May 22, 1987

Docket No. 50-483

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

Dear Mr. Schnell:

The Commission has issued the enclosed Amendment No. 23 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. This amendment is in response to your application dated December 19, 1986.

The amendment revises Technical Specification Figure 3.9-1 with correct curves for Westinghouse optimized fuel (OFA) and standard fuel (SFA). Figure 3.9-1 now also incorporates a curve for Westinghouse Vantage Fuel (V5) which overlays the OFA curve. TS sections 5.3.1 and 5.6.1.1 are also revised to reflect a maximum enrichment of 4.25 w/o U-235 for fuel storage.

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,

/s/

Thomas W. Alexion, Project Manager
Project Directorate III-3
Division of Reactor Projects

Enclosures:
1. Amendment No. 23 to License No. NPF-30
2. Safety Evaluation

cc w/enclosures:
See next page

Office:	LA/PDIII-3	PM/PDIII-3	OGC	PD/PDIII-3
Surname:	PKreutzer	TAlexion/tg	Bachmann	DWigginton
Date:	05/15/87	05/15/87	05/18/87	05/22/87

5/19/87

8706040173 870522
PDR ADOCK 05000483
P PDR

cc:
J. O. Cermak, CFA Inc.
4 Professional Dr., Suite 110
Gaithersburg, MD 20879

Gerald Charnoff, Esq.
Thomas A. Baxter, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N Street, N. W.
Washington, D. C. 20037

Mr. G. L. Randolf
General Manager, Operations
Union Electric Company
Post Office Box 620
Fulton, Missouri 65251

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
RR#1
Steedman, Missouri 65077

Mr. Donald W. Capone, Manager
Nuclear Engineering
Union Electric Company
Post Office Box 149
St. Louis, Missouri 63166

Chris R. Rogers, P.E.
Manager - Electric Department
301 W. High
Post Office Box 360
Jefferson City, Missouri 65102

Regional Administrator
U. S. NRC, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. Ronald A. Kucera, Deputy Director
Department of Natural Resources
P. O. Box 176
Jefferson City, Missouri 65102

Mr. Bart D. Withers
Pesident and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
P. O. Box 411
Burlington, Kansas 66839

Lewis C. Green, Esq.
Green, Hennings & Henry
Attorney for Joint Intervenors
St. Louis, Missouri 65251

Ms. Marjorie Reilly
Energy Chairman of the League of
Women Voters of Univ. City, MO
7065 Pershing Avenue
University City, Missouri 63130

Mr. Donald Bollinger, Member
Missourians for Safe Energy
6267 Delmar Boulevard
University City, Missouri 63130

Mr. Dan I. Bolef, President
Kay Drey, Representative
Board of Directors Coalition
for the Environment
St. Louis Region
6267 Delmar Boulevard
University City, Missouri 63130

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

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. STN 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 23
License No. NPF-30

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

   A. The application for amendment filed by Union Electric Company (the licensee) dated December 19, 1986 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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. 23, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into the license. UE shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David L. Wigginton, Acting Project Director
Project Directorate III-3
Division of Reactor Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 22, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 23

OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Revise Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. The corresponding overleaf pages are included to maintain document completeness.

REMOVE	INSERT
3/4 9-16	3/4 9-16
5-6	5-6
5-7	5-7

REFUELING OPERATIONS

3/4.9.12 SPENT FUEL ASSEMBLY STORAGE

LIMITING CONDITION FOR OPERATION

3.9.12 Spent fuel assemblies stored in Region 2 shall be subject to the following conditions:

a. The combination of initial enrichment and cumulative exposure shall be within the acceptable domain of Figure 3.9-1, and

b. No spent fuel assemblies shall be placed in Region 2, nor shall any storage location be changed in designation from being in Region 1 to being in Region 2, while refueling operations are in progress.

APPLICABILITY: Whenever irradiated fuel assemblies are in the spent fuel pool.

ACTION:

a. With the requirements of the above specification not satisfied, suspend all other movement of fuel assemblies and crane operations with loads in the fuel storage areas and move the non-complying fuel assemblies to Region 1. Until these requirements of the above specification are satisfied, boron concentration of the spent fuel pool shall be verified to be greater than or equal to 2000 ppm at least once per 8 hours.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.12 The burnup of each spent fuel assembly stored in Region 2 shall be ascertained by analysis of its burnup history and independently verified, prior to storage in Region 2. A complete record of such analysis shall be kept for the time period that the spent fuel assembly remains in Region 2 of the spent fuel pool.

