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

October 31, 2008

Mr. Adam C. Heflin
Senior Vice President and
Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: ONE-TIME EXTENSION OF COMPLETION TIME FOR ESSENTIAL SERVICE WATER SYSTEM PIPING REPLACEMENT (TAC NO. MD7252)

Dear Mr. Heflin:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 186 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to Union Electric Company's submittal dated October 31, 2007, as supplemented by letters dated February 21, March 7, May 6, July 10, and August 13, 2008.

The amendment revises the TSs to allow a one-time extension to the Completion Times for both essential service water (ESW) trains and the emergency diesel generators from 72 hours to 14 days. The revision to the TSs would apply when each train of the ESW system is inoperable during respective ESW system piping replacements.

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

Sincerely,

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures:
1. Amendment No. 186 to NPF-30
2. Safety Evaluation

cc w/encls: See next page

cc:

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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. 186
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 October 31, 2007, as supplemented by letters dated February 21, March 7, May 6, and July 10, and August 13, 2008, 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. 186 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, and shall be implemented before December 31, 2008.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating
License No. NPF-30 and
Technical Specifications

Date of Issuance: October 31, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 186

FACILITY OPERATING LICENSE NO. NPF-30

DOCKET NO. 50-483

Replace the following pages of the Facility Operating License No. NPF-30 and Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License

REMOVE	INSERT
-3-	-3-

Technical Specifications

REMOVE	INSERT
3 (table of contents)	3 (table of contents)
3.7-21	3.7-21
3.7-22	3.7-22
--	3.7.23
3.7-23	3.7-24
3.7-24	3.7-25
3.7-25	3.7-26
3.7-26	3.7-27
3.7-27	3.7-28
3.7-28	3.7-29
3.7-29	3.7-30
3.7-30	3.7-31
3.7-31	3.7-32
3.7-32	3.7-33
3.7-33	3.7-34
3.7-34	3.7-35
3.7-35	3.7-36
3.7-36	3.7-37
3.7-37	3.7-38
3.7-38	3.7-39
3.7-39	3.7-40
3.7-40	3.7-41
3.7-41	3.7-42
3.8-3	3.8-3
3.8-4	3.8-4
3.8-5	3.8-5
3.8-6	3.8-6

(4) UE, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source of special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) UE, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

UE is authorized to operate the facility at reactor core power levels not in excess of 3565 megawatts thermal (100% power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan*

The Technical Specifications contained in Appendix A, as revised through Amendment No. 187 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) Environmental Qualification (Section 3.11, SSER #3)**

Deleted per Amendment No. 169

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* Amendments 133, 134, &135 were effective as of April 30, 2000 however these amendments were implemented on April 1, 2000.

** The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESW train inoperable. (continued)	A.1 (continued) Restore ESW train to OPERABLE status.	--------NOTE-------- A one-time Completion Time of 14 days per ESW train is allowed to support planned replacement of ESW piping prior to December 31, 2008. ---------- 72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

3.7 PLANT SYSTEMS

3.7.8 Essential Service Water System (ESW)

LCO 3.7.8 Two ESW trains shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESW train inoperable.	A.1 ---------- NOTE ---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources-Operating," for emergency diesel generator made inoperable by ESW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for residual heat removal loops made inoperable by ESW. ----------	(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.8.1	---------- NOTE ---------- Isolation of ESW flow to individual components does not render the ESW inoperable. ---------- Verify each ESW manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.8.2	Verify each ESW automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.7.8.3	Verify each ESW pump starts automatically on an actual or simulated actuation signal.	18 months

3.7 PLANT SYSTEMS

3.7.9 Ultimate Heat Sink (UHS)

LCO 3.7.9 The UHS shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One cooling tower train inoperable.	A.1	Restore cooling tower train to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met. OR UHS inoperable for reasons other than Condition A.	B.1 AND B.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.9.1	Verify water level of UHS is ≥ 831.25 ft mean sea level.	24 hours
SR 3.7.9.2	Verify average water temperature of UHS is ≤ 90°F.	24 hours
SR 3.7.9.3	Operate each cooling tower fan for ≥ 15 minutes in both the fast and slow speed.	31 days

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Ventilation System (CREVS)

LCO 3.7.10 Two CREVS trains shall be OPERABLE.

---------- NOTE ----------
The control room boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CREVS train inoperable.	A.1	Restore CREVS train to OPERABLE status.	7 days
B. Two CREVS trains inoperable due to inoperable control room boundary in MODES 1, 2, 3, and 4.	B.1	Restore control room boundary to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1	Be in MODE 3.	6 hours
	AND		
	C.2	Be in MODE 5.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of irradiated fuel assemblies.	D.1	Place OPERABLE CREVS train in CRVIS mode.	Immediately
	OR		
	D.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	D.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
E. Two CREVS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	E.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	E.2	Suspend movement of irradiated fuel assemblies.	Immediately
F. Two CREVS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.10.1	Operate each CREVS train pressurization filter unit for ≥ 10 continuous hours with the heaters operating and each CREVS train filtration filter unit for ≥ 15 minutes.	31 days
SR 3.7.10.2	Perform required CREVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with VFTP
SR 3.7.10.3	Verify each CREVS train actuates on an actual or simulated actuation signal.	18 months
SR 3.7.10.4	Verify one CREVS train can maintain a positive pressure of ≥ 0.125 inches water gauge, relative to the outside atmosphere during the CRVIS mode of operation.	18 months on a STAGGERED TEST BASIS

3.7 PLANT SYSTEMS

3.7.11 Control Room Air Conditioning System (CRACS)

LCO 3.7.11 Two CRACS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CRACS train inoperable.	A.1	Restore CRACS train to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met in MODE 5 or 6, or during movement of irradiated fuel assemblies.	C.1	Place OPERABLE CRACS train in operation.	Immediately
	OR		
	C.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	C.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
D. Two CRACS trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	D.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	D.2	Suspend movement of irradiated fuel assemblies.	Immediately
E. Two CRACS trains inoperable in MODE 1, 2, 3, or 4.	E.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.11.1	Verify each CRACS train has the capability to remove the assumed heat load.	18 months

3.7 PLANT SYSTEMS

3.7.12 Not Used.

3.7 PLANT SYSTEMS

3.7.13 Emergency Exhaust System (EES)

LCO 3.7.13 Two EES trains shall be OPERABLE.

---------- NOTE ----------
The auxiliary or fuel building boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4,
During movement of irradiated fuel assemblies in the fuel building.

