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GNRO-2012/00036

May 9, 2012

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

SUBJECT: Response to Request for Additional Information (RAI) dated April 12, 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 April 12, 2012 (TAC No. ME7493, GNRI-2012/00080)

Dear Sir or Madam:

Entergy Operations, Inc is providing, in Attachment 1, the response to the referenced request for additional information (RAI). Attachment 2 includes the changes to the license renewal application identified in Attachment 1.

This letter does not contain any 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 9th day of May, 2012.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Perito".

MP/jas

Attachment(s): (see next page)

Attachment(s):

1. Response to Request for Additional Information (RAI)
2. License Renewal Application Changes

cc: with Attachments

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**Attachment 1 to
GNRO-2012/00036
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.1.26-1

Background. The program description of GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," states that the program includes internal inspections of metallic ducting. The program description also states that the program includes components exposed to air-indoor uncontrolled, air outdoor, condensation and water systems other than fire water, open-cycle cooling water, and closed treated water system.

The "detection of aging effects" program element of GALL Report AMP XI.M38 states that the program is opportunistic, applied when surfaces become accessible during the performance of periodic surveillances or during maintenance activities or scheduled outages. The "detection of aging effects" program element also states that a sample size for manipulation of flexible polymeric components be at least 10 percent of the available surface area.

During the audit of the Internal Surfaces in Miscellaneous Piping and Ducting Components Program, the staff was not able to determine if this program is consistent with the aspects of GALL Report AMP XI.M38 discussed above.

Issue. The LRA and the onsite documentation did not have sufficient detail for the staff to determine if the applicant's Internal Surfaces in Miscellaneous Piping and Ducting Components Program is consistent with GALL Report AMP XI.M38.

Request. Justify why the Internal Surfaces in Miscellaneous Piping and Ducting Components Program and Updated Final Safety Analysis Report (UFSAR) supplement do not include the following:

- Information on metallic ducting, if applicable
- The environments managed within the program
- Information on if inspections are opportunistic and, if so, when surfaces are anticipated to become accessible for inspection
- The sample size for manipulation of flexible polymers

Alternatively, revise LRA Sections A.1.26 and B.1.26 to include the information.

RAI B.1.26-1 Response

As stated in LRA Section B.1.26, this new program is consistent with the Generic Aging Lessons Learned (GALL) Report Aging Management Program (AMP) XI.M38, without exception, and therefore the timing of inspections, procedures utilized, and selection of manipulation sample sizes provided by the GGNS program are as indicated in the GALL Report AMP XI.M38. The systems containing the components crediting the program and the materials and environments of the affected components are specified in the aging management review results presented in LRA Section 3. As stated in LRA B.1.26, surfaces are made accessible for inspection during periodic surveillances or maintenance activities.

LRA Sections A.1.26 and B.1.26, Internal Surfaces in Miscellaneous Piping and Ducting Components Program, are revised as shown in Attachment 2 to specify that the inspections are opportunistic and that the sample size for manipulation of flexible polymeric components is at least 10 percent of the available surface area.

RAI B.1.26-2

Background. LRA Table 2.3.3-16 states that heat exchanger tubes have both a pressure boundary function and a heat transfer function. LRA Table 3.3.2-16 also includes an item for copper alloy greater than 15-percent zinc (inhibited) heat exchanger tubes exposed to air-indoor (external) with a pressure boundary intended function; however, there is not a parallel item for the intended function of heat transfer.

Issue. It is not clear to the staff why LRA Table 3.3.2-16 does not include an AMR item for copper alloy greater than 15-percent zinc (inhibited) heat exchanger tubes exposed to air-indoor (external) for the intended function of heat transfer, given that LRA Table 2.3.3-16 states that heat exchanger tubes have this intended function.

Request. Justify why LRA Table 3.3.2-16 does not include an AMR item for copper alloy greater than 15-percent zinc (inhibited) heat exchanger tubes exposed to air-indoor (external) for the intended function of heat transfer or revise the LRA to include this item.

RAI B.1.26-2 Response

The heat exchanger tubes that are copper alloy greater than 15-percent zinc (inhibited) exposed to air-indoor (external) are covered with aluminum fins. The Internal Surfaces in Miscellaneous Piping and Ducting Components Program manages fouling associated with the aluminum fins which cover the tubes. This component part of the heat exchanger is listed in LRA Table 3.3.2-16 as "Heat exchanger (fins)."

RAI B.1.26-3

Background. GALL Report AMP XI.M38 addresses the aging effects of hardening, loss of strength, cracking and loss of material for polymeric and elastomeric components. The GALL AMP also states that the aging effect of loss of material is part of this program for metallic components.

