

May 24, 1989

Docket No. 50-483

Mr. Donald F. Schnell  
Senior Vice President - Nuclear  
Union Electric Company  
Post Office Box 149  
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Dear Mr. Schnell:

SUBJECT: AMENDMENT NO. 46 TO FACILITY OPERATING LICENSE NO. NPF-30  
(TAC NO. 59771)

The Commission has issued the enclosed Amendment No.46 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 September 18, 1985, as supplemented by letters dated March 23 and May 9, 1989.

The amendment revises TS Section 3/4.6.1.6, Containment Vessel Structural Integrity, to provide both clarification and relaxation of some of the existing Surveillance Requirements, as well as adding provisions which the staff found vital for monitoring the integrity of prestressed concrete containments. In addition, modifications were made to some of the reporting requirements and action statements found within the Limiting Condition for Operation.

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 - III,  
IV, V and Special Projects  
Office of Nuclear Reactor Regulation

**Enclosures:**

1. Amendment No. 46 to License No. NPF-30
2. Safety Evaluation

cc w/enclosures:  
See next page

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Surname: PKreutzer  
Date: 5/12/89

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TAlexion/tg  
5/15/89

PD/PDIII-3  
JHannon  
5/15/89

OGC-WF1

SHLewis  
5/22/89

~~No legal objection~~  
~~made to SE~~  
~~as noted~~

~~Please make if changes are made to SE as noted~~

*Gentian Bugliu*  
5/22/89  
Agreed as changed

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PDR ADCK 05000483  
P PIC

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

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. STN 50-483

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 46  
License No. NPF-30

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by Union Electric Company (UE, the licensee) dated September 18, 1985, as supplemented by letters dated March 23 and May 9, 1989, 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:

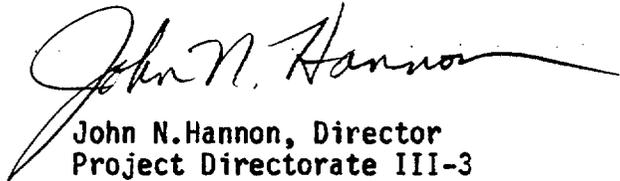
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P PDC

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 46, 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 upon issuance and shall be implemented within 30 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



John N. Hannon, Director  
Project Directorate III-3  
Division of Reactor Projects - III,  
IV, V and Special Projects  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 24, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 46

OPERATING LICENSE NO. WPF-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. Corresponding overleaf pages are provided to maintain document completeness.

REMOVE

3/4 6-8  
3/4 6-9  
3/4 6-10  
-

INSERT

3/4 6-8  
3/4 6-9  
3/4 6-10  
3/4 6-10a

## CONTAINMENT SYSTEMS

### AIR TEMPERATURE

#### LIMITING CONDITION FOR OPERATION

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3.6.1.5 Primary containment average air temperature shall not exceed 120°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the containment average air temperature greater than 120°F, reduce the average air temperature to within the limit within 8 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

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4.6.1.5 The primary containment average air temperature shall be the arithmetical average of the temperatures at the following locations and shall be determined at least once per 24 hours:

Location

- a. Containment Cooler Inlet located near NNE wall (E1 2068'-8");
- b. Containment Cooler Inlet located near West wall (E1 2068'-8");
- c. Containment Cooler Inlet located near NNW wall (E1 2068'-8"); and
- d. Containment Cooler Inlet located near East wall (E1 2068'-8").

## CONTAINMENT SYSTEMS

### CONTAINMENT VESSEL STRUCTURAL INTEGRITY

#### LIMITING CONDITION FOR OPERATION

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3.6.1.6 The structural integrity of the containment vessel shall be maintained at a level consistent with the acceptance criteria in Specification 4.6.1.6.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With the abnormal degradation indicated by the conditions in Specification 4.6.1.6.1a.4, restore the tendons to the required level of integrity or verify that containment integrity is maintained within 72 hours and perform an engineering evaluation of the containment and provide a Special Report to the Commission within 15 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With the indicated abnormal degradation of the structural integrity other than ACTION a. at a level below the acceptance criteria of Specification 4.6.1.6, restore the containment vessel to the required level of integrity or verify that containment integrity is maintained within 15 days and perform an engineering evaluation of the containment and provide a Special Report to the Commission within 30 days in accordance with Specification 6.9.2 or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. The provisions of Specification 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