---------- NOTE ----------
The SIS mode of operation is required only in MODES 1, 2, 3 and 4. The FBVIS mode of operation is required only during movement of irradiated fuel assemblies in the fuel building.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One EES train inoperable.	A.1	Restore EES train to OPERABLE status.	7 days
B. Two EES trains inoperable due to inoperable auxiliary building boundary in MODE 1, 2, 3 or 4.	B.1	Restore auxiliary building boundary to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR Two EES trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	C.1 AND C.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours
D. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the fuel building.	D.1 OR D.2	Place OPERABLE EES train in the FBVIS mode. Suspend movement of irradiated fuel assemblies in the fuel building.	Immediately Immediately
E. Two EES trains inoperable during movement of irradiated fuel assemblies in the fuel building.	E.1	Suspend movement of irradiated fuel assemblies in the fuel building.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.13.1	Operate each EES train for ≥ 10 continuous hours with the heaters operating.	31 days
SR 3.7.13.2	Perform required EES filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.13.3	Verify each EES train actuates on an actual or simulated actuation signal.	18 months
SR 3.7.13.4	Verify one EES train can maintain a negative pressure ≥ 0.25 inches water gauge with respect to atmospheric pressure in the auxiliary building during the SIS mode of operation.	18 months on a STAGGERED TEST BASIS
SR 3.7.13.5	Verify one EES train can maintain a negative pressure ≥ 0.25 inches water gauge with respect to atmospheric pressure in the fuel building during the FBVIS mode of operation.	18 months on a STAGGERED TEST BASIS

3.7 PLANT SYSTEMS

3.7.14 Not Used.

3.7 PLANT SYSTEMS

3.7.15 Fuel Storage Pool Water Level

LCO 3.7.15 The fuel storage pool water level shall be ≥ 23 ft over the top of the storage racks.

APPLICABILITY: During movement of irradiated fuel assemblies in the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Fuel storage pool water level not within limit.	A.1 ---------- NOTE ---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in the fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.15.1	Verify the fuel storage pool water level is ≥ 23 ft above the storage racks.	7 days

3.7 PLANT SYSTEMS

3.7.16 Fuel Storage Pool Boron Concentration

LCO 3.7.16 The fuel storage pool boron concentration shall be ≥ 2165 ppm.

APPLICABILITY: When fuel assemblies are stored in the fuel storage pool and a fuel storage pool verification has not been performed since the last movement of fuel assemblies in the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Fuel storage pool boron concentration not within limit.	---------- NOTE ---------- LCO 3.0.3 is not applicable. ----------		
	A.1	Suspend movement of fuel assemblies in the fuel storage pool.	Immediately
	AND		
	A.2.1	Initiate action to restore fuel storage pool boron concentration to within limit.	Immediately
	OR		
	A.2.2	Verify by administrative means that a non-Region 1 fuel storage pool verification has been performed since the last movement of fuel assemblies in the fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.16.1	Verify the fuel storage pool boron concentration is within limit.	7 days

3.7 PLANT SYSTEMS

3.7.17 Spent Fuel Assembly Storage

LCO 3.7.17 The combination of initial enrichment and burnup of each spent fuel assembly stored in Region 2 or 3 shall be within the Acceptable Domain of Figure 3.7.17-1 or in accordance with Specification 4.3.1.1.

APPLICABILITY: Whenever any fuel assembly is stored in the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 ---------- NOTE ---------- LCO 3.0.3 is not applicable. ---------- Initiate action to move the noncomplying fuel assembly to Region 1.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.17.1	Verify by administrative means the initial enrichment and burnup of the fuel assembly is in accordance with Figure 3.7.17-1 or Specification 4.3.1.1.	Prior to storing the fuel assembly in Region 2 or 3

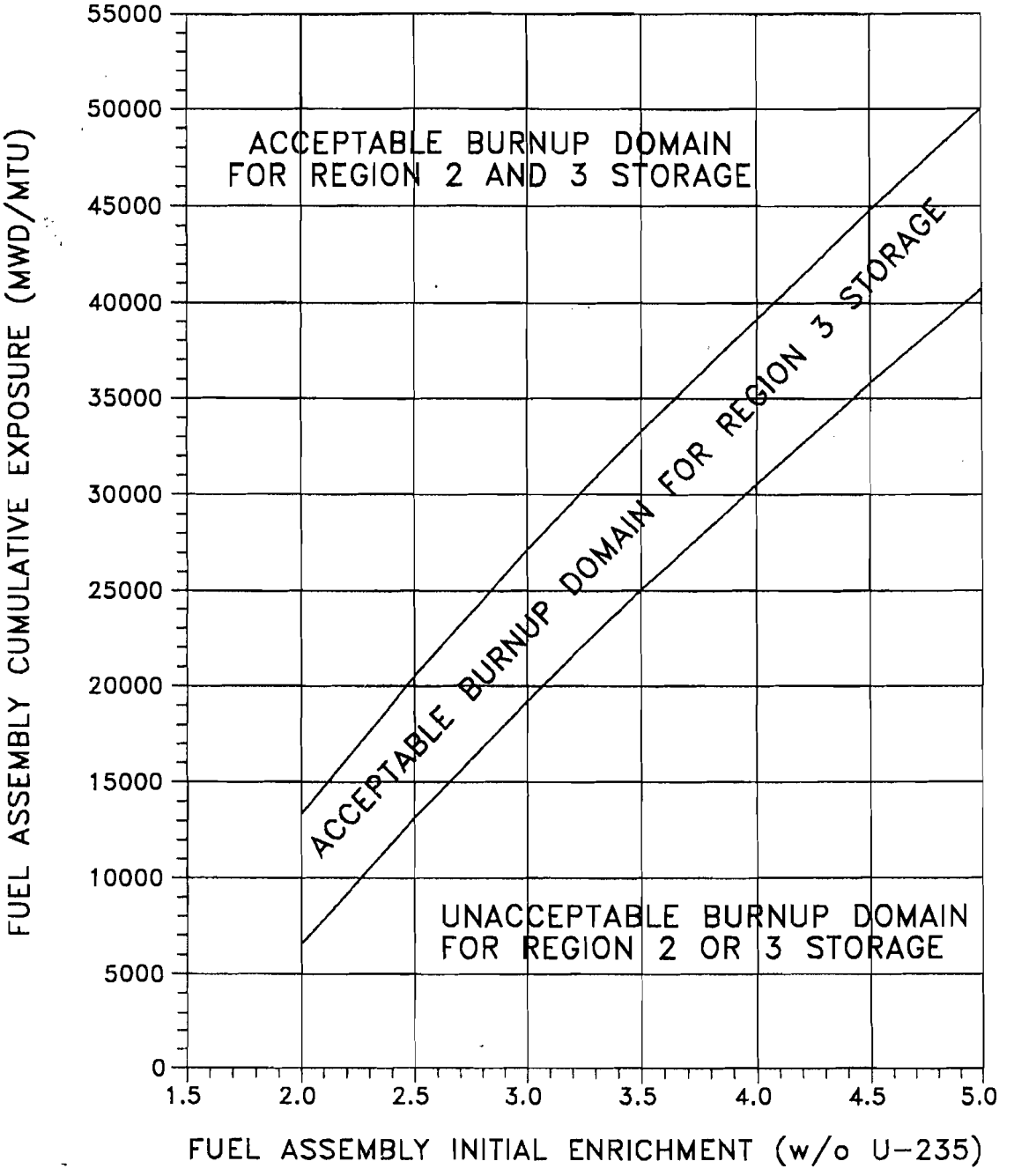

Figure 3.7.17-1 (page 1 of 1)
MINIMUM REQUIRED FUEL ASSEMBLY BURNUP AS A FUNCTION OF
INITIAL ENRICHMENT TO PERMIT STORAGE IN REGIONS 2 AND 3

