August 29, 2013

ULNRC-06033

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.90
10 CFR 50.59(c)(2)(viii)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF -30
PROPOSED REVISION TO FINAL SAFETY ANALYSIS REPORT
FSAR-SP SECTIONS 3.7(B) & 3.7(N), "SEISMIC DESIGN"
(LICENSE AMENDMENT REQUEST LDCN 12-0041) (TAC NO. MF0407)

References: 1) ULNRC-05941 dated December 20, 2012
2) NRC Letter, "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) dated August 9, 2013
3) ULNRC-05998 dated June 6, 2013

By the Reference 1 letter, Union Electric Company (Ameren Missouri) submitted a proposed amendment that would 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 (IHA) that are consistent with the recommendations of Regulatory Guide (RG) 1.61, Revision 1 "Damping Values for Seismic Design of Nuclear Power Plants." Reference 2 dated August 9, 2013 transmitted a Request for Additional Information (RAI) related to our application.

Enclosure 1 contains Ameren Missouri's response to the request contained in the August 9, 2013 RAI.

A clarification is hereby provided for the response that was provided by Reference 3. Specifically, Callaway's response to RAI EMCB-Callaway-IHA-RAI-7 stated the design basis code of record for the existing Seismic Category I CRDM seismic support assembly for the existing equipment is the 1977 Edition with Addenda through Summer 1977 of ASME Section III, Subsection NF (Class 1).

Through further discussions with Westinghouse, it was found the design basis code of record used in the final as-built stress report for the Seismic Category I CRDM seismic support assembly for the existing equipment is actually the 1977 Edition of ASME Section III, Subsection NF (Class 1) with no Addenda.

It should be noted that this letter does not contain new commitments.

Please contact Scott Maglio, Regulatory Affairs Manager, at (573) 676-8719 for any questions you may have regarding this amendment application.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on: August 29, 2013

Shannon L. Abel
Director Engineering Projects

DS/nls

Enclosure: 1) Response to Request for Additional Information License Amendment Request to Revise the Licensing Basis for Seismic Design as Described in the FSAR-SP

cc: U.S. Nuclear Regulatory Commission (Original)
Attn: Document Control Desk
Washington, DC 20555-0001

Mr. Steven A. Reynolds
Acting Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. Fred Lyon
Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-8B1
Washington, DC 20555-2738

Index and send hardcopy to QA File A160.0761

Hardcopy:

Certrec Corporation
4150 International Plaza Suite 820
Fort Worth, TX 76109
(Certrec receives ALL attachments as long as they are non-safeguards and may be publicly disclosed.)

Electronic distribution for the following can be made via Tech Spec ULNRC Distribution:

A. C. Heflin
F. M. Diya
C. O. Reasoner III
B. L. Cox
D. W. Neterer
L. H. Graessle
S. L. Abel
J. S. Geyer
S. A. Maglio
B. C. Daniels
NSRB Secretary
T. B. Elwood
G. G. Yates
STARS Regulatory Affairs
Mr. John O'Neill (Pillsbury Winthrop Shaw Pittman LLP)
Missouri Public Service Commission
Ms. Leann Tippitt-Mosby (DNR)
T. W. Pettus
W. P. Muskopf

RESPONSE TO

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), as supplemented by letter dated June 6, 2013 (ADAMS Accession No. ML13158A009), 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 the additional information requested below is needed to complete its review.

Mechanical and Civil Engineering Branch (EMCB)-Callaway-IHA-RAI-9

In section 3.1 (paragraph 2, page 6) of the letter dated December 20, 2012, the licensee indicated that the replacement reactor vessel closure head (RRVCH) includes a new structure called Integrated Head Assembly (IHA) that incorporates the functions of the former control rod drive mechanism (CRDM) seismic support structure, the CRDM ventilation cooling system, and the head lift rig. As a result of the new IHA structure, the licensee is requested to clarify the following items:

(a) Are there any changes required to the CRDM system and its supports?

(b) Is a re-analysis of the ASME class 1 CRDM system required?

(c) If re-analysis of the CRDM system is required, please provide (i) the damping values used in the original CRDM class 1 analysis and in the re-analysis, (ii) a summary of the results (primary stresses, primary plus secondary stress intensity range, and cumulative usage factor (CUF) along with allowable limits based on the applicable code edition) from the original analysis and reanalysis for the critical locations such as CRDM latch housing, CRDM travel housing, CRDM nozzle between top of head and dissimilar metal weld, and CRDM nozzle at J-groove weld.

