

August 16, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

ULNRC-05188

Ladies and Gentlemen:

DOCKET NUMBER 50-483
UNION ELECTRIC COMPANY
CALLAWAY PLANT
TECHNICAL SPECIFICATION REVISIONS ASSOCIATED WITH THE
STEAM GENERATOR REPLACEMENT PROJECT



- References:
1. ULNRC-05056 dated September 17, 2004
 2. ULNRC-05117 dated February 11, 2005
 3. ULNRC-05145 dated May 26, 2005
 4. ULNRC-05157 dated June 17, 2005
 5. ULNRC-05159 dated June 17, 2005
 6. ULNRC-05169 dated July 15, 2005
 7. ULNRC-05178 dated July 29, 2005

In Reference 1 above AmerenUE transmitted an application for amendment to Facility Operating License Number NPF-30 for the Callaway Plant in support of the replacement steam generators (RSGs) to be installed during Refuel 14 (fall 2005). This letter provides additional information on two issues recently raised by the NRC staff during the review of that application.

In Reference 5 above AmerenUE responded to several requests for additional information (RAIs) from the NRC Reactor Systems Branch. Questions 26 through 28 dealt with Section 6.3.10 of WCAP-16265 (Appendix A to the Reference 1 application) for the analysis of the Uncontrolled Rod Cluster Control Assembly (RCCA) Bank Withdrawal at Power event, referred to hereinafter as the RWAP event. The following discussion provides additional clarification regarding the departure from nucleate boiling (DNB) analysis for this event.

As indicated in WCAP-16265, with the exception of the computer code used, the transient-specific analysis methodology applied in the RWAP event analysis supporting the Callaway RSG program is consistent with the methodology used in the current Callaway RWAP licensing basis analysis; the RETRAN computer code was used as a replacement for the LOFTRAN computer code. This RWAP analysis methodology has been approved by the NRC in several past licensing submittals for Callaway and other plants. The RWAP event is primarily analyzed to show that the reactor protection system

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is capable of maintaining the integrity of the core. Reasonable assurance of this capability is demonstrated if the applicable minimum DNB ratio (DNBR) and peak linear heat rate limits are satisfied for a spectrum of RWAP cases analyzed at power levels of 100%, 60%, and 10% of full power. For each power level, a bounding range of reactivity insertion rates are examined with both minimum and maximum reactivity feedback assumptions. The RWAP analysis methodology applied in support of the Callaway RSG program is conservative and consistent with methodology approved by the NRC.

The minimum DNBR limit applied in the Callaway RWAP RSG analysis is 1.55. This value represents a DNBR limit that is conservative for both typical and thimble fuel cell types, which have defined DNBR safety analysis limits of 1.59 and 1.55, respectively. Section 7.1 of WCAP-16265 discusses the relationship between the safety analysis limit DNBR values and the DNB design criterion; there will be at least a 95-percent probability at a 95-percent confidence level (95/95) that DNB will not occur on the limiting fuel rods for any Condition I or II event. The thimble fuel cell DNBR limit was selected to represent both fuel cell types in the RWAP analysis because the DNBR at nominal full power conditions for the thimble fuel cell is closer to its limit than the nominal DNBR of the typical fuel cell is to its limit. If the DNBR limit for the typical fuel cell, 1.59, were used in the RWAP analysis with the corresponding nominal DNBR, a minimum DNBR greater than 1.59 would be calculated, and there would be more margin than that indicated in WCAP-16265. Satisfying the single DNBR limit of 1.55 ensures that both fuel cell types do not reach conditions that violate the respective DNBR safety analysis limits. The transient DNBR is calculated by the RETRAN computer code using an approximation method that uses partial derivatives which indicate how the DNBR changes in response to changes in the core power, average reactor coolant temperature, and pressure. This partial derivative DNBR approximation method is consistent with that which was used in support of the current Callaway RWAP licensing basis analysis. For the Callaway RSG RWAP analysis, the partial derivatives were conservatively defined based on core thermal safety limits for both fuel cell types calculated with the VIPRE computer code. As the Callaway analysis results have shown that the 1.55 DNBR limit is met for a large spectrum of cases at power levels of 100%, 60%, and 10% of full power (114 cases were examined), it is concluded that the reactor protection system is capable of maintaining the integrity of the core for an RWAP event.

On a separate subject, the following information is provided in response to an NRC question on the replacement SG shell side (secondary side) inventory at full load (100% power) and no load (0% power) conditions. The values represent the nominal case (clean and without tube plugging, $T_{hot} = 614^{\circ}\text{F}$ for 100% power and $T_{avg} = 555^{\circ}\text{F}$ for 0% power):

	100% power	0% power
Water mass (x 1,000 lbm)	100.2	150.5
Steam mass (x 1,000 lbm)	7.8	5.4
Total mass (x 1,000 lbm)	107.9 (round-off)	155.9

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References 2, 3, 4, 6, and 7 above provided various RAI responses, supplemental Technical Specification changes, and additional RAI response clarification in support of this amendment request. Nothing in the information provided above invalidates the findings of the licensing evaluations contained in Attachment 1 of Reference 1.

The implementation plans for this amendment application remain unchanged from Reference 1. If you have any further questions on this amendment application, please contact us.

Very truly yours,



Keith D. Young
Manager-Regulatory Affairs

GGY/KDY

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)
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SS

Keith D. Young, of lawful age, being first duly sworn upon oath says that he is Manager, Regulatory Affairs, for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Keith D. Young
Keith D. Young
Manager, Regulatory Affairs

SUBSCRIBED and sworn to before me this ¹⁶18 day of AUGUST, 2005.
RD 8-16-05

LORI L. TWILLMAN
Notary Public - Notary Seal
STATE OF MISSOURI
Callaway County
My Commission Expires: Aug. 3, 2007

For & Swellman