



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

April 25, 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.

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 8

RAI B.1.22-1

Background. SRP-LR, Appendix A.1.2.3.1, "Scope of Program," states that the scope of the program should include the specific structures and components, the aging of which the program manages.

LRA Section 3.2.2.1.2, "Low Pressure Core Spray," and Section 3.2.2.1.3, "High Pressure Core Spray," do not identify the Flow-Accelerated Corrosion Program as managing aging in either system. However, Calculation MC-Q1111-08011, "Evaluation of RF16 Flow-Accelerated Corrosion Wall Thickness Data," appears to show that this program also manages wall thinning in the low pressure core spray and high pressure core spray systems.

Issue. The Flow-Accelerated Corrosion Program manages wall thinning in systems that are not specified in the LRA.

Request.

- a. For the aging effects identified in Calculation MC-Q1111-08011 in the low pressure core spray and high pressure core spray systems, either revise all the appropriate sections and tables in the LRA, to reflect that the Flow-Accelerated Corrosion Program manages aging effects in these systems, or provide the appropriate aging management program (AMP) that manages the identified aging effects.
- b. Provide a discussion regarding any evaluation that will be performed to verify that there are no other systems which have aging effects being managed by the Flow-Accelerated Corrosion Program that were not identified in the LRA, or discuss why an evaluation is not required.

RAI B.1.22-2

Background. SRP-LR, Appendix A.1.2.3.5, "Monitoring and Trending," states that monitoring and trending activities should be described, and they should provide a prediction of the extent of degradation and thus effect timely corrective or mitigative actions.

Procedure EN-DC-315, "Flow-Accelerated Corrosion Program," Section 5.11, "Components Failing to Meet Initial Screening Criteria," states that a condition report shall be generated when "significant wall thinning," as defined in the procedure, is detected. A search of condition reports, which were generated during recent outages, only identified condition reports where wall thinning was reported to be below the minimum acceptable wall thickness, and none appeared to report "significant wall thinning," which could be a precursor condition when the wall thickness is slightly above the minimum acceptable value.

Issue. It is not clear that aging effects were being identified, and documented in the corrective action program, consistent with the program documents.

ENCLOSURE

Request. Provide information to confirm that significant wall thinning as defined in EN-DC-315 had not been detected in recent outages and condition reports were not required to be generated, or provide actions taken if activities prescribed in EN-DC-315 were not conducted.

RAI B.1.22-3

Background. The GALL Report AMP XI.M17, "Flow-Accelerated Corrosion," "scope of program" program element states that the Flow-Accelerated Corrosion Program includes procedures and controls to maintain the structural integrity of all carbon steel lines containing high-energy fluids.

Several condition reports reviewed by the staff during the audit refer to the MS-46 program for erosion/corrosion monitoring. GGNS-MS-46, "Program Plan for Monitoring Internal Erosion/Corrosion in Moderate Energy Piping Component, (Safety-Related)," states that it is applicable to components in moderate energy systems, and defines erosion/corrosion as "degradation and consequent wall thinning of piping components by a dissolution process and/or mechanical/chemical phenomenon." EN-DC-315, "Flow Accelerated Corrosion Program," defines flow-accelerated corrosion as "degradation and consequent wall thinning of a component by a dissolution phenomenon previously known as erosion/corrosion."

Issue. Based on the similarity in definitions between MS-46 and EN-DC-315, it is not clear to the staff whether MS-46 monitors wall thinning due to low-accelerated corrosion in moderate energy systems, and how it integrates with the Flow-Accelerated Corrosion Program described in the LRA

Request. Provide information regarding aging effects being managed by GGNS-MS-46, "Program Plan for Monitoring Internal Erosion/Corrosion in Moderate Energy Piping Components, (Safety-Related)," and how this program relates to or integrates with the Flow-Accelerated Corrosion Program described in the LRA.

