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GNRO-2012/00055

June 6, 2012

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

SUBJECT: Response to Request for Additional Information (RAI) Set 12 dated May 9, 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 9, 2012 (Accession No. ML12115a090, GNRI-2012/00112)

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 a revised commitment 14.

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 6th day of June, 2012.

Sincerely,

GMAO GGNS acting VP for Mike Perito

Jeremy Browning

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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cc: without Attachment(s)

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NRC Senior Resident Inspector
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Attachment 1 to

GNRO-2012/00055

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.1.13-1

Background. The license renewal application (LRA) states that the Containment Inservice Inspection – IWE Program is consistent with GALL Report AMP XI.S1, "ASME Section XI, Subsection IWE." The Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.S1 "acceptance criteria" program element states, "[f]or the containment steel shell or liner, material loss locally exceeding 10% of the nominal containment wall thickness or material loss that is projected to locally exceed 10% of the nominal containment wall thickness before the next examination are documented. Such areas are corrected by repair or replacement in accordance with IWE-3122 or accepted by engineering evaluation."

IWE-3122 states, "[w]hen flaws or areas of degradation are accepted by engineering evaluation, the area containing the flaw or degradation shall be reexamined in accordance with IWE-2420(b)." IWE-2420(b) states, "[w]hen examination results require evaluation of flaws or areas of degradation in accordance with IWE-3000, and the component is acceptable for continued service, the areas containing such flaws or areas of degradation shall be reexamined during the next inspection period listed in the schedule of the inspection program of IWE-2411 or IWE-2412, in accordance with Table IWE-2500-1, Examination Category E-C."

Issue. During the audit, the staff reviewed the results of the April 2007 IWE inspection of the containment suppression pool liner plate in base slab segments B1-B4 and S1-S4, and wall segments 93-1 through 93-8. The inspection data identified significant number (more than 100) locations where liner plate pits depths varied between 1/64 to 3/64 inches or 6 to 19% of the 1/4 inch thick liner plate. The applicant documented these pits as punch marks made during original construction and found them acceptable. The applicant plans to re-examine these pits in 2017. The applicant's use of a time interval of 10 years for augmented inspections and the criteria used for accepting degradation in the liner plate, in excess of 10 percent, does not appear to be in accordance with the ASME Section XI, IWE-2420(b).

Request.

a. Describe the basis for accepting pits greater than 10 percent of the liner plate nominal wall thickness, including description of any engineering evaluation performed in accordance IWE requirements.

b. Describe the basis for not identifying these pits for augmented inspection during the next inspection period as required by IWE-2420(b).

RAI B.1.13-1 RESPONSE

a. The Grand Gulf Nuclear Station (GGNS) suppression pool liner plate, which is backed by concrete, is not a part of the containment pressure boundary and was not designed in accordance with ASME Section III, Division I. This area of the suppression pool is inspected under the Structures Monitoring Program, but is inspected using a procedure that is also used for the Containment Inservice Inspection-IWE Program. Divers inspect the entire underwater portions of the suppression pool, including portions that are part of the primary containment boundary. The suppression pool liner consists of steel plates

with sufficient strength and ductility to resist the calculated strains and remain leak tight. The plate is stiffened with structural T-sections, channels, and angles to carry the design loads and to anchor the liner plate to the concrete drywell wall. In addition, the liner plate is thicker around major penetrations. Entergy personnel evaluated the identified pits as documented in the GGNS corrective action process and site calculations. The evaluation states that the reduction in liner plate thickness is acceptable. The calculation concluded that with a liner plate thickness of 0.225 inches, a factor of safety of 3.17, based on ultimate stress, and a factor of safety of 10.54 based on yield stress was maintained. The thinnest wall thickness identified was 0.231 inches which is bounded by this evaluation.

b. The identified flaws, identified as pits, are punch marks made to the liner plate during its construction and were not a result of age-related degradation, structural deformation or displacement of the liner plate. ASME Section XI Subsection IWE is not applicable to the area of the pits since this portion of the suppression pool liner plate is not a containment pressure boundary component.

RAI B.1.13-2

Background. The LRA states that the Containment Inservice Inspection – IWE Program is consistent with GALL Report AMP XI.S1. GALL Report AMP XI.S1 states:

> 10 CFR 50.55a imposes the inservice inspection (ISI) requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, Subsection IWE, for steel containments (Class MC) and steel liners for concrete containments (Class CC). The full scope of IWE includes steel containment shells and their integral attachments, steel liners for concrete containments and their integral attachments, containment hatches and airlocks and moisture barriers, and pressure-retaining bolting. This evaluation covers the 2004 edition, as approved in 10 CFR 50.55a. ASME Code, Section XI, Subsection IWE, and the additional requirements specified in 10 CFR 50.55a(b)(2) constitute an existing mandated program applicable to managing aging of steel containments, steel liners of concrete containments, and other containment components for license renewal.

