



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

July 23, 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, 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", is 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 28

**RAI B.1.8-2a**

Background. By letter dated May 1, 2012, Entergy Operations, Inc. (the applicant) responded to request for additional information (RAI) B.1.8-2, which requested that the license renewal application (LRA) include specific references to the Boiling Water Reactor and Vessels Internal Project (BWRVIP) documents credited for the applicant's Boiling Water Reactor (BWR) Penetrations Program. In its response, the applicant stated that its BWR Penetrations Program is consistent with the program described in NUREG-1801, Section XI.M8, BWR Penetrations, without exception. Therefore, by reference, the BWR Penetrations Program incorporates the relevant staff-approved BWRVIP documents consistent with NUREG-1801 guidance.

Issue. 10 CFR 54.21(d) requires that the updated final safety analysis report (UFSAR) supplement contain a summary description of the programs and activities for managing the effects of aging. Without referencing specific BWRVIP documents credited for the BWR Penetrations Program, the staff cannot determine whether the proposed UFSAR supplement in LRA Section A.1.8 contains an adequate summary description of the program and activities for managing the effects of aging in accordance with 10 CFR 54.21(d).

Request. Justify why LRA Section A.1.8 (UFSAR supplement) does not identify specific references to the BWRVIP documents credited for the BWR Penetrations Program.

**RAI B.1.8-4**

Background. LRA Table 3.1.2-1 addresses the applicant's aging management for the reactor vessel, including reactor vessel nozzles and penetrations. LRA Table 3.1.2-1 indicates that the BWR Vessel Internals and Water Chemistry Programs manage cracking due to stress corrosion cracking (SCC), intergranular stress corrosion cracking (IGSCC) and cyclic loading of the control rod drive (CRD) housing penetrations and incore housing penetrations under LRA items 3.1.1-102 and 3.1.1-98, respectively.

In contrast, the program scope of the BWR Penetrations Program and Generic Aging Lessons Learned (GALL) Report item IV.A1.RP-369 recommend that the BWR Penetrations Program and Water Chemistry Program be used to manage cracking of the CRD housing and incore monitor housing penetrations.

Issue. The applicant's aging management review results for cracking of the CRD housing and incore housing penetrations are not consistent with the scope of the BWR Penetrations Program and GALL Report item IV.A1.RP-369.

Request. Justify why cracking due to SCC, IGSCC and cyclic loading of the CRD housing penetrations and incore housing penetrations is managed by the BWR Vessel Internals and Water Chemistry Programs, which is inconsistent with the scope of GALL Aging Management Program (AMP) XI.M8, "BWR Penetrations," and GALL AMP item IV.A1.RP-369.

ENCLOSURE

**RAI B.1.9-1a**

Background. By letter dated May 1, 2012, the applicant responded to RAI B.1.9-1 to address the scope of the BWR Stress Corrosion Cracking Program. In its response, the applicant clarified that the program applies to BWR piping and piping welds made of austenitic stainless steel and nickel alloy that is 4 inches or larger in nominal diameter and contains reactor coolant at a temperature above 93 °C (200 °F) during power operation regardless of code classification, consistent with the GALL Report. The staff notes that the scope of GALL Report, AMP XI.M7, "BWR Stress Corrosion Cracking," includes relevant piping and piping welds regardless of code classification (i.e., the GALL Report coverage of components is more inclusive than the ASME Code Class 1 components).

LRA Section 2.3.1.2 addresses the reactor coolant pressure boundary (RCPB) and indicates that the RCPB corresponds to American Society of Mechanical Engineers (ASME) Code Class 1 components. For example, LRA Section 2.3.1.2 states that the majority of the components that comprise the RCPB are from the nuclear boiler system and reactor recirculation system and the RCPB review also includes the Class 1 portions of various systems connected to the reactor vessel.

Issue. LRA Sections B.1.9 (program description) and Section A.1.9 (UFSAR supplement) references the RCPB as the scope of the program, rather than the recommended GALL Report's description of "relevant piping and piping welds regardless of code classification."

Specifically, LRA Section B.1.9 states that the BWR Stress Corrosion Cracking Program is an existing program that manages cracking of the reactor coolant pressure boundary using preventive measures, inspection, and flaw evaluation. In addition, LRA Section A.1.9 states that the program manages cracking of the reactor coolant pressure boundary using preventive measures, inspection, and flaw evaluation.

