRO-2012/00043


Dear Sir or Madam:

Entergy Operations, Inc is providing, in Attachment 1, the response to reference 1) Requests for Additional Information (RAI). Attachment 3 includes the response to RAI B.1.34-1 that was committed to be provided by reference 2. Attachment 2 includes an updated listing of regulatory commitments for license renewal that includes revised commitment 30 required in response to an RAI 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 23rd day of August, 2012.

Sincerely,

 GGNS GMPO (Jeremy Browning)  
Acting VP for Mike Perito.

MP/jas

Attachment(s): (see next page)

Attachment(s): 1. Response to Requests for Additional Information (RAI)  
2. List of Regulatory Commitments  
3. Response to RAI B.1.34-1

cc: with Attachments

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cc: without Attachments

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**Attachment 1 to**  
**GNRO-2012/00098**  
**Response to Requests 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 3.0.5-1**

Background. Pursuant to 10 CFR 54.21(a)(3), a license renewal applicant is required to demonstrate that the effects of aging on structures and components subject to an aging management review are adequately managed so that their intended functions will be maintained consistent with the current licensing basis for the period of extended operation. Section 3.0.1 of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Revision 2 (SRP-LR), defines an aging management review as the identification of the materials, environments, aging effects, and aging management programs (AMPs) credited for managing the aging effects. SRP-LR Section A.1.2.3 defines an acceptable AMP as consisting of ten elements, including Element 10, "Operating Experience," which is described in SRP-LR Section A.1.2.3.10, Paragraph 1 (in part), as follows:

Consideration of future plant-specific and industry operating experience relating to aging management programs should be discussed. Reviews of operating experience by the applicant in the future may identify areas where aging management programs should be enhanced or new programs developed. An applicant should commit to a *future review of plant-specific and industry operating experience to confirm the effectiveness of its aging management programs or indicate a need to develop new aging management programs* (emphasis added). This information should provide objective evidence to support the conclusion that the effects of aging will be managed adequately so that the structure and component intended function(s) will be maintained during the period of extended operation.

In addition, 10 CFR 54.21(d) requires the application to contain a final safety analysis report (FSAR) supplement. This supplement must contain a summary description of the programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses for the period of extended operation.

The NRC issued License Renewal Interim Staff Guidance (LR-ISG)-2011-05, "Ongoing Review of Operating Experience," dated March 16, 2012, to clarify the staff's position that license renewal AMPs should be informed, and enhanced when necessary, based on the ongoing review of both plant-specific and industry operating experience.

Based on its review of the Grand Gulf Nuclear Station, Units 1, license renewal application (LRA), the staff determined that Section B.0.4 provides a general description of how the applicant gathered and considered operating experience in preparing its LRA, and Sections B.1.1 through B.1.44 summarize the specific operating experience considered for each AMP.

Issue. LRA Sections B.0.4 and B.1.1 through B.1.44 describe how the applicant incorporated operating experience into its AMPs and will monitor internal and external operating experience on an ongoing basis. The applicant states that the Operating Experience Program and the Corrective Action Program (CAP) are used to evaluate operating experience to enhance AMPs

and ensure the effectiveness of AMPs. However, the LRA does not provide specific details to describe the Operating Experience Program and CAP and how they are used to monitor operating experience on an ongoing basis and ensure the continued effectiveness of AMPs. The LRA also does not state whether new AMPs will be developed, as necessary.

Request.

- a. Describe the programmatic activities that will be used to continually identify aging issues, evaluate them and, as necessary, enhance the AMPs or develop new AMPs for license renewal. Indicate whether these activities and programs will be consistent with guidance described in LR-ISG-2011-05. If not consistent, provide the basis for the conclusion that the programmatic activities will ensure operating experience will be reviewed on an ongoing basis to address age-related degradation and aging management during the term of the renewed license
- b. Consistent with the response to Request (a) above, provide a summary description in the updated FSAR supplement of how operating experience will be reviewed on an ongoing basis to address age-related degradation and aging management during the term of the renewed license.