10 CFR 50.55a(b)(2)(ix)(B) states, "[w]hen performing remotely the visual examinations required by Subsection IWE, the maximum direct examination distance specified in Table IWA-2210-1 may be extended and the minimum illumination requirements specified in Table IWA-2210-1 may be decreased provided that the conditions or indications for which visual examination is performed can be detected at the chosen distance and illumination."

Issue. Section 3.2 of the Grand Gulf Nuclear Station (GGNS) License Renewal Project, Aging Management Program Evaluation Report Civil/Structural for Containment Inservice Inspection (CII) – IWE, states, "[t]he requirements of IWA-2210 are not applicable to Subsection IWE visual examinations per IWE-2100."

Request. Please describe the basis for not using the requirements of IWA Table 2210-1. 10 CFR 50.55(a) requires the use of Table IWA Table 2210-1 as amended by 10 CFR 50.55(a)(ix)(B). In addition, please provide the details of any departure, including license exemption, granted by the NRC to deviate from IWA-2210 requirements.

RAI B.1.13-2 RESPONSE

As stated in the GGNS LRA Section B.1.13, the Containment Inservice Inspection (CII) – IWE Program is consistent with the program described in NUREG-1801, Section XI.S1, ASME Section XI, Subsection IWE, with no exceptions. The referenced statement in Section 3.2 of the GGNS aging management program evaluation report for the CII – IWE program was intended to indicate that the GGNS CII - IWE Program uses IWA Table 2210-1 as amended by 10 CFR 50.55a(b)(2)(ix)(B) as required by 10 CFR 50.55(a). No exemption is necessary.

RAI B.1.13-3

Background. The LRA states that the Containment Inservice Inspection – IWE Program is consistent with the GALL Report AMP XI.S1. The GALL Report AMP XI.S1 "preventive actions" program element states:

> The program is also augmented to require that the selection of bolting material installation torque or tension and the use of lubricants and sealants are in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339 to prevent or mitigate degradation and failure of structural bolting. If the structural bolting consists of ASTM A325, ASTM F1852, and/or ASTM A490 bolts, the preventive actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication "Specification for Structural Joints Using ASTM A325 or A490 Bolts," need to be considered.

Issue. Section 3.2 of the GGNS License Renewal Project, Aging Management Program Evaluation Report Civil/Structural for Containment Inservice Inspection (CII) – IWE, states:

> Structural bolting is torqued in accordance with the site maintenance procedures that provide technical guidance for calculating the torque value requirements for a specified bolting material and for environment or temperature that the bolting material would be subjected to during plant operating conditions. The lubricants that are recommended in the maintenance procedure include the use of molybdenum disulfide, which is considered an outlier as described in the element above. Since the use of this lubricant is permitted by plant procedure, it is assumed that all high strength structural bolting material, i.e. ASTM A325 and A490, have used this lubricant in the torquing process during construction and maintenance activities for the life of the plant so far. GGNS procedures will be enhanced to prohibit use of this lubricant. This enhancement will be addressed in the Bolting Integrity Program.

In the statement above, the applicant has not addressed how and when the high strength bolts that were previously torqued using molybdenum disulfide lubricant will be inspected for degradation.

Request. Describe the plan, including sample size and frequency, for inspecting high strength bolts that were previously torqued using molybdenum disulfide lubricant. The plan should also describe the schedule for inspection in order to establish a trend for aging management of these high strength bolts during the period of extended operations.