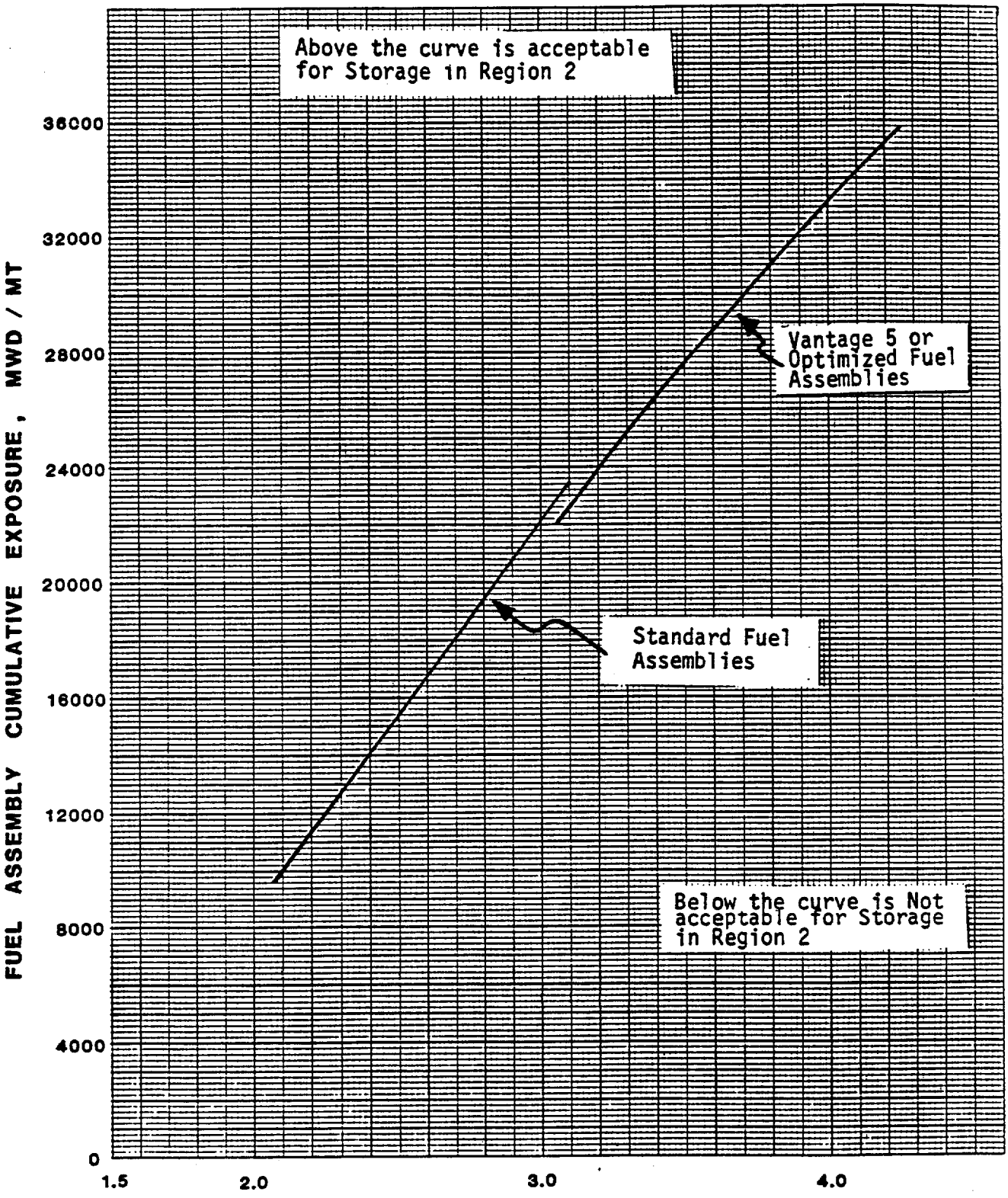

FIGURE 3.9-1

MINIMUM REQUIRED FUEL ASSEMBLY BURNUP AS A FUNCTION OF INITIAL ENRICHMENT TO PERMIT STORAGE IN REGION 2

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The core shall contain 193 fuel assemblies with each fuel assembly containing 264 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 144 inches and contain a maximum total weight of 1766 grams uranium. The initial core loading shall have a maximum enrichment of 3.10 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.25 weight percent U-235.