3.7 PLANT SYSTEMS

3.7.18 Secondary Specific Activity

LCO 3.7.18 The specific activity of the secondary coolant shall be ≤ 0.10 μCi/gm DOSE EQUIVALENT I-131.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Specific activity not within limit.	A.1	Be in MODE 3.	6 hours
	AND		
	A.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.18.1	Verify the specific activity of the secondary coolant is ≤ 0.10 Ci/gm DOSE EQUIVALENT I-131.	31 days

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable. (continued)		Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	AND		
	B.3.1	Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	---------- NOTE ---------- The required ACTION of B.3.2 is satisfied by the automatic start and sequence loading of the diesel generator. ----------	
		Perform SR 3.8.1.2 for OPERABLE DG.	24 hours
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One DG inoperable. (continued)	B.4 Restore DG to OPERABLE status.	---------NOTE--------- A one-time Completion Time of 14 days per DG is allowed to support planned replacement of ESW piping prior to December 31, 2008. ---------- 72 hours AND 6 days from discovery of failure to meet LCO
C. Two offsite circuits inoperable.	C.1 ---------- NOTE ---------- In Modes 1, 2, and 3, the turbine driven auxiliary feedwater pump is considered a required redundant feature. ---------- Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND	12 hours from discovery of Condition C concurrent with inoperability of redundant required features (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two offsite circuits inoperable. (continued)	C.2 Restore one offsite circuit to OPERABLE status.	24 hours
D. One offsite circuit inoperable. AND One DG inoperable.	---------- NOTE ---------- Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train. ---------- D.1 Restore offsite circuit to OPERABLE status. OR D.2 Restore DG to OPERABLE status.	 12 hours 12 hours
E. Two DGs inoperable.	E.1 Restore one DG to OPERABLE status.	2 hours
F. One required LSELS inoperable.	F.1 Declare the affected DG and offsite circuit inoperable. AND F.2 Restore required LSELS to OPERABLE status.	Immediately 12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1	Be in MODE 3.	6 hours
	AND		
	G.2	Be in MODE 5.	36 hours
H. Three or more AC sources inoperable.	H.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each required offsite circuit.	7 days
SR 3.8.1.2	---------- NOTES ---------- 1. Performance of SR 3.8.1.7 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3740 V and ≤ 4320 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 186 TO

FACILITY OPERATING LICENSE NO. NPF-30

UNION ELECTRIC COMPANY

CALLAWAY PLANT, UNIT 1

DOCKET NO. 50-483

1.0 INTRODUCTION

By letter dated October 31, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073100488), as supplemented by letters dated February 21, March 7, May 6, July 10, and August 13, 2008 (ADAMS Accession Nos. ML080640636, ML080780484, ML081340561, ML082060263, and ML082330455, respectively), Union Electric Company (UE, the licensee) requested an amendment to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1, Technical Specifications (TS). The supplemental letters dated February 21, March 7, May 6, July 10, and August 13, 2008, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on December 31, 2007 (72 FR 74362).

The purpose of the changes to the TS is to allow replacement of essential service water (ESW) system piping for Callaway Plant while operating in MODE 1. To accomplish this, the licensee is planning to remove each ESW line from service for up to 14 days. The current TS requirement for the ESW system permits a Completion Time (CT) of 72 hours for taking the ESW system out of service whenever the unit is operating in MODES 1 through 4. Also, because the ESW system is a support system for the emergency diesel generators (EDGs), the TS CT for the EDG system is similarly affected.

Therefore, the licensee has requested a one-time change to extend the CTs for the affected systems from 72 hours to 14 days (336 hours) to be applied on two separate occasions (once during each of the two ESW systems piping replacement). The increased CTs would only be applicable during the proposed ESW system replacement. The licensee requested that this one-time extension of the CT be applied to the TS Limiting Conditions for Operation (LCOs) 3.7.8 for the ESW system and 3.8.1 for the onsite EDGs.

2.0 REGULATORY EVALUATION

The NRC staff based its acceptance of licensee's request on the following regulatory criteria and guidelines:

- Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR) requires a licensee's TS to establish LCOs, which include CTs for equipment that are required for safe operation of the facility.

- General Design Criterion (GDC)-17, "Electric power systems," in Appendix A to 10 CFR Part 50, requires, in part, that nuclear power plants have an onsite electric power system and an offsite electric power system to permit the functioning of structures, systems, and components (SSCs) important to safety. The onsite power system is required to have sufficient independence, redundancy, and testability to perform its safety function, assuming a single failure. The offsite power system is required to be supplied by two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite power supplies.

- GDC-18, "Inspection and testing of electric power systems," requires that electric power systems that are important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features.

- Requirements of GDC-44, "Cooling Water," GDC-45, "Inspection of Cooling Water System," and GDC-46, "Testing of Cooling Water System," from Appendix A of 10 CFR Part 50 must be met.

- Section 50.65 of 10 CFR, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," requires that monitoring or preventive maintenance activities must be balanced against the objective of minimizing unavailability of the SSCs.

- Section 50.63 of 10 CFR, "Loss of all alternating current power," requires a nuclear power plant to be able to withstand for a specified duration and recover from a complete loss of offsite and onsite alternating current (AC) sources.

- Regulatory Guide (RG) 1.93, "Availability of Electric Power Sources," provides guidance with respect to operating restrictions or CTs if the number of available AC sources is less than that required by the TS LCO. In particular, this RG prescribes a maximum CT of 72 hours for an inoperable onsite or offsite AC source.

- RG 1.27, "Ultimate Heat Sink for Nuclear Power Plants," provides guidance for the source of service or "house" water supply necessary to safely operate, shut down, and cool down a nuclear plant.

- NUREG-0800, Standard Review Plan (SRP) 9.2.1, "Station Service Water System," provides the NRC staff with guidance to review the system.

- RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," describes a risk-informed approach, acceptable to the NRC, for assessing the nature and impact of proposed permanent licensing-basis changes by considering engineering issues and applying risk insights. This regulatory guide also provides risk-acceptance guidelines for evaluating the results of such evaluations. While not directly applicable to temporary changes, the NRC staff used RG 1.174 for guidance in evaluating the licensee's proposed changes.

- RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," describes an acceptable risk-informed approach specifically for assessing proposed permanent TS changes in allowed outage times. This regulatory guide also provides risk acceptance guidelines for evaluating the results of such assessments. While not directly applicable to temporary changes, the NRC staff used RG 1.177 for guidance in evaluating the licensee's proposed changes.

  RG 1.177 identifies a three-tiered approach for the licensee's evaluation of the risk associated with a proposed CT TS change, as discussed below.

  - Tier 1 assesses the risk impact of the proposed change in accordance with acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in RG 1.174 and RG 1.177. The first tier assesses the impact on operational plant risk based on the change in core damage frequency (ΔCDF) and change in large early release frequency (ΔLERF). It also evaluates plant risk while equipment covered by the proposed CT is out-of-service, as represented by incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP). Tier 1 also addresses probabilistic risk assessment (PRA) quality, including the technical adequacy of the licensee's plant-specific PRA for the subject application. Cumulative risk of the proposed TS change in light of past related applications or additional applications under review is also considered along with uncertainty/sensitivity analysis with respect to the assumptions related to the proposed TS change.

  - Tier 2 identifies and evaluates any potential risk-significant plant equipment outage configurations that could result if equipment, in addition to that associated with the proposed license amendment, is taken out-of-service simultaneously, or if other risk-significant operational factors, such as concurrent system or equipment testing, are also involved. The

purpose of this evaluation is to ensure that there are appropriate restrictions in place such that risk-significant plant equipment outage configurations will not occur when equipment associated with the proposed CT is implemented.

