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

September 11, 2014

Mr. Kevin J. Mulligan
Vice President, Site
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE GRAND GULF NUCLEAR STATION LICENSE RENEWAL APPLICATION, SET 51 (TAC NO. ME7493)

Dear Mr. Mulligan:

By letter dated October 28, 2011, Entergy Operations, Inc. submitted an application pursuant to 10 CFR Part 54, to renew the operating license NPF-29 for Grand Gulf Nuclear Station, 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 Mr. Ted Ivy, and a mutually agreeable date for the response is within 60 days from the date of this letter. If you have any questions, please contact me at 301-415-3873 or e-mail John.Daily@nrc.gov.

Sincerely,

/RA/

John Daily, Senior 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: See next page

September 11, 2014

Mr. Kevin J. Mulligan
Vice President, Site
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE GRAND GULF NUCLEAR STATION LICENSE RENEWAL APPLICATION, SET 51 (TAC NO. ME7493)

Dear Mr. Mulligan:

By letter dated October 28, 2011, Entergy Operations, Inc. submitted an application pursuant to 10 CFR Part 54, to renew the operating license NPF-29 for Grand Gulf Nuclear Station, 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 Mr. Ted Ivy, and a mutually agreeable date for the response is within 60 days from the date of this letter. If you have any questions, please contact me at 301-415-3873 or e-mail John.Daily@nrc.gov.

Sincerely,

/RA/

John Daily, Senior 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 next page
ADAMS Accession No.: ML14238A620 *Concurred via e-mail

OFFICE	LA:DLR	PM:RPB1:DLR	BC:RPB1:DLR	PM:RPB1:DLR
NAME	*YEdmonds	JDaily	YDiaz-Sanabria	JDaily
DATE	9/8/14	9/11/14	9/11/14	9/11/14

OFFICIAL RECORD COPY

GRAND GULF NUCLEAR STATION
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION, SET 51

RAI 3.0.3-1-RIC-1

Background:

By letter dated May 13, 2014, Entergy responded to Request for Additional Information (RAI) 3.0.3-1, and addressed the recurring internal corrosion portion of LR-ISG-2012-02. In its response, Entergy stated that, based on a review of plant-specific operating experience from the last 5 years, microbiologically-influenced corrosion (MIC) is a recurring internal corrosion issue as defined in LR-ISG-2012-02. Entergy also stated that it monitors loss of material due to MIC in the following four systems of the facility: (1) standby service water (SSW) system, (2) plant service water (PSW) system, (3) circulating water system, and (4) fire protection – water system. In addition, Entergy modified LRA Section B.1.35, "Periodic Surveillance and Preventive Maintenance," (PSPM) to manage recurring internal corrosion in these systems and added aging management review (AMR) items in the corresponding system tables of the LRA.

In addition, Entergy amended the table in the program description for the PSPM program to include aging management activities associated with recurring internal corrosion. The amended table states that wall thickness measurements will use ultrasonic testing (UT) or other suitable techniques to identify loss of material due to MIC. The amended table also states that a minimum of five MIC degradation inspections would be performed per refueling cycle until MIC degradation no longer met the criteria for recurring internal corrosion. In addition, the amended table states that inspection locations would be "based on pipe configurations, flow conditions, and operating history to represent a cross-section of potential MIC sites," and these locations would be periodically reviewed to validate their relevance and usefulness. The response indicates that approximately 60 inspections have been performed in the last 5 years.

The staff notes that Section A.1.2.3.4, "*Detection of Aging Effects*," in NUREG-1800, Revision 2, "Standard Review Plan for License Renewal Applications for Nuclear Power Plants" (SRP-LR), states that when sampling is used to represent a larger population of components, the basis for the sample size should be provided, and the samples should be biased toward locations most susceptible to the aging effect of concern. The SRP-LR also states that provisions for expanding the sample size, when degradation is detected in the initial sample, should be included. The staff also notes that because the PSPM program is a plant-specific aging management program (AMP) which does not correspond with an AMP in the GALL Report, the LRA should contain a description of each program element.

