UNION ELECTRIC

1901 Gratiot Street, St. Louis

Donald F. Schnell
Vice President

March 31, 1987

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

ULNRC-1471

CALLAWAY PLANT
DOCKET NO. 50-483
CALLAWAY PLANT UPRATING SUBMITTAL

Union Electric herewith transmits one original and one conformed copy of an application for amendment to Facility Operating License No. NPF-30 for Callaway Plant.

This amendment request revises Technical Specifications to support a Callaway Plant uprating to the 3565 MWt core power level. This will benefit the general public and customers of Union Electric by increasing the usefulness of Callaway Plant as a safe and dependable source of power for the region. The enclosure to this letter provides a listing of all Attachments. In summary, the Attachments provide the results of engineering and licensing reviews that support the Callaway uprating. These reviews verify the capability of the plant to operate at the increased power level without modifications to existing systems, structures, or components. Any revisions to the FSAR that are required due to the uprating will be incorporated into the FSAR during the annual update following implementation of the uprating.

The characteristics of the thermal hydraulic flow anomaly, first discovered at Callaway, are not impacted by the uprating. Based on information provided to the NRC in Westinghouse letter NS-NRC-87-3202, dated February 13, 1987, it is expected that sufficient margins continue to exist to insure that operation of Callaway Plant remains in compliance with all applicable regulatory and industry codes/standards applicable to Callaway at the uprated conditions with the flow anomaly present.

The steam generator tube rupture (SGTR) analysis, which was required by License Condition 2.C.(11), has been submitted and is the subject of ongoing NRC review. Union Electric's responses to additional NRC questions concerning the SGTR analysis are scheduled for submittal by May 15, 1987.

A001 1/1 w/check $150 #219753

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This request has been reviewed and approved by the Callaway Onsite Review Committee and the Nuclear Safety Review Board. It has been determined that this request does not involve any unreviewed safety questions as defined in 10CFR50.59 nor a significant hazard consideration as determined by the three factor test per 10CFR50.92.

Union Electric proposes October 15, 1987 as the effective date for implementation of the uprating, subject to NRC approval.

Enclosed is a check for the $150 application fee required by 10CFR170.21.

Very truly yours,

Donald F. Schnell

DJW/mat

Enclosure

Attachments

STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

Donald F. Schnell, of lawful age, being first duly sworn upon oath says that he is Vice President-Nuclear and an officer of 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 Donald F. Schnell
Donald F. Schnell
Vice President
Nuclear

SUBSCRIBED and sworn to before me this 31st day of March, 1987.

Barbara J. Pfaff
BARBARA J. PFAFF
NOTARY PUBLIC, STATE OF MISSOURI
MY COMMISSION EXPIRES APRIL 22, 1989
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Enclosure
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March 31, 1987

CALLAWAY UPRATING SUBMITTAL
LIST OF ATTACHMENTS

Attachment 1	Safety Evaluation
Attachment 2	Operating License/Technical Specifications Revised Pages
Attachment 3	Environmental Evaluation
Attachment 4	Significant Hazards Evaluation
Attachment 5	Appendices Appendix A - NSSS Uprating Licensing Report Appendix B - Section I BOP Uprating - Licensing Report Bechtel Review Appendix B - Section II BOP Uprating - Licensing Report Union Electric Review

Attachment 1
ULNRC-1471
March 31, 1987

CALLAWAY UPRATING SUBMITTAL
ATTACHMENT 1
SAFETY EVALUATION

SAFETY EVALUATION
FOR CALLAWAY PLANT
UPRATING TO 3579 MWt

SUMMARY

This Safety Evaluation supports the proposed uprating of Union Electric Company's Callaway Plant to a licensed core power of 3565 MWt from the present licensed core power of 3411 MWt.

NSSS and BOP systems and components have been reviewed and found to be capable of operating at the uprated power with no hardware changes to the present design. All applicable safety design bases and power generation design bases as defined in the FSAR will be met at uprated conditions.