RAI B.1.13-3 RESPONSE

The examination requirements of this ASME Section XI Subsection IWE apply to Class MC (Metal Containment) pressure retaining components and their integral attachments and to metallic shell and penetration liners of Class CC (Concrete Containment) pressure-retaining components and their integral attachments. Grand Gulf Nuclear Station (GGNS) is a concrete containment with a steel liner. The schedule of inspection is as stated by the program. Vessels, parts, and appurtenances outside the boundaries of the containment system as defined in the Design Specification are not included in scope of ASME Section XI Subsection IWE. As such, the bolting associated with these systems is not in scope of the ASME Section XI Subsection IWE inspection. GGNS does not have Class MC pressure-retaining components associated with its concrete containment liner. Since Class MC pressure-retaining components with bolted integral attachments to the GGNS steel liner meeting the requirements for MC pressure retaining components are not present, no plan to include ASTM A325 and A490 bolting in the scope of ASME Section XI Subsection IWE needs to be addressed by the program. It was assumed that molybdenum disulfide may have been used as a lubricant in the torquing process during construction with high strength structural bolting material, i.e. ASTM A325 and A490. However this bolting is not part of the containment liner construction and no Class MC component supports are integrally attached to the liner. However, as stated in Section 4.1 of the GGNS License Renewal Project, Aging Management Program Evaluation Report Non-Class I Mechanical, GGNS procedures will be enhanced to prohibit use of this lubricant, even though there is no ASTM A325 and A490 Class MC pressure-retaining component bolting integral to the GGNS containment liner plate. This enhancement is described in License Renewal Application Section B.1.3, Bolting Integrity, since the application and use of lubricants are governed by site procedures that are the implementing procedures for the Bolting Integrity Program.

RAI B.1.13-4

Background. The LRA states that the Containment Inservice Inspection – IWE Program is consistent with GALL Report AMP XI.S1. The GALL Report AMP XI.S1 "parameters monitored or inspected" program element recommends that pressure retaining surfaces of the containment be inspected for evidence of corrosion, cracking, and wear.

Issue. During the audit, the staff reviewed the document Program Section No. CEP-CISI-102, "Program Section for ASME Section XI, Division 1, GGNS Containment Inservice Inspection Program." Appendix A of this document lists CISI drawings for IWE Inspections. The drywell and weir wall liner plates between elevations 93' and 117' that are located in the suppression pool and the steel drywell head are not listed in this Appendix A.

Request. Provide justification for not inspecting the drywell and weir wall liner plates between elevations 93' and 117' that are located in the suppression pool, and the steel drywell head. If there are plans to inspect these components in the future, describe the frequency and procedures that will be used for these inspections to establish a trend for aging management.

RAI B.1.13-4 RESPONSE

The drywell, drywell head, the suppression pool (above containment floor and not part of containment cylinder wall) and weir wall liner plates, including the area between elevations 93

feet and 117 feet located in the suppression pool are not Class MC (Metal Containment) pressure retaining components of the containment as defined in ASME Section XI Subsection IWE and therefore are not included in scope of the ASME Section XI Subsection IWE program. These components are inspected under the Structures Monitoring Program. Because the Structures Monitoring Program specifies opportunistic inspections, the submerged portion of the weir wall in the area between elevations 93 feet and 117 feet is typically inspected during the ASME Section XI Subsection IWE inspections. The underwater weir wall welded connections at the suppression pool floor liner are inspected by divers during the IWE inspections. The frequency of inspections for the drywell, drywell head, the suppression pool (above containment floor and not part of containment cylinder wall) and weir wall liner plates is five years as stated in the enhancement identified for the Structures Monitoring Program. The Structures Monitoring Program was inadvertently omitted from the line items associated with the drywell, drywell head, the suppression pool, and weir wall. Therefore, the line items identified in LRA Table 3.5.2-1 are revised as shown to identify the Structures Monitoring Program as the aging management program for the associated aging effects. Additions are shown with underline and deletions with strikethrough.

Table 3.5.2-1: Containment Building								
Structure and/or Component or Commodity	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Program**	**NUREG-1801 Item**	**Table 1 Item**	**Notes**
Containment cylinder wall and floor liner plate (includes suppression pool outer wall liner)	EN, MB, PB, SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	CII – IWE Containment Leak Rate	II.B3.2.CP-35	3.5.1-35	A
Drywell electrical penetration sleeves	EN, ~~PB,~~ SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B4.CP-36~~ III.A1.TP-302	~~3.5.1-35~~ 3.5.1-77	A
Drywell equipment hatch	EN, MB, ~~PB,~~ SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B4.C-16~~ III.A1.TP-302	~~3.5.1-28~~ 3.5.1-77	~~B~~ A
Drywell head	EN, MB, ~~PB,~~ SSR	Stainless steel	Air – indoor uncontrolled	None	None	III.B5.TP-8	3.5.1-95	A
Drywell head	EN, MB, ~~PB,~~ SSR	Stainless steel	Exposed to fluid environment	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A5.T-14	~~3.5.1-37~~ 3.5.1-78	~~B~~ E
Drywell head access manway	EN, MB, ~~PB,~~ SSR	Stainless steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B4.C-16~~ III.A1.TP-302	~~3.5.1-28~~ 3.5.1-77	~~B~~ A
Drywell liner plate	EN, MB, ~~PB,~~ SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A1.TP-302	~~3.5.1-37~~ 3.5.1-77	~~B~~ A