Issue:

1. The response to RAI 3.0.3-1 states that MIC is monitored in the SSW, PSW, circulating water, and fire protection – water systems. However, the amended PSPM program also identifies the component cooling water (CCW) system as an additional system that will be monitored for MIC in response to the recurring internal corrosion issue.

ENCLOSURE

2. The amended AMP states that a minimum of five components will be inspected for MIC per refueling cycle until the criteria for recurring internal corrosion are not met. However, it is not evident if a minimum of five components will be inspected in each of the systems that were identified as being susceptible to recurring incidents of MIC or a minimum of five components in the collective set of systems that were identified as being susceptible to recurring incidents of MIC. The staff notes that if the current minimum sample size is a total of five inspections per refueling cycle, this appears to be substantially less than the average sample size that was inspected for the last 5 years. The staff also notes that the existing "detection of aging effects" program element for the PSPM program, states that a representative sample is 20 percent of the population with a maximum of 25 components. However, it is not evident if the sample size for recurring internal corrosion will be consistent with this because this program element did not provide any clarification for the recurring internal corrosion issue.
3. The SRP-LR states that the sample of components selected for examination should be biased towards those locations that are most susceptible to the specific aging effect of concern in the period of extended operation – in this case MIC. In contrast, the amended AMP states, in part, that inspection location selection is based on piping configurations, flow conditions, and operating history to select piping components in SSW, PSW, CCW, Circulating Water, and Fire Protection – Water Systems, and the sample will represent a cross-section of potential MIC sites. It is not evident how the application of these sample selection criteria will be used to rank SSW, PSW, CCW, Circulating Water, and Fire Protection – Water System components for susceptibility to MIC. Therefore the sampling criteria used to select components for inspection may not be inspecting components in these systems that are most susceptible to MIC degradation during the period of extended operation.
4. The amended AMP identifies that either UT or another suitable inspection technique will be used as the augmented inspection method for inspecting these components. However, the augmented inspection basis does not clarify which type of inspection techniques would be used if UT is not selected as the applicable non-destructive examination basis. The staff notes that the existing "detection of aging effects" program element states that established techniques such as visual inspections are used.
5. The amended AMP did not include any provisions for expanding the sample size or clarify the inspection expansion criteria that will be applied if further corrosion is detected in these systems as a result of implementing these augmented inspections.

<u>Request</u>:

1. Clarify whether MIC has ever been detected in the CCW system, and if so whether any consequent loss of material met the criteria specified in LR-IS-2012-02 for recurring internal corrosion. Since the CCW system will be monitored as part of the recurring internal corrosion issue, justify why the response did not propose any amendments of LRA Table 3.3.2-8, "Component Coolant Water System," and LRA Table 3.3.2-19-23, "Component Cooling Water System, Nonsafety-Related Components Affecting Safety-Related Systems," to include AMR items for recurring internal corrosion.
2. Clarify and justify whether the program will inspect a minimum of five piping component locations in each of the five systems (i.e., the SSW, PSW, CCW, Circulating Water, and

Fire Protection – Water Systems) that the program includes for recurring internal corrosion or whether the amended AMP will inspect only a minimum of five component locations in the collective set of systems that were identified as being susceptible to recurring occurrences of MIC.

3. Justify why the sample of components selected for monitoring loss of material due to MIC is directed only at a cross-section of potential MIC sites and is not being biased toward locations most susceptible to the aging effect of concern. Describe, clarify, and justify how the use of component configurations, system flows, and operating history will be used to rank piping components in SSW, PSW, CCW, Circulating Water, and Fire Protection – Water Systems for occurrences of MIC during the period of extended operation and how the ranking results will be used to pick components for UT inspection such that the sample set will not omit inspections of components that are considered to be highly susceptible to MIC.
4. Clarify and justify the alternative inspection method that will be applied to these components if UT will not be selected as the basis for performing the inspections.
5. Identify and justify any component inspection sample expansion criteria that will be applied to the inspections if further evidence of MIC or other corrosion effects are detected in these systems.

