



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

September 14, 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.

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:
As stated

cc w/encl: Listserv

GRAND GULF NUCLEAR STATION
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION SET 37

RAI B.1.5-6b

Background. Request for additional information (RAI) B.1.5-6a addressed why a 100 mV polarization is adequate to protect steel and stainless steel buried components when there is a nearby bare wire copper grid and how the testing methodology ensures that the steel and stainless steel buried piping has achieved a sufficient level of polarization.

Issue. In relation to the adequacy of the 100 mV polarization, the staff evaluated each of the three bases in the response to RAI B.1.5-6a and determined the following:

- The first basis cited NACE Corrosion Engineer's Reference Handbook and stated that since both steel and copper can be cathodically protected by applying a minimum of 100 mV polarization, then, "with the CP system raising the piping and grounding grid to an equipotential voltage of 100 mV, galvanic action is nullified." The staff reviewed the "NACE Corrosion Engineer's Reference Book," Third Edition, Robert Baboian, editor, page 161. A 100 mV of cathodic protection polarization between the structure and a reference electrode does not raise the two components (i.e., steel piping and copper ground grid) to the same potential, but rather would raise each component's potential relative to the reference electrode to which it is being measured. This could still result in the mixed metal free corrosion potential remaining in the oxidizing range for the steel piping.
- The second basis cited the NACE Corrosion Engineer's Reference Handbook and stated that the handbook specifies that a target current density is 0.1 mA/ft² to 0.2 mA/ft². The response stated that the protected area at the station is 22.175 acres and the applied current from the rectifiers was 214.65 amps resulting in an average current density of 0.2 mA/ft². The staff reviewed the "NACE Corrosion Engineer's Reference Book," Third Edition, Robert Baboian, editor, page 162 and noted two discrepancies in this basis. First, the cited target current density represents an approximate current requirement for steel piping. The staff believes that this target current density should not be considered as an acceptance criteria for cathodic protection because it does not address localized conditions and it could be met by buried components with degraded coatings resulting in greater current demand. Second, the NACE handbook cited the source of its table as "Metals Handbook," Ninth Edition, Volume 1, page 758. Page 759 of this reference states, "[t]he total current requirements for the current density method are calculated by multiplying the areas of exposed metal [not the site acreage] by the current density selected for protection." It goes on to state, "[b]ecause the condition of a coating cannot always be predicted, the actual current density applied to each local region may differ from the calculated value by a sizeable amount, resulting in either under protection when the coating is in poor condition or overprotection when it is in exceptionally good condition."
- In the third basis the response stated that if buried steel components and the bare wire copper grounding grids were in close proximity or mixed metal couples were occurring, a plot of the native potential data would show a mean of 350 mV, whereas, the mean at the site is 427 mV. The staff could not locate the source of the 350 mV criterion and

ENCLOSURE

therefore cannot at the present time accept this basis. The staff does not know whether the 350 mV criterion was obtained from a reference book or calculated based on the ratio of steel and stainless steel to copper configuration.

The response stated that Area Potential Earth Current (APEC) surveys would be used to ensure that an adequate level of polarization would be achieved for buried steel and stainless steel components. While the staff agrees that APEC surveys can provide information related to localized potentials and current flow, it is not convinced that use of the 100 mV minimum polarization coupled with APEC surveys is sufficient to demonstrate adequate cathodic protection due to the potential for the survey technique to be affected by other buried components or structures.

Request. If 100 mV acceptance criterion will be used, instead of -850 mV, for the cathodic protection surveys, respond to the following:

- a. Provide the source documents which establish the basis for the mean 350 mV criterion or describe how the value was derived. If the graph on Attachment 1, page 4 of the response to RAI B.1.5-6a was developed based on data other than the most recent APEC survey, state how it was developed.
- b. Submit the complete last APEC survey report with this RAI response.
- c. If APEC surveys will be used to confirm the effectiveness of the 100 mV polarization criterion, revise the Buried Piping and Tanks Inspection Program and Updated Final Safety Analysis Report (UFSAR) supplement to reflect its use.
- d. State what methods will be used to confirm the results of the APEC surveys (e.g., buried coupons, electrical resistance probes). Revise the Buried Piping and Tanks Inspection Program and UFSAR supplement, as necessary, to reflect the use of this method.
- e. State what actions will be taken if the method used to confirm the APEC surveys indicates that corrosion of in-scope buried components is occurring more rapidly than expected. This response should not be limited to a reference to entering the condition in the corrective action program.

Otherwise, confirm that the cathodic protection surveys will use -850 mV acceptance criterion.

RAI B.1.20-2b

Background. In RAI B.1.20-2a the staff requested that the applicant state what portion of the CO₂ tank will be made accessible for visual inspection. In its response dated August 13, 2012, the applicant stated that the metal housing surrounding the CO₂ tank has a three-foot diameter bolted access cover which can be removed to perform the visual inspections. The applicant also stated that inspection techniques used for confined spaces, such as boroscopes and mirrors, will be used to examine a wide surface area of the tank. The applicant further stated that a bare metal inspection will be performed when the insulation is removed for maintenance, which is consistent with the guidance in Generic Aging Lessons Learned (GALL) Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components."

GALL Report AMP XI.M36 states that insulated surfaces may be inspected when the external surface is exposed (i.e., during maintenance) at such intervals that would ensure that the components' intended functions are maintained. The applicant's response did not address the percentage of bare metal that would be exposed during the inspections or the frequency at which the bare metal inspections of the tank would be performed.

Issue. It is unclear to the staff what portion of the tank will be made accessible for visual inspection or the frequency at which the bare metal inspections of the tank will be performed.

Request. State what portion of the CO₂ tank will be made accessible for bare metal inspection and the frequency or basis for the frequency at which bare metal inspections of the tank will be performed.

September 14, 2012

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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:
As stated

cc w/encl: Listserv

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*concurrence via email

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NAME	NFerrer	YEdmonds	DMorey	NFerrer
DATE	9/12/12	9/7/12	9/13/12	9/14/12

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Letter to Michael Perito from Nathaniel Ferrer dated September 14, 2012

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