Appendix A of Attachment 5 contains the NSSS Uprating Licensing Report and is referenced in support of this safety evaluation.

Appendix B of Attachment 5 contains the BOP Uprating Licensing Report and is referenced in support of this safety evaluation.

Accident, Radiological, and Nuclear Evaluations which support the uprating have been performed in conjunction with the separate licensing submittal to allow the use of VANTAGE 5 fuel at Callaway (see ULNRC-1470 dated 3/31/87).

It is concluded that the operation of the Callaway Plant at the uprated power level does not involve an unreviewed safety question as defined by 10 CFR 50.59.

INTRODUCTION

This evaluation supports Union Electric Company's license amendment request to increase the electrical output of the Callaway Plant. At present, Callaway is licensed to operate at a core power of 3411 MWt (which corresponds to an NSSS power of 3425 MWt). This amendment application requests the necessary license and technical specification changes to operate the Callaway Plant at a core power of 3565 MWt (NSSS power of 3579 MWt). This uprated power represents an increase of 4.5% and is equivalent to the Engineered Safety Features Design Rating of the Callaway Plant.

Union Electric has submitted a license amendment request (ULNRC-1470 dated 3/31/87) to utilize Westinghouse 17 x 17 VANTAGE 5 (V-5) fuel beginning with Callaway Cycle 3 operation. The requested uprating is scheduled to begin concurrently with Cycle 3 operation.

The uprating evaluations are based upon V-5 fuel. These evaluations envelop the Optimized Fuel Assembly (OFA) and Low Parasitic (LOPAR) fuels which will be employed during the transition cycles. All accident and radiological analyses required for transition to V-5 fuel have been performed at the uprated power of 3579 MWt.

In support of the requested uprating, the NSSS systems and components were analyzed by Westinghouse to verify their capability to meet the structural and functional requirements for operation at 3579 MWt. A detailed description of this review is contained in Appendix A of Attachment 5.

Likewise, the BOP systems and components were analyzed by Bechtel and Union Electric to verify their capability to meet the structural and functional requirements for operation at 3579 MWt. A detailed description of this review is contained in Appendix B of Attachment 5.

All plant systems are screened for possible impact due to an uprating. Those systems that are clearly not dependent upon thermal power level were excluded from further engineering and licensing review. Table 1 lists all plant systems and the appendix containing discussion of their review (or a note if a detailed review was not necessary).

NSSS SYSTEMS AND COMPONENTS EVALUATION

The NSSS systems and components were reviewed to determine the impact of the Callaway uprating. The review consisted of verifying that all safety, functional, and structural criteria as defined in the FSAR are met at the uprated power level. The review was performed in accordance with the following guidelines (put forth in WCAP-10263, "A Review Plan for Uprating the Licensed Power of a Pressurized Water Reactor Power Plant"):

1. The review encompassed all aspects of the Callaway NSSS system design and operation and NSSS equipment mechanical design which were impacted by the power increase.

2. The review was performed in accordance with the licensing criteria and standards which currently apply to Callaway.

3. Equipment mechanical designs were evaluated against the original industry design codes and standards to which the equipment was built.

4. Current techniques have been used for those analyses required in the course of the NSSS review.

Review of NSSS equipment designs that are impacted by the uprating has shown that, in most cases, requirements for operation at the higher power are enveloped by either the original Callaway design or by the generic component design. In a few cases, it has been necessary to perform additional design calculations to verify the component's capability for operation and compliance with the original design codes and standards at the uprated conditions. In every case, however, it has been shown that the NSSS equipment originally provided for the Callaway Plant is capable of safe and reliable operation at 3579 MWt without modification.