RAI 3.0.3-1-CUI-1

Background:

By letter dated May 13, 2014, the applicant amended LRA Table 3.3.2-7, "Standby Service Water System – Summary of Aging Management Evaluation," and LRA Table 3.3.2-9, "Plant Service Water System – Summary of Aging Management Evaluation," to include new plant-specific AMR items for managing corrosion-related effects (i.e., aging effects induced by condensation – corrosion under insulation) in insulated, safety-related piping and piping components of the SSW and PSW systems.

Issue:

In the letter of May 13, 2014, the applicant did not amend LRA Table 3.3.2-19-16, "Standby Service Water System, Nonsafety-Related Components Affecting Safety-Related Systems – Summary of Aging Management Evaluation," and LRA Table 3.3.2-19-19, "Plant Service Water System, Nonsafety-Related Components Affecting Safety-Related Systems – Summary of Aging Management Evaluation," to include AMR items analogous to those included for insulated, safety-related SSW and PSW piping components in LRA Tables 3.3.2-7 and 3.3.2-9. The staff needs clarification on why the AMR item bases for managing corrosion under insulation in insulated piping components of the SSW and PSW systems do not apply to LRA Tables 3.3.2-19-16 and 3.3.2-19-19 as well.

Request:

Provide your basis why LRA Table 3.3.2-19-16, "Standby Service Water System, Nonsafety-Related Components Affecting Safety-Related Systems – Summary of Aging Management Evaluation," and LRA Table 3.3.2-19-19, "Plant Service Water System, Nonsafety-Related

Components Affecting Safety-Related Systems – Summary of Aging Management Evaluation," have not been amended to include AMR items for nonsafety-related, insulated piping and piping components in the SSW and PSW systems analogous to those included for safety-related, insulated piping components in LRA Tables 3.3.2-7 and 3.3.2-9.

RAI 3.0.3-1-FWS-1

Background:

Exception Footnote 3 for LRA Section B.1.21 dated May 13, 2014, states that a "version" of a main drain test is conducted in each building on an annual basis. It also states that main header flow testing is conducted in seven loops that supply the standpipe system.

Exception No. 4 states that more than 30 main drain tests are performed throughout the plant.

Issue:

Given the use of the term "version," it is not clear to the staff how main drain tests are conducted and, as a result, whether the tests have the capability to detect potential flow blockage. In addition, Exception No. 4 did not state the periodicity of conducting the 30 main drain tests and header flow tests.

Request:

1. State how main drain tests are conducted in comparison to NFPA 25 (2011 Edition) Sections 6.3.1.5 and 13.2.5 including details such as test location, parameters monitored, acceptance criteria, and how test results are trended.
2. Where test details differ from those stated in NFPA 25, state the basis for why the alternative testing will be equally effective at detecting flow blockage.
3. State the periodicity of conducting the 30 main drain tests. If the periodicity is longer than a year, state the basis for why potential flow blockage will be detected prior to the fire water system not being able to perform its current licensing basis intended function(s).
4. State the periodicity of conducting the header flow testing. If the periodicity is longer than 5 years, state the basis for why potential flow blockage will be detected prior to the fire water system not being able to perform its current licensing basis intended function(s).

RAI 3.0.3-1-FWS-2

Background:

Exception No. 6 for LRA Section B.1.21 dated May 13, 2014, states that adhesion testing in accordance with ASTM D 3359, "Standard Test Methods for Measuring Adhesion by Tape Test," is not performed on fire water storage tank internal coatings. In addition, the exception states that holiday testing and ultrasonic thickness checks or mechanical measurements of any identified corroded areas are conducted. An enhancement contains a list of tests and inspections that will be conducted on the internal surfaces of the fire water storage tank.

Issue:

The staff noted that NFPA 25 Section 9.2.7 specifies vacuum box testing for flat bottom tanks; however, it is not stated as being performed in either Exception No. 6 or the enhancement.

