April 30, 1996

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

SUBJECT: AMENDMENT NO. 110 TO FACILITY OPERATING LICENSE NO. NPF-30 - CALLAWAY PLANT, UNIT 1 (TAC NO. M94761)

Dear Mr. Schnell:

The Commission has issued the enclosed Amendment No. 110 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated February 9, 1996 (ULNRC-3325).

The amendment revises TS 5.3.1 to allow the use of ZIRLO clad fuel rods and ZIRLO filler rods.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Original Signed By
Kristine M. Thomas, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 110 to NPF-30
2. Safety Evaluation

cc w/encls: See next page

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DOCUMENT NAME: CAL94761.AMD

OFC	LA/PDIV-2	BC/SRXB	OGC NLO	PM/PDIV-2
NAME	EPeyton	RJones	M Young	KThomas KMT
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures: 1. Amendment No. 110 to NPF-30
2. Safety Evaluation

cc w/encls: See next page

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

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 110
License No. NPF-30

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Union Electric Company (UE, the licensee) dated February 9, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-30 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 110 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance to be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Kristine M Thomas

Kristine M. Thomas, Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 30, 1996

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 110 TO FACILITY OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Replace the following page of the Appendix A Technical Specifications with the enclosed page. The revised page is identified by amendment number and contains vertical lines indicating the areas of change. The corresponding overleaf page is also provided to maintain document completeness.

REMOVE	INSERT
5-6	5-6

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The core shall contain 193 fuel assemblies with each fuel assembly normally containing 264 fuel rods clad with Zircaloy-4 or Zirlo, except that limited substitution of fuel rods by filler rods consisting of Zircaloy-4 stainless steel, Zirlo or by vacancies may be made if justified by a cycle-specific reload analysis. Each fuel rod shall have a nominal active fuel length of 144 inches and contain a maximum total weight of 1766 grams uranium. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 5.00 weight percent U-235. Fuel with enrichments greater than 4.10 weight percent of U-235 shall contain sufficient integral fuel burnable absorber such that the requirements of Specification 5.6.1.1 are met.

CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 53 full-length and no part-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 142 inches of absorber material. All control rods shall be hafnium, silver-indium-cadmium, or a mixture of both types. All control rods shall be clad with stainless steel tubing.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The Reactor Coolant System is designed and shall be maintained:

a. In accordance with the Code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,

b. For a pressure of 2485 psig, and

c. For a temperature of 650°F, except for the pressurizer which is 680°F.

VOLUME

5.4.2 The total volume of the Reactor Coolant System, including pressurizer and surge line, is 12,135 ± 100 cubic feet at a nominal T_{avg} of 557°F.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1.

5.6 FUEL STORAGE

CRITICALITY

5.6.1.1 The spent fuel storage racks are designed and shall be maintained with:

a. A k_{eff} equivalent to less than or equal to 0.95 when flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1 of the FSAR. This is based on fresh fuel with the maximum initial enrichment of U-235 in Region 1 and on spent fuel with combination of initial enrichment and discharge exposures, shown in Figure 3.9-1, in Region 2, and

b. A nominal 9.24 inch center-to-center distance between fuel assemblies placed in the storage racks, and

c. A maximum reference fuel assembly $K\infty$ less than or equal to 1.480 at 68°F for storage in Region 1.

5.6.1.2 The k_{eff} for new fuel for the first core loading stored dry in the spent fuel storage racks shall not exceed 0.98 when aqueous foam moderation is assumed.

DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 2040 feet.

CAPACITY

5.6.3 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1344 fuel assemblies.

5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.7-1.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 110 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By letter dated February 9, 1996, Union Electric Company (UE), requested changes to the Technical Specifications (Appendix A to Facility Operating License No. NPF-30) for the Callaway Plant, Unit 1. The proposed amendment would revise TS 5.3.1 to allow the use of ZIRLO clad fuel rods and ZIRLO filler rods.

2.0 EVALUATION

The Westinghouse ZIRLO fuel is described in topical report WCAP-12610, "VANTAGE+ Fuel Assembly Reference Core Report." The VANTAGE+ fuel assembly design was developed from the VANTAGE 5 fuel assembly design and was designed with ZIRLO, which is a new cladding and thimble tube alloy. The ZIRLO alloy is a zirconium alloy similar to Zircaloy-4 which was developed to enhance corrosion resistance. ZIRLO is a modification of Zircaloy-4 that includes a reduction in the tin and iron content, eliminating the chromium content, and adding one percent niobium.

In addition to the use of ZIRLO alloy in VANTAGE+, dimensional modifications to the fuel assembly skeleton are introduced for extended-burnup applications. The VANTAGE+ reconstitutable top nozzle (RTN) has an option for a slight height reduction and a compensating recess in the adapter plate to accommodate the rod cluster control rod assembly hub in the fully inserted position for extended-burnup applications. The VANTAGE+ RTN is otherwise identical to that of the VANTAGE 5 design except for modifications necessary to accommodate extended burnup operations. These modifications consist of the use of ZIRLO guide thimbles and small skeletal dimensional alterations to provide additional fuel assembly and rod growth space for extended burnup levels.

Since the VANTAGE+ fuel assembly is intended to replace either the Westinghouse Standard, Optimized, or VANTAGE 5 fuel designs, the VANTAGE+ assembly design envelope is equivalent to those of previous Westinghouse fuel assemblies. Also, the VANTAGE+ fuel assembly is designed to be mechanically and hydraulically compatible with the previous Westinghouse fuel designs in full or transitional cores. The same functional requirements and design criteria established for the Westinghouse VANTAGE 5 fuel assembly remain valid

for the VANTAGE+ fuel assembly. The NRC staff approved the ZIRLO fuel design discussed in WCAP-12610 in a safety evaluation dated July 1, 1991.

The NRC staff also approved loss-of-coolant accident (LOCA) methodologies in a safety evaluation dated October 9, 1991, for Westinghouse topical report WCAP-12610, Appendix F, "LOCA NOTRUMP Evaluation Model: ZIRLO Modifications," and Appendix G, "LOCA Plant Specific Accident Evaluation." Westinghouse performed the LOCA analyses assuming a total peaking factor of 2.45 at 102 percent of a core power of 2775 MWt. An appropriate set of input conditions and a worst break, a double-ended cold leg guillotine break with a discharge coefficient of 0.4, were used. Using the Westinghouse approved evaluation model, with modifications to account for the ZIRLO material properties, the calculated peak cladding temperature was 2083.5 degrees F, the calculated maximum local metal-water reaction was 7.2 percent, and the calculated total core-wide metal-water reaction was less than 0.3 percent. These values are below the allowable limits specified in 10 CFR 50.46(b) of 2200 degrees F, 17 percent, and 1 percent, respectively. The analyses also indicated that the temperature transient would be terminated while the core geometry was still amenable to cooling in accordance with 10 CFR 50.46(b)(4). Individual plant approved emergency core cooling system design assures long term cooling capability to satisfy 10 CFR 50.46(b)(5).

Based on the above, the staff finds the proposed changes to the Callaway TS to allow the use of ZIRLO clad fuel rods and ZIRLO filler rods acceptable.

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. The NRC 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 7558). Accordingly, the 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 the amendment.

5.0 CONCLUSION

The Commission 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: K. Thomas

Date: April 30, 1996