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

August 21, 2012

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

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

Dear Mr. Perito:

On August 15, 2012, the Nuclear Regulatory Commission (NRC) issued requests for additional information (RAIs) Agencywide Documents and Management System (ADAMS) Accession No. ML12220A337, in regards to your application to renew the operating license for Grand Gulf Nuclear Station, Unit 1.

Due to an inadvertent error, the RAIs were labeled as draft RAIs. The corrections are marked in the enclosure. No other changes were made.

We regret any inconvenience this may have caused.

Sincerely,

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 32

~~Draft~~ RAI 3.5.1.12-1

Background. NRC Information Notice (IN) 2011-20 "Concrete Degradation by Alkali-Silica Reaction (ASR)" was issued to inform industry of operating experience related to concrete degradation due to ASR. IN 2011-20 was issued on November 18, 2011, which is after the NRC received the Grand Gulf Nuclear Station (GGNS) license renewal application (LRA) on November 1, 2011. IN 2011-20 states that the American Society for Testing and Materials (ASTM) updated standards, ASTM C1260 and ASTM C1293, and guidance provided in the appendices of ASTM C289 and ASTM C1293, cautions that the tests described in ASTM C227 and ASTM C289 may not accurately predict aggregate reactivity when dealing with late- or slow-expanding aggregates containing strained quartz or microcrystalline quartz.

The Generic Aging Lessons Learned (GALL) Report recommends using the XI.S2 "ASME Section XI, Subsection IWL," XI.S6 "Structures Monitoring," and XI.S7, "Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the Federal Energy Regulatory Commission (FERC)/US Army Corp of Engineers dam inspections and maintenance aging management programs (AMPs) to manage cracking due to expansion from reaction with aggregates for those accessible areas of concrete structures within the scope of the respective programs. However, for inaccessible areas, further evaluation is required to determine if a plant-specific AMP is needed.

The following discussions for items with same aging-effect/mechanism "cracking due to expansion from reaction with aggregates" were provided in LRA Table 3.5.1:

LRA Table 3.5.1, item 12, states that this item is not applicable and the listed aging effects do not require management at GGNS. Nonetheless, components are included in the Containment Inservice Inspection – IWL program to verify the absence of other aging effects, such as loss of material, for components in this listing.

LRA Table 3.5.1, item 19, states that this item is not applicable and the listed aging effects do not require management at GGNS. Nonetheless, components are included in the Containment Inservice Inspection – IWL program to verify the absence of other aging effects, such as cracking, for components in this listing.

LRA Table 3.5.1, item 43, states that this item is consistent with the GALL Report. The Structures Monitoring program will manage the effects of cracking for the components in this listing.

LRA Table 3.5.1, item 50, states that this item is not applicable. Listed aging effects do not require management at GGNS. Nonetheless, components are included in the RG 1.127 and Structures Monitoring programs to verify the absence of other aging effects, such as cracking, for components in this listing.

LRA Table 3.5.1, item 54, states that cracking due to expansion due to reaction with aggregates does not require aging management for concrete for these groups of structures at GGNS,

because concrete is constructed in accordance with the recommendation in ACI 318. Nonetheless, components are included in the Structures Monitoring program.

Issue. The GALL Report identifies cracking due to expansion from reaction with aggregates as a possible aging effect for concrete structures in any environment; and industry operating experience, communicated through IN 2011-20, has shown that tests described in ASTM C227 and ASTM C289 may not accurately predict aggregate reactivity when dealing with late- or slow-expanding aggregates containing strained quartz or microcrystalline quartz. The staff notes that LRA Section 3.5.2.2.1.8 states potential reactivity of aggregates were tested in accordance with ASTM C 289 and ASTM C 227.

It is also unclear why cracking due to expansion from reaction with late- or slow-expanding aggregates would not be an applicable aging effect at GGNS for LRA Table 3.5.1, items 12, 19, 50, and 54, but is consistent with the GALL Report for item 3.5.1-43 as stated above from the discussion column of Table 3.5-1.

Request.

a. State if operating experience for cracking due to expansion from reaction with aggregates is applicable to GGNS; and, if applicable, provide action(s) and/or program to manage this aging effect during the period of extended operation.
b. Provide the technical justification as to why the aging management review (AMR) items associated with cracking due to expansion from reaction with late- or slow-expanding aggregates are not applicable, and why this aging effect does not require aging management at GGNS.
c. If revisions to LRA Table 3.5.1, items 12, 43, and 50 are needed, ensure LRA Sections 3.5.2.2.1.8, 3.5.2.2.2.1.2, and 3.5.2.2.2.3.2 are consistent, to provide clarification in the evaluation of these sections.