Review of NSSS systems design and operating capability has verified that they will remain in compliance with the functional requirements specified in the FSAR when the Callaway Plant is operated at the increased power rating. A few system parameters and setpoints have been revised to reflect operation at the higher power, but those operating conditions have been shown to be within the design capability of the systems as they currently exist. Although the uprating is made possible through the use of operating margins existing in the NSSS, sufficient design and operating margins have been retained to allow safe and reliable operation of the plant.

The only NSSS system which is impacted is the Residual Heat Removal (RHR) system. As a result of the higher decay heat associated with the uprating, plant cooldown times will increase slightly. The original plant cooldown goes from 350 F at 4.0 hours to 140 F at 20.0 hours (i.e., 16.0 hours on RHR). The new

plant cooldown goes from 350 F at 4.0 hours to 140 F at 23.3 hours (i.e., 19.3 hours on RHR). However, this increase in plant cooldown time is not considered to be significant, and safety requirements are still satisfied with respect to a single train cooldown under accident conditions. No changes have been recommended for the RHR heat exchangers or for the required tubeside or shellside flow rates.

Refer to Appendix A of Attachment 5 for a detailed discussion of the NSSS evaluations.

BOP SYSTEMS AND COMPONENTS EVALUATION

The BOP systems and components were reviewed to determine the impact of the Callaway uprating. The review consisted of comparing the existing design with the performance requirements at the uprated power level of 3579 MWt and determining if modifications were required and if there was any impact on safety. An exception to the above involves the turbine-generator described below.

Results of this review (Appendix B of Attachment 5) show that the secondary side systems and components have the capability to function properly at the uprated power level without any modifications to their existing design. In addition, all applicable safety criteria are met.

The Spent Fuel Pool Cooling and HVAC systems were reviewed as part of the V-5 submittal. The combined effects of the uprating, V-5 fuel, and extended burnup result in increased heat loads and increased pool and air temperatures. All of the FSAR limits and design criteria are still met. Refer to ULNRC-1470 dated 3/31/87 for a detailed discussion of the analysis results.

Review of the turbine-generator is based on the Valves Wide Open (VWO) heat balance which represents an NSSS power of 3562 MWt compared to the uprating basis of 3579 MWt. The ability of the turbine-generator to operate above 3562 MWt will be determined by careful monitoring of performance parameters. This potential limitation to plant output represents an operational limitation, not a safety concern. All applicable safety criteria are met at the uprated power of 3579 MWt, regardless of the turbine-generator's ability to operate at that power level. Whether or not the VWO heat balance parameters prove to be limiting, the licensing basis will still be 3565 MWt core power.

Refer to Appendix B of Attachment 5 for a detailed discussion of BOP evaluations.

NUCLEAR EVALUATION

Evaluation of the effects on the fuel design of the uprating to 3565 MWth core power were conducted (ULNRC-1470 dated 3/31/87). Both the fuel currently in the core (LOPAR and OFA) and reload fuel (V-5) were reviewed with respect to nuclear design, thermal hydraulic design, and fuel performance. The effects of mixed core operation were also evaluated. Results of this review indicate there are no significant effects on the fuel design due to the uprating. Refer to ULNRC-1470 dated 3/31/87 for a detailed description of the fuel design review.

ACCIDENT AND RADIOLOGICAL EVALUATIONS

The LOCA and NON-LOCA analyses of record (presently in the FSAR), which support LOPAR and OFA fuels, were reviewed to demonstrate that all applicable safety criteria would be met for the Callaway uprating. These analyses were performed at an NSSS power of 3579 MWt, and the assumed parameters are consistent with the uprating. Therefore, the results are valid for the Callaway uprating. Results show that all applicable safety criteria are met.

The LOCA analyses submitted via ULNRC-1470 dated 3/31/87, which support LOPAR, OFA, and V-5 fuels, were performed at an NSSS power of 3579 MWt, and the assumed parameters are consistent with the uprating. Therefore, the results are valid for the Callaway uprating. Results show that all applicable safety criteria are met. Refer to ULNRC-1470 dated 3/31/87 for a detailed description of the analyses.