**RAI 3.0.5-1 RESPONSE**

- a. The following describes the programmatic activities that identify aging issues, evaluate them and, as necessary, enhance the AMPs or develop new AMPs for license renewal at GGNS. These activities and programs are consistent with guidance in LR-ISG-2011-05.

GGNS site procedures specify reviews of relevant site and industry operating experience (OE). These procedures implement two programs that monitor, on an ongoing basis, industry and plant-specific operating experience that includes operating experience dealing with the effects of aging. These programs are the operating experience program (OEP) and the corrective action program (CAP). Evaluations completed under these two programs ensure that aging management programs continue to be effective in managing the effects of aging for which they are credited.

Description of the Operating Experience Program

The OEP implements the requirements of NRC NUREG 0737, "Clarification of TMI Action Plan Requirements," Section I.C.5, and is consistent with guidance contained in Institute of Nuclear Power Operations (INPO) 10-006, Revision 1, "Operating Experience (OE) Program and Construction Experience (CE) Program Descriptions" and INPO 97-011, "Guidelines for the Use of Operating Experience." As such, the OEP monitors industry operating experience.

Information sources monitored under the OEP include the following.

- NRC licensee event reports (LERs) from other plants
- NRC generic communications (bulletins, generic letters, regulatory issue summaries, information notices)
- INPO industry event reports (IERs)

- INPO download of industry operating experience
- NSSS owners group reports
- Vendor bulletins
- 10CFR Part 21 reports
- Operating experience from other Entergy Nuclear sites

Incoming OE items are screened by a team of OE coordinators for impact on Entergy plants. A series of team meetings, inter-site conference calls, and condition review group meetings are used to ensure proper consideration of OE source documents.

Training provided for personnel responsible for submitting, screening, assigning, evaluating, or otherwise processing plant-specific and industry operating experience, as well as for personnel responsible for implementing AMPs, is based on the complexity of the job performance requirements and assigned responsibilities.

Further documentation in the CAP is required when the initial OEP evaluation identifies a condition adverse to quality, a non-conformance, the potential inoperability of any structures, systems or components, degraded equipment, or equipment not performing as expected or per design. The definition of degraded equipment includes degradation due to the effects of aging.

Issues with potential plant impact require the initiation of an OEP written review. Timely determination of plant impact is ensured by scheduling completion of OEP written reviews within a period not to exceed 90 days. Extensions past the scheduled date require management approval. The result of an OEP written review may include enhancement of aging management programs or development of new aging management programs.

Issues with no impact (or only a small probability of impact), yet considered to hold informational value, are sent to the appropriate departmental point of contact for review.

#### Description of the Corrective Action Program

The CAP implements the requirements of 10 CFR 50, Appendix B, Criterion XVI. As such, the CAP is used to monitor plant-specific operating experience and to evaluate industry operating experience that is relevant to the plant.

The CAP is entered upon identification of a condition adverse to quality, a non-conformance, the potential inoperability of any structures, systems or components, degraded equipment, or equipment not performing as expected or per design. The definition of degraded equipment includes degradation due to the effects of aging. Issues addressed in the corrective action process include adverse conditions and conditions adverse to quality and minor problems that may be precursors to more significant events. This includes a broad range of problems and areas for improvement.

Information sources monitored under the CAP include the following.

- Licensee event reports
- System health reports
- Results of inspections performed under plant aging management programs

- Results of the operating experience program
- Reports of assessments of the effectiveness of plant aging management programs

Under the CAP, conditions are coded to enable trending for the purpose of addressing broader programmatic or process weaknesses. Site management is responsible for ensuring that trend codes are provided for conditions assigned to their department. Aging-related trend code criteria include the following.