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4.6.1.6.1 Containment Vessel Tendons. The structural integrity of the pre-stressing tendons of the containment vessel shall be demonstrated at the end of 1.5, 3.5 and 5.5 years following the initial containment vessel structural integrity test and at 5-year intervals thereafter. The structural integrity of the tendons shall be demonstrated by:

- a. Determining that a random but representative sample of at least 11 tendons (4 inverted U and 7 hoop) each have an observed lift-off force within the predicted limits established for each tendon. For each subsequent inspection one tendon from each group (1 inverted U and 1 hoop) shall be kept unchanged to develop a history and to correlate the observed data. The procedure of inspection and the tendon acceptance criteria shall be as follows:

## CONTAINMENT SYSTEMS

### CONTAINMENT VESSEL STRUCTURAL INTEGRITY

#### SURVEILLANCE REQUIREMENTS (Continued)

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1. If the measured prestressing force of the selected tendon in a group lies above the prescribed lower limit, the lift-off test is considered to be a positive indication of the sample tendon's acceptability,
2. If the measured prestressing force of the selected tendon in a group lies between the prescribed lower limit and 90% of the prescribed lower limit, two adjacent (accessible) tendons, one on each side of this tendon shall be checked for their prestressing forces. If the prestressing forces of these two tendons are above 95% of the prescribed lower limits for the tendons, all three tendons shall be restored to the required level of integrity, and the tendon group shall be considered as acceptable. If the measured prestressing force of any two tendons falls below 95% of the prescribed lower limits of the tendons, additional lift-off testing shall be done to detect the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure,
3. If the measured prestressing force of any tendon lies below 90% of the prescribed lower limit, the defective tendon shall be completely detensioned and additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure,
4. If the average of all measured prestressing forces for each group (corrected for average condition) is found to be less than the minimum required prestress level at the anchorage locations for that group, the condition shall be considered as abnormal degradation of the containment structure,
5. If from consecutive surveillances the measured prestressing forces for the same tendon or tendons in a group indicate a trend of prestress loss larger than expected and the resulting prestressing forces will be less than the minimum required for the group before the next scheduled surveillance, additional lift-off testing shall be done so as to determine the cause and extent of such occurrence. The condition shall be considered as an indication of abnormal degradation of the containment structure, and
6. Unless there is abnormal degradation of the containment vessel during the first three inspections, the sample population for subsequent inspections shall include at least 6 tendons (3 hoop, 3 inverted U).

## CONTAINMENT SYSTEMS

### CONTAINMENT VESSEL STRUCTURAL INTEGRITY

#### SURVEILLANCE REQUIREMENTS (Continued)

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- b. Performing tendon detensioning, inspections, and material tests on a previously stressed tendon from each group. A randomly selected tendon from each group shall be completely detensioned in order to identify broken or damaged wires and determine that over the entire length of the removed wire sample (which shall include the broken wire if so identified) that:
1. The tendon wires are free of corrosion, cracks, and damage, and
  2. A minimum tensile strength of 240 ksi (guaranteed ultimate strength of the tendon material) exists for at least three wire samples (one from each end and one at mid-length) cut from each removed wire.

Failure to meet the requirements of 4.6.1.6.1.b shall be considered as an indication of abnormal degradation of the containment structure.