RAI B.1.22-4

Background. The GALL Report AMP XI.M17, Section 4 "Detection of Aging Effects," states, in part, that the schedule of inspections ensures detection of wall thinning before the loss of intended function.

EN-DC-315, "Flow-Accelerated Corrosion Program," Section 3.0, "Definitions," defines safety factor as a margin of safety used to account for inaccuracies in wear rate evaluations. Section 5.6.10 states that a 10 percent safety factor should be applied and the basis for safety factors less than 10 percent shall be documented. Calculation MC-Q1111-08011, "Evaluation of RF16 Flow-Accelerated Corrosion Wall Thickness Data," Section 4.0, "Assumptions," states that for systems which only operate part-time, it is acceptable to use the grid-synchronized hours in calculating the projected life, because it provides a valid relative measure of wear for whatever number of hours each system has actually operated. The calculation also states that these infrequently used systems are expected to operate in the future similar to how they operated in the past. The calculation assumes a safety factor of 10 percent on the wear rate in determining the remaining service life of every component, without regard to the frequency of usage.

Issue. Notes within MC-Q1111-08011 state that the reactor core isolation cooling system is assumed to operate 12 hours per year. For this and other systems that only operate part-time, it was unclear to the staff if the normally applied 10 percent safety factor was sufficient to account for inaccuracies in the wear rate evaluation, because relatively small increases in operating times (i.e., 1.2 hours for the reactor core isolation cooling system) could “consume” all of the uncertainties being applied in the 10 percent safety factor and not leave any margin for the other uncertainties (i.e., ultrasonic testing inaccuracies).

Request. Provide information which gives reasonable assurance that the 10 percent safety factor, used in wear rate evaluations to calculate the remaining life of components in systems which only operate part-time, accounts for wear rate inaccuracies due to variations in assumed operating times of the systems.

RAI B.1.22-5

Background. SRP-LR, Section A.1.2.3.10, “Operating Experience,” states that operating experience which results in program enhancements or additional programs, should be considered.

Calculation MC-Q1111-08011, “Evaluation of RF16 Flow-Accelerated Corrosion Wall Thickness Data,” Item 809, states that the reactor water cleanup (RWCU) bottom head drain lines are an operating experience issue, and that BWRVIP-205, “Bottom Head Drain Line Inspection and Evaluation Guidelines,” November 2008, changed GGNS from Category B to Category C, which requires an inspection within two outages.

Issue. BWRVIP-205 was not included in LRA Appendix C, “Response to BWRVIP Applicant Action Items,” and it is unclear to the staff whether the inspections prescribed in BWRVIP-205 will be performed and whether they are being tracked under the flow-accelerated corrosion program or the reactor vessel internals management program.

Request. Provide information regarding the status of the inspections prescribed in BWRVIP-205, “Bottom Head Drain Line Inspection and Evaluation Guidelines,” and either provide an enhancement for the Flow-Accelerated Corrosion Program to include these inspections or provide the bases for concluding that the prescribed inspections are not needed.

RAI B.1.22-6

Background. SRP-LR, Section A.1.2.3.10, “Operating Experience,” states that operating experience should result in appropriate program enhancements and can show where an existing program has succeeded and where it has failed (if at all) in intercepting aging degradation in a timely manner.

Calculation MC-Q1111-08011, “Evaluation of RF16 Flow-Accelerated Corrosion Wall Thickness Data,” Items 355 and 553, identified that the measured wall thickness was less than the specified minimum wall thickness. The projected life for each component indicated that the minimum wall thickness criterion was not met more than 3 years prior to the inspection.

Issue. While a condition report was initiated and the inspection scope was appropriately increased, based on the calculated wear rates, the staff questioned the effectiveness of the program because the planned inspections are typically scheduled to identify wall thinning and to repair or replace components before minimum wall thickness criterion is violated.

Request. Provide information discussing the circumstances surrounding the apparent weakness in scheduling inspections for Items 355 and 553 in the Flow-Accelerated Corrosion Program prior to RF16. Include information regarding any corrective actions or enhancements to the program taken as a result of these plant-specific operating experiences.