- Tier 3 addresses the licensee's overall configuration risk management program (CRMP) to ensure that adequate programs and procedures are in place for identifying risk-significant plant configurations resulting from maintenance or other operational activities and appropriate compensatory measures are taken to avoid risk-significant configurations that may not have been considered when the Tier 2 evaluation was performed. Compared with Tier 2, Tier 3 provides additional coverage to ensure risk-significant plant equipment outage configurations are identified in a timely manner and that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity over extended periods of plant operation. Tier 3 guidance can be satisfied by the Maintenance Rule (10 CFR 50.65(a)(4)), which requires a licensee to assess and manage the increase in risk that may result from activities such as surveillance testing and corrective and preventive maintenance, subject to the guidance provided in RG 1.177, Section 2.3.7.1, and the adequacy of the licensee's program and PRA model for this application. The CRMP is to ensure that equipment removed from service prior to or during the proposed extended CT will be appropriately assessed from a risk perspective.

- SRP Chapter 19

General guidance for evaluating the technical basis for proposed risk-informed changes is provided in Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance," of the NRC Standard Review Plan (SRP), NUREG-0800. Guidance on evaluating PRA technical adequacy is provided in Section 19.1, "Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities." More specific guidance related to risk-informed TS changes is provided in SRP Section 16.1, "Risk-Informed Decision Making: Technical Specifications," which includes CT changes as part of risk-informed decision making.

Section 19.2 of the SRP states that a risk-informed application should be evaluated to ensure that the proposed changes meet the following key principles:

- The proposed change meets the current regulations, unless it explicitly relates to a requested exemption or rule change.

- The proposed change is consistent with the defense-in-depth philosophy.

- The proposed change maintains sufficient safety margins.

- When proposed changes increase core damage frequency or risk, the increase(s) should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.

- The impact of the proposed change should be monitored using performance measurement strategies.

- RG 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," endorses the guidance (in part) of NUMARC 93-01 (Section 11), "Industry Guidelines for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

3.0 TECHNICAL EVALUATION

The Callaway Plant ESW system carbon steel buried piping has developed fouling, pinhole leaks, and other localized degradation due to microbiologically induced corrosion. The licensee proposes to replace the buried ESW carbon steel piping with buried polyethylene piping. The licensee plans to perform this work while the plant is in MODES 1 through 4. The licensee stated that the ESW piping replacement cannot be completed within the current 72-hour CTs allowed under existing TS LCOs, and requests extension of CTs to 14 days.

The ESW system consists of two separate, 100 percent capacity, safety-related, cooling water trains. Each train consists of a self-cleaning strainer, prelube tank, one 100 percent capacity pump, piping, valves, and instrumentation. The principal safety-related function of the ESW system is the removal of decay heat from the reactor via the component cooling water (CCW) system and removal of containment heat loads via the containment coolers. The ESW system provides cooling water from the ultimate heat sink (cooling tower) for plant components that require cooling for safe shutdown of the reactor following an accident and/or loss-of-offsite power (LOOP). These components are the CCW heat exchangers, containment air coolers, diesel generator coolers, safety injection pump room coolers, residual heat removal pump room coolers, containment spray pump room coolers, centrifugal charging pump room coolers, CCW pump room coolers, auxiliary feedwater pump room coolers, control room air conditioning condensers, Class 1E switchgear air-conditioning condensers, and penetration room coolers. The ESW system provides emergency makeup to the fuel pool and CCW systems. It is also the backup water supply to the auxiliary feedwater system.

As stated above, the licensee has requested a one-time change to extend the CTs for the affected systems from 72 hours to 14 days (336 hours) to be applied on two separate occasions (once during each of the two ESW systems piping replacement). The increased CTs would only be applicable during the proposed ESW system replacement. The licensee requested that this one-time extension of the CTs be applied to the TS LCO 3.7.8 for the ESW system and LCO 3.8.1 for the onsite EDGs. The NRC staff has reviewed the licensee's request for TS changes from a deterministic perspective and evaluated the probabilistic risk of the proposed one-time change to extend CTs for ESW and EDGs.

3.1 Evaluation of Extension of CTs for ESW and EDGs

The offsite and onsite power system at the Callaway Plant is designed to comply with the requirements of GDC-17 and GDC-18, respectively. As described in the licensee's Final Safety Analyses Report (FSAR), the plant is supplied power from the offsite system through two independent and redundant sources in accordance with GDC-17. With respect to the safety-related (Class 1E) power supply configuration, one preferred circuit from the switchyard supplies power to a multi-winding startup transformer, one winding of which feeds a 13.8/4.16 kiloVolt (kV) engineered safety feature (ESF) transformer (also equipped with an automatic load tap changer and its associated capacitor bank). Each ESF transformer supplies power to an associated Class 1E 4.16 kV bus. For each safety-related bus normally fed by its associated transformer, the capability exists for either bus to be ultimately supplied by the other preferred source connection.

The onsite standby power system includes Class 1E AC and direct current (DC) power supply capability for equipment used to achieve and maintain a cold shutdown of the plant and to mitigate the consequences of a design-basis accident. With respect to Class 1E AC power, each of the two Class 1E load groups at the 4.16 kV bus level is capable of being powered from an independent EDG (one per load group) that functions to provide power in the event of a loss of the preferred power source. Undervoltage relays are provided for each 4.16 kV bus to detect an undervoltage condition and automatically start the EDG in response to such a condition. The Class 1E DC system includes four separate 125 Volt (V) DC batteries that supply power for Class 1E controls, instrumentation, and inverters.

3.1.1 Proposed TS Changes

The proposed change to TS 3.7.8, "Essential Service Water System," will add a note to the CT of Required Action A.1 that would require the restoration of an inoperable ESW train to OPERABLE status. This new note would allow a one-time CT extension from 72 hours to 14 days per ESW train to be used prior to December 31, 2008, for replacing underground ESW piping. The new note would read: "A one-time Completion Time of 14 days per ESW train is allowed to support planned replacement of ESW piping prior to December 31, 2008."

Currently, TS 3.8.1.B requires that two separate and independent EDGs be operable in MODES 1 through 4. In the event that one of the required EDGs becomes inoperable, the LCO requires the inoperable EDG to be returned to OPERABLE status within 72 hours, or the plant must be in Hot Standby (MODE 3) within 6 hours and be placed in Cold Shutdown (MODE 5) within the following 36 hours. Additionally, if two of the required EDGs become inoperable, TS 3.8.1 Action E requires that at least one of the inoperable EDGs be returned to OPERABLE status within 2 hours or the plant must be brought to Hot Standby conditions within the next 6 hours and to Cold Shutdown conditions within the following 36 hours.

The licensee has proposed adding a note to TS 3.8.1.B.4 for a one-time CT extension from 72 hours to 14 days. The new note would read "A one-time Completion Time of 14 days per DG [diesel generator] is allowed to support planned replacement of ESW piping prior to December 31, 2008."

