

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

May 2, 2013

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

SUBJECT: CALLAWAY PLANT, UNIT 1 – REQUEST FOR ADDITIONAL INFORMATION RE: PROPOSED REVISION TO FSAR-SP SECTIONS 3.7(B) AND 3.7(N), "SEISMIC DESIGN" (TAC NO. MF0407)

Dear Mr. Heflin:

By application dated December 20, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13002A370), to the U.S. Nuclear Regulatory Commission (NRC), Union Electric Company (dba Ameren Missouri, the licensee) submitted a license amendment request to revise a methodology in the licensing basis as described in the Final Safety Analysis Report - Standard Plant (FSAR-SP) to include damping values for the seismic design and analysis of the integrated head assembly that are consistent with the recommendations of NRC Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," Revision 1, March 2007.

The NRC staff has determined that additional information, as requested in the enclosure, is needed to complete its review. Please provide a response to the questions by June 7, 2013. If circumstances result in the need to revise the requested response date, please contact me at 301-415-2296 or via e-mail at Fred.Lyon@nrc.gov.

Sincerely,

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Carl F. Lyon, Project Manager Plant Licensing Branch IV Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosure: As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST TO REVISE THE LICENSING BASIS

FOR SEISMIC DESIGN AS DESCRIBED IN THE FSAR-SP

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

By application dated December 20, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13002A370) (Reference 1), to the U.S. Nuclear Regulatory Commission (NRC), Union Electric Company (dbpa Ameren Missouri, the licensee) submitted a license amendment request to revise a methodology in the licensing basis as described in the Final Safety Analysis Report - Standard Plant (FSAR-SP) to include damping values for the seismic design and analysis of the integrated head assembly that are consistent with the recommendations of NRC Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," Revision 1, March 2007.

The NRC staff has determined that the additional information requested below is needed to complete its review.

Mechanical and Civil Engineering Branch (EMCB)-Callaway-IHA-RAI-1

In Section 2.2 (paragraph 2, page 4) of Reference 1, the licensee indicated that the weighted average damping value will be used in the analysis of loss-of-coolant accident (LOCA) loads in the Integrated Head Assembly (IHA) design basis. The licensee is requested to clarify whether the LOCA analysis performed for the IHA assembly (1) is a linear elastic analysis, (2) utilizes the response spectrum or time history method, and (3) if a response spectrum method was used, whether the type of spectra utilized is acceleration spectra or displacement spectra for the three orthogonal directions.

EMCB-Callaway-IHA-RAI-2

In Section 3.1 (paragraph 2, page 6) of Reference 1, the licensee indicated that the ductwork part of the IHA structure is not composed of a traditional round or rectangular section. It is also not clear from Figure 2 of the Attachment 1 of Reference 1, what is the cross-sectional shape of the Control Rod Drive Mechanism (CRDM) ductwork inside the IHA shroud. The licensee is requested to describe the cross-sectional shape of the CRDM ductwork inside the IHA shroud.

EMCB-Callaway-IHA-RAI-3

In Section 3.1 (paragraph 4, page 6) of Reference 1, the licensee indicated that there are gaps between the digital rod position indication (DPRI) plates, which transmit seismic loads from the CRDM pressure housings to the seismic frame assembly. The licensee is requested to provide the following additional information: (1) How large are the gaps between the DPRI plates, (2) How are the non-linear effects of the gaps considered in the seismic analysis, (3) Is the

Enclosure

seismic analysis of the IHA assembly a linear analysis, and (4) If it is a linear analysis, how are the impact effects accounted for during the seismic movements and closure of the gaps.

EMCB-Callaway-IHA-RAI-4

In Section 3.3 (paragraph 1, page 8) of Reference 1, the licensee indicated that there will be a net increase in the overall weight of the IHA assembly that is replacing the current lifting rig / platform during the Callaway Replacement Reactor Vessel Closure Head (RRVCH) project. The licensee is requested to provide the following: (1) the old and new overall weight of the IHA assembly, (2) clarify whether the loads due to additional mass of the IHA assembly are considered in the qualification of (i) the Reactor Vessel supports, (ii) local areas of the IHA assembly support connections with the RRVCH, and (iii) the tie rod connections to the reactor cavity wall, and (3) clarify whether the tie rods of the IHA assembly connected to the reactor cavity wall provide horizontal restraint only, or is there a vertical component.

EMCB-Callaway-IHA-RAI-5

In Section 3.3 (paragraph 2, page 8) of Reference 1, the licensee described the finite element model and analysis of the IHA assembly based on shell and beam elements. The analysis considers the active tie rods. The licensee is requested to respond to the following questions: (1) Was a mesh sensitivity study performed for convergence of the finite element analysis (FEA) results? (2) What structural analysis finite element program is utilized in the analysis of the IHA assembly, and was that FEA program previously qualified and listed in the Callaway FSAR and used for other components or structures at the Callaway plant, or it is an entirely new computer program? (3) What is the total number of tie rods, and how many of them are active tie rods? (4) Are the number of active tie rods the same for the Operating Basis Earthquake (OBE) and the Safe Shutdown Earthquake (SSE) seismic analyses?

EMCB-Callaway-IHA-RAI-6

Section 3.3 (paragraph 3, page 8) of Reference 1 provides the OBE and SSE seismic analyses based on envelopes of the building spectra at elevation 2047'-6" and the RRVCH spectra. The licensee is requested to provide (1) what the elevations are for the RRVCH spectra, and (2) whether the elevation 2047'-6" corresponds to the reactor building floor spectra or the internal structure spectra.

EMCB-Callaway-IHA-RAI-7

Section 3.3 (paragraph 2, page 10) of Reference 1 notes that seismic category I components of the IHA assembly were evaluated using acceptance criteria corresponding to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section III, Division I, Subsection, 2001 Edition through 2003 Addenda. Please provide clarifications to the following questions: (1) What is the design basis code for the Callaway Plant? (2) Was a code reconciliation performed for using the ASME B&PV Code, Section III for the IHA assembly versus the design basis code? (3) Was the same ASME Code edition used for the non-seismic category I components?

EMCB-Callaway-IHA-RAI-8

Attachment 1 of Reference 1 (pages 2, 3, and 4):

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The IHA assembly is a complex structure, as shown in Figures 1, 2, and 3 of Attachment 1. The licensee is requested to provide the major overall dimensions and label the major components in Figures 1, 2, and 3. Also, please provide the elevations for all of the major component locations.

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Sincerely,

/RA by Jim Polickoski for/

Carl F. Lyon, Project Manager Plant Licensing Branch IV Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

*email dated

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