Phyllis

From: Clark, Phyllis
Sent: Monday, November 07, 2016 11:30 AM
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 C; Speer, Chris; Diaz-Sanabria, Yoira K; Wittick, Brian; Morey, Dennis; RidsNrrDlr Resource; RidsNrrDlrRpb1 Resource; RidsNrrDlrRerb Resource; RidsNrrDlrRarb Resource; RidsNrrDlrRasb Resource; RidsNrrDlrRsrg Resource; RidsNrrPMWaterford Resource; 'RidsRgn4MailCenter@nrc.gov'; Folk, Kevin; Keegan, Elaine; Mitchell, Jeffrey; Buford, Angela; Prinaris, Andrew; Wong, Albert; Huynh, Alan; Akhavannik, Huda; Sweat, Tarico; Medoff, James; Gavula, James; Lopez, Juan; Cuadrado de Jesus, Samuel; Min, Seung K; 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
Subject: REF: WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – RAI SET 5 (CAC NO. MF7492)
Attachments: WATERFORD 3 LRA Set 5 Enclosure (Final 11 7 2016).docx

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

Mr. Michael R. Chisum
Site Vice President

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE WATERFORD STEAM ELECTRIC STATION, UNIT 3, LICENSE RENEWAL APPLICATION – SET 5 (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 with the exception of RAI 4.2.3-1. RAI 4.2.3-1 has a response time of 60 days. 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.: **ML16307A006** ***via email**

OFFICE	PM:RPB1:DLR	BC:RARB:DLR	BC:RASB:DLR	BC:RPB1:DLR	PM:RPB1:DLR
NAME	PClark	DMorey*	BWittick*	YDiaz-Sanabria*	PClark
DATE	10/24/2016	10/14/2016	10/6/2016	11/7/2016	11/7/2016

WATERFORD STEAM ELECTRIC STATION, UNIT 3
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION – SET 5
(CAC NO. MF7492)

RAI 3.1.2-1

Background:

Table 3.1.2-4 of the LRA lists several carbon steel steam generator components externally exposed to indoor air with no aging affect or AMP identified. These AMR items cite generic note G and plant-specific note 105, which states that high component surface temperatures preclude moisture accumulation that could result in corrosion.

These carbon steel components are located in the containment air environment, which, as identified in other AMR items, is an environment of air with borated water leakage. Table 3.0-1 of the LRA shows that an air with borated water leakage environment is similar to the air-indoor uncontrolled environment. Table IX.D of the GALL Report describes the air-indoor uncontrolled environment as associated with systems with temperatures above the dew point where the surfaces of components may be wetted, but only rarely.

Issue:

During refueling outages, these components will be at ambient temperatures, which may or may not be above the dew point. Therefore, they may be susceptible to a condensation environment during outages. The GALL Report recommends that GALL Report AMP XI.M36, "External Surfaces Monitoring of Mechanical Components," be used to manage loss of material due to general, pitting, and crevice corrosion for steel components exposed to uncontrolled indoor air.

Request:

Provide the technical basis or operating experience to justify why loss of material due to general, pitting, and crevice corrosion is not an applicable aging effect for the subject steam generator components, given that, during normal plant events such as refueling outages, particularly during prolonged outages, if any, these components will be at or near ambient temperatures. Alternatively, provide AMR items that describe how this aging effect will be managed.

RAI 3.3.2.3.4-1

Background:

LRA Table 3.3.2-4 states that for plastic regulator bodies and filter bodies exposed to condensation (internal) and indoor air (external) there is no aging effect and no AMP is proposed. The AMR item cites generic note F.

Issue:

During the audit the staff interviewed the applicant. The applicant stated that it could not determine the components' plastic material type. They also stated that the components are located in the main control room and are portions of the compressed air system interface with the breathing air system. The staff noted that plastics in general are susceptible to degradation due to exposure to environmental factors such as temperature, radiation, ozone, sunlight, oxidation, and ultraviolet light (GALL Report Chapter IX.E, "Use of Terms for Aging").

Request:

Confirm the portion of the air system in which the regulators and filters are installed and the location of the components.

State the basis for why environmental factors including temperature, radiation, ozone, sunlight, oxidation, and ultraviolet light will not cause degradation of the components.

RAI 4.2.3-1

Background:

LRA Section 4.2.3 describes the applicant's evaluation of the time-limited aging analysis on pressurized thermal shock (PTS). During the audit, the staff noted that the following report describes more detailed information on the PTS analysis: WCAP-18002-NP, Revision 0, "Waterford Unit 3 Time-Limited Aging Analysis on Reactor Vessel Integrity," dated July 2015.