- CA - This code is used to identify trends indicating a deviation from the licensing or design basis caused by the effects of aging or other issues.
- EO – This code is used to identify equipment or system problems due to aging or other issues that are not attributed to inadequate maintenance.
- EV – This code is used to document aging issues for plant buildings and structures.

In addition, the following equipment reliability trend codes are used to classify conditions as applicable.

- ER3.08 - The station proactively responds to emerging industry issues related to materials degradation and aging to ensure safe and reliable operation.
- ER3.09 - Passive components, such as major tanks, vessels, structures, and underground piping, are periodically tested or monitored to assess life expectancy. Aging mechanisms are defined. Degraded conditions are trended and/or repairs are planned consistent with importance.

Conditions are then evaluated and corrected. Evaluation includes consideration of the need for the adjustment of the frequency of future inspections, whether new or different inspections are needed, and whether the inspections include adequate depth and breadth of component, material, and environment combinations. Engineering evaluation of age-related conditions, including engineering actions to implement aging management programs, is performed by engineering personnel who are trained and qualified to perform engineering activities.

Extent of condition reviews evaluate related operating experience to determine the scope of corrective actions. Corrective actions can include enhancement of aging management programs or development of new aging management programs. For significant conditions adverse to quality, the cause of the condition is determined and corrective actions to preclude recurrence are implemented.

Timely implementation of identified enhancements is ensured through assignment of responsibility to specific site organizations for monitoring and reporting on the status of work completion. Prescribed guidelines are used to set the timeframe for implementation due dates. Designation of an enhancement as a “long-term corrective action” (that is, an enhancement which cannot be implemented within this timeframe) requires approval of senior site management. Regular oversight of pending program enhancements is provided. A focused self-assessment of the CAP is performed on a regular basis.

### Description of Elements Common to the OEP and the CAP

The administrative controls for the review of operating experience provide a formal review and approval process.

- b. The following summary description of the ongoing review of operating experience is provided as a UFSAR supplement. LRA Section A.0.1 is added as shown below with additions underlined.

#### **A.0.1 Ongoing Review of Operating Experience**

Operating experience from plant-specific and industry sources is captured and systematically reviewed on an ongoing basis in accordance with the quality assurance program, which meets the requirements of 10 CFR Part 50, Appendix B, and the operating experience program, which meets the requirements of NUREG-0737, "Clarification of TMI Action Plan Requirements," Item I.C.5, "Procedures for Feedback of Operating Experience to Plant Staff."

The operating experience program interfaces with and relies on active participation in the Institute of Nuclear Power Operations' operating experience program, as endorsed by the NRC.

In accordance with these programs, incoming operating experience items are screened to determine whether they may involve age-related degradation or impact to aging management programs (AMPs).

Items so identified are further evaluated, and affected AMPs are either enhanced or new AMPs are developed, as appropriate, when it is determined through these evaluations that the effects of aging may not be adequately managed.

Training provided for personnel responsible for submitting, screening, assigning, evaluating, or otherwise processing plant-specific and industry operating experience, as well as for personnel responsible for implementing AMPs, is based on the complexity of the job performance requirements and assigned responsibilities.

Plant-specific operating experience associated with aging management and age-related degradation is reported to the industry in accordance with guidelines established in the operating experience program.

#### **RAI B.1.42-1a**

Background. Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.S6, "Structures Monitoring," program element "detection of aging effects," states that in general, all structures are monitored on a frequency not to exceed 5 years. The GALL Report further states that some structures of lower safety significance, and subjected to benign environmental conditions, may be monitored at an interval exceeding 5 years; however, they should be identified and listed, together with their operating experience.