Currently, TS 3.8.1.B.4 has a second LCO statement that reads: "AND 6 days from discovery of failure to meet LCO." The second LCO statement was included for certain Required Actions to establish a limit on the maximum time allowed for any combination of conditions that would result in a single continuous failure to meet the LCO. The licensee proposed deletion of this second CT for TS 3.8.1.B.4 per NRC-approved Technical Specification Task Force (TSTF)-439, Revision 2, ""Eliminate Second Completion Times Limiting Time From Discovery of Failure To Meet an LCO." Subsequently, by letter dated July 10, 2008, the licensee withdrew this request.

In changing TS 3.7.8 in this amendment, a page is also being added. TS 3.7.8 and TSs 3.7.9 through 3.7.18 are being re-issued with new page numbers. Therefore, the page numbers on the TS Table of Contents will change for TSs 3.7.9 through 3.7.18 and a new page 3 of the TS Table of Contents is being issued with this amendment to reflect these changes. This is an administrative change to correctly show the page numbers for TSs 3.7.9 through 3.7.18. This does not change any requirement in the TSs because there is no other change to these TSs than the page number change. Based on this, the NRC staff concludes that proposed change to the TS Table of Contents and associated page changes meet 10 CFR 50.36, and is, therefore, acceptable.

3.1.2 Deterministic Evaluation

The NRC staff evaluated the licensee's proposed changes described above from a deterministic approach in the following sections.

3.1.2.1 Essential Service Water System Outage

The purpose of the proposed change to TS 3.7.8 is to extend the ESW system CT from the current 72 hours to 14 days to allow the licensee to perform major modifications to the associated piping system that requires more than 3 days to implement while the plant is operating in MODES 1 through 4.

In order to maintain the defense-in-depth approach during the ESW piping system modification, the licensee has committed to align the normal non-safety-related water system to serve most of the ESW loads and manually block valves that isolate the normal service water during accident conditions. This will maintain the functional capability of the inoperable ESW train during the time that the normal service water system is functional, as long as offsite power is available. The licensee will implement compensatory measures to minimize the likelihood of losing offsite power during the use of this one-time CT extension.

The operable train of safety equipment will continue to be capable of performing the necessary safety functions consistent with accident analysis assumptions. The licensee will implement compensatory measures that will prohibit discretionary maintenance and testing on redundant equipment as detailed in the licensee's letter dated March 7, 2008. These measures will assure that the defenses against human errors will be adequately preserved during the proposed CT extension.

In response to questions that were raised by the NRC staff, additional discussion and clarification of the contingencies being implemented were provided by the licensee in its letter dated March 7, 2008. Some of the contingencies that the licensee identified include

(1) programmatic activities, such as protecting the other (operable) train of safety equipment by deferring, to the extent possible, the performance of any maintenance or testing related to the operable train of equipment; providing operator training in certain areas that are impacted; (2) establishing enhanced monitoring to address flooding considerations; and (3) stationing a dedicated operator in the safe shutdown facility during the extended outage period. Based on this being a one-time change of limited duration, the NRC staff concludes the programmatic activities to be appropriate and necessary for maintaining defense-in-depth.

3.1.2.2 Emergency Diesel Generator Outage

The purpose of the proposed change to TS 3.8.1 is to extend the EDG system CT from 72 hours to 14 days to allow the licensee to perform major modifications to the ESW system associated piping. The licensee stated that the proposed modification will require more than 72 hours to implement while the plant is operating in MODES 1 through 4. The ESW system provides cooling water for the EDG system during emergency conditions. The ESW system outage will render the corresponding EDG inoperable.

The NRC staff evaluated the licensee's request to extend the CT for EDGs to determine whether the station blackout requirement in 10 CFR 50.63 would be eroded by the proposed changes and whether the overall availability of the EDGs would be reduced significantly as a result of increased on-line maintenance activities. In light of the recent experiences in offsite power system outages, it has been the NRC staff's position that the availability of an additional power source is a condition for approval of an extended EDG CT.

The licensee has proposed compensatory actions to reduce the risk of loss of redundant AC power required for safe shutdown during the implementation stages of the modifications. The licensee stated that the following compensatory measures will be implemented to enhance plant safety during each 14-day outage period:

1. A temporary alternate AC power source consisting of DGs, with combined capacity equal to or greater than the capacity of either one of the installed EDGs will be available as a backup power source. This temporary alternate AC source could power protected train loads in the unlikely event a LOOP event occurred and the protected train's EDG failed to start and run. Prior to applying the extended CT, these temporary DGs will be load tested to demonstrate their capability of supporting a load equal to the continuous rating of the inoperable EDG. After entering the extended CT, this source will be verified available every 8 hours and treated as protected equipment. The licensee plans to stage four temporary DGs in the switchyard such that they can be connected to the safeguard transformer ring bus and have dedicated manning such that Callaway Plant's 4-hour station blackout coping duration will not be exceeded.

2. Access to the switchyard will be limited to personnel with a demonstrable need (e.g., staff associated with the temporary DGs) and no work will be allowed in the switchyard that could cause a LOOP event during the one-time extended CT.

3. The one-time extended CT will not be entered if inclement weather conditions are forecasted (i.e., work under the extended CT will not be started if severe

weather, as defined in plant procedures, is forecasted to occur within 140 miles of the plant). National Weather Service reports will be monitored prior to and throughout each ESW train LCO outage.

4. In response to NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," the licensee provided details on the formal agreement between UE and Midwest Independent System Operator (MISO), the transmission system operator for the network around the Callaway Plant. The response cites the Real Time Contingency Analysis program used by MISO and UE Transmission Operations and control room notification protocols from the MISO and UE Transmission Operations upon deteriorating or degraded grid conditions. The licensee uses the information from MISO, onsite data from degraded voltage bus setpoints and design provisions, and offsite power source operability limits and alarm settings for evaluation of maintenance risk assessments. The licensee stated that these commitments will remain in place for the planned ESW outages. Specific examples of conditions identified in the agreement include the following:

   a) In accordance with noted agreement/protocol, the MISO will monitor the appropriate system conditions and notify Callaway Plant via the UE Transmission Operator when operating conditions are outside of established limits, defined as the Category 8 Alarm, as well as when they are restored to within acceptable criteria.

   b) In accordance with noted agreement/protocol, the UE Transmission Operator will immediately notify the Callaway Plant of an actual violation to the operating criteria affecting the plant.

   c) In accordance with noted agreement/protocol, the MISO or the UE Transmission Operator will immediately notify the Callaway Plant upon verification that grid study results indicate a post-contingent violation of operating criteria that is not mitigated within 15 minutes.

5. To preclude potentially high-risk plant configurations that could result, if equipment, in addition to that the proposed license amendment, is taken out-of-service simultaneously, the licensee will implement the following commitments:

   a) The turbine-driven auxiliary feedwater pump (TDAFP) will remain operable.

   b) The TDAFP pump room and associated valve rooms will be posted as restricted access.

   c) The protected train motor-driven auxiliary feedwater (MDAFW) pump room and associated valve rooms will be posted as restricted access.

   d) The condensate storage tank will be posted as restricted access.

e) No work will be allowed on the security diesel.

3.1.2.3 Conclusions of Deterministic Evaluation

The NRC staff evaluated, from a deterministic perspective, the licensee's request to extend the CTs associated with ESW and corresponding EDG system outages for implementation of piping modifications. The NRC staff concludes that the deterministic evaluation supports the proposed extension of the CT for the ESW and EDG systems from 72 hours to 14 days on a one-time basis. The NRC staff's conclusion is based on the compensatory measures as discussed in this technical evaluation.