~~Draft~~ RAI 3.5.1.94-1

Background. The GALL report (item III.B1.1.TP-10) states that non-metallic vibration isolation elements exposed to air-indoor, uncontrolled or air-outdoor should be managed for reduction or loss of isolation function due to radiation hardening, temperature, humidity, and sustained vibratory loading using the ASME Section XI, Subsection IWF Program. In LRA table 3.5-1, item 94, the applicant states that age management of vibration isolation elements is not applicable because no vibration isolation elements at GGNS are in scope and subject to aging management review. The staff reviewed the applicant's Inservice Inspection-IWF Program in LRA Section B.1.24 and noted that there is an enhancement to the parameters monitored or inspected program element that states, "Elastomeric vibration elements will be monitored for cracking, loss of material, and hardening." Further, the staff reviewed LRA Section A.1.42 and noted that the Structures Monitoring Program is enhanced with inspection requirements for vibration isolators to include augmented inspections by feel or touch to detect hardening if the vibration isolation function is suspect.

Issue. The applicant's statement that there are no vibration isolation elements in scope is not consistent with the applicant's proposed enhancement to the "parameters monitored or inspected" ISI-IWF program element stated in LRA Section B.1.24 or the applicant's proposed

enhancement to the Structures Monitoring program in LRA Section A.1.42 for age management of vibration isolation elements.

Request.

a. Clarify if there are vibration isolation elements at GGNS included in scope for license renewal. If not included in scope, provide justification to support that determination.
b. If vibration isolation elements will be managed as stated in the Structures Monitoring and/or Inservice Inspection-IWF Programs, confirm that the statements in the LRA accurately reflect the planned enhancements to those programs.

~~Draft~~ RAI B1.14-2a

Background. In response to RAI B1.14-2 dated July 25, 2012, the applicant described the acceptance criteria used for the GGNS containment concrete surface visual examination. The applicant also stated that the GGNS acceptance criteria used for the containment concrete surface visual examination are consistent with the quantitative acceptance criteria recommended in Chapter 5 of ACI 349.3R-02.

Issue. The staff reviewed the applicant's response of RAI B1.14-2, and noted that the detailed acceptance criteria described in RAI B1.14-2 response for the GGNS containment concrete surface is based on the quantitative limits of the second tier acceptance criteria in Subchapter 5.2.1 of ACI 349.3R-02. This does not appear to be consistent with the guidelines recommended in Chapter 5 of ACI 349.3R-02, which require further evaluation if concrete surface conditions did not meet the quantitative limits of first tier acceptance criteria in Subchapter 5.1.1. The applicant did not provide any justification for excluding the first tear evaluation criteria of the ACI 349.3R-02 for the GGNS containment concrete surface examination.

Request. Explain the reason for not using the first tier evaluation criteria as defined in Subchapter 5.1 of the ACI 349.3R-02 for the GGNS containment concrete surface examination.

~~Draft~~ RAI B.1.15-1

Background. The GGNS Containment Leak Rate Program, states that GGNS has implemented Option B for the 10 CFR Part 50, Appendix J testing and is consistent with GALL Report AMP XI.S4, "10 CFR Part 50, Appendix J." The GALL Report AMP XI.S4 "scope of program" program element states, "[t]he scope of the containment LRT program includes all containment boundary pressure-retaining components."

Issue. The GGNS Technical Specifications state, "10 CFR Part 50, Appendix J program establishes the leakage rate testing program of the containment as required by 10 CFR 50.54(o) [conditions of licenses] and 10 CFR Part 50, Appendix J Option B as modified by approved exemptions." In addition, Section 6.2.6.3, "Primary Containment Isolation Valve Leakage Rate Tests," of the UFSAR states, "[c]ertain valves are not required to be Type C tested by Appendix J although they meet the GDC definitions of containment isolation valves." It is not clear how the applicant will manage aging effects of exempted/excluded components (valves, penetrations, and other components) from the 10 CFR Part 50, Appendix J testing for the period of extended operation.

Request. For those components (valves, penetrations, and other components) that have been exempted/excluded from the 10 CFR Part 50, Appendix J testing, identify how aging effects will be managed during the period of extended operation. Indicate which AMPs will be used to manage the aging effects for each of the exempted/excluded components, or justify why an AMP is not necessary for the period of extended operation.

~~Draft~~ RAI B.1.15-2

Background. The GGNS Containment Leak Rate Program, states that GGNS has implemented Option B for the 10 CFR Part 50, Appendix J testing and is consistent with GALL Report AMP XI.S4. The GALL Report AMP XI.S4 "monitoring and trending" program element states:

> Because the LRT program is repeated throughout the operating license period, the entire pressure boundary is monitored over time. The frequency of these tests depends on which option (A or B) is selected. With Option A, testing is performed on a regular fixed time interval as defined in 10 CFR Part 50, Appendix J. In the case of Option B, the interval for testing may be adjusted on the basis of acceptable performance in meeting leakage limits in prior tests. Additional details for implementing Option B are provided in NRC RG 1.163 and NEI 94-01.

Issue. The GGNS Technical Specifications, referencing the 10 CFR Part 50, Appendix J Testing Program, state that the performance characteristics of the program are implemented in accordance with Amendment 135 to the Operating License. The NRC's staff safety evaluation report for Amendment 135, dated April 6, 1998, states that the applicant does not use NRC RG 1.163, which establishes the performance criteria per GALL Report XI.S4, for "10 CFR Part 50, Appendix J Program," for implementation of Option B. There appears to be an inconsistency between the proposed AMP and the recommendations in GALL (i.e., use of guidance in NRC RG 1.163 for implementation of Option B for containment leak rate testing).