In addition, LRA Table 3.2.1, item 54, and LRA Table 3.3.1, item 110, indicate that the components in the engineered safety features and auxiliary systems, within the scope of the BWR Stress Corrosion Cracking Program, were reviewed as part of the Class 1 reactor coolant pressure boundary [as addressed in LRA Table 3.1.2-3].

Request.

- a. Justify why LRA Sections B.1.9 and A.1.9 indicate that the BWR Stress Corrosion Cracking Program only manages aging of the RCPB rather than the recommended scope of the program, per the GALL Report, that includes relevant piping and piping welds regardless of code classification.
- b. Clarify why LRA items 3.2.1-54 and 3.3.1-110 indicate that the components in the engineered safety features and auxiliary systems, subject to the program, were reviewed as part of the RCPB, rather than against the relevant piping and piping welds (regardless of code classification) that are included in the program scope.
- c. If necessary, provide updates to LRA Sections B.1.9 and A.1.9 and items 3.2.1-54 and 3.3.1-110, consistent with the response.

#### **RAI B.1.9-2a**

Background. By letter dated May 1, 2012, the applicant responded to RAI B.1.9-2, in part, to address the types of inspections of the stainless steel and nickel alloy thermal sleeve and sleeve extensions of reactor vessel nozzles (recirculation inlet, core spray inlet, and RHR/LPCI nozzles). In its response, the applicant indicated that the BWR Stress Corrosion Cracking Program [along with the Water Chemistry Program] is credited to manage cracking due to SCC and IGSCC in the thermal sleeves and thermal sleeve extensions of the reactor nozzles. The applicant's response also states that welds adjacent to specific components are inspected because welds are the susceptible areas.

In comparison, GALL Report item IV.B1.R-99 recommends the BWR Vessel Internals Program and Water Chemistry Program to manage cracking of the core spray nozzle thermal sleeves. In addition, Section 3.2.4, "Other Locations," of BWRVIP-18-A, "BWR Vessel and Internals Project BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines," indicates that there is currently no technique available for inspecting the core spray nozzle thermal sleeve welds. Inspection of thermal sleeve welds should be done when the capability exists.

Issue. The staff needs to further clarify whether the BWR Vessel Internals Program (including BWRVIP-18-A) is used to manage cracking of the core spray nozzle thermal sleeves as recommended in the GALL Report.

The staff also noted that BWRVIP-18-A indicates that there is currently no technique available for inspecting the thermal sleeve welds of the core spray nozzles and inspection of thermal sleeve welds should be done when the capability exists. It is not clear to the staff how the applicant's BWR Stress Corrosion Cracking Program inspects the thermal sleeves and thermal sleeve extensions to manage aging.

#### Request.

- a. Provide justification for using the BWR Stress Corrosion Cracking Program to manage the aging of thermal sleeves and thermal sleeve extensions, given that they are typically located within the reactor vessel or piping. As part of the justification, describe how the BWR Stress Corrosion Cracking Program inspects these components (for example, using ultrasonic testing). In addition, describe the inspection results and operating experience in terms of occurrence of cracking in the thermal sleeves and sleeve extensions of the reactor nozzles.
- b. Ensure that the LRA (including Table 3.1.2-1) is consistent with the applicant's response.

#### **RAI B.1.9-3**

Background. By letter dated May 1, 2012, the applicant responded to RAI B.1.9-2 to, in part, to address the types of inspections of the stainless steel and nickel alloy thermal sleeve and sleeve extensions of reactor vessel nozzles (recirculation inlet, core spray inlet, and RHR/LPCI nozzles).

As part of its response, the applicant identified a program exception. The applicant indicated that the use of a risk-informed inservice inspection application for Category A welds should be considered an exception since it is not expressly identified as an acceptable approach in NUREG-1801, Section XI.M7. The applicant also indicates that this exception is justified because the risk informed application was authorized by the NRC staff in a Safety Evaluation Report (SER), "Safety Evaluation by the Office Of Nuclear Reactor Regulation Request For Alternative GG-ISI-002 To Implement Risk-Informed Inservice Inspection (ISI) Program Based on The American Society Of Mechanical Engineers Code, ASME Code Case N-716," dated September 21, 2007.

The staff noted that the NRC letter dated September 21, 2007, states that the NRC staff authorizes the proposed alternative in accordance with 10 CFR 50.55a(a)(3)(i) for the remainder of the licensee's second 10-year ISI interval, which was extended by the NRC letter dated February 13, 2007, until fall 2008, and for its third 10-year ISI interval ending in 2017. The NRC letter also states that the NRC staff's approval of the licensee's RIS\_B program does not constitute approval of Code Case N-716.

