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

June 22, 2012

Mr. Adam C. Heflin
Senior Vice President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE CALLAWAY PLANT, UNIT 1, LICENSE RENEWAL APPLICATION (TAC NO. ME7708)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 for renewal of Operating License NPF-30 for the Callaway Plant, Unit 1. The staff of the U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing this application in accordance with the guidance in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants." During its review, the staff has identified areas where additional information is needed to complete the review. The staff's requests for additional information are included in the enclosure. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Sarah G. Kovaleski, of your staff, 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 301-415-2946 or by e-mail at Samuel.CuadradoDeJesus@nrc.gov.

Sincerely,

Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
As stated

cc w/encl: Listserv

CALLAWAY PLANT, UNIT 1
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

LRA Section B3.1 – Fatigue Monitoring

RAI B3.1-1

Background:

License renewal application (LRA) Section B3.1 identifies an enhancement to the "preventive actions" program element of the Fatigue Monitoring Program. Specifically, it states that "[p]rocedures will be enhanced to require the review of the temperature and pressure transient data from the operator logs and plant instrumentation to ensure actual transient severity is bounded by the design and to include environmental effects where applicable."

The staff noted that the applicant's program is an existing program, which has been monitoring transients since initial plant startup.

Issue:

The staff noted that an essential part of a Fatigue Monitoring Program is to ensure that the design severity of a transient is not exceeded during plant operation; therefore, considering this enhancement to the program, it is not clear to the staff how the applicant ensures accumulated transients from initial plant start up will be bounded by the design transients prior to procedure enhancement.

Request:

(a) Explain how the existing program ensures that transients from initial plant startup are either bounded by the design transient or accurately captured by the Fatigue Monitoring Program.

(b) If a reconciliation or verification of transient severity was performed to obtain a baseline, justify that the Fatigue Monitoring Program includes an accurate account of transients that occurred such that fatigue will be managed during the period of extended operation.

(c) If the existing program already includes provisions for comparing transient severity between actual and design transients, discuss the purpose of the enhancement.

RAI B3.1-2

Background:

LRA Section B3.1 identifies an enhancement to the "parameters monitored or inspected" program element of the Fatigue Monitoring Program. Specifically, it states that "[p]rocedures

will be enhanced to include additional transients that contribute significantly to fatigue usage identified by evaluation of ASME Section III fatigue and fatigue crack growth analyses."

In contrast, LRA Section 4.3.1 states "[LRA] Table 4.3-2, *Transient Accumulations and Projections* lists the transients monitored by the Fatigue Monitoring Program. In addition, the transients included in the program were identified through a review of the design and licensing analyses."

Issue:

Based on LRA Section 4.3.1 it seems that a review of the design and licensing analyses has already been performed; therefore, it is not clear to the staff what will be enhanced in the procedures.

Request:

(a) Clarify the discrepancy between LRA Section B3.1 and LRA Section 4.3.1.

(b) Clarify what actions will be taken as part of this enhancement to the procedures to include additional transients that contribute significantly to fatigue usage identified by evaluation of ASME Section III fatigue and fatigue crack growth analyses.

RAI B3.1-3

Background:

During its audit, the staff reviewed the applicant's evaluation of plant-specific and generic operating experience related to its Fatigue Monitoring Program. The "operating experience" program element of Generic Aging Lessons Learned (GALL) Report aging management program (AMP) X.M1 recommends that the program review industry experience relevant to fatigue cracking. The staff noted that regulatory issue summary (RIS) 2011-14, "Metal Fatigue Analysis Performed by Computer Software," was issued on December 29, 2011. This RIS is associated with the implementation of computer software packages used to demonstrate the ability of nuclear power plant components to withstand the cyclic loads associated with plant transient operations.

Issue:

Documentation of how the applicant addressed this recently issued RIS was not available to the staff during its audit; therefore, it is not clear if and how the applicant will address the issues discussed in RIS 2011-14.

During its audit, the staff noted that the applicant uses the computer software, FatiguePro, which can perform cycle counting, cycle-based and stress-based fatigue monitoring to manage cumulative fatigue damage. It is not clear, if the data collected by FatiguePro is reviewed and modified prior to the determination of cumulative fatigue usage for a component or of an accrued transient cycle.

