



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

July 17, 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 by telephone at 301-415-1045 or by e-mail at [Nathaniel.Ferrer@nrc.gov](mailto:Nathaniel.Ferrer@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "N. Ferrer", with a long horizontal flourish extending to the right.

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 27

**RAI B.1.5-4a**

Background. The response to request for additional information (RAI) B.1.5-4 states that there are two in-scope buried stainless steel pipe lines that are routed in close proximity to each other neither of which is coated, there is no soil testing data to demonstrate that the soil does not contain deleterious compounds that could degrade the stainless steel material, and one visual inspection will be conducted in the 10-year period prior to the period of extended operation to determine if additional inspections are required.

Footnote 3 of Aging Management Program (AMP) XI.M41, related to stainless steel piping, states, "[c]oatings are provided based on environmental conditions (e.g., stainless steel in chloride containing environments). If coatings are not provided, a justification is provided in the LRA."

Issue. The staff has insufficient information to evaluate the proposal to conduct one inspection of the buried uncoated in-scope stainless piping in the 10-year period prior to the period of extended operation in order to determine if additional inspections are required. Given that the preventive action recommendation of Generic Aging Lessons Learned (GALL) Report AMP XI.M41 is not met (i.e., no coating, no soil analyses), the staff does not agree with conducting the minimum number of inspections recommended in GALL Report AMP XI.M41. The staff believes that additional actions are needed such as: (a) additional inspections to ensure that a representative sample of the piping is conducted, (b) a demonstration that one inspection is sufficiently representative of the total length of all in-scope buried uncoated stainless steel piping, or (c) soil testing with possible augmented inspections prior to the period of extended operation.

Request. For the Buried Piping and Tanks Inspection Program, include a method to determine the condition of the buried uncoated in-scope stainless steel piping prior to the period of extended operation, or include soil testing with possible augmented inspections prior to and during the period of extended operation. Otherwise, propose an alternative approach that will ensure that the piping will meet its intended function(s) throughout the period of extended operation.

Revise the Updated Final Safety Analysis Report (UFSAR) Supplement, as necessary, to reflect the plant-specific approach to buried uncoated in-scope stainless piping.

**RAI B.1.5-6a**

Background. The response to RAI B.1.5-6, in regard to the 100 mV of cathodic polarization criterion, states:

Adequacy of polarization can be indicated by both the 100mV polarization criterion as well as the 850mV instant "off" polarized criterion. Ohm's law dictates that polarization at the cathode of a CP system circuit must occur, although possibly at different levels, simultaneously everywhere in the circuit.

ENCLOSURE

This means that the potentials measured at the ground surface for both the 100mV and the 850mV criteria are representative of what is taking place at all locations on the bare surfaces of the buried piping and structures. Thus, any singular 100mV polarization indication ensures that the most active buried piping material has achieved protection, as would be the case for a singular 850mV polarized half-cell reading.

NACE SP0169-2007 Section 6.2.2.1.3 states, “[a] minimum of 100 mV of cathodic polarization between the structure surface and a stable reference electrode contacting the electrolyte. The formation or decay of polarization can be measured to satisfy this criterion.

Section 5.3.2.2 of ISO 15589-1, “Petroleum and natural gas industries – Cathodic protection of pipeline transportation systems – Part 1: On-land pipelines,” in regard to the 100 mV polarization criteria states, “[f]urthermore, the criteria shall not be used in case of pipelines connected to or consisting of mixed metal components.”

Issue. The staff believes that a 100 mV cathodic polarization will reduce corrosion compared to the no-polarization level for the steel components. However, the effectiveness of the 100 mV criterion could be compromised when mixed metals (i.e., two different metallic components electrically connected) come into contact in a common environment (i.e., soil) resulting in formation of a galvanic cell in which the cell potential might exceed 100 mV, thus, negating the effect of 100 mV cathodic polarization for the most anodic component.

The response was insufficient in demonstrating that the most active (e.g., most anodic) buried in-scope piping material has achieved a 100 mV polarization in that it did not address the mixed metal environment of the buried piping. For example, the following was not provided:

- evidence or proposed future evidence (e.g., buried test coupons) to ensure that 100 mV criterion was providing sufficient protection for the mixed metal environment as defined previously,
- evidence that even while utilizing a 100 mV criterion, local soil-to-pipe potential were close to -850 mV, or
- the basis for using the 100 mV criterion.