Request:

1. Clarify whether vacuum box testing will be conducted in accordance with NFPA 25 Section 9.2.7, item (6). If not, provide the basis for why there is reasonable assurance that the current licensing basis intended function(s) of the fire water storage tank will be met during the period of extended operation.
2. If adhesion testing will not be conducted, state the basis for why there is reasonable assurance that the current licensing basis intended function(s) of the fire water storage tank will be met during the period of extended operation.

RAI 3.0.3-1-FWS-3

Background:

Exception No. 7 for LRA Section B.1.21 dated May 13, 2014, states that full flow deluge valve testing for the deluge valves associated with the charcoal filters is not conducted. The footnote for the exception states that: (a) the deluge valves associated with the control room fresh air charcoal filters are trip tested, but not at full flow; and (b) the deluge systems associated with the auxiliary building standby containment cooling system and containment vent charcoal filters are not trip tested due to the potential for water damaging the charcoal in the filter units. An enhancement states that the nozzles are inspected when charcoal is replaced.

Issue:

The staff noted that NFPA 25 Section 13.4.3.2.2.5(A) states: "[w]here the nature of the protected property is such that water cannot be discharged, the nozzles or open sprinklers shall be inspected for correct orientation and the system tested with air to ensure that the nozzles are not obstructed." Therefore, testing could be conducted consistent with LR-ISG-2012-02 AMP XI.M27 without wetting charcoal filter media. It is not clear to the staff how it will be demonstrated that flow blockage is not occurring when either testing is conducted at less than full flow rate or inspections are conducted in lieu of flow testing.

Request:

1. State the basis for why full flow testing of deluge valves cannot be conducted in accordance with NFPA 25.
2. State the basis for why there is reasonable assurance that flow blockage will be detected when full flow deluge valve testing is not conducted.

RAI 3.0.3-1-FWS-4

Background:

An enhancement to LRA Section B.1.21 dated May 13, 2014, states that the Fire Water System program will be enhanced to include periodic inspections that will be performed by opening a flushing connection at the end of **one** [emphasis added by NRC] main in each structure containing in-scope water-based fire suppression systems.

Issue:

The staff notes that NFPA 25, Section 14.2.2 specifies an internal inspection of every other wet pipe system (in buildings with multiple wet pipe systems) and that the alternate systems (not inspected during the previous inspection) be inspected during the next inspection. Since the response only stated that **one** main in each structure will be opened, it is not clear whether there are multiple wet pipe systems in any of the structures containing in-scope fire water systems and, if so, whether all wet pipe systems will be inspected as stated in NFPA 25.

Request:

State whether there are multiple wet pipe systems in any of the structures containing in-scope fire water systems and, if there are, whether internal inspections will be conducted as stated in NFPA 25, Section 14.2.2, or provide the basis for not conducting the internal inspections on every other wet pipe system every 5 years.

RAI 3.0.3-1-FWS-5

Background:

The “parameters monitored/inspected” and “detection of aging effects” program elements of LR-ISG-2012-02 AMP XI.M27 state that, when visual inspections are used to detect loss of material, the inspection technique should be capable of detecting surface irregularities that could indicate wall loss to below nominal pipe wall thickness due to corrosion and corrosion product deposition and, where such irregularities are detected, follow-up volumetric wall thickness examinations are performed.

Issue:

The staff noted that there are no exceptions or enhancements associated with this recommendation.

Request:

Clarify whether this recommendation in LR-ISG-2012-02 AMP XI.M27 is incorporated into the program, and if not, provide the basis for the exception.

RAI 3.0.3-1-FWS-6

Background:

The “parameters monitored/inspected” and “detection of aging effects” program elements of LR-ISG-2012-02 AMP XI.M27 state that periodic visual or flow tests and volumetric inspections should be conducted on portions of water-based fire protection system components that have been wetted but are normally dry, such as dry-pipe or preaction sprinkler system piping and valves.