Request:

(a) Describe and justify any actions that have been or will be taken to address the concerns described in RIS 2011-14, related to the use of computer software to demonstrate the ability of components to withstand cyclic loads associated with transients and the documentation of analyst's engineering judgment and intervention.

(b) Describe the activities that are performed to the information/data that is collected by FatiguePro prior to determining the cumulative fatigue usage for a component or an accrued transient cycle. Further justify if the concerns described in RIS-2011-14, related to documentation of the analyst's engineering judgment and intervention, have been addressed for the current use or will be addressed for the future use of a computer software for fatigue calculations.

RAI B3.1-4

Background:

LRA Section A2.1 provides a summary description of the applicant's Fatigue Monitoring Program, which generally describes the key aspects of the program when implemented for the period of extended operation. During its audit and review of LRA Section B3.1, the staff noted that the applicant's Fatigue Monitoring Program uses three monitoring methods; specifically cycle counting, cycle-based fatigue monitoring and stress-based fatigue monitoring.

Issue:

The staff noted that the monitoring methods used by an applicant to manage cumulative fatigue damage are a key aspect to a Fatigue Monitoring Program. However, the applicant's Final Safety Analysis Report Supplement in LRA Section A2.1 for this program does not include a description or discussion of how the monitoring methods will manage cumulative fatigue damage during the period of extended operation.

Request:

Revise LRA Section A2.1 to provide a description of how each monitoring method of the Fatigue Monitoring Program will manage fatigue. Otherwise justify why a revision to LRA Section A2.1, to capture this key aspect of the Fatigue Monitoring Program, is not needed.

LRA Section 4.2.2 – Charpy Upper Shelf Energy (USE)

RAI 4.2.2-1

The staff noted that the time-limited aging analysis (TLAA) of Charpy Upper-Shelf Energy (USE) discussed in LRA Section 4.2.2 includes direct projections of end-of-extended-license (EOLE, 54 effective full power years (EFPY)) USE values for all reactor vessel (RV) beltline and extended beltline materials.

For the RV extended beltline materials, please provide the following additional information:

(a) For the RV nozzle shell plates and inlet/outlet nozzle forgings, please identify their material types (i.e., SA-533B plate, SA-508, Class 2 forging, etc.).

(b) For the nozzle shell-to-intermediate shell weld and all inlet/outlet nozzle-to-shell welds, please identify the weld fabrication method and flux type.

(c) For all extended beltline materials, please identify the following:

(i) The heat numbers for plates and forgings, and the weld wire heat number and flux lot number for welds; and

(ii) The source of the initial USE and copper (Cu) content data. If the initial USE and Cu content data are not based on measured heat-specific values from certified material test reports (CMTRs), then please provide justification for using these values.

LRA Section 4.2.3 – Pressurized Thermal Shock (PTS)

RAI 4.2.3-1

For all extended beltline materials, please identify the source of the initial reference temperature (RT_{NDT}) and nickel (Ni) content data. If the initial RT_{NDT} and Ni content data are not based on measured heat-specific values from CMTRs, then please provide justification for using these values.

LRA Section B2.1.17 – RV Surveillance Aging Management Program (AMP)

RAI B2.1.17-1

LRA Section B2.1.17 states that the last surveillance capsule tested under the Reactor Vessel Surveillance Program was exposed to neutron fluence levels equivalent to about 54 EFPY of exposure, which exceed the 60-year peak RV wall neutron fluence.

Please identify the high energy (E > 1.0 MeV) neutron fluence for this capsule, as determined from the capsule dosimetry analysis.

RAI B2.1.17-2

LRA Section B2.1.17 discusses the status of two standby surveillance capsules. The LRA states that one capsule was removed at 71 EFPY of equivalent RV exposure and is stored in the spent fuel pool for reinsertion or testing as deemed appropriate. The other capsule will be removed at approximately 108 EFPY of equivalent exposure.

Please identify these standby surveillance capsules (e.g., Capsule "W", "Z", etc.).

Mr. Adam C. Heflin
Senior Vice President and Chief Nuclear Officer
Union Electric Company
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Fulton, MO 65251

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Sincerely,

/RA/

Samuel Cuadrado de Jesús, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure:
As stated

cc w/encl: Listserv

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Letter to A. Heflin from S. Cuadrado DeJesus dated, June 22, 2012

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