



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

April 11, 2012

Mr. Michael Perito  
Vice President, Site  
Entergy Operations, Inc.  
P.O. Box 756  
Port Gibson, MS 39150

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
GRAND GULF NUCLEAR STATION LICENSE RENEWAL APPLICATION (TAC  
NO. ME7493)

Dear Mr. Perito:

By letter dated October 28, 2011, Entergy Operations, Inc., submitted an application pursuant to Title 10 of the *Code of Federal Regulations*, Part 54, to renew the operating license for Grand Gulf Nuclear Station, Unit 1 (GGNS) for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Jeff Seiter, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1045 or e-mail [nathaniel.ferrer@nrc.gov](mailto:nathaniel.ferrer@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "N. Ferrer", written over a horizontal line.

Nathaniel Ferrer, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50- 416

Enclosure:  
Requests for Additional  
Information

cc w/encl: Listserv

GRAND GULF NUCLEAR STATION  
LICENSE RENEWAL APPLICATION  
REQUESTS FOR ADDITIONAL INFORMATION SET 3

**RAI B.1.3-1**

Background. The “preventive actions” program element of GALL Report AMP XI.M18, “Bolting Integrity,” states that the program includes preventive actions including the use of bolting material that has an actual measured yield strength limited to less than 150 ksi. The program further states that if used, high strength closure bolting (actual yield strength  $\geq$  150 ksi) should be monitored for cracking since it may be subject to stress corrosion cracking.

LRA Section B.1.3 states that the program is consistent with GALL Report AMP XI.M18, “Bolting Integrity,” and further states, in an enhancement, that it includes inspection techniques to address high strength closure bolting. Additionally, the staff noted that high strength closure bolting is identified as a component managed by the Bolting Integrity Program in Table 3.2.1 of the license renewal application (LRA). However, during the audit, the applicant stated that there are no high strength closure bolts in use at the plant.

Issue. The staff reviewed the Bolting Integrity Program plant basis document and other supporting documents and interviewed the plant staff and was unable to determine if high strength closure bolts are in use at the plant. Statements made by the applicant appear to contradict the information presented in the LRA.

Request. Clarify whether high strength closure bolts are in use at the plant. Provide appropriate supporting documentation if they are used. Additionally, provide an explanation of specific plant processes or procedures to differentiate the high strength closure bolts from non-high strength bolts. If high strength closure bolts are not used, ensure applicable LRA sections are updated, as necessary.

**RAI B.1.3-2**

Background. GALL Report AMP XI.M18, “Bolting Integrity,” manages aging of closure bolting for pressure retaining components. The program generally includes periodic inspection of closure bolting for indication of loss of preload, cracking, and loss of material due to corrosion, rust, etc.

LRA Section B.1.3 states the Bolting Integrity Program is an existing program that manages loss of preload, cracking, and loss of material for closure bolting for pressure-retaining components using preventive and inspection activities. During the audit, the applicant stated that typical inspections conducted to detect aging effects in bolting include system walkdowns and visual indications of leakage.

The “operating experience” program element in LRA Section B.1.3 describes corrosion discovered on bolting located in the SSW basin under approximately 5 feet of water. The flange studs, nuts, and portions of the flange were observed to be covered with an iron colored deposit. When the deposit was removed from the studs and nuts on this flange, most of the protective coating was found to be deteriorated and there was noticeable metal loss from the studs. However, there were no signs of system leakage at this location nor were there any signs of previous leakage.

ENCLOSURE

Issue. It is not clear how the corrosion described in the LRA was discovered. A submerged environment creates difficulty in identifying loss of preload, cracking, and loss of material through system walkdowns and visual indications of leakage.

In addition to the bolting described in the operating experience example, there are components within the scope of license renewal in several other systems that are in wet or submerged environments. Visual inspections conducted during operator rounds and system walkdowns to detect leakage may not be feasible or effective due to these environmental conditions.

Request.