Issue:

The staff noted that there are no exceptions or enhancements associated with this recommendation.

Request:

Clarify whether this recommendation in LR-ISG-2012-02 AMP XI.M27 is incorporated into the program, and if not, provide the basis for the exception.

RAI 3.0.3-1-FWS-7

Background:

LRA Section A.1.21 does not state: (a) NFPA 25 (2011 Edition) as a reference for testing and inspections; (b) that testing or replacement of sprinklers that have been in place for 50 years will be performed in accordance with the 2011 Edition of NFPA 25; and (c) that periodic visual or flow tests and volumetric inspections should be conducted on portions of water-based fire protection system components that have been wetted but are normally dry.

Issue:

The licensing basis for this program for the period of extended operation may not be adequate if this information is not incorporated into the updated final safety analysis report (UFSAR) supplement.

Request:

Provide justification for why LRA Section A.1.21 sufficiently describes the licensing bases for the activities described above.

RAI 3.0.3-2a

Background:

1. The response to RAI 3.0.3-2 dated May 13, 2014, states that subsequent coating inspections will be based on the initial inspection results. The response further indicates that, if no indications are found during inspection of one train, the redundant train need not be inspected during that inspection interval, and the subsequent inspection would be on the redundant train.
2. The response to RAI 3.0.3-2 dated May 13, 2014, states, "[a]n individual knowledgeable and experienced in nuclear coatings work will prepare a coating report." In addition, LRA Section B.1.35 was revised to state that the results of previous inspections are reviewed prior to conducting a coating inspection.
3. The response to RAI 3.0.3-2 dated May 13, 2014, states that if base metal is exposed and accompanied by accelerated corrosion, a volumetric examination will be performed to ensure there is sufficient wall thickness so that the component can perform its current licensing basis intended function until the next inspection.
4. The response to RAI 3.0.3-2 dated May 13, 2014, states, "[c]orrective actions for unacceptable inspection findings will be determined in accordance with the Grand Gulf Nuclear Station 10 CFR 50, Appendix B, Corrective Action Program (CAP)."
5. LRA Section B.1.35 lists the program elements that are required to be enhanced for the Periodic Surveillance and Preventive Maintenance Program. The "monitoring and trending" program element includes new requirements necessary to effectively manage

loss of coating integrity; however, this program element is not listed in the list of affected program elements.

Issue:

1. Redundant trains do not always have identical coatings installed to the same requirements. Redundant trains may also operate with different operating conditions due to factors such as flow distributions within headers. In addition, turbulent conditions may have different impacts in redundant trains due to localized differences in configuration (e.g., distance away from a control valve). As such, the proposal to not inspect redundant trains during that inspection interval lacks sufficient justification for the staff to conclude that there is reasonable assurance that the current licensing basis intended function(s) of in-scope components will be met.

2. In regard to monitoring and trending of the results of coating inspections:

    a. Regulatory Guide (RG) 1.54, "Service Level I, II, and III Protective Coatings Applied to Nuclear Plants," provides the staff position for training and qualification of individuals involved in coating activities. ASTM D7108, "Standard Guide for Establishing Qualifications for a Nuclear Coatings Specialist," referenced in RG 1.54, provides unique requirements for individuals that perform actions beyond inspecting coatings. These actions include resolving and dispositioning issues that arise during the performance of coating and lining work, and generating written assessment reports. As used in the response to the RAI, the term "an individual knowledgeable and experienced in nuclear coatings work" lacks sufficient specificity for the staff to conclude that the individual who will prepare coating reports will be appropriately qualified to perform the task.

    b. The staff noted that, while the Periodic Surveillance and Maintenance Program was revised to state that the results of previous inspections are reviewed prior to conducting a coating inspection, neither the Fire Water System nor Service Water Integrity programs include this detail.

    c. The staff also noted that the Fire Water System program does not identify what information will be included in the inspection reports.