- c. Performing tendon retensioning of those tendons detensioned for inspection to at least the force level recorded prior to detensioning or the predicted value, whichever is greater, with the tolerance within minus zero to plus 6%, but not to exceed 70% of the guaranteed ultimate tensile strength of the tendons. During retensioning of these tendons the changes in load and elongation shall be measured simultaneously at a minimum of three approximately equally spaced levels of force between zero and the seating force. If the elongation corresponding to a specific load differs by more than 10% from that recorded during the installation, an investigation shall be made to ensure that the difference is not related to wire failures or slip of wires in anchorages. This condition shall be considered as an indication of abnormal degradation of the containment structure.
- d. Verifying the OPERABILITY of the sheathing filler grease by assuring:
1. There are no changes in the presence or physical appearance of the sheathing filler-grease including the presence of free water,
  2. Amount of grease replaced does not exceed 5% of the net duct volume, when injected at  $\pm 10\%$  of the specified installation pressure,

CONTAINMENT SYSTEMS

CONTAINMENT VESSEL STRUCTURAL INTEGRITY

SURVEILLANCE REQUIREMENTS (Continued)

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3. Minimum grease coverage exists for the different parts of the anchorage system,
4. During general visual examination of the containment exterior surface, that grease leakage that could affect containment integrity is not present, and
5. The chemical properties of the filler material are within the tolerance limits specified as follows:

Water Content	0-10% by dry weight
Chlorides	0-10 ppm
Nitrates	0-10 ppm
Sulfides	0-10 ppm
Reserved Alkalinity	>0

Failure to meet the requirements of 4.6.1.6.1.d shall be considered as an indication of abnormal degradation of the containment structure.

4.6.1.6.2 End Anchorages and Adjacent Concrete Surfaces. As an assurance of the structural integrity of the containment vessel, tendon anchorage assembly hardware (such as bearing plates, stressing washers, wedges, and buttonheads) of all tendons selected for inspection shall be visually examined. Tendon anchorages selected for inspection shall be visually examined to the extent practical without dismantling the load bearing components of the anchorages.

Bottom grease caps of all vertical tendons shall be visually inspected to detect grease leakage or grease cap deformations. The surrounding concrete shall also be checked visually for indication of any abnormal condition. The frequency of this surveillance shall be in accordance with 4.6.1.6.1. Significant grease leakage, grease cap deformation or abnormal concrete condition shall be considered as an indication of abnormal degradation of the containment structure.

4.6.1.6.3 Containment Vessel Surfaces. The exterior surface of the containment shall be visually examined to detect areas of large spall, severe scaling, D-cracking in an area of 25 sq. ft. or more, other surface deterioration or disintegration, or grease leakage, each of which shall be considered as evidence of abnormal degradation of structural integrity of the containment. This inspection shall be performed prior to the Type A containment leakage rate test.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 46 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 September 18, 1985, as supplemented on March 23 and May 9, 1989, the licensee submitted proposed revisions to Section 3/4.6.1.6, Containment Vessel Structural Integrity, of the Callaway Technical Specifications (TS). This section includes a number of surveillance requirements that ensure that the structural integrity of the containment will be maintained in accordance with the safety analysis requirements for the life of the facility. A representative sample of containment tendons is examined at predetermined intervals to ensure that the containment will withstand the maximum pressure of 50 psig under design basis accident conditions. Surveillance requirements include verification of containment tendon lift-off forces and stresses, tensile strength tests of the tendon wires, examination for voids in the sheathing filler grease, and visual examination of tendons, anchorages and exposed interior and exterior containment surfaces.

The existing TS has two Limiting Conditions for Operation (LCOs). The existing LCO (a) requires the plant to be in hot standby if the deficiencies related to the behavior of sample lift-off force measurements cannot be restored to the required level of integrity within 15 days. If the lift-off force of any one tendon falls outside of the acceptance criteria, additional testing must be performed. For all other conditions, LCO (b) requires that all parameters (lift-off stresses, tensile strength, voids in the grease, etc.,) be restored to the required level of integrity within 72 hours.

The licensee's submittal of September 18, 1985 requested a number of changes to the TS. The most significant of these changes and the bases are as follows. The 72 hour LCO would be eliminated. The LCO of 15 days would remain for LCO (a) while varying requirements would be substituted for LCO (b). Subsequent discussions with the licensee indicated their belief that 72 hours would be insufficient time to select accessible tendons and erect scaffolding if additional testing is desirable or required by the TS, obtain test or chemical analysis results back from off-site contractors, or adequately analyze and respond to new issues or unidentified problems. Upon observing abnormal degradation for conditions other than those under LCO (a), the licensee proposed additional reporting requirements and an engineering evaluation to demonstrate continued containment structural integrity. This

relaxation would permit tendon parameters to be outside of their acceptance criteria provided that the overall containment structural integrity could be demonstrated. The licensee also proposed that the maximum void content of 5% in the sheathing filler grease would be removed. It would be replaced by a statement referring to an examination for wide-spread grease leakage on the containment exterior surface. This relaxation was sought because the initial filling operation did not require verification of voids less than 5%.