- a. Identify the inspection technique used to discover the corrosion identified in the LRA operating experience example and describe the frequency of the inspection type. Also describe any followup activities undertaken to address the corrosion and other related components which may be affected; and
- b. Explain how and on what frequency inspections are performed for submerged bolting and how those inspections would detect loss of preload, cracking, and loss of material in the bolting.

**RAI B.1.12-1**

Background. The “detection of aging effects” program element of GALL Report AMP XI.M24, “Compressed Air Monitoring,” states that the program includes periodic visual inspections of critical component internal surfaces (compressors, dryers, after-coolers, and filters) to detect signs of loss of material due to corrosion. ASME O/M-S/G-1998, Part 17 provides guidance for inspection frequency and inspection methods of these components.

LRA Section B.1.12 states that the Compressed Air Monitoring Program is consistent with GALL Report AMP XI.M24, “Compressed Air Monitoring,” and does not identify any enhancements or exceptions to the “detection of aging effects” program element. Enhancement 2 to the Compressed Air Monitoring Program identifies an enhancement to the “parameters monitored or inspected” and “monitoring and trending” program elements which states that the program will be enhanced to include periodic and opportunistic inspections of accessible internal surfaces of piping and components in certain compressed air systems.

Issue. It is not clear that the “detection of aging effects” program element of the Compressed Air Monitoring Program is consistent with GALL Report AMP XI.M24 because the enhancement does not identify the “detection of aging effects” as a program element affected. It is also not clear that the critical components (i.e., compressors, dryers, after-coolers, and filters) will be included in the periodic and opportunistic inspections of these systems, nor is it clear what specific types and frequency of inspections will be used.

Request. Clarify whether Enhancement 2 to the Compressed Air Monitoring Program applies to the “detection of aging effects” program element. In addition, clarify the types of components to be inspected and the specific inspection type and frequency which will be used.

### **RAI B.1.12-2**

Background. The “monitoring and trending” program element of GALL Report AMP XI.M24, “Compressed Air Monitoring,” states that the program includes system dew point recording and trending, air quality analysis results review and trending, and trending of visual inspection results to ascertain if adverse long-term trends exist. Additionally, the program specifies for test data to be analyzed and compared to data from previous tests to provide for the timely detection of aging effects on passive components.

LRA Section B.1.12 states that the program is consistent with GALL Report AMP XI.M24, with an enhancement to the “monitoring and trending” program element. The enhancement states that the program will be enhanced to include periodic and opportunistic inspections of accessible internal surfaces of piping and components in certain air systems.

Issue. It is not clear that the “monitoring and trending” program element of the Compressed Air Monitoring Program is consistent with GALL Report AMP XI.M24 because the enhancement does not describe any dew point recordings, air quality checks, or trending practices recommended for this program.

Request. Describe the monitoring and trending practices for the Compressed Air Monitoring Program and clarify how the enhancement applies to the “monitoring and trending” program element.

### **RAI B.1.12-3**

Background. SRP-LR Table 3.0-1 states that the Updated Final Safety Analysis Report (UFSAR) supplement for the “Compressed Air Monitoring” program should include a summary description of the program to consist of monitoring moisture content and corrosion, and performance of the entire system, including preventive monitoring and inspection of components. It should also reference the applicant’s crediting of its response to NRC Generic Letter 88-14 and standards such as ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture. LRA Section A.1.12, “Compressed Air Monitoring” program, does not include a summary description of the program and instead only includes a description of the planned enhancements.

Issue. The licensing basis for the period of extended operation may not be adequate if the applicant does not incorporate an appropriate summary description of the Compressed Air Monitoring Program in the UFSAR supplement.

Request. Provide further information showing why including a summary description of the program to consist of monitoring moisture content and corrosion, and performance of the entire system, including preventive monitoring and inspection of components and referencing the applicant’s crediting of its response to NRC Generic Letter 88-14 and standards such as ISA-S7.0.1-1996 as guidance for testing and monitoring air quality and moisture is not required, or revise LRA Section A.1.12 to include key aspects of the program that provide guidance for testing and monitoring air quality and moisture.