Issue. The staff noted that the NRC approval for the applicant's use of the ASME Code Case N-716 methodology, modified as described by the applicant's submittals, is granted for a certain portion of the second inservice inspection interval and the third interval only. If the applicant further pursues, the applicant would be required to reapply for the use of its risk-informed inservice inspection methodology for any 10-year interval beyond the third interval. Therefore, the staff needs to clarify what inspection scope and schedule the applicant would use in the BWR Stress Corrosion Cracking Program in the case the applicant could not get NRC approval for the use of the applicant's methodology.

Request. Clarify what inspection scope and schedule the BWR Stress Corrosion Cracking Program would use for Category A welds in the case the applicant could not get NRC approval for the use of the applicant's risk-informed inservice inspection methodology. Ensure that LRA Sections B.1.9 and A.1.9 are consistent with the response.

#### **RAI B.1.9-4**

Background. Event Notification Report No. 47880, dated April 30, 2012, indicates that the applicant detected an unacceptable weld indication by ultrasonic testing in one of the residual heat removal (RHR) system to reactor pressure vessel nozzles (N06B-KB weld) during the current refueling outage. The dimension of the indication is approximately 0.9 inches in length and approximately 0.5 inches in depth. Nominal wall thickness of the weld is 1.3 inches.

The event notification also indicates that the weld defect has been evaluated by Entergy Engineering and determined to meet the criteria for reporting identified in NUREG-1022: Welding or material defects in the primary coolant system that cannot be found acceptable under ASME Section XI, IWB-3600, "Analytical Evaluation of Flaws," or ASME Section XI, Table-IWB-3410-1, "Acceptable Standards."

Issue. The staff needs to confirm that this operating experience does not affect the effectiveness of the applicant's BWR Stress Corrosion Cracking Program.

Request.

- a. Clarify whether the weld addressed in the event notification is included in the scope of the BWR Stress Corrosion Cracking Program. If this weld is included in the program scope, identify the material and category of the weld in accordance with Generic Letter 88-01 as referenced in the GALL Report (e.g., Alloy 82/182 weld with Category C prior to this event).
- b. Evaluate this operating experience in terms of the effectiveness of the applicant's aging management as follows:
  1. Describe the results of the previous inspections performed as part of the BWR Stress Corrosion Cracking Program.
  2. Describe the root or apparent cause analysis results and the corrective action to be taken. In addition, identify the new weld category assigned after this event in order to confirm whether it is consistent with Generic Letter 88-01 as referenced in GALL Report AMP XI.M7.
  3. Justify why this operating experience does not affect the effectiveness of the applicant's program. As part of the response, identify any impact of this operating experience on the program elements of the applicant's BWR Stress Corrosion Cracking Program.

**RAI B.1.10-1a**

Background and Issue. In RAI B.1.10-1, the staff requested that the applicant provide reference to the specific BWRVIP document credited for the BWR Vessel Attachment Welds Program. By letter dated May 1, 2012, the applicant responded to state that LRA Section A.1.10 was not changed to include the reference of BWRVIP-48-A. The applicant stated that the existing Section A.1.10 references "applicable industry standards and staff-approved BWRVIP documents," which provides a more comprehensive definition of applicant guidance to ensure program effectiveness than to list specific BWRVIP documents that may be revised or superseded in the future. This is contradictory to SRP-LR Table 3.0-1, "FSAR Supplement for Aging Management of Applicable Systems," for GALL Report AMP XI.M4, which specifically references BWRVIP-48-A.

10 CFR 54.21(d) requires that the UFSAR supplement contained a summary description of the program and activities for managing the effects of aging. Without an explicit reference to the appropriate document (i.e., BWRVIP-48-A) the summary description proposed by the applicant is vague and does not allow the staff to make a finding of reasonable assurance regarding whether the proposed UFSAR supplement in LRA Section A.1.10 reflects an accurate summary description of the program and activities for managing the effects of aging.

Request. Revise LRA Section A.1.10 to indicate that the BWR Vessel Attachment Welds Program perform inspections and flaw evaluation in accordance with the guidelines in the BWRVIP-48-A report consistent with the SRP-LR's FSAR supplement. Alternatively, identify the section of the current UFSAR that references the BWRVIP-48-A report.

July 23, 2012

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

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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

cc w/encl: Listserv

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Letter to Michael Perito from Nathaniel Ferrer dated July 23, 2012

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

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