Issue. The LRA states that the Structures Monitoring Program, with enhancements, is consistent with the GALL Report AMP XI.S6. In its response to RAI B.1.42-1, dated May 30, 2012, the applicant stated that an enhancement identified in LRA Section B.1.42 will 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 interval to 10 years. The applicant further stated that this enhancement will also ensure that in-scope structures are inspected at least once every 10 years during the period of extended operation. GALL Report AMP XI.S6 does allow some structures of lower safety significance, and subject to benign environmental conditions, to be monitored at an interval exceeding 5 years; however, the structures should be identified and listed, together with their operating experience. It is not clear whether all structures and structural components, within the scope of license renewal, will be monitored on a frequency not to exceed 5 years consistent with the recommendations in the GALL Report, or if the applicant plans to extend the inspection interval for structures of lower safety significance.

Request.

- a. Clarify if all structures and structural components, within the scope of license renewal, will be inspected every 5 years consistent with recommendations in GALL Report AMP XI.S6.
- b. If there are structures and structural components that will be inspected at a frequency greater than the 5-year interval as recommended in GALL Report AMP XI.S6, identify and list the structures and structural components, and provide technical justification (e.g., safety significance, environmental conditions, and operating experience) for this inspection frequency that demonstrates that aging effects will be detected before there is loss of intended function(s).

**RAI B.1.42-1a RESPONSE**

- a. Consistent with recommendations in NUREG-1801 Section XI.S6, Grand Gulf Nuclear Station (GGNS) structures and structural components within the scope of license renewal will be inspected every five years during the period of extended operation.
- b. GGNS has not identified any structures or structural components within the scope of license renewal that will be inspected at a frequency of less than once every five years during the period of extended operation. LRA Sections A.1.42 and B.1.42 enhancements are revised as shown below. Deletions are shown with strike-through.

**A.1.42 Structures Monitoring Program**

The Structures Monitoring Program will be enhanced as follows.

- 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.~~

**B.1.42 STRUCTURES MONITORING****Enhancements**

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

<b>Elements Affected</b>	<b>Enhancements</b>
4. Detection of Aging Effects	<p>The Structures Monitoring Program will be enhanced to clarify that detection of aging effects will</p> <p>(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.</p> <p>(b) Require inspections every five years for structures and structural components within the scope of license renewal <del>unless technical justification is provided to extend the inspection to a period not to exceed ten years.</del></p>

**Attachment 2 to**  
**GNRO-2012/00098**  
**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	<p>Enhance the Bolting Integrity Program for GGNS to clarify the prohibition on use of lubricants containing MoS<sub>2</sub> for bolting, and to specify that proper gasket compression will be visually verified following assembly.</p> <p>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.</p> <p>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.</p>	Prior to November 1, 2024	GNRO-2011/00093	B.1.3

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
4	<p>Enhance the Boraflex Monitoring Program for GGNS to perform periodic surveillances of the boraflex neutron absorbing material in the spent fuel pool and upper containment pool at least once every 5 years using Boron-10 Areal Density Gage for Evaluating Racks (BADGER) testing.</p> <p>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.</p>	Prior to November 1, 2024	GNRO-2011/00093 GNRO-2012-00077	B.1.4/ RAI B.1.4-1
5	<p>Implement the Buried Piping and Tanks Inspection Program for GGNS as described in LRA Section B.1.5. Soil testing will be performed at two locations near the stainless steel condensate storage system piping that is subject to aging management review. Measured parameters will include soil resistivity, bacteria, pH, moisture, chlorides and redox potential. If the soil is determined to be corrosive then the number of inspections will be increased from one to two prior to and during the period of extended operation.</p>	Prior to November 1, 2024	GNRO-2011/00093 GNRO-2012/00089	B.1.5/ RAI B.1.5-4a

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
6	<p>Enhance the Boiling Water Reactor (BWR) Vessel Internals Program for GGNS as follows.</p> <p>(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).</p> <p>(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.</p>	Prior to November 1, 2024	GNRO-2011/00093	B.1.11