3.1.3 Probabilistic Risk Assessment of Proposed TS Changes

As discussed above, TS 3.7.8, Essential Service Water System (ESW), Condition A, is applicable when one ESW train is inoperable. A note is added to the CT for Condition A to state: "A one-time Completion Time of 14 days per ESW train is allowed to support planned replacement of ESW piping prior to December 31, 2008."

Also, TS 3.8.1, AC Sources – Operating, Condition B is applicable when one DG is inoperable. A note is added to the CT for Condition B to state: "A one-time Completion Time of 14 days per DG is allowed to support planned replacement of ESW piping prior to December 31, 2008."

3.1.3.1 Review Methodology

Per SRP Section 19.2 and Section 16.1, the NRC staff reviewed the licensee's submittal using the three-tiered approach and the five key principles of risk-informed decision making presented in RG 1.174 and RG 1.177. The NRC staff review's scope and findings focused explicitly on the evaluation of the risk impacts.

3.1.3.2 Key Information Used in the Review

The key information used in the NRC staff's review is contained in Sections 4.0 of Attachment 1 of the licensee's letter dated October 31, 2007, as supplemented by requests for additional information (RAI) responses dated February 21, May 6, July 10, and August 13, 2008.

3.1.3.3 Comparison Against Regulatory Criteria/Guidelines

The NRC staff's evaluation of the licensee's proposed changes to TS using the three-tiered approach and the five key principles outlined in RG 1.174 and RG 1.177 are presented in the following sections.

3.1.3.4 Traditional Engineering Evaluation

The traditional engineering evaluation presented below addresses the first three key principles and the fifth key principle of the NRC staff's philosophy of risk-informed decision-making, which concerns compliance with current regulations, evaluations of defense-in-depth, evaluation of safety margins, and performance measurement strategies – implementation and monitoring program.

Key Principle 1: Compliance with Current Regulations

The licensee does not propose to deviate from existing regulatory requirements and compliance with existing regulations is maintained by the proposed one-time change to the TS requirements. Therefore, with respect to compliance with current regulations, the NRC staff considers the proposed TS change to be acceptable.

Key Principle 2: Evaluation of Defense-in-Depth

RG 1.177 identifies seven attributes for maintaining consistency with the defense-in-depth philosophy. The licensee has addressed each of these defense-in-depth attributes. In addition, the licensee responded to the NRC staff's RAI by letter dated July 10, 2008, and provided other supporting information by letters dated February 21, March 7, May 6, and August 13, 2008. The NRC staff has reviewed the information that was provided in this regard and the evaluation of each of the defense-in-depth attributes, discussed in item 2, is provided below:

1. A reasonable balance among avoidance of core damage, avoidance of containment failure, and adequate consequence mitigation is preserved.

The proposed change involves a one-time extension of the current TS 3.7.8 CT for the ESW system piping modification project. The systems that are affected during an ESW system piping replacement outage are all associated with the train that corresponds to the affected (inoperable) ESW train, leaving one train of safety equipment fully operable and capable of performing its safety functions.

Further, for the ESW system piping modification project, the normal service water system will be cross-connected through supply valves to the equipment heat loads of each affected ESW train during a significant part of the extended CT for that train. Flow from the cooled loads of the ESW "A" train and "B" train will return to the normal service water system by way of cross-connected return valves during the extended CT. Automatic closure signals for the cross-connected supply and return valves between the normal service water system and the ESW system will be defeated to ensure that there will be no loss of normal service water flow to the loads of the affected ESW system trains. In addition, automatic open signals for the return valves from the ESW system to the ultimate heat sink (UHS) will be defeated to ensure that there will be no diversion of normal service water return flow to the UHS.

The licensee concluded that preserving the operability of one ESW system train and serving the loads of the affected (inoperable) ESW train from the normal service water system during a significant part of the extended CT will maintain the balance among the avoidance of core damage, avoidance of containment failure, and consequence mitigation.

In Attachment 1 of its July 10, 2008, letter, the licensee noted that one complete ESW train will be maintained in an operable status. The licensee further stated that there is no requirement to assume a single failure while operating under a TS required action. Therefore, there will be no effect on the analysis of any accident or the progression of the accident since the operable ESW train is capable of serving 100 percent of all the required heat loads. As such, there is no impact on consequence mitigation for any transient or accident.

In addition, the licensee stated that normal service water will be available for a significant part of the 14-day outage to supply the loads of the out-of-service ESW train. This will reduce risk by making equipment cooled by the out-of-service ESW train available for various engineered safety feature (ESF) mitigation functions in the event the protected (operable) ESW train was to fail.

Given the above considerations, the NRC staff agrees with the licensee that a reasonable balance among avoidance of core damage, avoidance of containment failure, and consequence mitigation is preserved.

2. Over-reliance on programmatic activities to compensate for weaknesses in plant design is avoided.

The proposed change involves a one-time proposed extension of the current TS 3.7.8 CT for systems that are impacted by the ESW system piping modification project. The systems that are affected during an ESW system piping replacement outage are all associated with the train that corresponds to the affected (inoperable) ESW train, leaving one train of safety equipment fully operable and capable of performing its safety functions.

The proposed extension of the CT results in a corresponding increase in the amount of time that the redundancy normally afforded by the other (inoperable) ESW train will not be available; therefore, the proposed extension of the CT increases the amount of time that safety systems are vulnerable to single failures. However, as discussed in defense-in-depth attribute 1 above, the normal service water system will be cross-connected to supply cooling to loads of the inoperable ESW train during a significant part of the extended CT. Although the pumped flow from the normal service water system would be unavailable if a LOOP occurred, the licensee stated that steps will be taken to minimize the likelihood of losing offsite power during the extended CT.

In Enclosure 1 of its March 7, 2008, letter, as supplemented by the May 6, 2008, letter, and as updated by Attachment 2 of the July 10, 2008, letter, the licensee committed to supplying four temporary DGs to serve as an alternate AC power source. The alternate AC power source will have a combined capacity equal to or greater than the capacity of either one of the installed Callaway EDGs. In the event that a LOOP event occurred during the extended CT, the alternate AC power source would power the protected (operable) train loads.

In Attachment 2 of its July 10, 2008, letter, the licensee committed to implement certain compensatory measures to provide increased assurance that the operable train of safety equipment will not be unnecessarily challenged or compromised during each of the ESW system piping replacement outages.

As listed in Section 3.3 of this safety evaluation, the licensee identified some compensatory measures that do not involve programmatic activities. These include:

- no risk-significant equipment voluntarily taken out-of-service (other than the out-of-service ESW train and supported systems rendered inoperable by the out-of-service ESW train) and no work allowed on the protected (operable) ESW train;

- the out-of-service ESW train loads cooled by the normal service water with the ESW supply and return valves opened and ESW return-to-UHS valves closed (and power removed from the operators);

- the new ESW piping installation performed with the normal service water system cooling the out-of-service ESW train loads; and

- a temporary alternate power source made available as a backup.

The NRC staff concludes that the above activities are appropriate and necessary. Further, the staff concludes that the licensee's activities are not overly reliant on programmatic activities to compensate for design weaknesses. Rather, the proposed ESW system piping modification is addressing the plant operational issues.