LRA Sections B.1.26 and A.1.26 state that the program manages hardening and loss of strength for elastomers and polymers. LRA AMR items assigned to the Internal Surfaces in Miscellaneous Piping and Ducting Components Program address the aging effects of change in material properties and cracking for elastomers, and addresses the aging effects of cracking, fouling, and loss of material for the remaining components and structures within the program. LRA AMR items do not address the aging effects of hardening and loss of strength for elastomers.

Issue. The aging effects included in LRA Sections B.1.26 and A.1.26 are not consistent with those in GALL Report AMP XI.M38 and do not reflect the aging effects addressed in the LRA AMR items associated with the applicant's Internal Surfaces in Miscellaneous Piping and Ducting Components Program.

Request. Revise LRA Sections B.1.26 and A.1.26 to state all aging effects that are being addressed within the program and provide technical justification for inconsistencies with the aging effects managed by GALL Report AMP XI.M38.

RAI B.1.26-3 Response

Hardening and loss of strength, as used in NUREG-1801 Section XI.M38, are both examples of a change in material properties. The LRA aging management review (AMR) results specify change in material properties for items where hardening and loss of strength are issues for elastomers. Cracking is also listed as an aging effect since cracking can be an effect of hardening and loss of strength for elastomers.

LRA Sections A.1.26 and B.1.26 are revised as shown in Attachment 2 to specify the aging effects that the Internal Surfaces in Miscellaneous Piping and Ducting Components Program manages. Technical justification for the apparent inconsistencies is provided in the revision to Table 3.2.1 as shown in Attachment 2.

RAI B.1.26-4

Background. SRP-LR Table 3.2-1, item 43 states that elastomers exposed to air-indoor, uncontrolled (internal) will be managed for hardening and loss of strength with GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components."

LRA Table 3.2.1, item 3.2.1-43 states that elastomers exposed to air-indoor, uncontrolled (internal) will be managed for hardening and loss of strength with the Internal Surfaces in Miscellaneous Piping and Ducting Components program. LRA Table 3.2.2-6 states that duct flexible connections, elastomers exposed to air-indoor (internal) will be managed for cracking and change in material properties, referencing LRA Table 3.2.1, item 3.2.1-43.

Issue. The aging effects being managed for the elastomeric duct flexible connections in LRA Table 3.2.2-6 are not consistent with LRA Table 3.2.1, item 3.2.1-43 or SRP-LR Table 3.2-1, item 43.

Request. Justify why the LRA Table 3.2.2-6 item for aging effects for elastomeric duct connections is not aligned with the referenced LRA Table 3.2.1, item 3.2.1-43 and SRP-LR Table 3.2-1, item 43. Alternatively, revise the applicable LRA sections to align these items.

RAI B.1.26-4 Response

In LRA Table 3.2.1, the discussion column of LRA Item Number 3.2.1-43 is revised as shown in Attachment 2 by removing "Degradation" and adding "cracking and change in material properties." Hardening and loss of strength, as used in standard review plan for license renewal (SRP-LR) Table 3.2-1, item 43, are both examples of a change in material properties. The LRA AMR results specify change in material properties for items where hardening and loss of strength are issues for elastomers. Cracking is also listed as an aging effect since cracking can be an effect of hardening and loss of strength for elastomers. Therefore, cracking and change in material properties are considered equivalent to hardening and loss of strength.

RAI B.1.26-5

Background. SRP-LR Section A.1.2.3.3, "Parameters Monitored or Inspected," states that this program element should identify the aging effects the program manages and provide a link between the parameters monitored and how the monitoring will ensure adequate aging management. SRP LR Section A.1.2.3.3 also states that parameters monitored or inspected should be capable of detecting the presence and extent of aging effects.

The "parameters monitored/inspected" program element of GALL Report AMP XI.M38 states that the inspection parameters associated with metallic components are surface discontinuities, corrosion and material parameters wastage (loss of material), leakage from or onto internal surfaces (loss of material), and worn, flaking, or oxide-coated surfaces (loss of material). This program element also states that inspection parameters for polymers are surface cracking, crazing, scuffing, and dimensional change (e.g., "ballooning" and "necking"), discoloration, exposure of internal reinforcement for reinforced elastomers, and hardening as evidenced by a loss of suppleness during manipulation.

LRA Section B.1.26 does not identify any parameters monitored or inspected.

Issue. The "parameters monitored/inspected" program element of Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not have sufficient detail on what inspection parameters will be in this program for metallic components and for polymers; therefore, the staff cannot determine if the program is consistent with GALL Report AMP XI.M38

Request. Justify why the "parameters monitored/inspected" program element of Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not include the specific parameters monitored and their related aging effects for this program's metallic and polymeric components, or revise the LRA to include this information.