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
7	<p>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.</p> <p>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.</p> <ul style="list-style-type: none"> <li>• Automatic Depressurization System (ADS) air</li> <li>• Division 1 Diesel Generator Starting Air (D1DGSA)</li> <li>• Division 2 Diesel Generator Starting Air (D2DGSA)</li> <li>• Division 3 Diesel Generator Starting Air (D3DGSA), also known as the HPCS Diesel Generator</li> <li>• Instrument Air (IA)</li> </ul>	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	<p>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.</p> <p>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.</p>	Prior to November 1, 2024	GNRO-2011/00093	B.1.16
9	<p>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.</p> <p>Enhance the External Surfaces Monitoring Program as follows.</p> <ol style="list-style-type: none"> <li>1. Underground components within the scope of this program will be clearly identified in program documents.</li> <li>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.</li> </ol>	Prior to November 1, 2024	GNRO-2011/00093	B.1.18



#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
10	<p>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).</p> <p>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.</p> <p>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. <math>F_{en}</math> 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.</p> <p>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.</p>	Two years prior to November 1, 2024	<p>GNRO-2011/00093</p> <p>GNRO-2012/00063</p>	B.1.19/ RAI B.1.19-1, RAI 4.3-11

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
11	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Prior to November 1, 2024	<p>GNRO-2011/00093</p> <p>GNRO-2012/00042</p>	B.1.20/ RAI B.1.20-2

OR

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
12 (cont.)	<p>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.</p> <p>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.</p> <p>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.</p>		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.)	<p>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.</p> <p>Enhance the Inservice Inspection - IWF Program to clarify that detection of aging will include:</p> <p>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.</p> <p>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.</p>			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
14 (cont.)	<p>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.</p> <p>Enhance the Inservice Inspection - IWF Program acceptance criteria to include the following as unacceptable conditions.</p> <p>a) Loss of material due to corrosion or wear, which reduces the load bearing capacity of the component support;</p> <p>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</p> <p>c) Cracked or sheared bolts, including high strength bolts, and anchors.</p>		<p>GNRO-2012/00055</p> <p>GNRO-2011/00093</p>	
15	<p>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.</p> <p>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.</p>	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	<p>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.</p> <p>Enhance the Masonry Wall Program to clarify that detection of aging effects require masonry walls to be inspected every 5 years.</p>	Prior to November 1, 2024	GNRO-2011/00093	B.1.27/ RAI 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	<p>Enhance the Non environmentally Qualified (Non-EQ) Inaccessible Power Cables (400V to 35kV) Program to include low-voltage (400V to 2kV) power cables.</p> <p>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.</p> <p>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.</p>	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	<p>Enhance the Oil Analysis Program to provide a formalized analysis technique for particulate counting.</p> <p>Enhance the Oil Analysis Program to include piping and components within the main generator system (N41) with an internal environment of lube oil.</p>	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	<p>Enhance the Protective Coating Program to include parameters monitored or inspected by the program per the guidance provided in ASTM D5163-08.</p> <p>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.</p> <p>Enhance the Protective Coating Program to include acceptance criteria per ASTM D 5163-08.</p>	Prior to November 1, 2024	GNRO-2011/00093	B.1.36
27	<p>Ensure that the additional requirements of the ISP(E) specified in BWRVIP-86, Revision 1, including the conditions of the final NRC safety evaluation for BWRVIP-116 incorporated in BWRVIP-86, Revision 1 will be addressed before the period of extended operation.</p> <p>Ensure that new fluence projections through the period of extended operation and the latest vessel beltline ART Tables are provided to the BWRVIP prior to the period of extended operation.</p>	Prior to November 1, 2024	<p>GNRO-2011/00093</p> <p>GNRO-2012/00081</p> <p>GNRO-2012/00081</p>	B.1.38 / RAI B.1.38-1, B.1.38-4