Request. In light of the in-scope buried piping being within a mixed metal environment:

- a. State why a 100 mV polarization is adequate to protect steel and stainless steel buried components when there is a nearby bare wire copper grid.
- b. If a 100 mV polarization criterion cannot be demonstrated to provide adequate protection to the piping, propose and provide the basis for an alternative criterion.
- c. Describe the testing methodology which verifies adequate level of polarization for the steel and stainless steel buried piping.

#### **RAI B.1.20-2a**

Background. In RAI B.1.20-2 the staff requested that the applicant provide an aging management review (AMR) item for the fire suppression system outdoor CO<sub>2</sub> tank (License

Renewal Drawing 35E, location H3) and explain how the tank will be managed for aging. The response to RAI B.1.20-2 states that the outdoor CO<sub>2</sub> tank is included in the AMR item for carbon steel tank exposed to air indoor uncontrolled in LRA Table 3.3.2-13. The RAI response also states that the environment is considered air indoor uncontrolled because the tank is inside an enclosure and is insulated. The response further states that the area around the tank inside the enclosure that is accessible will be monitored for moisture or rust stains emanating from the insulation using the Fire Protection Program in order to manage loss of material. The applicant revised the Fire Protection Program to include an enhancement to visually inspect the external surfaces of the CO<sub>2</sub> tank for signs of corrosion at least once every fuel cycle.

The GALL Report defines "air-indoor uncontrolled" as indoor air associated with systems whose temperatures are above the dew point such that condensation can occur, but only rarely. The GALL Report defines "air - outdoor" as outdoor air associated with components exposed to atmospheric air, ambient temperatures, humidity, and weather, including precipitation and wind.

Issue. The CO<sub>2</sub> tank is located outdoors surrounded by insulation and a metal housing. While the metal housing will protect the CO<sub>2</sub> tank from precipitation and wind, the metal housing will not protect the CO<sub>2</sub> tank from humidity or the temperature extremes experienced outdoors. It is unclear to the staff how the environment inside the metal housing can be evaluated as uncontrolled indoor air because the environment inside the enclosure is not consistent with the GALL Report definition of "air-indoor uncontrolled."

During the staff's walk down of the outdoor CO<sub>2</sub> tank, there did not appear to be any accessible portions of the tank or its foundation since the metal housing surrounding the tank does not have any access ports and covers the base of the tank. It is unclear to the staff what portion of the tank will be made accessible for visual inspection or how an inspection for moisture or rust stains emanating from the tank is sufficient to detect loss of material from the tank prior to loss of intended function given that rust stains may not appear until the pressure integrity of the tank is challenged.

Request.

- a. State whether there are any other components identified in the license renewal application (LRA) which are located outdoors in a similar environment to the CO<sub>2</sub> tank (i.e., surrounded by an enclosure) which have been evaluated as being exposed to an indoor air environment instead of an environment that includes exposure to moisture, such as outdoor air, condensation, or raw water.
- b. For all of the items identified in (a), state the basis for why the item does not require evaluation for exposure to moisture.
- c. State what portion of the CO<sub>2</sub> tank will be made accessible for visual inspection (e.g., physical location on tank, percentage of bare metal exposure of the external surface of the tank)? If the surface of the CO<sub>2</sub> tank will not be made accessible for visual inspection, state how an inspection for moisture or rust stains emanating from the tank insulation or metal housing is sufficient to detect loss of material from the tank prior to loss of intended function.

#### **RAI B.1.21-2a**

Background. In RAI B.1.21-2, the staff requested that the applicant provide AMR items for sprinkler heads that reference the Fire Water System Program to manage aging, or provide justification for why no program will be used to manage aging. The response to RAI B.1.21-2 dated May 15, 2012, states that sprinklers are described as nozzles in the LRA and that nozzles are listed in LRA Table 3.3.2-12 as being managed by the Fire Water System and Selective Leaching programs. However, the only nozzle AMR items in LRA Table 3.3.2-12 that reference the Fire Water System Program to manage aging are for nozzles exposed to water. LRA Section 2.3.3.12 states that the applicant's fire water system includes both wet-pipe and dry-pipe sprinkler systems. Sprinkler heads exposed to both air and water are included within the scope of GALL Report AMP XI.M27, "Fire Water System."