RAI B.1.26-5 Response

As stated in LRA Section B.1.26, this new program is consistent with NUREG-1801 AMP XI.M38 without exception. The GGNS examinations monitor metallic and elastomeric component surface condition for visible evidence of loss of material, cracking, and change in material properties. As stated in LRA Section B.1.26, the program also includes physical manipulation or pressurization to detect hardening or loss of strength for elastomers.

LRA Section B.1.26 Program Description first paragraph is revised as shown in Attachment 2 to specify that the program monitors surface condition during visual inspections.

RAI B.1.26-6

Background. SRP-LR Section A.1.2.3.6, "Acceptance Criteria," states that this program element should describe the qualitative or quantitative acceptance criteria and those criteria should ensure that the structure and component intended functions are maintained consistent with all current licensing basis (CLB) design conditions during the period of extended operation.

The "acceptance criteria" program element of GALL Report AMP XI.M38 states the acceptance criteria for the following:

- stainless steel: clean surfaces, shiny with no discoloration,
- metals: any abnormal surface,
- flexible polymers: a uniform surface texture and color with no cracks, and no unanticipated dimensional change, no abnormal surface with the material in an "as new" condition with respect to hardness, flexibility, physical dimensions, and color
- rigid polymers: no erosion, cracking, crazing, checking, and chalks.

LRA Section B.1.26 does not identify the acceptance criteria for the components within this program.

Issue. The "acceptance criteria" program element of Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not have sufficient detail on the acceptance criteria that will be in this program for stainless steel, metals, flexible polymers, and rigid polymers, and thus the staff cannot determine if the program is consistent with GALL Report AMP XI.M38.

Request. Justify why the "acceptance criteria" program element of the Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not include specific acceptance criteria for the program's components, or revise the LRA to include this information.

RAI B.1.26-6 Response

As stated in LRA Section B.1.26, Internal Surfaces in Miscellaneous Piping and Ducting Components Program, this new program is consistent with NUREG-1801 AMP XI.M38 without exception. As such, the acceptance criteria of NUREG-1801, Section XI.M38 are incorporated by reference into the GGNS program described in LRA Section B.1.26.

The program description in LRA Section B.1.26 is revised as shown in Attachment 2 to explicitly state specific acceptance criteria for the following.

- Stainless steel: clean surfaces, shiny, no abnormal surface condition
- Metals: no abnormal surface condition
- Flexible polymers: a uniform surface texture and color with no cracks, no unanticipated dimensional change, and no abnormal surface conditions
- Rigid polymers: no surface changes affecting performance such as erosion and cracking

Conditions that do not meet the acceptance criteria are entered into the correction action program for evaluation. Any indications of relevant degradation will be evaluated using design standards, procedural requirements, current licensing basis, and industry codes or standards.

RAI B.1.26-7

Background. SRP-LR 3.1.2.5 states that the summary description of the programs and activities for managing the effects of aging for the period of extended operation in the final safety analysis report (FSAR) supplement should be sufficiently comprehensive such that later changes can be controlled by 10 CFR 50.59, and the description should contain information associated with the bases for determining that aging effects will be managed during the period of extended operation. In addition, 10 CFR 54.21(d) states that the FSAR supplement must contain a summary description of the program and the activities for managing the effects of aging.

SRP-LR Table 3.0-1, GALL Chapter XI.M38 states that this program applies to any water system other than open-cycle cooling water, treated water, and fire water. The SRP-LR also states that this program is applied to ensure that these environments are not causing degradation where a component's intended function could be lost, and where visual inspections of internal surfaces may not be possible a plant-specific program would be applied.

LRA Section A.1.26 states that the program manages the effects of aging using visual inspections of the internal surfaces of piping and components during periodic surveillances or maintenance activities when the surfaces are accessible for visual inspection. LRA Section A.1.26 also states that physical manipulation or pressurization to detect hardening or loss of strength for elastomers and polymers are used.

Issue. The UFSAR supplement for the Internal Surfaces in Miscellaneous Piping and Ducting Components Program does not include key elements of the program description, including which water systems are included in the scope of the program, whether the programs purpose intends to retain a component's intended function, and does not include a provision for a plant-specific program when visual inspections of internal surfaces are not possible.

Request. Justify why LRA Section A.1.26 does not include key elements of the Internal Surfaces in Miscellaneous Piping and Ducting Components Program or revise the LRA to include this information.

RAI B.1.26-7 Response

As stated in LRA Section B.1.26, this new program is consistent with the program described in NUREG-1801, Section XI.M38, without exception for all program elements. The purpose of the program is to maintain each component's intended function.

Other than to explain that the program scope includes components not included in other aging management programs, NUREG-1801 Section XI.M38 does not limit the operating environments in which the program can be applied. Thus, a list of operating environments is not necessary in GGNS LRA A.1.26.