**RAI B.1.33-1**

Background. The LRA Section B.1.33 states that the One-Time Inspection Program will be consistent with the GALL Report AMP XI.M32. The GALL Report AMP XI.M32 “detection of aging effects” program element identifies the inspection method associated with each aging effect, aging mechanism, and parameter monitored. LRA Section B.1.33 does not state for the aging effects of loss of material, cracking and fouling what inspection methods are associated with each item.

Issue. It is not clear what inspection methods the One-Time Inspection Program will use for each aging effect or if the program will be consistent with GALL Report AMP XI.M32.

Request. Justify why the inspection methods that will be used in conjunction with each aging effect are not included in the One-Time Inspection Program summary and why the program is consistent with GALL Report AMP XI.M32, or provide the necessary revisions to LRA Section B.1.33 to include this information.

**RAI B.1.33-2**

Background. The SRP-LR Table 3.0-1 includes a recommended GALL Report AMP XI.M32 program description to be provided in the UFSAR supplement describing the scope of structures and components for the One-Time Inspection Program. The SRP-LR also states that this program cannot be used for structures or components with known age-related degradation or when the environment in the period of extended operation is not expected to be equivalent to that in the prior 40 years.

LRA Section A.1.33 does not state the conditions when structures and components are to be excluded from the scope of the One-Time Inspection Program.

Issue. LRA Section A.1.33 omits the restrictions on when this program may be applied to structures and components. The licensing basis for the period of extended operation may not be adequate if the applicant does not incorporate an appropriate summary description of the One-Time Inspection Program in the UFSAR supplement.

Request. Justify why the UFSAR supplement does not include a description of the conditions for when the One-Time Inspection program cannot be used, or revise the UFSAR supplement to include this information.

**RAI B.1.35-1**

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 (e.g., wall thickness, detection and sizing of cracks).

LRA Section B.1.35 states that the Periodic Surveillance and Preventive Maintenance Program monitors and inspects parameters linked to the degradation of the particular structure or component intended functions.

The “parameters monitored or inspected” program element of GALL Report AMP XI.M38, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components,” (for which the Periodic Surveillance and Preventive Maintenance program is used as a substitute) recommends that visual inspection parameters for loss of material of metallic components include corrosion and material parameter wastage, leakage from or onto internal surfaces, and worn, flaking, or oxide-coated surfaces. GALL Report AMP XI.M38 also recommends that inspection parameters in polymers include surface cracking, crazing, scuffing, dimensional change, discoloration, and hardening as evidence by a loss of suppleness (when appropriate).

Issue. The “parameters monitored/inspected” program element of the Periodic Surveillance and Preventive Maintenance Program does not have the necessary detail to link the parameters monitored to the aging effects.

Request. Justify why the “parameters monitored/inspected” program element of the Periodic Surveillance and Preventive Maintenance Program does not include the specific parameters monitored (e.g., wastage, surface condition, elastomer hardening and cracking) and their related aging effects for each of the structure and component groupings managed by the program, or revise LRA Section B.1.35 to include the information.

#### **RAI B.1.35-2**

Background. SRP-LR Section A.1.2.3.4, “Detection of Aging Effects,” states that inspection samples should be biased towards locations most susceptible to the specific aging effect of concern. For example, the “detection of aging effects” program element of GALL Report AMP XI.M21A, “Closed Treated Water System,” states that a representative sample of piping is selected based on likelihood of corrosion or cracking. Similarly, the “detection of aging effects” program element of GALL Report AMP XI.M32, “One-Time Inspection,” states that inspections for loss of material, cracking, and reduction of heat transfer should focus on bounding or lead components most susceptible to aging (e.g., locations isolated from the flow stream and are susceptible to the gradual accumulation of agents that promote aging).

LRA Section B.1.35 states that a representative sample of components with each material, environment, and aging effect combination will be selected to detect degradation.

Issue. The Periodic Surveillance and Preventive Maintenance Program description does not provide information on if inspection samples should be biased towards locations most susceptible to aging.

Request. Justify why the “detection of aging effects” program element of the Periodic Surveillance and Preventive Maintenance Program does not include the selection of locations most susceptible to aging, where practical, as an additional inspection sampling criterion, or revise LRA Section B.1.35 to include the information.