Table 3.5.2-1: Containment Building

Structure and/or Component or Commodity	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Drywell liner plate	EN, MB, ~~PB,~~ SSR	Stainless steel	Exposed to fluid environment	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A5.T-14	~~3.5.1-37~~ 3.5.1-78	~~B~~ E
Drywell mechanical penetration sleeves	~~PB,~~ SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B4.CP-36~~ III.A1.TP-302	~~3.5.1-35~~ 3.5.1-77	A
Drywell personnel access lock	EN, MB, ~~PB,~~ SSR	Carbon steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B4.C-16~~ III.A1.TP-302	~~3.5.1-28~~ 3.5.1-77	~~B~~ A
Suppression pool liner plate (interior wall)	EN, HS, ~~PB,~~ SSR	Stainless steel	Air – indoor uncontrolled	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A5.TP-302	~~3.5.1-37~~ 3.5.1-78	A
Suppression pool liner plate (interior wall)	EN, HS, ~~PB,~~ SSR	Stainless steel	Exposed to fluid environment	Loss of material	~~CII – IWE Containment Leak Rate~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A5.T-14	~~3.5.1-37~~ 3.5.1-78	E
~~Suppression pool liner plate~~	~~EN, HS, PB, SSR~~	~~Stainless steel~~	~~Exposed to fluid environment~~	~~Cracking~~	~~TLAA – metal fatigue~~	~~II.B2.2.C-48~~	~~3.5.1-9~~	~~A~~
Weir wall liner plate	HS, SSR	Stainless steel	Exposed to fluid environment	Loss of material	~~CII – IWE~~ Structures Monitoring	~~II.B2.2.C-49~~ III.A5.T-14	~~3.5.1-37~~ 3.5.1-78	E
Drywell wall	SSR, EN, MB, ~~PB~~	Concrete	Air – indoor uncontrolled	None	Structures Monitoring	II.B3.2.CP-84	3.5.1-24	I, 501

RAI B.1.13-5

Background. The LRA, states that the Containment Inservice Inspection – IWE Program is consistent with GALL Report AMP XI.S1. GALL Report AMP XI.S1 recommends that the Containment Inservice Inspection – IWE Program to be implemented in accordance with the ASME 2004 edition, as approved in 10 CFR 50.55a. 10 CFR 50.55a(g)(4) requires that inservice inspection of components and system pressure tests conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the Code referenced in the 10 CFR 50.55a(b), 12 months before the start of the 120 months inspection interval.

Issue. It is not clear to the staff that the Containment Inservice Inspection – IWE Program is consistent with GALL Report AMP XI.S1 because Section 3.2 of the GGNS License Renewal Project, Aging Management Program Evaluation Report Civil/Structural for the Containment Inservice Inspection (CII) – IWE states that IWE examination satisfies the requirements of the Code Edition 1998 edition with 1999 and 2000 addenda, 2001 edition with 2003 addenda, and the 2004 edition.

Request. Please identify the ASME Code edition that is being used during the current inspection interval, and if this Code edition is consistent with GALL Report recommendations and 10 CFR 50.55a(g)(4) requirements. Alternatively, provide the basis for using an ASME Code edition other than prescribed in 10 CFR 50.55a(g)(4).

RAI B.1.13-5 RESPONSE

The third inspection interval for Grand Gulf Nuclear Station (GGNS) began in 2008. Consistent with 10 CFR 50.55a, the ASME Section XI code of record for GGNS Containment Inservice Inspection (CII)-IWE Program for the third inspection interval is the 2001 Edition with the 2003 Addenda. Consistent with Chapter 1 of NUREG-1801, codes endorsed by 10 CFR 50.55a after 1995 are acceptable for CII-IWE inspections. Consistent with NUREG 1801 recommendations, the GGNS CII-IWE program will continue to include the requirements of the appropriate ASME Code edition and addenda in accordance with 10 CFR 50.55a(g)(4).

RAI B.1.24-1

Background. The LRA states that the Inservice Inspection – IWF Program, with enhancements, is consistent with GALL Report AMP XI.S3, "ASME Section XI, Subsection IWF." The GALL Report AMP XI.S3 "detection of aging effects" program element states that for high strength bolting (actual measured yield strength greater than or equal to 150 ksi) in sizes greater than 1 inch nominal diameter, volumetric examination comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 should be performed to detect cracking in addition to the VT-3 examination. The GGNS Aging Management Program Evaluation Report for ASME Section XI, Subsection IWF is enhanced to include provisions to perform volumetric examinations comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 for identified high strength structural bolts.

