



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

August 23, 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, SET 8,  
ELECTRICAL (TAC NO. ME7708)

Dear Mr. Heflin:

By letter dated December 15, 2011, Union Electric Company d/b/a Ameren Missouri (the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54) for renewal of Operating License No. NPF-30 for the Callaway Plant, Unit 1 (Callaway). 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](mailto:Samuel.CuadradoDeJesus@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Samuel Cuadrado de Jesús".

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, SET 8, ELECTRICAL

**RAI B3.2-1**

Background:

The 2010 Environmental Qualification (EQ) Program Simple Self-Assessment Report recommended EQ Program health reports be issued in a timely manner. License renewal application (LRA) Section B3.2, "Environmental Qualification (EQ) of Electric Components," states that Callaway Plant (Callaway) routinely audits the EQ program to ensure that program elements are carried out properly. The staff has observed that self assessment reports and EQ health reports are tools commonly used by the nuclear industry to monitor the effectiveness of program performance including EQ programs.

Issue:

Although the staff identified two self assessment reports, the staff did not identify any EQ Program health reports in its review of EQ operating experience. EQ health and self assessments, performed periodically, can be useful in identifying adverse trends in EQ Program performance.

Request:

- a) Provide the schedule for performing self assessment reports and EQ health reports consistent with LRA Section B3.2.
- b) Provide additional operating experience [e.g., disposition of follow-up actions identified by the self assessments (2004 and 2010) including corrective actions] that further demonstrate the effectiveness of the EQ Program.

**RAI 3.6.2.1-1**

Background:

In LRA Table 3.6.2-1, items 3.6.1.016 and 017, the applicant stated that for fuse holders (not part of active equipment): metallic clamps exposed to air – indoor uncontrolled, increased resistance of connection due to chemical contamination, corrosion, and oxidation; fatigue due to ohmic heating, thermal cycling, electrical transients and metallic clamps exposed to air – indoor uncontrolled and controlled, increased resistance of connection due to fatigue caused by frequent manipulation or vibration are not applicable because in-scope fuse holders are part of larger assemblies and therefore no aging management program (AMP) is required. The applicant further stated that this includes fuses installed for electrical penetration protection. The aging management review (AMR) items (Table 3.6.2-1 of the LRA) do not include this component type or reference Note I (i.e., aging effect in NUREG-1801 for this component, material and environment combination are not applicable).

NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," Revision 2, items VI.A.LP-23 and -31, "Fuse Holders (not part of active equipment): Metallic Clamp," identifies the aging/effect mechanisms for these items as increased resistance of connection due to chemical contamination, corrosion, oxidation; fatigue due to ohmic heating, thermal cycling, electrical transients, and increased resistance of connection due to fatigue caused by frequent manipulation or vibration, respectively. GALL Report AMP XI.E5, "Fuse Holders," states that fuse holders located outside of active devices should be tested to provide an indication of the condition of the metallic clamps of fuse holders.

Issue:

The applicant stated that aging management is not required because all in-scope fuses are located in larger assemblies. This is inconsistent with the GALL Report AMP XI.E5 "scope of program" which only specifies in-scope fuses located outside of active assemblies as not requiring aging management. The applicant did not provide technical justification of why these fuse holders located in air indoor-uncontrolled and air indoor-uncontrolled or controlled and located in larger assemblies do not require aging management.

Request:

Provide an evaluation that addresses each aging effect/mechanism identified in GALL Report, items VI.A.LP-23 and -31 (fuse holders – metallic clamps).

**RAI 3.6.2.1.4-1**

Background:

LRA Section 3.6.1 lists the following electrical component types subject to AMR under "Insulated cable and connections" (including the following):

- Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements
- Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance
- Inaccessible power cables not subject to 10 CFR 50.49 EQ requirements

Issue:

LRA Section 3.6.2.1.4, "Insulated Cable and Connections," under AMPs only lists the following:

- Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements
- Inaccessible power cables not subject to 10 CFR 50.49 EQ requirements

Request:

Explain why AMP, "Electrical cables and connections not subject to 10 CFR 50.49 EQ requirements used in instrumentation circuits that are sensitive to reduction in conductor insulation resistance" is not listed in LRA Section 3.6.2.1.4.

**RAI 3.6.2.2.3-1**

Background:

NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR)," Revision 2, Section 3.6.2.2.3 states that loss of material due to wind induced-abrasion, loss of conductor strength due to corrosion, and increased resistance of connection due to oxidation or loss of preload could occur in transmission conductors and connections, and in switchyard bus and connections.