3. System redundancy, independence, and diversity are preserved commensurate with the expected frequency, consequences of challenges to the system, and uncertainties (e.g., no risk outliers).

The operable train of safety equipment will continue to be capable of performing the necessary safety functions consistent with accident analysis assumptions. The licensee stated that new ESW system piping continues to satisfy the plant design criteria, including the criteria for seismic qualification. Also, as discussed in Attachment 2 of the July 10, 2008, letter, the licensee committed to the implementation of certain compensatory measures that will assure the availability and capability of the operable train of safety equipment while operating during the extended CT. The compensatory measures will also maintain the functional capability of the inoperable ESW train during the time that the normal service water system is functional, as long as offsite power is available.

In Attachment 2 of its letter dated July 10, 2008, the licensee listed its compensatory measures for the pipe replacement in its Summary of Regulatory Commitments.

Compensatory measures that preserve system redundancy, independence, and diversity include:

- no risk-significant equipment voluntarily taken out-of-service (other than the out-of-service ESW train and supported systems rendered inoperable by the out-of-service ESW train) and no work allowed on the protected (operable) ESW train;

- the out-of-service ESW train loads cooled by the normal service water with the ESW supply and return valves opened and ESW return-to-UHS valves closed (and power removed from the operators); and

- the new ESW piping installation performed with the normal service water system cooling the out-of-service ESW train loads;

- a temporary alternate power source made available as a backup.

These compensatory measures also include:

- not entering the extended CT period if inclement weather conditions are forecasted;
- the TDAFW pump remains operable with restricted access to the TDAFW pump and protected train MDAFW pump rooms and associated valve rooms and the condensate storage tank;
- no work allowed on the security diesel;
- flood mitigation equipment verified to be available and functional;
- flood watches for the protected (operable) ESW train initiated to assure availability of plant features for flood mitigation; and,
- operations personnel appropriately trained regarding the TS CT change and associated ESW system piping modifications.

Additional compensatory measures are identified in Section 3.1.3.5.2 of this safety evaluation. Based on the licensee's committed actions, the NRC staff agrees with the licensee that sufficiently redundant, independent, and diverse capabilities will be maintained for performing critical safety functions during the proposed one-time CT extension.

4. Defenses against potential common cause failures are preserved and the potential for the introduction of new common cause failure mechanisms is assessed.

As discussed above, the licensee will establish compensatory measures to assure the availability and capability of redundant, independent, and diverse means of accomplishing critical safety functions during the proposed CT extension. Compensatory measures will assure the functional capability of the inoperable ESW train by supplying cooling to its loads from the normal service water system when this system is functional, as long as offsite power is available. The licensee will take steps to minimize the likelihood of losing offsite power during the CT extension.

In Attachments 1 and 2 of the July 10, 2008, letter, the licensee committed to certain compensatory measures which defend against the potential for common cause failures. (Refer to Section 3.3 of this safety evaluation.) The licensee committed to maintaining one complete ESW train in an operable status during the 14-day outage for each train, such that the operable train is capable of serving 100 percent of the required post-accident loads. No new loads are being placed on the ESW system; only a change in piping material will be made. No new functionality requirements are being imposed on the ESW system. Post-modification hydrostatic testing will confirm the readiness to return the ESW system to operation.

The licensee also committed to supplying four temporary DGs that will be capable of powering the electrical loads of the protected (operable) train in the event of a LOOP and, if the operable

standby DG for the plant were to fail, to start and run when called upon. Further, the 14-day outage will not be entered if severe weather is forecast.

In addition, the licensee committed to not voluntarily work on risk-significant equipment other than the affected ESW system train. Access activity will be restricted to the TDAFW pump, normal charging pump, and condensate storage tank.

Based on the licensee's committed actions, the NRC staff finds that the licensee has taken appropriate measures to preserve defenses against potential common cause failures and adequately assessed the introduction of new common cause failure mechanisms.

5. Independence of barriers is not degraded.

The ESW system piping modification does not directly impact the independence of barriers or otherwise cause them to be degraded. Therefore, the NRC staff concludes that the independence of barriers will not be degraded by the proposed CT extension.

6. Defenses against human errors are preserved.

The licensee has established compensatory measures to assure that critical safety functions will be maintained during the proposed CT extension.

In Attachment 2 of the July 10, 2008, letter, the licensee committed to implement certain compensatory measures which preserve defenses against human error. The licensee committed to provide operator training that assures operator awareness of the plant configuration and actions that may be needed in responding to the occurrence of problems during the proposed CT extension for performing the ESW system piping modification. The licensee will also establish compensatory measures to prohibit discretionary maintenance on risk-significant equipment. Therefore, the NRC staff concludes that the defenses against human errors will be adequately preserved during the proposed CT extension.

7. The intent of the General Design Criteria (GDC) in Appendix A to 10 CFR Part 50 is maintained.

The proposed change involves an extension of the current TS CT for systems that are impacted by the ESW system piping modifications. The systems that are affected during an ESW system outage are all associated with the train that corresponds to the affected ESW train, leaving one train of safety equipment fully operable and capable of performing its safety functions. The proposed change does not modify the plant design bases or the design criteria that were applied to SSCs during plant licensing. Therefore, the NRC staff concludes that the plant design with respect to the general design criteria is not affected by the proposed change.

Based on the above review of defense-in-depth attributes, the NRC staff finds that defense-in-depth will be adequately maintained during the proposed CT extension for the ESW system and supported systems.

Key Principle 3: Evaluation of Safety Margins

Design basis analyses and system design criteria are not impacted by the proposed one-time change to the TS and, consequently, safety margins are not affected. Therefore, with respect to the evaluation of safety margins, the NRC staff concludes the proposed TS change to be acceptable.

Key Principle 5: Performance Measurement Strategies - Implementation and Monitoring Program

RG 1.174 and RG 1.177 establish the need for an implementation and monitoring program to ensure that extensions to TS CTs do not degrade operational safety over time and that no adverse degradation occurs due to unanticipated degradation or common cause failure mechanisms.

An implementation and monitoring program is intended to ensure that the impact of the proposed TS change continues to reflect the reliability and availability of SSCs impacted by the change. RG 1.174 states that monitoring performed in conformance with the Maintenance Rule, 10 CFR 50.65, can be used when the monitoring performed is sufficient for the SSCs affected by the risk-informed application.

The guidance in Section 2.3 of RG 1.174 states, in part, that the NRC staff expects licensees to integrate, or at least coordinate, their monitoring for risk-informed changes with existing programs for monitoring equipment performance on site. Monitoring is required in accordance with the Maintenance Rule (10 CFR 50.65). For the proposed TS change, the licensee states that the ESW system, the DGs, and safety systems serviced by ESW are within the scope of Callaway's Maintenance Rule program and have availability and reliability criteria established to monitor performance. Based on the above, the NRC staff concludes that the licensee's monitoring of equipment performance using the Maintenance Rule to be acceptable.

3.1.3.5 The NRC Staff's Probabilistic Risk Assessment

The evaluation presented below addresses the NRC staff's philosophy of risk-informed decision making, that when the proposed changes result in a change in core damage frequency (CDF) or risk, the increase should be small and consistent with the intent of the Commission's Safety Goal Policy Statement (Key Principle 4).