During its onsite audit, the staff asked how the applicant will implement the provisions for volumetric examinations, including identification of bolts to be inspected and frequency of examination. The applicant responded that it will perform volumetric examinations of any high strength bolts identified on the component supports that are in the scope of the IWF sample for each inspection interval.

Issue. The applicant's Inservice Inspection – IWF Program states that selection of component supports for examination is based on ASME classification, which includes 25% of Class 1 piping supports, 15% of Class 2 supports, and 10% of class 3 supports. The staff is concerned that performing volumetric examinations only on bolts that are already within the IWF sample of component supports does not ensure that an adequate number of bolts will be examined in order to effectively manage aging of high strength bolting. The intent of the GALL recommendation is to identify and perform volumetric examination on a representative sample of the entire population of high strength structural bolting to provide assurance that age-related degradation of high strength bolts will be managed.

Request. Describe how the volumetric inspections for the Inservice Inspection – IWF Program will effectively manage cracking for the entire population of high strength bolts for the period of extended operation. Include discussion of bolt selection methods, sample size, and frequency of examinations.

RAI B.1.24-1 RESPONSE

NUREG-1801 indicates that ASTM A-325, F-1852, and ASTM A-490 bolts used in civil structural applications are not prone to stress corrosion cracking (SCC) and as such, the potential for SCC does not need to be evaluated for this bolting. However, Grand Gulf Nuclear Station (GGNS) will augment the Inservice Inspection (ISI)-IWF program, as stated in the LRA B.1.24 enhancement, to include volumetric examination of high-strength bolting comparable to that specified in ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 in addition to the VT-3 examination. GGNS will enhance the ISI-IWF program to identify the component supports that contain high strength bolting (actual yield strength 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.

The following additional enhancement to element 4 of the Inservice Inspection – IWF program in Appendix B.1.24 will be implemented prior to the period of extended operation. Additions are shown with underline.

Elements Affected		Enhancements
4.	Detection of Aging Effects	The ISI-IWF Program will be enhanced to clarify that detection of aging will include the following: (a) Structural bolting (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 (c) <u>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.</u>

RAI B.1.24-2

Background. The LRA states that the Inservice Inspection – IWF Program, with enhancements, is consistent with GALL Report AMPXI.S3. The GALL Report AMP XI.S3 "monitoring and trending" program element states that examinations that reveal indications which exceed the acceptance standards and require corrective measures are extended to include additional examinations in accordance with ASME Section IX, Subsection IWF-2430. The applicant's Inservice Inspection – IWF Program basis documentation states that the acceptance criteria are in accordance with ASME Section IX, Subsection IWF-3410(a).

Issue. During its onsite audit, the staff reviewed documentation regarding degradation of a bolt that was found while performing a VT-3 examination of a pipe restraint in the standby service water system in July 2011. The degradation of the bolt was determined to exceed the acceptance criteria of the Inservice Inspection – IWF Program and the condition was entered into the corrective action program for replacement of the bolt. During its review, the applicant did not provide documentation which indicated additional examinations would be performed or that such examinations had been performed, in accordance with the GALL Report recommendations and the requirements of ASME Section IX, Subsection IWF-2430.

Request. For the identified condition, provide documentation that demonstrates that the Inservice Inspection - IWF Program is consistent with GALL Report AMP XI.S3, regarding increase in sample size when deficiencies are identified during examination of supports. If additional inspections were not performed, provide the basis for the statement in LRA Section B.1.24 that the IWF program is consistent with ASME code and Section XI.S3 of the GALL Report.

RAI B.1.24-2 RESPONSE

The examinations conducted under the Grand Gulf Nuclear Station (GGNS) Inservice Inspection (ISI) - IWF Program are performed to meet the requirements of ASME Section XI Subsection IWF with enhancements. During ISI-IWF inspections of supports in the standby service water (SSW) basins in 2003, one of the underwater supports was documented as not meeting the acceptance requirements of ASME Section XI Subsection IWF-3000. This degraded support was documented in the GGNS corrective action program and the scope of the ISI-IWF inspection was increased to add additional supports to meet the requirements of ASME Section XI Subsection IWF-2430.