The NON-LOCA analyses of record were evaluated for impact due to V-5 fuel (ULNRC-1470 dated 3/31/87). Certain cases were reanalyzed in order to support the V-5 fuel. These reanalyzed NON-LOCA cases were performed at an NSSS power of 3579 MWt and the assumed parameters are consistent with the uprating. Therefore, the results are valid for the Callaway uprating. Results show that all applicable safety criteria are met. Refer to ULNRC-1470 dated 3/31/87 for a detailed description of these analyses.

The licensing basis supported by this report continues to be 10% maximum steam generator tube plugging. Per ULNRC-1470 dated 3/31/87, 15% tube plugging was assumed for all LOCA cases and for the reanalyzed NON-LOCA cases. However, the NON-LOCA cases which were evaluated and were not impacted by V-5 fuel (and consequently not reanalyzed) only assume 10% tube plugging.

The radiological source terms were evaluated as part of the Cycle 3 reload analysis at the uprated power level. The source terms are based on 102% of 3565 MWt core power. Refer to ULNRC-1470 dated 3/31/87 for a detailed description of the radiological analysis.

Four additional MSLB cases were analyzed to determine the impact of the uprating. Cases 1,2,3, and 16 of FSAR Table 6.2.1-56 (representing 102% of 3425 MWt) were reanalyzed at 102% of 3579 MWt (raising the spectrum of cases from 16 to 20). The four additional P/T curves are bounded by the existing Equipment Qualification (EQ) envelope with one exception. The temperature profile of reanalyzed Case 16 exceeds the EQ envelope at one point; however, the overall case is less limiting than the EQ envelope. Therefore, no impact on equipment qualification will occur due to the uprating. Refer to Attachment 5, Appendix B, Section V for further discussion.

RELEASES DURING NORMAL PLANT OPERATION

The Callaway Plant releases and offsite doses were previously evaluated by the Staff relative to 10 CFR 50 Appendix I for an uprated reactor power level of 3565 Mwt in Section 11.1 of NUREG-0830, SER, October 1981. In the SER, the Staff concluded that the liquid- and gaseous- waste-treatment systems will be capable of meeting the ALARA levels and the requirements of 10 CFR 50.34a and Appendix I to 10 CFR 50.

SUMMARY OF TECHNICAL SPECIFICATIONS CHANGES

Table 2 presents a summary list of the Technical Specification Changes due to the uprating to a licensed core power of 3565 MWt (NSSS power of 3579 MWt).

CONCLUSIONS

This review has demonstrated that the Callaway Plant is capable, in its present design configuration, of operating safely and reliably at the proposed power rating and remains in compliance with the design criteria and safety limits specified in the FSAR, provided the plant is operated in accordance with the proposed Technical Specification changes. The review has verified the following:

1. The probability of an accident previously evaluated in the FSAR will not be increased.

2. The consequences of an accident previously evaluated in the FSAR will not be increased.

3. The possibility of an accident which is different than any already evaluated in the FSAR will not be created.

4. The probability of a malfunction of NSSS or BOP equipment important to safety, previously evaluated in the FSAR, will not be increased.

5. The consequences of a malfunction of NSSS or BOP equipment important to safety, previously evaluated in the FSAR, will not be increased.

6. The possibility of a malfunction of NSSS or BOP equipment important to safety, different from any already evaluated in the FSAR, is not created by operation at the uprated power.

7. The margin of safety as defined in the bases to any technical specification will not be reduced by operation at the uprated power.

Therefore, it has been concluded that operation of the Callaway Plant at the increased power rating does not reduce any safety margins, and does not involve an unreviewed safety question as defined by 10 CFR 50.59.