WCAP-18002-NP, Revision 0, indicates that the initial unirradiated reference temperature (called $RT_{NDT(U)}$ or initial RT_{NDT}) of lower shell plate M-1004-2 is updated from 22 °F to 0 °F. The WCAP report also indicates that this update is based on drop-weight and transverse-orientation Charpy V-notch test data per ASME Code Section III, NB-2300 in comparison with the previously determined value (22 °F) based on NRC Branch Technical Position (BTP) MTEB 5-2, which is comparable to the current BTP 5-3 in NUREG-0800, 2007.

The staff also noted that the previously determined initial RT_{NDT} value (22 °F) is described in Section 5 of WCAP-16088-NP, Revision 1, "Waterford Unit 3 Reactor Vessel Heatup and Cooldown Limit Curves for Normal Operation," dated September 2003 (ADAMS ML041620063).

Issue:

The LRA, including LRA Table 4.2-3, does not describe a specific provision of ASME Code Section III, NB-2331 that the applicant used in updating the initial RT_{NDT} of lower shell plate M-1004-2. In a similar manner, the staff noted that additional information is necessary to clarify whether the applicant's test data were adequately used in updating the initial RT_{NDT} values for the following beltline materials: (a) intermediate shell plates M-1003-1, M-1003-2 and M-1003-3; and (b) lower shell plates M-1004-1 and M-1004-3.

Request:

In order to demonstrate that the applicant's test data were adequately used in updating the initial RT_{NDT} of the beltline materials discussed above, describe the specific provision of ASME Code Section III, NB-2331 that the applicant used. As part of the response, provide the temperature (T_{Cv}) representing a minimum of 50 ft-lb absorbed energy and 35 mil lateral expansion as obtained in transverse-orientation Charpy V-notch tests for each material if such temperature was determined in the evaluation of material properties.

RAI 3.1.2.2.6.2-1

Background:

SRP-LR Section 3.1.2.2.6.2 recommends further evaluation to manage cracking due to stress corrosion cracking (SCC) in Class 1 PWR cast austenitic stainless steel (CASS) reactor coolant system piping, piping components, and piping elements exposed to reactor coolant. The SRP-LR indicates that SCC could occur in CASS components that do not meet the NUREG-0313, Revision 2, guidelines for ferrite and carbon content.

LRA Section 3.1.2.2.6.2 states that cracking due to SCC in these components will be managed by the Water Chemistry Control – Primary and Secondary and Inservice Inspection Programs. The LRA states that the Inservice Inspection Program provides qualified inspection techniques to monitor cracking.

Issue:

The applicant did not provide its methodology that will be used to identify CASS Class 1 reactor coolant system piping, piping components, and piping elements that do not meet the NUREG-0313 guidelines for ferrite and carbon content. In addition, the applicant did not provide enough information about the "qualified inspection techniques" within the Inservice Inspection Program that will monitor cracking.

Request:

1. Provide and justify the methodology used to identify CASS Class 1 reactor coolant system piping, piping components, and piping elements that do not meet the NUREG-0313 guidelines for ferrite and carbon content.

2. Provide the inspection methodology, including inspection technique and frequency that will be used to detect and monitor cracking of these components. Justify that this inspection methodology will be adequate to detect and monitor cracking due to SCC during the period of extended operation.

RAI B.1.31-1

Background:

The “scope of program” program element of the license renewal application (LRA) Aging Management Program (AMP) states that the Protective Coating Monitoring and Maintenance Program manages the effects of aging on Service Level I coatings applied to external surfaces of carbon steel and concrete inside containment. The Generic Aging Lessons Learned (GALL) Report AMP recommends that the minimum scope of the program include Service Level I coatings applied to steel and concrete surfaces inside containment to minimize degradation of coatings that can lead to clogging of Emergency Core Cooling Systems suction strainers. This ensures operability of post-accident safety systems that rely on water recycled through the containment sump/drain system.

Issue:

It is not clear to the staff that the scope of the LRA AMP is consistent with the scope of the NUREG-1801 Protective Coating Monitoring and Maintenance Program since the licensee’s inspection program documents do not specify the surfaces to be inspected. In addition, in response to Generic Letter 2004-02 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080650615), the licensee described indeterminate coatings, and indicated that all failed coatings are assumed to transport completely to the sump. Therefore, it is not clear to the staff how failed coatings are addressed in the licensee’s inspection program to effectively manage coatings inside containment.

Request:

Please describe the coatings that are included within the scope of inspections consistent with your LRA AMP. Your description should include a discussion of how inspection findings are used to quantify degraded coatings, unqualified coatings, and indeterminate coatings for comparison to assumptions in sump screen performance analyses. Finally, you should also describe how available margins are adequate to allow for further coating degradation prior to the next inspection.

RAI B.1.31-2

Background:

During an audit conducted during the week of July 11, 2016, the licensee provided information to the staff regarding coating degradation found in containment. The failed coating system was Carboline Carbo Zinc 11 (CZ11) primer top coated with Carboline Phenoline 305. The licensee stated that the failure mechanism was splitting of CZ11 primer leaving only CZ11 primer on the substrate; however, a formal root cause evaluation had not been performed or was not readily available.