Issue:

The applicant did not include plant specific operating experience at Callaway to support the applicant's claim that loss of material due to wind induced abrasion and fatigue, loss of transmission conductor strength from corrosion, and increased resistance of connection due to oxidation or loss of preload are not significant aging effects for transmission conductors and connections. In addition, the applicant did not address whether a review of plant-specific operating experience indicated additional aging effects exist beyond those addressed in the GALL Report.

Request:

Confirm that there has been no plant-specific operating experience of loss of material due to wind induced abrasion or fatigue, loss of conductor strength due to corrosion, or increased resistance of connection due to oxidation or loss of preload at Callaway. If loss of material or loss of conductor strength has occurred, describe the corrective actions performed to prevent reoccurrence.

Provide a review of plant specific operating experience including whether additional aging effects exist beyond those identified by the GALL Report and SRP-LR Section 3.6.2.2.3 for transmission conductors and connections, and switchyard bus and connections.

**RAI 4.4-1**

Background:

SRP-LR, Revision 2, Chapter 4.4, "Environmental Qualification (EQ) of Electric Equipment," Section 4.4.1, "Areas of Review," states that some nuclear power plants have mechanical equipment that was qualified in accordance with the provisions of Criterion 4 of Appendix A to 10 CFR Part 50. If a plant has qualified mechanical equipment, it is typically documented in the plant's master EQ list.

If this qualified mechanical equipment requires the performance of a time-limited aging analysis (TLAA), it should be performed in accordance with the provisions of SRP-LR Section 4.7, "Other Plant-Specific Time-Limited Aging Analysis." If a TLAA of qualified mechanical equipment is necessary, it usually involves the environmental effects on components such as seals, gaskets, lubricants, hydraulic fluid, or diaphragms.

Issue:

LRA Section 4.4, "Environmental Qualification (EQ) of Electric Equipment," TLAA includes a discussion of mechanical equipment qualification and states that the qualification for some mechanical equipment extends beyond 40 years. The applicant states that TLAA 4.4 also manages the aging of mechanical components.

Final Safety Analysis Report (FSAR) summary report A2.2, "Environmental Qualification (EQ) of Electrical Equipment," does not include mechanical equipment as part of the FSAR summary description.

FSAR Summary Report A3.3, "Environmental Qualification (EQ) of Electric Equipment," states that this program also manages the aging of mechanical EQ components.

AMP B3.2, "Environmental Qualification (EQ) of Electrical Components," states that the Callaway EQ Program assigns qualified lives to safety-related mechanical components located in harsh environments. The LRA states that these components are managed with the EQ maintenance and/or surveillance programs.

The inclusion of mechanical components in TLAA 4.4 is inconsistent with the guidance provided in SRP-LR Section 4.4.1, "Areas of Review," which states that a TLAA for mechanical components should be performed under the provision of SRP-LR Section 4.7, "Other Plant-Specific Time-Limited Aging Analysis." In addition Table 3.6.1, item number 3.6.1.1 does not identify mechanical equipment as a component type for EQ TLAA.

Request:

Explain why the inclusion of environmental qualification of mechanical components is included in TLAA 4.4, "Environmental Qualification (EQ) of Electric Components" contrary to the guidance provided in SRP-LR 4.4.1 with regard to TLAAs for mechanical components and associated AMR items. Explain the discrepancy between AMP B3.2, TLAA 4.4, Appendix A, Section A.2.2, and Section A3.3 with regard to the inconsistency in the application of aging management of EQ of mechanical components. Explain why the component type (electrical equipment) in Table 3.6.1, item number 3.6.1.1 is inconsistent with TLAA 4.4 (electrical and mechanical components).

August 23, 2012

Mr. Adam C. Heflin  
Senior Vice President and Chief Nuclear Officer  
Union Electric Company  
P.O. Box 620  
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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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**ADAMS Accession No.:** ML12233A613

\*concurrence via e-mail

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<b>NAME</b>	IKing	SCuadrado	DMorey	SCuadrado
<b>DATE</b>	8/21/2012	8/22/2012	8/22/2012	8/23/2012

**OFFICIAL RECORD COPY**

Letter to A. Heflin from S. Cuadrado DeJesus dated August 23, 2012

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ELECTRICAL (TAC NO. ME7708)

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