

August 19, 1994

Docket No. 50-483

Mr. Donald F. Schnell
Senior Vice President - Nuclear
Union Electric Company
Post Office Box 149
St. Louis, Missouri 63166

Dear Mr. Schnell:

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SUBJECT: CALLAWAY PLANT, UNIT 1 - CORRECTION TO AMENDMENT NO. 91 TO FACILITY
OPERATING LICENSE NO. NPF-30 (TAC NO. M88834)

On August 5, 1994, the Commission issued Amendment No. 91 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. This amendment revised the Technical Specifications (TS) in response to your application dated February 17, 1994, as supplemented by letter dated May 18, 1994.

In Section 2.0, Evaluation, of the Safety Evaluation issued with Amendment No. 91, there are corrections for the Callaway IPE submittal date, accumulator unavailability event, and the PRA analyses success criterion. The corrected safety evaluation, in its entirety, is enclosed. Line bars indicate the corrected material.

Please accept our apologies for any inconvenience these errors may have caused.

Sincerely,

ORIGINAL SIGNED BY:

L. Raynard Wharton, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation

cc w/enclosures:
See next page

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

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Please accept our apologies for any inconvenience these errors may have caused.

Sincerely,

A handwritten signature in black ink, reading "L. Raynard Wharton", is positioned above the typed name.

L. Raynard Wharton, Project Manager
Project Directorate III-3
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation

cc w/enclosure:
See next page

Mr. D. F. Schnell
Union Electric Company

Callaway Plant
Unit No. 1

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 91 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By application for license amendment dated February 17, 1994, Union Electric Company (the licensee), requested changes to Technical Specification (TS) for Callaway Plant, Unit 1. The proposed amendment would revise Section 3/4.5.1, "Accumulators," and associated Bases 3/4.5.1. The revision adds a new Action Statement a. to TS 3.5.1 permitting a 72-hour allowed outage time (AOT) for the condition where one accumulator is inoperable when its boron concentration does not fall within the 2300-2500 ppm band. If an accumulator is inoperable for any other reason, Action Statement b. must be followed. Action Statement b. is revised to replace the current 1-hour AOT with a 24-hour AOT. The licensee stated that the current AOT is insufficient to perform maintenance and restoration on accumulator subsystems.

The revision to TS Limiting Condition for Operation (LCO) 3.5.1 is consistent with NUREG-1431 (September 1992), "Standard Technical Specifications for Westinghouse Power Plants," with the exception of the 24-hour AOT for Action Statement b., which is supported by a licensee plant-specific PRA evaluation.

Surveillance Requirements (SR) 4.5.1.1.a.1 and 4.5.1.1.b are revised and SR 4.5.1.2 is deleted from the TS, but retained in FSAR Chapter 16. These changes are consistent with guidance provided in NRC Generic Letter 93-05, "Line-Item Technical Specification Improvements to Reduce Surveillance Requirements for Testing During Power Operation," dated September 27, 1993. The revised Bases 3/4.5.1 discusses the rationale for the 72-hour and 24-hour AOTs for Action Statements a. and b. above.

The supplemental information contained in the May 18, 1994, letter was within the scope of the initial notice, and did not affect the NRC staff's proposed no significant hazards consideration.

2.0 EVALUATION

The total core damage frequency (CDF) reported in the Callaway IPE (ULNRC-2703, September 29, 1992) is $5.8E-05$ r-yr⁻¹. The licensee stated that based on plant operating experience, that an accumulator test and maintenance unavailability of 100 hr/calendar-yr ($q_{tm}=1.14E-02$) provides a conservative upper bound on q_{tm} in support of a 24-hour AOT for the proposed new Action Statement b. of LCO 3.5.1. The staff agrees with this assessment.

The licensee requantified core damage sequence AS04 of the large LOCA event tree in support of the proposed 24-hour AOT. The original (as reported in the Callaway IPE) AS04 sequence frequency was $3.00 \text{ E-09 r-yr}^{-1}$. The new AS04 sequence frequency with $q_{tm} = 100 \text{ hours/yr}$ is $3.87 \text{ E-09 r-yr}^{-1}$ resulting in an increase in this sequence frequency of $8.7 \text{ E-10 r-yr}^{-1}$. This results in no measurable impact on the overall CDF reported in the IPE of $5.8 \text{ E-05 r-yr}^{-1}$. The staff requested additional information of three types:

1. The impact of assuming one accumulator unavailable for a year.
2. The impact of human error-driven events representing improper alignment of the system.
3. The impact of the requested 24-hour accumulator AOT on a typical intermediate LOCA sequence.

The licensee modeled the configuration with one accumulator out-of-service for an entire year by including a house event in the PRA that removed the events associated with accumulator A from the fault tree, reducing the top event for the fault tree to "Two of Three Accumulators Fail to Inject into the Cold Legs." The computed increase in core damage frequency, including a LOCA and a non-LOCA fault tree (with removal of redundant cutsets) was 0.1 percent.

The licensee examined a number of possible errors which were examined to determine the events constituting improper system alignment. The possibility that normally open accumulator discharge MOVs could be misaligned was examined. These valves are opened by procedure and the power to the valves is isolated by opening and locking their supply breakers. Additionally, valve alarms actuate if the valves are not fully open, and position is indicated on the main control board. SR 4.5.1.1.a.2) and 4.5.1.1.c require that these valves be verified open with their power isolated for each accumulator. Then, the valves get an open signal on an SIS. In its response to staff questions, the licensee stated that, because of these precautions, a misalignment of the isolation valves was not considered a credible event. The staff agrees with this assessment.