Issue:

It is not clear to the staff that the operating experience for the licensee's Service Level I coatings is consistent with industry operating experience since a root cause evaluation was not performed to determine the reason for the splitting of the CZ11 primer.

Request:

Please describe actions taken to determine the root cause of CZ11 primer degradation in containment, including means for ensuring that coatings currently categorized as qualified are not susceptible to the same failure mechanism.

RAI B.1.31-3

Background:

The “acceptance criteria” program element of the LRA AMP states that the Protective Coating Monitoring and Maintenance Program meets the technical basis of American Society for Testing and Materials (ASTM) D 5163-08 and provides an effective method to assess coating condition through visual inspections. The GALL Report AMP recommends additional ASTM and other recognized test methods, in addition to visual inspections, for use in characterizing the severity of observed coating defects and deficiencies.

Issue:

It is not clear to the staff that these LRA AMP statements are consistent with implementation since it appears that the licensee has not performed additional tests (e.g., adhesion tests) to properly bound degradation of Service Level I Coatings that are present in the containment building.

Request:

Significant quantities of degraded coatings have been identified by the licensee through visual assessment. Specifically, condition reports reviewed by the staff during the audit (CR-WF3-2005-02046, CR-WF3-2011-02987, and CR-WF3-2015-08489) showed that additional quantities of degraded coatings are identified through inspections each outage. Given the apparent active degradation of the coatings, please describe actions taken to determine the extent of condition, including any physical testing that has been performed, or is planned, in order to determine if the degradation extends beyond that identified by visual assessment.

RAI 3.2.2.2-1

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function will be maintained consistent with the current licensing basis for the period of extended operation. As described in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," and when evaluation of the matter in the GALL Report applies to the plant.

The LRA states that the Water Chemistry Control-Primary and Secondary program will be consistent with GALL Report AMP XI.M2, "Water Chemistry." GALL Report AMP XI.M2 recommends a verification of the effectiveness of the chemistry control program, such as GALL Report AMP XI.M32, "One-Time Inspection," to ensure that significant degradation is not occurring and the component's intended function is maintained during the period of extended operation.

Issue:

LRA Table 3.2.2-2 states that the nickel alloy thermowell exposed to treated borated water will be managed by the Water Chemistry Control-Primary and Secondary program for loss of material. The line item in question does not have a plant-specific note indicating that it will be included in the One-Time Inspection program inspection sample, as recommended by GALL Report AMP XI.M2.

Request:

Confirm that a one-time inspection program such as GALL Report, AMP XI.M32, "One-Time Inspection," will be used to verify the effectiveness of the Water Chemistry Control-Primary and Secondary program for managing loss of material by including the nickel alloy thermowell in the One-Time Inspection program or provide the bases for not including the item in question in the One-Time Inspection program.

RAI 3.3.2.7-1

Background:

Section 54.21(a)(3) of 10 CFR requires the applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function will be maintained consistent with the current licensing basis for the period of extended operation. As described in the Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, an applicant may demonstrate compliance with 10 CFR 54.21(a)(3) by referencing the GALL Report and when evaluation of the matter in the GALL Report applies to the plant.

Element 4 of GALL Report AMP XI.M30, "Fuel Oil Chemistry," states that, "Prior to the period of extended operation, a one-time inspection (i.e., AMP XI.M32) of selected components exposed to diesel fuel oil is performed to verify the effectiveness of the Fuel Oil Chemistry program."

Issue:

The LRA states that the Diesel Fuel Monitoring program will be consistent with the program described in NUREG-1801, Section XI.M30, Fuel Oil Chemistry. LRA Table 3.3.2-7 includes stainless steel heat exchanger tubes exposed to fuel oil that will be managed by the Diesel Fuel Monitoring program for reduction of heat transfer. However, GALL Report AMP XI.M30 only manages loss of material and does not include reduction of heat transfer; it is unclear how the Diesel Fuel Monitoring program will be effective in managing the reduction of heat transfer.

Additionally, the staff notes that other aging effects are being verified by GALL Report, AMP XI.M32, "One-Time Inspection," as indicated by a plant-specific note in the aging management review results tables. The line item in question does not include the plant-specific note for using the One-Time Inspection program to verify effectiveness of the Diesel Fuel Monitoring program. It is unclear whether the effectiveness of the program will be verified for reduction of heat transfer.

Request:

1. Provide the technical bases to demonstrate that reduction of heat transfer for the heat exchanger tubes in question will be adequately managed by the Diesel Fuel Monitoring program.

2. Confirm that the One-Time Inspection program will verify the effectiveness of the Diesel Fuel Monitoring program for managing reduction of heat transfer or provide the bases for not needing this verification.