Phyllis

From: Clark, Phyllis
Sent: Monday, April 17, 2017 2:12 PM
To: 'mchisum@entergy.com'
Cc: 'jjarrel@entergy.com'; 'dfrey@entergy.com'; 'lmurr91@entergy.com'; 'GYOUNG4 @entergy.com'; 'Dlach@entergy.com'; 'ataylo1@entergy.com'; 'aharris@entergy.com'; 'Milster, Leia Elizabeth'; Ramirez, Frances; Speer, Chris; Wittick, Brian; Morey, Dennis; RidsNrrDlr Resource; RidsNrrDlrRpb1 Resource; RidsNrrDlrRerb Resource; RidsNrrDlrRarb Resource; RidsNrrDlrRasb Resource; RidsNrrDlrRsrg Resource; RidsNrrPMWaterford Resource; RidsRgn4MailCenter Resource; Folk, Kevin; Keegan, Elaine; Buford, Angela; Prinaris, Andrew; Wong, Albert; Huynh, Alan; Sweat, Tarico; Medoff, James; Gavula, James; Lopez, Juan; Cuadrado de Jesus, Samuel; Min, Seung; Obadina, Sarah; Sadollah, Mohammad; Rogers, Billy; Brittner, Donald; Fu, Bart; Allik, Brian; Lehman, Bryce; Gardner, William; Thomas, George; Mink, Aaron; Doutt, Clifford; Holston, William; Yoo, Mark; Pulvirenti, April; McIntyre, David; Burnell, Scott; Moreno, Angel; Kennedy, Kriss; Scott, Catherine; Yoder, Matthew; Bloom, Steven
Subject: REF: WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – RAI SET 17 (CAC NO. MF7492)
Attachments: Waterford 3 LRA RAI Set 17 (Final 4 10 2017).docx

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

Mr. Michael R. Chisum
Site Vice President
Entergy Operations, Inc.

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – SET 17 (CAC NO. MF7492)

Dear Mr. Chisum:

By letter dated March 23, 2016, Entergy Operations, Inc. submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, to renew the operating license NPF-38 for Waterford Steam Electric Station, Unit 3. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing the information contained in the license renewal application and has identified areas where additional information is needed to complete the review.

The enclosed requests for additional information were discussed with Mr. Alan Harris 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 301-415-6447 or by e-mail at Phyllis.Clark@nrc.gov.

Sincerely,

Phyllis Clark

Phyllis Clark, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure:
As stated

cc: Listserv

ADAMS Accession No.: **ML17101A443** ***via email**

OFFICE	PM:RGPB:DLR	BC:RPRB:DLR	Acting BC:RPGB:DLR	PM:RPGB:DLR
NAME	PClark	DMorey*	SBloom*	PClark
DATE	4/10/2017	4/10/2017	4/11/2017	4/17/2017

WATERFORD STEAM ELECTRIC STATION, UNIT 3

LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION – SET 17

(CAC NO. MF7492)

RAI 4.3.3-2a

Background:

By letter dated October 12, 2016, the staff issued RAI 4.3.3-2, requesting the applicant to provide additional information on its methodology to identify and evaluate plant-specific locations for environmentally-assisted fatigue (EAF). By letter dated December 12, 2016, the applicant responded to RAI 4.3.3-2 stating that its methodology will be based on EPRI Report 1024995, "Environmentally Assisted Fatigue Screening, Process and Technical Basis for Identifying EAF Limiting Locations." The applicant stated that this screening process will determine the "sentinel" locations that will bound and appropriately represent each thermal zone.

Per 10 CFR 54.29(a)(1), the staff needs reasonable assurance that the effects of aging will be managed for the period of extended operation. In addition, per SRP-LR Section 4.3.2.1.3, the applicant should address the effects of the coolant environment on component fatigue life. One acceptable approach (which the applicant is using) is to assess the impact on a sample of critical components. This sample should include, as a minimum, those selected in NUREG/CR 6260. Applicants should also consider adding additional plant specific component locations if the locations might be more limiting than those in NUREG/CR-6260.

The applicant has not provided reasonable assurance that their methodology will successfully and appropriately identify plant-specific component locations that may be more limiting than those identified in NUREG/CR 6260.

Issue:

As of April 2016, EPRI Technical Report 1024995 has not been submitted to the NRC for review and approval and, therefore, has not been endorsed by the NRC. The applicant did not define a plant-specific methodology and criteria to select the most limiting locations for EAF. The licensee has not demonstrated that a plant-specific screening methodology has been developed in a manner that conservatively evaluates EAF effects, with the same degree of analytical rigor for all locations, to identify the bounding locations.

For the step in the methodology that computes the estimated EAF value (U_{en}*), the applicant stated that it will calculate U_{en}* using a fatigue correction factor (F_{en}) that is the average of the F_{en} determined for the strain rate of the predominant thermal transient and the maximum F_{en} determined by the minimum strain rate. The term predominant thermal transient is not defined, nor how the predominant thermal transient will be determined for each component. Further, the applicant does not provide a basis for why the resulting U_{en}* is a conservative value that can be used to compare the locations in an appropriate manner. Also, within each thermal zone, the applicant stated that "the CUF values are determined on a common basis (i.e., unbundled transients) so that valid rankings can be achieved." The staff is unclear what specific

parameters will be used. The staff needs additional information to determine if the components will be assessed similarly.

For the step in the methodology that examines the relative rankings and selects the sentinel locations, the staff also needs additional information to determine if the applicant selection of sentinel locations within a thermal zone is conservative and appropriate. The applicant did not define the specific selection criteria in its "further study" to determine the sentinel locations. Also, the staff is unclear on the term, "close-coupled," in terms of determining the number of sentinel locations within a thermal zone.

The applicant also did not clarify if material type is one of the criteria when selecting sentinel locations (i.e., a sentinel location of one material can bound a location of a different material within a thermal zone). The staff noted that the U_{en}* of different materials may respond differently when the EAF is being refined in the future. The staff noted that refinement of the U_{en}* value sentinel location of one material may not correspond to an equivalent reduction of the U_{en}* value of a bounded location of a different material. The applicant did not justify that the refinement of the higher U_{en}* of one material would ensure the reduction of U_{en}* values for another material within the same transient section.

Request:

1. Confirm if components in different thermal zones will be compared to each other. If they will be or can be, describe the methodology that will be used to make the comparison, including any assumptions, and provide a technical justification that the comparison can be made in an appropriate manner.

2. For the step in the methodology that compares locations within a thermal zone:
    a. Define the term, "predominant thermal transient," and how it will be determined for each component.
    b. Justify that calculating the U_{en}* using an average F_{en} is conservative and appropriate.
    c. In addition to use of unbundled transients, define other relevant parameters that will be used to ensure that the CUF values can be determined on a common basis (i.e., amount of rigor, use of the same ASME code fatigue curves).
    d. Justify that the parameters used above will provide a conservative and appropriate comparison between locations within the same thermal zone.

3. For the step in the methodology that selects sentinel locations:
    a. Define the term, "close-coupled," and how it will be applied in determining the number of sentinel locations within a thermal zone.
    b. Provide the selection criteria that will be applied to each thermal zone to select the sentinel locations.
    c. If material type is not a selection criterion (i.e., a sentinel location of one material can bound a location of a different material within a thermal zone), justify that the refinement of the U_{en}* value of a sentinel location of one material would ensure the reduction of the U_{en}* of a bounded location of a different material.