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, 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 $\pm$ 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 a conservative allowance of 2.6% $\Delta k/k$ for uncertainties as described in Section 4.3 of the FSAR. This is based on new fuel with an enrichment of 4.25 weight percent 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.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 23 TO FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. STN 50-483

1.0 INTRODUCTION

By letter dated December 19, 1986, Union Electric Company submitted a request for changes to the Technical Specifications (TS) to revise Figure 3.9-1, regarding required burnup as a function of initial enrichment for Region 2 of the spent fuel pool, with correct curves for Westinghouse optimized fuel (OFA) and standard fuel (SFA). The letter also requested that Figure 3.9-1 incorporate a curve for Westinghouse Vantage Fuel (V5) which overlays the OFA curve with an extension to 4.25 w/o U-235. Finally, the letter requested that TS sections 5.3.1 and 5.6.1.1 be revised to reflect a maximum enrichment of 4.25 w/o U-235 for fuel storage.

2.0 DISCUSSION

Callaway's first reload core (Cycle 2) contains both SFA and OFA. The next reload core (Cycle 3) will introduce the V5 option as a mix with the SFA and OFA designs. Use of the V5 design requires increasing the maximum enrichment limit for stored fuel from 4.2 w/o to 4.25 w/o. Supplemental criticality analyses were performed to support storage of 4.25 w/o fuel, and additional assessments were made to determine the impact of using the V5 option on spent fuel pool design criteria.

In the course of performing supplemental calculations to verify criticality limits for V5 fuel storage, discrepancies were identified between the current work and that provided in 1985. The discrepancies were reviewed and the source of errors was identified. The errors rendered incorrect both the SFA and OFA curves currently presented in Figure 3.9-1 of the Callaway TS.

The discrepancy in the OFA curve was traced to the use of an incorrect multiplier on the fission product absorption cross section. Further investigation showed that the original (FSAR) analysis had been correctly done. The error produces non-conservative values for the burnup required for storage in Region 2 of the spent fuel pool. The error was of the order of 2000 MWd/MT in burnup for the OFA fuel.

The discrepancy in the SFA curve was traced to an incorrect transcription of data from the original SFA calculated curves. This transcription error resulted in a similar non-conservative error for the SFA as the OFA.

At the time of the discovery of the error there was no fuel stored in Region 2 (Region 2 is designed to safely store irradiated fuel assemblies in large numbers). The error did not impact the analyses for Region 1 (Region 1 is designed to safely store a number of fresh unirradiated fuel assemblies and a full core unloading if that should prove necessary). Of the spent fuel stored in Region 1, only four assemblies qualify for storage in Region 2 if the incorrect burnup versus initial enrichment curve is used. Each of these assemblies would also qualify for storage if the correct curve were used. Thus, no violation of the design bases of the racks resulted from the error.

3.0 EVALUATION

The licensee, in the December 19, 1986 submittal, presented revised curves for the standard and OFA fuel assemblies for enrichments up to 4.20 weight percent U-235. Also presented were analyses to support the storage of V5 and OFA fuel having enrichments up to 4.25 weight percent U-235. The analyses show that the same curve of required burnup as a function of initial enrichment may be used for both the V5 and OFA assemblies.

The same methodology that was used to perform the FSAR Spent Fuel Pool analysis was used to obtain the TS curves. Acceptable methods that have been verified against experiments were approved by the NRC staff for use in the FSAR analysis and continue to be acceptable for the present analyses.

Analyses were performed for Region 1 to confirm that storage of fuel having an enrichment up to 4.25 weight percent U-235 results in a k-effective value, including uncertainties, of less than our acceptance criterion of 0.95 for this quantity. The revised curves of required burnup as a function of initial enrichment were extended to an enrichment of 4.25 weight percent U-235 using the previously approved methods. Particular attention was paid to quality assurance during the analysis. We conclude that the revised curves are acceptable.

The changes to the TS include replacement of Figure 3.9-1 with the revised curve and changing the maximum enrichment value in Specifications 5.3.1 and 5.6.1.1 to 4.25 weight percent U-235. These revisions are consistent with the safety analyses provided and are, therefore, acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to 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 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. 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; and (2) such activities will be conducted in compliance with the Commission's regulations and 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: W. Brooks, SRXB
T. Alexion, PDIII-3

Dated: May 22, 1987