RAI B.1.22-7

Background. The GALL Report AMP XI.M17, "Flow-Accelerated Corrosion," states that the inspection schedule developed by the applicant on the basis of the results of a predictive code like CHECWORKS provides reasonable assurance that structural integrity will be maintained between inspections.

GGNS condition report CR2010-00823 described an error reported by Electric Power Research Institute (EPRI) in its CHECWORKS model software in which the wrong hours were used to calculate the predicted wear. The condition description stated that of the 122 instances where the specific software feature was used, only 7 wear rate analysis runs and components were potentially affected, and further evaluation concluded that there was no impact on the wear rate calculations. The condition report stated that CHECWORKS is only one of the tools used by the flow-accelerated corrosion engineer to determine component wear.

Issue. While other tools may be available to the flow-accelerated corrosion engineer to determine component wear, if there are errors in the CHECWORKS software, it was unclear to the staff what in-place process is used to determine component wear, such that errors in the CHECWORKS software model will be detected.

Request. Provide a description of any in-place process or verification method, which is used to determine component wear that could validate or detect errors in the CHECWORKS software, such that there is reasonable assurance structural integrity of components will be maintained between inspections.

RAI B.1.40-1

Background. The GALL Report AMP XI.M33, "Selective Leaching," "detection of aging effects" program element recommends that one-time inspections using visual and hardness measurement techniques should be conducted to detect selective leaching. The Selective Leaching Program Evaluation Report states that the program will include visual inspection and hardness measurements; however, the implementing procedure states that hardness testing or verification is conducted where possible.

Issue. It is not clear to the staff that the implementing procedure for the Selective Leaching Program is consistent with GALL Report AMP XI.M33 because the implementing procedure does not require hardness measurements in all cases due to the "where possible" modifier.

Request. State what methods will be used to confirm the absence of selective leaching when hardness measurements are not possible.

RAI B.1.40-2

Background. The GALL Report AMP XI.M33, "Selective Leaching," "corrective actions" program element recommends that unacceptable inspection findings will result in additional inspections being performed. The Selective Leaching Program Evaluation Report, "corrective actions" program element states that corrective actions of unacceptable inspection findings will be carried out in accordance with the corrective action program and that corrective actions will be consistent with NUREG-1801; however, the implementing procedure states that the cause evaluation and corrective actions for indications of selective leaching should include consideration of scope expansion.

Issue. It is not clear to the staff that the implementing procedure is inconsistent with GALL Report AMP XI.M33 because the implementing procedure states that scope expansion should be considered whereas the GALL Report recommends that unacceptable findings will result in further inspections.

Request. Confirm that, if selective leaching is detected in the one-time inspection proposed in the program, further inspections will be conducted to ensure that the extent of degradation is understood.

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

DISTRIBUTION:

HARD COPY:

DLR RF

E-MAIL:

PUBLIC [or NON-PUBLIC, if applicable]

RidsNrrDir Resource

RidsNrrDirRpb1 Resource

RidsNrrDirRpb2 Resource

RidsNrrDirRarb Resource

RidsNrrDirRapb Resource

RidsNrrDirRasb Resource

RidsNrrDirRerb Resource

RidsNrrDirRpob Resource

NFerrer

DDrucker

DWrona

DMorey

AWang

RSmith, RIV

BRice, RIV

DMcIntyre, OPA

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.

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

DISTRIBUTION: See following pages

ADAMS Accession No.:ML12094a009

OFFICE	LA:RPB1:DLR	PM:RPB1:DLR	BC:RPB1:DLR	PM:RPB1:DLR
NAME	YEdmonds	NFerrer	DMorey	NFerrer
DATE	04 / 13 / 12	04 / 13 / 12	04 / 25 / 12	04 / 25 / 12

OFFICIAL RECORD COPY