#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
28	<p>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.</p> <p>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.</p> <p>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.</p>	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	<p>Enhance the Structures Monitoring Program to clarify that the scope includes the following:</p> <p>a) In-scope structures and structural components.</p> <ul style="list-style-type: none"> <li>• Containment Building (GGN 2)</li> <li>• Control House – Switchyard</li> <li>• Culvert No. 1 and drainage channel</li> <li>• Manholes and Ductbanks</li> <li>• Radioactive Waste Building Pipe Tunnel</li> <li>• Auxiliary Building (GGN2)</li> <li>• Turbine Building (GGN2)</li> </ul> <p>b) In-scope structural components</p> <ul style="list-style-type: none"> <li>• Anchor bolts</li> <li>• Anchorage / embedments</li> <li>• Base plates</li> <li>• Basin debris screen and grating</li> <li>• Battery racks</li> <li>• Beams, columns, floor slabs and interior walls</li> <li>• Cable tray and cable tray supports</li> <li>• Component and piping supports</li> <li>• Conduit and conduit supports</li> <li>• Containment sump liner and penetrations</li> <li>• Containment sump structures</li> </ul>	Prior to November 1, 2024	<p>GNRO-2011/00093</p> <p>GNRO-2012/00074</p> <p>GNRO-2012-00095</p>	<p>B.1.42/ RAI</p> <p>B.1.42-3,</p> <p>B.1.42-5,</p> <p>2.1-4,</p> <p>3.5.1.33-2,</p> <p>B.1.13-4a,</p> <p><u>B.1.42-1a</u></p>

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	<ul style="list-style-type: none"> <li>• Control room ceiling support system</li> <li>• Cooling tower drift eliminators</li> <li>• Cooling tower fill</li> <li>• CST/RWST retaining basin (wall)</li> <li>• Diesel fuel tank access tunnel slab</li> <li>• Drainage channel</li> <li>• Drywell electrical penetration sleeves</li> <li>• Drywell equipment hatch</li> <li>• Drywell floor slab (concrete)</li> <li>• Drywell head</li> <li>• Drywell head access manway</li> <li>• Drywell liner plate</li> <li>• Drywell mechanical penetration sleeves</li> <li>• Drywell personnel access lock</li> <li>• Drywell wall (concrete)</li> <li>• Ductbanks</li> <li>• Electrical and instrument panels and enclosures</li> <li>• Equipment pads/foundations</li> <li>• Exterior walls</li> <li>• Fan stack grating</li> <li>• Fire proofing</li> <li>• Flood curbs</li> <li>• Flood retention materials (spare parts)</li> <li>• Flood, pressure and specialty doors</li> <li>• Floor slab</li> <li>• Foundations</li> <li>• HVAC duct supports</li> <li>• Instrument line supports</li> <li>• Instrument racks, frames and tubing trays</li> <li>• Interior walls</li> <li>• Main steam pipe tunnel</li> <li>• Manholes</li> <li>• Manways, hatches, manhole covers, and hatch covers</li> <li>• Metal siding</li> <li>• Missile shields</li> <li>• Monorails</li> <li>• Penetration sealant (flood, radiation)</li> <li>• Penetration sleeves (mechanical/ electrical not penetrating primary containment boundary)</li> <li>• Pipe whip restraints</li> <li>• Pressure relief panels</li> <li>• Reactor pedestal</li> <li>• Reactor shield wall (steel portion)</li> <li>• Roof decking</li> </ul>			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont)	<ul style="list-style-type: none"> <li>• Roof hatches</li> <li>• Roof membrane</li> <li>• Roof slabs</li> <li>• RPV pedestal sump liner and penetrations</li> <li>• Seals and gaskets (doors, manways and hatches)</li> <li>• Seismic isolation joint</li> <li>• Stairway, handrail, platform, grating, decking, and ladders</li> <li>• Structural bolting</li> <li>• Structural steel, beams columns, and plates</li> <li>• Sumps and Sump liners</li> <li>• Support members: welds; bolted connections; support anchorages to building structure</li> <li>• Support pedestals</li> <li>• Transmission towers (see Note 1)</li> <li>• Upper containment pool floor and walls</li> <li>• Vents and louvers</li> <li>• Weir wall liner plate</li> </ul> <p>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.</p> <p>c) Clarify the term “significant degradation” to include “that could lead to loss of structural integrity”.</p> <p>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.</p> <p>Enhance the Structures Monitoring Program to clarify that parameters monitored or inspected include:</p> <p>a) inspection for missing nuts for structural connections.</p> <p>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.</p> <p>c) Include periodically inspecting the leak chase</p>		GNRO-2012/00054	