Request

a. For the Containment Leak Rate Program, identify the exceptions and/or enhancements needed to make the program consistent with GALL and identify whether the program should be either evaluated as:
    1. Consistent with exceptions,
    2. Consistent with enhancements, or
    3. Consistent with exceptions and enhancements.
b. If the program is not consistent, consistent with exceptions, or consistent with enhancements with GALL, then expand the summary description of the program sufficiently, so it can be reviewed as a plant-specific program.

~~Draft~~ RAI B.1.22-7a

Background. In addressing an error report associated with the CHECWORKS software, GGNS condition report CR2010-00823 stated that CHECWORKS is only one of the tools used by the Flow-Accelerated Corrosion Program to determine component wear. In its initial response to the RAI for this issue, the staff requested GGNS to provide a description of other in-place

processes or verification methods used by the Flow-Accelerated Corrosion Program to determine component wear that could validate or detect errors in the CHECWORKS software.

The response dated May 25, 2012, stated that the results of component inspections are the primary input used to calculate the next scheduled inspection, and that this approach provides reasonable assurance that an error in the CHECWORKS software will not prevent the GGNS Flow-Accelerated Corrosion Program from providing reasonable assurance that the intended function of components will be maintained. The response concluded that as more actual inspection data is acquired, the already limited reliance of CHECWORKS becomes less.

Issue. The condition report discussed above documented an error in the CHECWORKS software and the resolution of this issue stated that CHECWORKS is only one of the tools used by the Flow-Accelerated Corrosion Program to predict component wear. The response appears to state that GGNS calculates the next scheduled inspection primarily using the results of component inspections independently from CHECWORKS. It is not clear to the staff how GGNS calculates the next scheduled inspection using the results of component inspections without CHECWORKS. Further, it is not clear to staff how reliance on the component inspection results reduces the effects of the errors in CHECKWORKS. Since the condition report stated that CHECWORKS is only one of the tools used by the Flow-Accelerated Corrosion Program to determine component wear, the staff needs additional information about the other tools that are used to calculate component wear.

Request. Provide a description of the other tools (i.e., any in-place process or verification method), which are used in the Flow-Accelerated Corrosion Program to determine component wear that could detect or validate errors in the CHECWORKS software. If CHECWORKS is the only prediction tool being used, then explain how the use of component inspection results reduces the effects of any errors in CHECWORKS.

~~Draft~~ RAI B.1.43-1a

Background. GALL Report AMP XI.M2, "Water Chemistry," states that the water chemistry program for boiling-water reactors (BWRs) relies on monitoring and control of reactor water chemistry based on industry guidelines in the BWR Vessel and Internals Project (BWRVIP)-190. The response to RAI B.1.43-1, dated May 25, 2012, regarding the methods used to determine the effectiveness of hydrogen water chemistry (HWC) at GGNS, states that platinum loading will be verified by using an artifact that had been removed from the reactor core, because an electrochemical corrosion potential (ECP) mitigation monitoring system was not available during the last operating cycle. The response continued by stating that BWRVIP-62, Revision 1, "Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection," does not require platinum deposition measurements on coupons to demonstrate mitigation for reactors that use on-line noble chemistry (OLNC). The response also stated that the recommendations by the NRC in the safety evaluation to BWRVIP-62 were incorporated into BWRVIP-62-A, which have been incorporated into BWRVIP-62, Revision 1. The applicant further stated that continuous ECP monitoring will be installed during the spring 2012 outage, which will meet the recommendations of BWRVIP-62, Revision 1.

Issue. The NRC has not reviewed BWRVIP-62, Revision 1, and there are differences between the NRC's recommendations for verification of noble metal loading in the safety evaluation

related to BWRVIP-62-A, and the guidance given in BWRVIP-62, Revision 1. Specifically, BWRVIP-62-A states that noble metal (platinum) loading shall be monitored by periodic removal of durability monitors or by removal and analysis of deposits from artifacts within the vessel. In addition, the staff noted that BWRVIP-190, states that for plants using noble metal chemical application with ECP probes, catalyst (platinum) loading on durability monitors or vessel artifacts are to be monitored to demonstrate the effective implementation of HWC. Furthermore, although BWRVIP-190 discusses OLNC, it does not address any difference for platinum deposition measurements on coupons for plants using this technique. It is not clear to the staff whether the applicant will continue to monitor noble metal loading during the period of extended operation or whether continuous ECP monitoring has been installed.

Request. Confirm that, during the period of extended operation, the Water Chemistry Control – BWR program will monitor noble metal loading by either periodic removal of durability monitors or by removal and analysis of deposits from artifacts within the vessel. If not, justify the difference with BWRVIP-190 for monitoring catalyst loading to demonstrate effective implementation of HWC. Additionally, confirm that continuous ECP monitoring has been installed.

August 21, 2012

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/RA/

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

Docket No. 50-416

Enclosure:
As stated

cc w/encl: Listserv

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ADAMS Accession No.: ML12230A310

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Letter to M. Perito from N. Ferrer dated August 21, 2012

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