Subsequent ISI-IWF inspections performed after 2004 identified additional supports that did not meet the acceptance requirements of Article IWF-3000, section IWF-3400. These unacceptable conditions were documented in condition reports (CRs) in the GGNS corrective action program. During the evaluation of the CRs, it was determined to increase the frequency of the inspections of the underwater supports and include all the under-water supports. Therefore, 100% of the underwater supports and their attachments in the SSW basins are inspected each year. Since 100% of the under-water supports in the SSW basins are inspected, discovery of the support with the degraded nut in 2011 did not result in an expansion of the scope of IWF inspections per IWF-2430.

RAI B.1.24-3

Background. The LRA states that the Inservice Inspection – IWF program, with enhancements, is consistent with GALL Report AMP XI.S3. The GALL Report AMP XI.S3 "monitoring and trending" program element states that examinations of component supports that reveal indications which exceed the acceptance standards and require corrective measures are extended to include additional examinations in accordance with ASME Section XI, Subsection IWF-2430.

During review of plant-specific operating experience, the staff noted cases in which conditions were found during IWF examinations that appeared to be degraded, an engineering evaluation determined that the as-found component was acceptable-as-is, but the component was still re-worked to as-new condition. Since the applicant determined that the as-found condition did not affect the support's capability to perform its design function, the applicant did not apply ASME Section XI, Subsections IWF-2420 and IWF-2430 for successive or additional examinations.

Issue. The ASME Code, Section XI, Subsection IWF Program requires the inspection of the same sample of the total population of component supports each inspection interval. The staff's concern with respect to aging management is that if ASME Code, Section XI, Subsection IWF supports that are part of the inspection sample are reworked to as-new condition, they are no longer typical of the other supports in the population. Subsequent ASME Code, Section XI, Subsection IWF inspections of the same sample would not represent the age-related degradation of the rest of the population.

Request. Describe how the ASME Section XI, Subsection IWF Program will be effective in managing aging of similar/adjacent components that are not included in the sample population. Include in your description a justification that the program will be effective in situations when corrective actions are not required per the ASME Code, Section XI, Subsection IWF, acceptance criteria, but a support within the inspection sample is repaired to as-new condition without an expansion of the sample population size.

RAI B.1.24-3 RESPONSE

The Grand Gulf Nuclear Station (GGNS) Inservice Inspection (ISI)-IWF Program will continue to be effective in managing aging of similar/adjacent components that are not included in the sample population by expanding the sample population if component support examinations performed in accordance with ASME Section XI, Subsection IWF Table IWF-2500-1 reveal flaws or relevant conditions exceeding the acceptance standards of IWF-3400. This expansion of sample size is in accordance with ASME Section XI, Subsection IWF-2430. Additional examinations on Class 1, 2 and 3 component supports are performed in accordance with the criteria in ASME Section XI, Subsection IWF-2430(a), (b), (c) and (d). For conditions when corrective actions are not required per the ISI-IWF acceptance criteria, but the support is within the inspection sample, the repair activity is evaluated to determine whether it is a repair/replacement activity or is considered a maintenance activity. Maintenance activities are defined as work activities performed on items within the ASME Section XI boundary that are not defined as repair/replacement activities but may require the performance of a new ASME Section XI Code examination or test. The maintenance activities are performed and controlled in accordance with GGNS maintenance procedures. Typically, maintenance activities are not considered repair/replacement activities; however, they may affect an existing examination or test and necessitate a new preservice examination or test. If a maintenance activity is

performed and the activity affects an existing preservice or inservice examination record, then a new preservice examination will be performed. The repair activities are governed by GGNS repair and replacement procedures in accordance with ASME Code Section XI. Therefore GGNS ISI-IWF Program will continue to be effective in managing aging of similar/adjacent components that are not included in the initial sample population or are repaired when corrective actions are not required by the ASME Code.

RAI B.1.24-4

Background. The LRA states that the Inservice Inspection – IWF Program, with enhancements, is consistent with GALL Report AMP XI.S3. The GALL Report AMP XI.S3 "operating experience" program element recommends that applicants review site-specific operating experience to ensure the IWF sampling inspections will be effective in managing aging effects for in-scope component supports and bolting. Staff review of condition reports and conversations with the applicant have indicated that there may be age-related degradation of underwater bolting of component supports in the Standby Service Water (SSW) basins. During the staff's onsite review, the applicant stated that the degraded bolting was not found during IWF inspections and thus is not subject to IWF requirements for expansion of scope per ASME Section XI, Subsection IWF-2430. In all cases, the conditions were entered into the corrective action process and scheduled for repair or determined acceptable for continued service.