Callaway Response

(a) There are changes to the CRDM and supports. For example, the replacement CRDM housing is a two piece design compared to the original CRDM three piece design; and the number of tie rods restraining the CRDM seismic support structure has been reduced from six to four.

(b) A re-analysis of the ASME Class 1 CRDM is required as a result of the changes in the CRDM design and support structure.

(c) Although a reanalysis of the CRDM was required; the seismic analysis damping value used in the re-analysis is 5% (for OBE and SSE) which is the same as what was used in the original CRDM Class 1 analysis and is described in Callaway FSAR section 3.7 (N).1.3. The LOCA analysis damping value used in the re-analysis is 4% which is also

the same as what was used in the original CRDM Class 1 analysis; however this was not previously described in the Callaway FSAR.

A summary of available results (primary stresses, primary plus secondary stress intensity range, and cumulative usage factor (CUF) along with allowable limits based on the applicable code edition) from the original analysis and reanalysis for the critical locations such as CRDM latch housing, CRDM travel housing, CRDM nozzle between top of head and dissimilar metal weld (DMW), and CRDM nozzle at J-groove weld are provided in Tables 1 and 2 respectively.

Table 1
Callaway Original CRDMs
Results of ASME Code Stress Evaluation

	Load Combination	ASME Classification	Calculated Value	Allowable Value
Rod Travel Housing	Design	Pm	11.477 ksi	16.1 ksi
Rod Travel Housing	Design	Pl + Pb	15.441 ksi	24.15 ksi
Rod Travel Housing	OBE	Moment	26.167 in-kips	89.675 in-kips
Rod Travel Housing	Faulted	Moment	121.428 in-kips	231.580 in-kips
Latch Housing	Design	Pm	12.861 ksi	16.1 ksi
Latch Housing	Design	Pl + Pb	15.023 ksi	24.15 ksi
Latch Housing	OBE	Moment	47.634 in-kips	245.513 in-kips
Latch Housing	Faulted	Moment	124.660 in-kips	702.233 in-kips
CRDM Nozzle*	Design	Pm	7.157 ksi	16.1 ksi
CRDM Nozzle*	Design	Pl + Pb	9.203 ksi	24.15 ksi
CRDM Nozzle*	OBE	Moment	64.013 in-kips	110.000 in-kips
CRDM Nozzle*	Faulted	Moment	178.348 in-kips	240.000 in-kips
CRDM Nozzle**	Design	Pm	6.75 ksi	23.3 ksi
CRDM Nozzle**	Design	Pl + Pb	27.575 ksi	34.95 ksi
CRDM Nozzle**	Faulted	Pm	8.40 ksi	39.0 ksi
CRDM Nozzle**	Faulted	Pl + Pb	34.33 ksi	83.8 ksi
CRDM Nozzle**	Normal & Upset	P + Q	59.0 ksi	69.9 ksi
CRDM Nozzle**	Normal & Upset	CUF	0.109	1.0

Notes: * CRDM Nozzle between head and dissimilar metal weld
** CRDM Nozzle (J-Groove Weld)

Where: Pm = Primary Membrane Stress Intensity
Pl + Pb = Primary Membrane + Primary Bending Stress Intensity
P + Q = Primary + Secondary Stress Intensity Range
CUF = Fatigue Cumulative Usage Factor

Table 2

Callaway Replacement CRDMs

Results of ASME Code Stress Evaluation

	Design				Faulted [1]				Normal & Upset			
	Pm [ksi]		Pl + Pb [ksi]		Pm [ksi]		Pl + Pb [ksi]		P+Q [ksi]		U	
Location	Actual	Allow	Actual	Allow	Actual	Allow	Actual	Allow	Actual	Allow	Actual	Allow
CRDM Latch Housing	14.32	16.2	21.06	24.3	25.83	37.9	34.45	56.9	41.03	48.4	0.061	1.0
CRDM Travel Housing	11.72	16.2	16.99	24.3	16.07	37.9	25.35	56.9	41.24	48.4	0.005	1.0
CRDM Nozzle between Head and DMW	10.98	23.3	30.17	34.9	19.56	55.9	73.96	83.8	39.06	69.9	0.0003	1.0
CRDM Nozzle at J-Groove Weld	9.27	23.3	30.73	34.9	16.1	55.9	72.79	83.8	69.63	69.9	0.618	1.0

(1) Faulted loads include SSE and LOCA combined

Where: Pm: Primary Membrane Stress Intensity

Pl+Pb: Primary Membrane + Primary Bending Stress Intensity

P+Q: Primary + Secondary Stress Intensity Range

U: Fatigue Usage Factor

DMW: Dissimilar Metal Weld