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont.)	<p>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.</p> <p>Enhance the Structures Monitoring Program to clarify that detection of aging effects will:</p> <ul style="list-style-type: none"> <li>a) include augmented inspections of vibration isolators by feel or touch to detect hardening if the vibration isolation function is suspect.</li> <li>b) Require inspections every 5 years for structures and structural components within the scope of license renewal <del>unless technical justification is provided to extend the inspection to a period not to exceed 10 years.</del></li> <li>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.</li> <li>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.</li> <li>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.</li> </ul> <p>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</p>		<p>GNRO-2011/00093</p> <p>GNRO-2012/00098</p> <p>GNRO-2012/00054</p> <p>GNRO-2012/00054</p> <p>GNRO-2012/00076</p> <p>GNRO-2011/00093</p>	

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
	experience will also be considered in the development of the acceptance criteria.			
31	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Prior to November 1, 2024	<p>GNRO-2011/00093</p> <p>GNRO-2012/00049</p>	B.1.44/ RAI B.1.44-1, B.1.44-2

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31 (cont.)	<p>Enhance the Water Chemistry Control – Closed Treated Water Program to conduct inspections whenever a boundary is opened for the following systems.</p> <ul style="list-style-type: none"> <li>• Drywell chilled water (DCW – system P72)</li> <li>• Plant chilled water (PCW – system P71)</li> <li>• Diesel generator cooling water subsystem for Division I and II standby diesel generators</li> <li>• Diesel engine jacket water for engine-driven fire water pump</li> <li>• Diesel generator cooling water subsystem for Division III (HPCS) diesel generator</li> <li>• Turbine building cooling water (TBCW– system P43)</li> <li>• Component cooling water (CCW – system P42)</li> </ul> <p>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.</p>			

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31 (cont.)	<p>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.</p> <ul style="list-style-type: none"> <li>• Drywell chilled water (DCW – P72)</li> <li>• Plant chilled water (PCW – P71)</li> <li>• Diesel generator cooling water subsystem for Division I and II standby diesel generators</li> <li>• Diesel engine jacket water for engine-driven fire water pump</li> <li>• Diesel generator cooling water subsystem for Division III (HPCS) diesel generator</li> <li>• Turbine building cooling water (TBCW – P43)</li> <li>• Component cooling water (CCW – P42)</li> </ul> <p>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.</p>			
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

**Attachment 3 to**

**GNRO-2012/00098**

**Response to Request for Additional Information B.1.34-1**



The response to RAI B.1.34-1 submitted in the letter GNRO-2012/00043 dated May 18, 2012 stated that because this is a new program the total number of welds that will be included in the volumetric inspections, based on the total population of welds of each weld type, has not been determined but will be provided by August 31, 2012 to support the NRC review of this program. This review has been completed and the table with the information as requested in the original RAI is provided below.

	Total Number of Welds at GGNS	Total Number of Welds to Be Inspected under the One-Time Inspection – Small-Bore Piping Program	Percentage of Total Welds To Be Inspected
ASME Code Class 1 Small-Bore Piping Full Penetration or Butt Welds	195	20	10.2%
ASME Code Class 1 Small-Bore Piping Partial Penetration or Socket Welds	408	25	6.1%

The sample size meets the sample size described in the GALL Report (i.e., 10 percent of the weld population or a maximum of 25 welds of each weld type) so no technical justification is required.