Table 1

CALLAWAY UPRATING SYSTEM REVIEW LIST

System	Class (Note 1)	Description	Appendix (Note 2)
AB	Q	Main Steam	B
AC	Q	Main Turbine	B
AD	N	Condensate	B
AE	Q	Feedwater	B
AF	N	FW Htr. Extrac., Drns., Vents	B
AK	N	Condensate Demineralizer	B
AL	Q	Auxiliary Feedwater	B
AM	N	Raw Water Supply	X
AN	S	Demin. Water Stor. & Transfer	B
AP	Q	Condensate Storage & Transfer	B
AQ	N	Cond. & FW Chemical Add.	X
BB	Q	Reactor Coolant	A
BG	Q	Chemical & Volume Control	A
BL	Q	Reactor Makeup Water	B
BM	Q	Steam Generator Blowdown	B
BN	Q	Borated Refueling Water Stor.	B
CA	N	Steam Seals	B
CB	N	Main Turbine Lube Oil	B
CC	N	Generator H2 & C02	B
CD	N	Generator Seal Oil	B
CE	N	Stator Cooling Water	B
CF	N	Lube Oil Stor., Tran., Purif.	B
CG	N	Condensor Air Removal	B
CH	N	Main Turbine Control Oil	B
DA	N	Circulating Water	B
DB	N	Cooling Tower Makeup & Blowdown	B
DD	N	Circ. Water Chemical Control	X
DE	N	Intake & Water Treatment	B
EA	N	Service Water	B
EB	N	Closed Cooling Water	B
EC	Q	Fuel Pool Cooling & Cleanup	B
EF	Q	Essential Service Water	B
EG	Q	Component Cooling Water	B
EJ	Q	Residual Heat Removal	A
EM	Q	High Pressure Coolant Injection	A
EN	Q	Containment Spray	B
EP	Q	Accumulator Safety Injection	A

Table 1 (Cont.)

FA	N	Auxiliary Steam Generator	X
FB	Q	Auxiliary Steam	X
FC	Q	Auxiliary Turbines	B
FE	N	Aux. Steam Chemical Add.	X
GA	S	Plant Heating	X
GB	N	Central Chilled Water	B
GC	N	Service & Stores Bldg. HVAC	X
GD	Q	ESW Pumphouse HVAC	X
GE	Q	Turbine Building HVAC	X
GF	Q	Misc. Building HVAC	X
GG	Q	Fuel Building HVAC	B
GH	S	Radwaste Building HVAC	X
GK	Q	Control Building HVAC	X
GL	Q	Auxiliary Building HVAC	B
GM	Q	Diesel Generator Building HVAC	X
GN	Q	Containment Cooling	B
GP	Q	Containment ILRT	X
GR	N	Containment Atmosphere Control	B
GS	Q	Containment Hydrogen Control	A
GT	Q	Containment Purge	B
HA	S	Gaseous Radwaste	B
HB	Q	Liquid Radwaste	B
HC	S	Solid Radwaste	B
HD	Q	Decontamination	X
HE	S	Boron Recycle	B
HF	S	Secondary Liquid Waste	B
JA	N	Aux. Oil Stor. & Transfer	X
JE	Q	Emergency Fuel Oil	X
JH	N	Auxiliary Gas	X
KA	Q	Compressed Air	X
KB	Q	Breathing Air	X
KC	Q	Fire Protection	X
KD	N	Domestic Water	X
KE	Q	Fuel Hand., Stor., & RV Serv.	X
KF	S	Cranes, Hoists, & Elevators	X
KH	S	Service Gas	X
KJ	Q	Standby Diesel Engine	X
KS	N	Bulk Chemical Storage	X
LA	S	Sanitary Drainage	X
LB	S	Roof Drains	X
LC	N	Yard Drains	X
LD	N	Chemical & Detergent Waste	X
LE	Q	Oily Waste	X
LF	Q	Floor & Equipment Drains	X

Table 1 (Cont.)