There are no components at GGNS in the scope of this program for which visual inspection of internal surfaces is not possible. Thus, no plant-specific program is required.

LRA section A.1.26 is revised as shown in Attachment 2 to provide clarification of key elements of the program.

RAI B.1.26-8

Background. The “detection of aging effects” program element of GALL Report AMP XI.M38 states that visual inspections should include all accessible surfaces. The GALL Report also states that if visual inspections of internal surfaces are not possible, then the applicant needs to provide a plant-specific program.

LRA Section B.1.26 does not state if all components and surfaces managed within the program are accessible.

Issue. It is not clear if all the components and surfaces within this program are accessible, or whether some may be inaccessible. GALL Report AMP XI.M38 recommends that inaccessible components would require particular techniques and strategies, defined in a plant-specific program, to manage aging for those components.

Request. Review the surfaces and components within this program and determine if any may be inaccessible for visual inspections. Consider in the review for inaccessible components all items such as elastomers, polymers, and submerged metallic piping and any other inaccessible piping. If there are inaccessible items, ensure the “detection of aging effect” program element of the Internal Surfaces in Miscellaneous Piping and Ducting Components Program is updated to describe the method and inspection techniques that will be used to age manage these components.

RAI B.1.26-8 Response

As stated in NUREG-1801 Section XI.M38, inspections conducted under this program are conducted whenever piping or ducting is opened for any reason. Section XI.M38 also states “If visual inspection of internal surfaces is not possible, then the applicant needs to provide a plant-specific program.” There are no components at GGNS in the scope of this program for which visual inspection of internal surfaces is not possible. Thus, no plant-specific program is required. As stated in LRA Section B.1.26, this new program is consistent with the program described in NUREG-1801 Section XI.M38, without exception.

**Attachment 2 to
GNRO-2012/00036
License Renewal Application Changes**

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

A.1.26 Internal Surfaces in Miscellaneous Piping and Ducting Components Program

The Internal Surfaces in Miscellaneous Piping and Ducting Components Program manages the effects of aging using opportunistic visual inspections of the internal surfaces of metallic piping, piping components, ducting, elastomeric components, and other components during periodic surveillances or maintenance activities when the surfaces are accessible for visual inspection. The program inspections ensure that environmental conditions are not causing material degradation that could result in a loss of the component's intended function. For metallic components visual inspection will be used to detect loss of material and fouling. For elastomeric components, visual inspections will be used to detect cracking and change in material properties. Physical manipulation or pressurization to detect hardening or loss of strength for elastomers and polymers is also used. Visual examinations of elastomeric components are accompanied by physical manipulation such that changes in material properties are readily observable. The sample area subject to manipulation of flexible elastomeric components is at least 10 percent of the available surface area.

This program will be implemented prior to the period of extended operation.

B.1.26 INTERNAL SURFACES IN MISCELLANEOUS PIPING AND DUCTING COMPONENTS

Program Description

The Internal Surfaces in Miscellaneous Piping and Ducting Components Program is a new program that manages the effects of aging using opportunistic visual inspections of the internal surfaces of piping and components during periodic surveillances or maintenance activities when the surfaces are accessible for visual inspection. For metallic components visual inspection will be used to detect loss of material and fouling. For elastomeric components, visual inspections will be used to detect cracking and change in material properties. The program monitors surface condition for visible evidence of loss of material in metallic components and changes in material properties for elastomeric components, including possible evidence of surface discontinuities. Physical manipulation or pressurization to detect hardening or loss of strength for elastomers and polymers is also used. Visual examinations of elastomeric components are accompanied by physical manipulation such that changes in material properties are readily observable.

Specific acceptance criteria are as follows.

- Stainless steel: clean surfaces, shiny, no abnormal surface condition
- Metals: no abnormal surface condition
- Flexible polymers: a uniform surface texture and color with no cracks, no unanticipated dimensional change, and no abnormal surface conditions
- Rigid polymers: no surface changes affecting performance such as erosion and cracking

Conditions that do not meet the acceptance criteria are entered into the correction action program for evaluation. Any indications of relevant degradation will be evaluated using design standards, procedural requirements, current licensing basis, and industry codes or standards.

This program will be implemented prior to the period of extended operation.

Item Number	Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-43	Elastomers elastomer seals and components exposed to air – indoor, uncontrolled (internal)	Hardening and loss of strength due to elastomer degradation	Chapter XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"	No	Consistent with NUREG-1801. Degradation <u>Cracking and change in material properties</u> of elastomer components internally exposed to indoor air is <u>are</u> managed by the Internal Surfaces in Miscellaneous Piping and Ducting Components Program. <u>Cracking and change in material properties are considered equivalent to hardening and loss of strength.</u>