    Coatings work, similar to welding and other processes, is generally classified as a special process because the only way to provide reasonable assurance that the coated component will perform its intended function and not impact downstream in-scope components is to monitor the process. As stated in 10 CFR Part 50 Appendix B Criterion IX, "Control of Special Processes," personnel involved in special processes should be qualified. Likewise, ISO [International Organization for Standardization] 9001-2008, "Quality Management System Requirements," paragraph 7.5.2 states that personnel involved in such processes should be qualified. The staff noted that the qualification of individuals conducting coatings inspection related activities (e.g., inspections, evaluation of inspection findings) is not reflected in the current licensing basis.

3. The staff noted that the RAI response states that a volumetric examination will be performed if there is evidence of accelerated corrosion; however, if coatings are credited for corrosion prevention (e.g., corrosion allowance in design calculations is zero, the "preventive actions" program element credited the coating) and the base metal has been exposed or it is beneath a blister, the component's base material in the vicinity of the

degraded coating should be examined to determine if the minimum wall thickness is met and will be met until the next inspection. The staff lacks sufficient information to conclude that "evidence of accelerated corrosion" is an acceptable criterion for conducting followup volumetric examinations.

The staff also noted that the Fire Water System Program does not include acceptance criteria for loss of coating integrity.

4. The staff lacks sufficient information to evaluate the adequacy of corrective actions associated with loss of coating integrity. For example, the response does not state whether coatings that do not meet the acceptance criteria will be repaired or replaced and what testing or examination will be conducted to ensure that the extent of repaired or replaced coatings encompasses sound coating material.

5. By not listing the "monitoring and trending" program element as one of the program elements requiring enhancement for the Periodic Surveillance and Preventive Program, the staff cannot be certain that the new requirements will be incorporated into plant-specific implementing documents.

<u>Request:</u>

1. Provide a justification for why inspection results on one train are sufficiently representative of the coating condition on redundant train(s) such that it is acceptable to extend the inspection interval for redundant train(s) when no indications are found during the inspection of the initial train.

2. Respond to the following:

    a. State the specific qualifications for the individual that prepares the coating report for the Periodic Surveillance and Preventive Maintenance, Fire Water System, and Service Water Integrity programs; update the UFSAR Supplements accordingly.

    b. State how the results of coatings inspections will be monitored and trended for the Service Water Integrity Program.

    c. State how the results of coatings inspections will be monitored, trended, and reported for the Fire Water System Program.

    State whether qualifications for individuals conducting coatings inspection activities, in all three of the above programs, will be reflected in the current licensing basis. If the licensing basis will not include qualification requirements, state the basis for why there will be adequate controls to ensure that the appropriate personnel will conduct coatings inspection related activities.

3. State the basis for why conducting volumetric wall thickness examinations of components only when the extent of loss of material is characterized as "accelerated corrosion" is sufficient to provide reasonable assurance that the current licensing basis intended function(s) of components with exposed base metal or base metal in the vicinity of a blister will be met. State the acceptance criteria that will be used by the Fire Water System Program for loss of coating integrity.

4. State the specific corrective actions that will be taken when inspection results do not meet acceptance criteria.

5. Clarify whether the Enhancements section of LRA Section B.1.35 will include the "monitoring and trending" program element as being an "Element Affected." If not, state how it will be ensured that these new requirements will be incorporated into plant-specific implementing documents.

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE GRAND GULF NUCLEAR STATION, LICENSE RENEWAL APPLICATION, SET 51 (TAC ME7493

DISTRIBUTION: Via Listserv

HARD COPY:

DLR RF

E-MAIL:
PUBLIC
RidsNrrDlr Resource
RidsNrrDlrRpb1 Resource
RidsNrrDlrRpb2 Resource
RidsNrrDlrRarb Resource
RidsNrrDlrRasb Resource
RidsNrrPMGrand Gulf Resource

JDaily
DDrucker
BWittick
YDiaz-Sanabria
AWang
RSmith, RIV
BRice, RIV
DMcIntyre, OPA