MA	N	Main Generator	B
MB	N	Excitation & Voltage Regulation	B
MD	N	EHV Switchyard Bus	B
ME	N	EHV Switchyard 125 V DC	B
MF	N	EHV Switchyard Lighting	X
MH	N	Outgoing EHV Lines	B
MR	N	Startup Transformer	B
NB	Q	4.16 KV AC (1E)	B
NE	Q	Standby Generator	B
NF	Q	Load Shed. & Emer. Load Seq.	X
NG	Q	480 V AC (1E)	B
NK	Q	125 V DC (1E)	B
NN	Q	Instrument AC (1E)	B
PA	Q	13.8 KV AC	B
PB	N	4.16 KV AC	B
PG	Q	480 V AC	B
PJ	N	250 V DC	B
PK	Q	125 V DC	B
PN	Q	Instrument AC	B
PQ	N	Uninterruptible AC	B
QA	N	Normal Lighting	X
QB	Q	Standby Lighting AC	X
QD	S	Emergency Lighting DC	X
QE	N	Telephone System	X
QF	S	Public Address	X
QG	N	Grounding	X
QH	N	Cathodic Protection	X
QJ	N	Freeze Protection	X
QN	N	Misc. Equipment	X
QT	N	Permanent Road Lighting	X
RD	N	Meteorological Instrumentation	X
RJ	N	BOP Computer	B
RK	N	Plant Annunicator	X
RL	Q	Main Control Board	X
RM	N	Process Sampling	B
RP	Q	Misc. Control Panels	X
RR	Q	Safety Assessment System	X
SA	Q	BOP ESFAS	X
SB	Q	Reactor Protection	A
SC	Q	Reactor Instrumentation	A
SD	N	Area Radiation Monitoring	X
SE	Q	Ex-Core Meutron Monitoring	A
SF	N	Reactor Control	A
SG	N	Seismic Instrumentation	X
SJ	Q	Nuclear Sampling	B

Table 1 (Cont.)

SK	N	Plant Security	X
SP	Q	Process Radiation Monitoring	X
SQ	N	Loose Parts Monitoring	X
SR	N	Incore Neutron Monitoring	A
ST	N	Emer. Resp. Facility Info.	X
SZ	N	Radioactive Release Info.	X

Notes:

1. Class:
   - Q = System is safety related or has safety related components.
   - S = System is special scope (FP, DA, 2/1) or has special scope components, but has no safety related function or components.
   - N = System is non-Q, non-special scope, and has no safety related or special scope components.

2. Appendix:
   - A = Appendix A of Attachment 5 (NSSS Licensing Report).
   - B = Appendix B of Attachment 5 (BOP Licensing Report).
   - X = Review not required; system operation not dependent on thermal power level.

Table 2

SUMMARY AND JUSTIFICATION FOR CALLAWAY PLANT TECHNICAL SPECIFICATION CHANGES TO THE UPRATING

PAGE	SECTION	DESCRIPTION OF CHANGE	JUSTIFICATION
I-II	Index	Delete definition of DESIGN THERMAL POWER and re-number definitions.	This definition is no longer required since the RATED THERMAL POWER will be 3565 MWt, and the accident analyses were performed at this core power.
1-2-1-7	1.10-1.41	Delete definition of DESIGN THERMAL POWER and re-numbered definitions 1.11 through 1.41. Revised value for RATED THERMAL POWER.	This change reflects the uprated core.
2-2	Figure 2.1-1	Revised Reactor Core Safety Limits.	The new limits result from the uprated core.
2-7, 2-10	Table 2.2-1	Replaced DESIGN THERMAL POWER with RATED THERMAL POWER. Revise notes associated with OT-delta T and OP-delta T setpoints.	This change reflects the uprated core.

Attachment 2
ULNRC-1471
March 31, 1987

CALLAWAY UPRATING SUBMITTAL

ATTACHMENT 2

OPERATING LICENSE AND TECHNICAL SPECIFICATIONS
REVISED PAGES