Issue. The staff is concerned that although the degraded bolts were not found during IWF inspections, it is possible that bolts that are within the scope of the IWF program may have been identified as degraded during these inspections. In addition, it is not clear to the staff if there has been any effort to inspect bolts in the SSW basin that are in the IWF inspection sample population and may be subject to the same condition.

Request.

a. For all of the degraded bolts that have been found during underwater inspections of the SSW basin, provide information regarding an evaluation to determine if any of the identified bolts are part of the IWF sample.

b. If there are no IWF bolts in the SSW basin, provide justification for not including bolts subject to this environment in the scope of the IWF program.

c. If IWF bolts are located in the SSW basin, provide information to assess if the scope of the IWF AMP should be expanded to component supports in the SSW basins and any plans to conduct additional examinations of component supports.

d. Clarify if the latest ISI IWF inspection conducted in July 2011 included any bolts in the SSW basins and the results of the inspection of those bolts.

RAI B.1.24-4 RESPONSE

a. There are number of ASME Section XI Subsection-IWF underwater component supports located in the standby service water (SSW) basin. Degraded supports and associated bolted connections were identified during the underwater inspections of the SSW basin during inspections in 2003 and 2011. ASME Section XI Subsection IWF calls for inspection of a minimum of six underwater component supports in the SSW basin once every interval. The sample population for the Inservice Inspection (ISI)-IWF inspection included the identified deficient underwater component supports. This inspection is performed in accordance with ASME Section XI Subsection IWF-2500-1.

b. The ASME Section XI Subsection IWF boundary includes the component bolting on component supports in the SSW basin.

c. The scope of the ASME Section XI Subsection IWF Program as described in LRA section B.1.24 does not need to be expanded to include supports located in the SSW basin. The component supports in the SSW basin are included in the component supports addressed in LRA Table 3.5.2-4 which credits the ASME Section XI Subsection IWF Program for managing the effects of aging.

d. During the July 2011 inspection of the SSW basin, a hanger (support) was found degraded including part of the supporting bolted connection. In accordance with ASME Section XI Subsection IWF-3112.3, GGNS performed an evaluation to "accept-as-is" the degraded condition of the brace on the support and to remove the area of corrosion on the flange of the brace by cleaning and re-coating the degraded area in accordance with GGNS site procedures. The degraded fastener was replaced in accordance with the design drawing. The ASME Section XI Subsection IWF Program includes provisions to re-inspect the degraded support during the next inspection period in accordance with ASME Section XI IWF-2420 and 3122.2. Examinations performed on the remaining population of supports located in the basin, including their bolted connections, found no degraded bolting that failed to meet acceptance criteria.

RAI B.1.24-5

Background. The LRA states that the Inservice Inspection – IWF Program, with enhancements, is consistent with GALL Report AMP XI.S3. GALL Report, AMP XI.S1, "ASME Section, Subsection IWF," Element 2, "preventive actions" states:

> The program is also augmented to require that the selection of bolting material installation torque or tension and the use of lubricants and sealants are in accordance with the guidelines of EPRI NP-5769, EPRI TR-104213, and the additional recommendations of NUREG-1339 to prevent or mitigate degradation and failure of structural bolting. If the structural bolting consists of ASTM A325, ASTM F1852, and/or ASTM A490 bolts, the preventive actions for storage, lubricants, and stress corrosion cracking potential discussed in Section 2 of RCSC (Research Council for Structural Connections) publication "Specification for Structural Joints Using ASTM A325 or A490 Bolts," need to be considered.

The LRA Section B.1.24 states:

> "Structural bolting is torqued in accordance with the site maintenance procedures that provide technical guidance for calculating the torque value requirements for a specified bolting material and for environment or temperature that the bolting material would be subjected to during plant operating conditions. The lubricants that are recommended in the maintenance procedure include the use of molybdenum disulfide, which is considered an outlier as described in the element above. Since the use of this lubricant is permitted by plant procedure, it is assumed that all high strength structural bolting material, i.e. ASTM A325 and A490, have used this lubricant in the torquing process during construction and maintenance activities for the life of the plant so far. GGNS procedures will be enhanced to prohibit use of this lubricant. This enhancement will be addressed in the Bolting Integrity Program."

Issue. The applicant's Inservice Inspection – IWF Program does not address how and when the high strength bolts that were previously torqued using molybdenum disulfide lubricant will be inspected for degradation.

Request. Describe the plan, including sample size and frequency, for inspecting high strength bolts that were previously torqued using molybdenum disulfide lubricant. The description should also describe the schedule for inspection which enables the establishment of a trend for aging management of these high strength bolts during the period of extended operation.