On March 16, 1988, the licensee met with the NRC staff to discuss the licensee's submittal. While some minor changes to the original submittal were agreed upon, the staff requested that the licensee submit a statistical analysis to justify continued plant operation for up to 15 days as proposed by the licensee once abnormal degradation has been observed.

The licensee submitted the requested statistical analysis along with additional modifications to the TS in their submittal of March 23, 1989. Changes to the original TS submittal include the addition of a 30-day special reporting requirement when selected conditions are not satisfied, clarification to the original submittal by linking together the surveillance requirements and LCO that addressed lift-off forces and lift-off stresses, and reinsertion of the maximum limit of 5% voids in the grease-filled tendon sheaths provided it is linked with visual observation of widespread grease leakage.

## 2.0 EVALUATION

The Wolf Creek and Callaway facilities have the identical TS regarding Containment Vessel Structural Integrity. At the time of licensing, these TS represented the staff's latest thinking and represented the staff's standard TS. The changes described above are being sought simultaneously by Wolf Creek and Callaway. While the staff was interested in providing flexibility to the licensees, the staff also sought plant-specific as well as a generic solution to the limiting conditions for operation when certain tendon degradation is indicated during containment inspections. Under the premise that the staff was embarking on a future model of TS that other licensees may wish to consider, the staff proceeded both cautiously and deliberately in this area.

On May 3, 1989 a meeting was held among the Wolf Creek and Callaway licensees, their contractors, and the NRC project and technical staff. The purpose of the meeting was to review and discuss previous submittals and to find a technical resolution of the issue. The licensee and their contractors initially presented their statistical analysis that provided justification for the 15-day LCO once abnormal degradation has been identified. The staff rejected their analysis primarily because the data base was limited to plant-specific information from Wolf Creek and Callaway and did not expand to other available, historical data. Further discussions on the previous submittals were not productive.

Following a caucus by the staff, an extended session was conducted with the licensees that dealt with clarifying the staff's position and modifying the licensees' submittals accordingly. A revised set of TS were agreed upon and were distributed to the licensees at the conclusion of the meeting. The revised TS, which include aspects of the licensees' original submittals and provisions that the staff found essential for meeting the staff's requirements, include providing the licensees with an option of demonstrating that containment integrity is maintained as opposed to restoring the nonconforming tendons to the required level of integrity when a measured or observed parameter falls outside its acceptance criteria for both the LCO's set out below, and retaining the 72-hour LCO if the average of all measured prestressing forces from the sample group fell outside the acceptance criteria. All other measured or observed parameters identified in the surveillance requirements would fall within a 15-day LCO. Other changes made to surveillance requirements falling under the 15-day LCO include reinserting the requirement to limit the void content in the grease-filled tendon sheaths to 5%, and adding an additional requirement to perform trending analysis of prestressing forces. If the trending analysis predicts unacceptable values it will be considered as an indication of abnormal degradation and additional testing will be required to determine the cause and extent of such degradation.

The licensee's submittal of May 9, 1989 formalized this agreement.

Based upon this discussion and evaluation, the staff has concluded: (1) The TS met the staff's requirements for containment vessel structural integrity; (2) The TS provided both clarification and relaxation of some of the existing LCO's and Surveillance Requirements, as well as adding provisions which the staff found vital for monitoring the integrity of prestressed concrete containments; and (3) The TS are consistent with and support the conclusions of the licensee's originally-submitted Safety Evaluation and no significant hazards consideration determination. The proposed changes to the TS are, therefore, acceptable.

### 3.0 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 or a change to a surveillance requirement. 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.

4.0 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: H. Ashar, ESGB  
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Dated: May 24, 1989