The licensee considered inadvertent venting of the accumulators. In order for this to occur, an SOV (solenoid operated valve) must be actuated from the main control board, since there is no automatic actuation feature for these valves. The operator must consciously operate these valves to vent the accumulators. The licensee stated that conscious venting of multiple accumulators is not a credible action. The staff agrees with this assessment.

The licensee also examined the drain and fill lines off the accumulators. These small diameter lines incorporate either check valves to prevent backflow or valves with no automatic features that must be consciously operator-actuated. The licensee's position is that errors associated with filling and draining multiple accumulators are not credible. The staff agrees with this assessment.

The last area of potential human error examined was related to the accumulator instrument loops. Each accumulator has two level and two pressure

transmitters, providing indication and alarm to the operators on accumulator pressure and level. The licensee determined that, despite miscalibration of the level transmitters, a sufficient volume of borated water to prevent core damage still exists. Therefore, miscalibration of the level transmitters was not considered in the PRA analyses. Miscalibration of the pressure transmitters was, however, still considered to be a credible error. As a result, a new basic event was added to the fault tree to model this error and assigned a failure probability of $3.0 \text{ E-}04$, based on values used in the Surry PRA (NSAC-152, Volume 3). The miscalibration led to an accumulator unavailability of $3.0 \text{ E-}04$ for the large LOCA and non-large LOCA cases, showing that such errors for the accumulator pressure transmitters may have a substantially larger impact on accumulator unavailability than does the proposed AOT increase, since these unavailabilities without the pressure transmitter miscalibration errors were $7.74 \text{ E-}06$ for the large LOCA case and $6.0 \text{ E-}06$ for the non-large LOCA case. The licensee determined that, the impact on the CDF of these errors is negligible. The staff finds this analysis acceptable.

In response to the staff's request, the licensee, quantified an intermediate LOCA sequence to examine the impact upon it of the requested 24-hour AOT. The sequence has an intermediate LOCA initiating event, followed by failure of all four high head ECCS pumps, and injection failure of two accumulators. Two sets of analyses were performed to determine the impact of the proposed 24-hour AOT on the CDF due to this sequence, one containing the accumulator pressure miscalibration error as discussed above, and the other without the miscalibration error. The results of these calculations show no discernible increase in accumulator injection unavailability or accident sequence frequency whether there is no accumulator test and maintenance (TM) included or the accumulator is in TM for 100 hr/yr (corresponds to 24-hr AOT). In the case where the accumulator is in TM all year, with no miscalibration error, there is a barely discernible increase (less than 1%) in injection unavailability and sequence frequency. Even with this gross overestimate of the requested 24-hour AOT, the increase in sequence frequency is in the $\text{E-}14$ range. Again, the licensee determined this insignificant, and the staff finds this analysis acceptable.

The licensee's FSAR large break LOCA analysis assumed that borated water from one accumulator is diverted through the line break, and that successful accumulator injection occurs from the remaining three intact accumulators injecting into the Reactor Coolant System cold legs. The success criterion used in the licensee's PRA analyses was two of three intact accumulators injecting.

2.1 TECHNICAL SPECIFICATION CHANGES

The staff has reviewed the information submitted by the licensee, and concludes that the licensee's requested changes to Technical Specification 3/4.5.1 and Bases Section 3/4.5.1 are consistent with the plant design and safety analysis limits and are, therefore, acceptable as discussed below.

The new Action Statement 3.5.1.a. provides 72-hours allowed outage time (AOT) for one accumulator inoperable due to boron concentration. This approach is

consistent with guidance provided in NUREG-1431, "Standard Technical Specifications for Westinghouse Power Plants," regarding boron concentration limits to ensure core subcriticality during reflood.

The new AOT for Action Statement 3.5.1.b. provides 24-hours in lieu of the current 1-hour AOT. The PRA analysis provided the justification for the increased AOT since, there was only a very insignificant effect on the overall core damage frequency (CDF). Plant operating experience supports the determination that a 1-hour AOT does not allow enough time to perform maintenance and restoration on the accumulator subsystems.

Surveillance 4.5.1.1.a.1) is revised consistent with the guidance of NRC Generic Letter 93-05 regarding removal of surveillance requirements for instrumentation. The basis for this revision is to eliminate ineffective tests that place undue burden on plant personnel without commensurate safety benefit.

Surveillance 4.5.1.1.b is revised consistent with GL 93-05 guidance regarding the surveillance clarification that was added for RWST boron concentration. The basis for this clarification is that an inadvertent dilution cannot occur if the normal makeup (RWST) boron concentration is greater than the accumulator boron concentration.

Surveillance 4.5.1.2 is deleted from the TS consistent with GL 93-05 guidance for removing requirements that should be retained in existing plant procedures. The basis for this deletion is to reduce unnecessary radiation exposure to plant personnel resulting from testing instruments that do not initiate safety actions.

Bases Section 3/4.5.1 is revised to discuss the 72-hour and 24-hour AOTs for Action Statements a. and b.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Missouri State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (59 FR 14898). Accordingly, this amendment meets the eligibility criteria for

categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: M. Wohl
L. R. Wharton

Date: August 5, 1994