RAI B.1.24-5 RESPONSE

NUREG-1801 states that ASTM A-325, F-1852, and ASTM A-490 bolts used in civil structural applications have not shown to be prone to stress corrosion cracking (SCC). Cracking due to SCC is an applicable aging effect on high-strength bolting greater than one inch and having a yield strength greater than 150 kips per square inch (ksi) (that is, maraging steel and low-alloy quenched and tempered (LAQT) bolts) exposed to sustained high tensile stress in a corrosive environment. High-strength bolting is not exposed to a corrosive environment at Grand Gulf Nuclear Station (GGNS). Industry operating experience has shown that failures of high-strength bolts have been reported for two classes of bolting materials, high-nickel maraging steels and LAQT steels. Both high-nickel maraging steels and LAQT steels are commonly used for nuclear steam supply system (NSSS) component support bolting. The Inservice Inspection (ISI)-IWF Program plan already addresses the potential for SCC for high-strength bolts for these components by including sample size and frequency, for bolts that may have been previously torqued using MoS_2. However, GGNS will augment the ISI-IWF program, as stated in the LRA B.1.24 enhancement, to include volumetric examination comparable to ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 of bolting in addition to the VT-3 examination. As described in response to RAI B.1.24-1, GGNS will enhance the ISI-IWF program to identify the component supports that contain high-strength bolting (actual yield strength 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.

Attachment 2 to

GNRO-2012/00055

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.

#	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-2012/00042	B.1.20/ RAI B.1.20-2

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
12	Enhance the Fire Water Program to include inspection of hose reels for degradation. Acceptance criteria will be enhanced to verify no unacceptable degradation. Enhance the Fire Water Program to include one of the following options. (1) Wall thickness evaluations of fire protection piping using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material will be performed prior to the period of extended operation and at periodic intervals thereafter. Results of the initial evaluations will be used to determine the appropriate inspection interval to ensure aging effects are identified prior to loss of intended function. <u>OR</u> (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/ RAI B.1.24-1

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

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

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

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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
28	Enhance the Regulatory Guide (RG) 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program to clarify that detection of aging effects will monitor accessible structures on a frequency not to exceed 5 years consistent with the frequency for implementing the requirements of RG 1.127. Enhance the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program to perform periodic sampling, testing, and analysis of ground water chemistry for pH, chlorides, and sulfates on a frequency of at least every 5 years. Enhance the RG 1.127, Inspection of Water-Control Structures Associated With Nuclear Power Plant Program acceptance criteria to include quantitative acceptance criteria for evaluation and acceptance based on the guidance provided in ACI 349.3R.	Prior to November 1, 2024	GNRO-2011/00093	B.1.39
29	Implement the Selective Leaching Program as described in LRA Section B.1.40.	Prior to November 1, 2024	GNRO-2011/00093	B.1.40
30	Enhance the Structures Monitoring Program to clarify that the scope includes the following: a) In-scope structures and structural components. • Containment Building (GGN 2) • Control House – Switchyard • Culvert No. 1 and drainage channel • Manholes and Ductbanks • Radioactive Waste Building Pipe Tunnel 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			

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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
30 (cont.)	Enhance the Structures Monitoring Program to clarify that detection of aging effects will: a) include augmented inspections of vibration isolators by feel or touch to detect hardening if the vibration isolation function is suspect. b) Require inspections every 5 years for structures and structural components within the scope of license renewal unless technical justification is provided to extend the inspection to a period not to exceed 10 years. 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-2011/00093 GNRO-2012-00054 GNRO-2012-00054 GNRO-2011/00093	

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

#	COMMITMENT	IMPLEMENTATION SCHEDULE	SOURCE	RELATED LRA SECTION / AUDIT ITEM
31 (cont.)	Enhance the Water Chemistry Control – Closed Treated Water Program to conduct inspections whenever a boundary is opened for the following systems. • Drywell chilled water (DCW – system P72) • Plant chilled water (PCW – system P71) • Diesel generator cooling water subsystem for Division I and II standby diesel generators • Diesel engine jacket water for engine-driven fire water pump • Diesel generator cooling water subsystem for Division III (HPCS) diesel generator • Turbine building cooling water (TBCW– system P43) • Component cooling water (CCW – system P42) These inspections will be conducted in accordance with applicable ASME Code requirements, industry standards, and other plant-specific inspection and personnel qualification procedures that are capable of detecting corrosion or cracking.		GNRO-2011/00093	

#	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.		GNRO-2011/00093	
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