Issue. The AMR items in LRA Table 3.3.2-12 for nozzles exposed indoor air state that the components have no aging effects requiring management and no AMP is proposed. It is unclear to the staff why the nozzles exposed to air do not require aging management using the Fire Water System Program.

Request. State the basis for why the nozzles exposed to indoor air do not require aging management.

#### **RAI B.1.21-3a**

Background. In RAI B.1.21-3, the staff requested that the applicant clarify whether the visual inspections that will be performed as part of the enhancement to the Fire Water System Program to perform visual inspections of the internal surfaces of fire protection piping will be performed periodically during the period of extended operation. The staff also requested that the applicant state the basis for the frequency of inspections. The response to RAI B.1.21-3 dated May 15, 2012, states that the periodicity of the visual inspections is tied to the need for routine or corrective maintenance and that the basis for the frequency is a past maintenance history demonstrating that inspections have been performed on a representative number of locations. The RAI response also states that additional inspections will be performed as needed to obtain the representative sample prior to the period of extended operation.

Issue. The response to RAI B.1.21-3 states that the inspection frequency is based on the need for component maintenance, which implies that the inspection frequency is purely opportunistic. GALL Report AMP XI.M27 states that inspections may be performed concurrent with component maintenance; however, it recommends that plant-specific inspection intervals be determined by engineering evaluation of the fire water piping to ensure degradation is detected prior to loss of intended function. The RAI response did not state the frequency at which the visual inspections will be performed or include an acceptable basis for the frequency of inspections. It is unclear to the staff what the inspection frequency will be and how the inspection frequency discussed in the enhancement to the Fire Water System Program is consistent with the guidance in GALL Report AMP XI.M27.

**Request.** State the basis for the frequency of the visual inspections that will be performed during the period of extended operation as part of the enhancement to the Fire Water System Program to perform visual inspections of the internal surfaces of fire protection piping.

**RAI B.1.26-1a**

**Background.** In RAI B.1.26-1, the staff requested that the applicant fully describe the environments that are applied to the Internal Surfaces in Miscellaneous Piping and Ducting Components program. The applicant's response to RAI B.2.26-1, dated May 9, 2012, states that the environments within the program are specified in LRA Section 3. The revised LRA UFSAR Supplement section omits a complete description of the program's environments.

The staff reviewed this response and found it unacceptable because it is inconsistent with the minimum UFSAR Supplement description for this program recommended in the SRP-LR, Table 3.0-1.

**Issue.** The revised UFSAR Supplement does not fully describe the program's environments and is inconsistent with the minimum description for this program recommended in the SRP-LR, Table 3.0-1.

**Request.** Revise LRA Section A.1.26 to be consistent with the standard review plan – license renewal (SRP-LR) and fully describe the program's environments, or justify why this description is not required.

**RAI B.1.28-1a**

**Background.** LRA Section B.1.28 states that the Non-EQ Cable Connections Program is consistent with GALL Report AMP XI.E6. The GALL Report AMP under "parameter monitored/inspected" program element recommends that connection type be considered for sampling basis. During the audit, the staff reviewed the Grand Gulf basis document GGNS-EP-08-LRD08, Revision 1, and noted that the "parameters monitored or inspected" program element does not consider or address connection type as one of sample selection criteria. The staff requested the applicant clarify how the applicant's Non-EQ Cable Connection Program (basis document) is consistent with GALL Report AMP XI.E6 with respect to sample selection criteria including connection type. In response to the staff's request, in a letter dated May 25, 2012, the applicant stated that LRA Section B.1.28 is consistent with the program as described in NUREG-1801, Section XI.E6, Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirement, without exception. The applicant also stated that as described in LRA Section B.1.28, connection type is a factor that will be considered in sample selection.

**Issue.** The basis document under "parameter monitored/inspected" program element is not consistent with those in GALL AMP XI.E6 because it does not consider connection type as sampling basis.

**Request.** Revise the basis document to include connection type as sampling basis or explain how the "parameter monitored/inspection" program element is consistent with those in GALL AMP XI.E6.

July 17, 2012

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Vice President, Site  
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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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Letter to Michael Perito from Nathaniel Ferrer dated July 17, 2012

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