### **RAI B.1.35-3**

Background. SRP-LR Section A.1.2.3.4, "Detection of Aging Effects," states that this program element should describe how program data are collected and that the discussion should provide justification, including codes and standards, that the method or technique is adequate to detect the aging effects. For example, GALL Report AMP XI.M32, "One-Time Inspection," describes specific visual inspection methods (e.g., VT-1, VT-3, EVT-1), performed by qualified personnel, to be used for each of the aging effects monitored, following procedures consistent with ASME code.

LRA Section B.1.35 states that visual or other NDE techniques will be used to inspect components for loss of material.

Issue. The "detection of aging effects" program element of the Periodic Surveillance and Preventive Maintenance Program does not have the necessary detail regarding how data are collected, consistent with codes and standards.

Request. Justify why the "detection of aging effects" program element of the Periodic Surveillance and Preventive Maintenance Program does not include specific inspection techniques (e.g. VT-1, VT3, ultrasonic thickness, manual flexing), consistent with industry codes and standards, that will be used to detect the aging effects, or the qualification requirements of personnel that will be performing the inspections. Alternatively, revise LRA Section B.1.35 to include this information.

### **RAI B.1.35-4**

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.

LRA Section B.1.35 states that acceptance criteria are defined in specific inspection procedures and that those procedures verify the absence of aging effects or compare applicable parameters to limits established by plant design basis. The staff noted that procedures associated with the program have not yet been created.

The applicant uses the Periodic Surveillance and Preventive Maintenance program is used as a substitute for GALL Report AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components," and GALL Report AMP XI.M20, "Open-Cycle Cooling Water System." The "parameters monitored or inspected" program element of GALL Report AMP XI.M38 recommends that visual acceptance criteria for metallic surfaces include any indication of relevant degradation, such as discoloration of otherwise clean, shining stainless steel surfaces. GALL Report AMP XI.M38 also recommends that acceptance criteria for flexible polymers include verification of like-new condition (e.g., lack of cracking and the hardness, flexibility, physical dimensions, and color of the material are unchanged). GALL Report AMP XI.M20 recommends that acceptance criteria for loss of material include minimum required wall thickness.

Issue. The “acceptance criteria” program element of the Periodic Surveillance and Preventive Maintenance Program does not adequately define the acceptance criteria. LRA Section B.1.35 states that acceptance criteria are defined in inspection procedures; however, those procedures have not yet been created.

Request. Justify why the “acceptance criteria” program element of the Periodic Surveillance and Preventive Maintenance Program do not include specific acceptance criteria (e.g., any indication of relevant degradation, pipe wall remaining above minimum design wall thickness, absence of cracking) for each of the structure and component groupings managed by the program, or revise LRA Section B.1.35 to include this information.

#### **RAI B.1.35-5**

Background. SRP-LR Section 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 UFSAR 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 UFSAR supplement must contain a summary description of the program and the activities for managing the effects of aging.

LRA Section B.1.35 states that inspections will occur at least once every five years.

Issue. The UFSAR supplement for the Periodic Surveillance and Preventive Maintenance Program does not include the frequency of inspections. This information is associated with the bases for determining that the aging will be effectively managed during the period of extended operation. The licensing basis for the period of extended operation may not be adequate without this information in the UFSAR supplement.

Request. Justify why the UFSAR supplement for the Periodic Surveillance and Preventive Maintenance Program does not include the frequency of inspections to be conducted during the period of extended operation, or revise LRA Section A.1.35 to include this information.

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
GRAND GULF NUCLEAR STATION, LICENSE RENEWAL APPLICATION

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Mr. Michael Perito  
Vice President, Site  
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P.O. Box 756  
Port Gibson, MS 39150

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
GRAND GULF NUCLEAR STATION LICENSE RENEWAL APPLICATION (TAC  
NO. ME7493)

Dear Mr. Perito:

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Sincerely,

**/RA/**

Nathaniel Ferrer, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50- 416

Enclosure:  
Requests for Additional  
Information

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