3.1.3.5.1 Tier 1: PRA Capability and Insights

The first tier evaluates the impact of the proposed changes on plant operational risk. The Tier 1 NRC staff review involves two aspects: (1) evaluation of the validity of the Callaway PRA models and their application to the proposed changes, and (2) evaluation of the PRA results and insights based on the licensee's proposed application.

PRA Quality

The objective of the PRA quality review is to determine whether the Callaway PRA used in evaluating the proposed changes is of sufficient scope, level of detail, and technical adequacy

for this application. The NRC staff review evaluated the PRA quality information provided by the licensee in its submittal, including industry peer reviews results.

The Callaway PRA model, referred to as the Fourth Update Model, only addresses internal events (internal flooding, fires, seismic, and other external events are not included) for at power conditions for both level 1 (core damage) and level 2 (containment performance and large early release). The PRA is an updated individual plant examination (IPE) model originally developed in response to Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities," and associated supplements. Administrative procedures control revisions to the model, and include provisions for monitoring plant changes that could affect the PRA model. Revisions have been made to maintain fidelity between the model and actual plant design and operation, at a minimum frequency of every 36 months, or when a plant change is made that would significantly impact the PRA model.

The PRA has undergone two peer reviews; a review sponsored by the Westinghouse Owners' Group (WOG), which followed Nuclear Energy Institute (NEI) 00-02, "Industry Probabilistic Risk Assessment (PRA) Peer Review Process," and a review by Scientech, LLC, against the American Society of Mechanical Engineers (ASME) PRA Standard [ASME RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications" (April 5, 2002), Addendum A to this standard (ASME RA-Sa-2003, December 5, 2003), and Addendum B to this standard (ASME RA-Sb-2005, December 30, 2005)].

The licensee stated that the remaining five significant open items from the WOG peer review, and the gap items identified by the Scientech review, would not have a direct impact on the PRA insights developed for this application. In response to an NRC staff RAI, the licensee provided the details of the open items and gap items, along with the licensee's disposition of each item. Items were dispositioned as not impacting the application, when it was clear the item would not impact the risk analyses for this application (e.g., documentation issues), and sensitivity analyses were conducted when an item was determined to potentially impact the risk analyses. The NRC staff has reviewed each of these items and the licensee's disposition, and agreed with the licensee's conclusion that none of these items would substantially impact the conclusion of the risk analyses supporting this application.

The licensee identified that as of the date of its submittal, there were no outstanding plant changes which would require a change to the PRA model. Also, there were no planned plant changes scheduled to be implemented prior the end of 2008, when the one-time TS changes will expire, which would significantly impact the PRA model.

The licensee identified a 4×10^{-12} truncation level used to generate the model cutsets used for the risk analyses which supports this application. The licensee further identified sensitivity analyses it had performed on its baseline PRA model which confirms the adequacy of the selected truncation level, and also identified that the truncation level was consistent with the internal events PRA standard.

Based on its review of the above information, the NRC staff finds that the licensee has satisfied the intent of RG 1.177 (Sections 2.3.1, 2.3.2, and 2.3.3), RG 1.174 (Sections 2.2.3 and 2.5), and SRP Section 19.1, and that the quality of the Callaway internal events PRA is sufficient to

support the risk evaluation for internal events provided by the licensee in support of the proposed license amendment.

PRA Results and Insights

The risk metrics for ΔCDF (core damage frequency) and ΔLERF (large early release frequency) for internal events were calculated by the licensee by assuming 14 days of unavailability for each train of ESW (two 14-day outages). The ICCDP (incremental core damage probability) and ICLERP (incremental early release probability) for internal events were similarly calculated for each individual train. External events risk contribution is addressed separately. The licensee assessed the change using a baseline model which assumed no other equipment was unavailable during the ESW outages.

The licensee's methodology is consistent with the guidance of RG 1.177, Section 2.3.4, and Section 2.4 and is, therefore, acceptable to the NRC staff.

The results of the licensee analyses of internal events are based on the results from the regeneration of cutsets for the specific configuration of one ESW train out-of-service, and are shown in Table 1.

Table 1: Internal Events Risk

Risk Metric	Callaway Result
ΔCDF	2.04E-6/year
ΔLERF	4.72E-8/year
ICCDP	6.83E-7 (train A) 1.36E-6 (train B)
ICLERP	1.25E-8 (train A) 3.47E-8 (train B)

Internal Flooding

For the ESW extended outage, the significant internal flooding concern is for an ESW piping break on the operational train which results in disabling of both ESW trains (one due to the initiating event, one due to the outage). In this event, both safety trains of equipment would be unavailable, and only the TDAFW pump would be available for decay heat removal. Since reactor coolant pump (RCP) seal cooling would be unavailable (due to the loss of both ESW trains failing component cooling water, and the normal charging pump not being in a flood-protected area), reactor coolant loss is anticipated due to pump seal failures, and with both safety trains unavailable, no makeup to the reactor coolant system would be available.

In order to address such scenarios, the licensee reviewed the Callaway internal flooding analysis to identify those areas of the plant where the flood initiating event may occur, and performed risk evaluations of those areas. The flooding analysis is based on data and methods used to support the Callaway Plant IPE, submitted to the NRC staff in September 1992. Flood frequencies in the IPE were estimated using various industry guidance documents, and floods were assumed to fail all equipment in the affected area as well as the flood source.

Where the licensee was able to demonstrate the availability of the normal charging pump to maintain RCP seal cooling, and the TDAFW pump for decay heat removal, credit was taken for these components to perform their function. Similarly, credit was taken for operation of the normal service water system to supply the protected ESW header for those areas where the flood effects would not impact the capability of this function. For four flood areas, no mitigation was identified, and the flood initiating event was assumed to result in core damage.

The licensee committed to minimize flood risk by instituting 1-hour interval flood watches on the protected ESW train throughout the ESW outage. All other accessible portions of the protected ESW train (i.e., those portions not inside containment or otherwise excluded by radiological conditions) will be subject to periodic flood watches on an 8-hour interval.

The IPE applied a recovery factor of 0.3, based on industry experience that 70 percent of flood events are identified by routine, incidental observations by plant personnel. The licensee, based on its commitment for a 1-hour flood watch in these areas, applied a 0.1 factor to account for its expectation of increased likelihood of detecting and isolating a pipe leak or break. The licensee identified a sensitivity study conducted on this assumption, and stated that the results were not overly sensitive to this assumption. Since the flooding risk contribution to overall risk is not dominant, this assumption is not significant to the overall risk evaluation of the extended CTs.

The risk results for internal flooding are shown in Table 2.

Table 2: Internal Flooding Events Risk

Risk Metric	Callaway Result
ΔCDF	6.06E-7/year
ΔLERF	1.45E-8/year
ICCDP	3.03E-7
ICLERP	7.27E-9

The licensee stated that there is no appreciable difference in the train-specific flooding risk due to the conservative generic nature of the flood frequency calculations, and the fact that the analyses do not credit the capability of the normal service water system to supply the out-of-service ESW header.

Fires

For fires, similar to floods, the main concern is fires which can disable one ESW train or components cooled by ESW, such that during the extended CT such fires could result in no ESW or safety equipment cooled by ESW being available. The licensee evaluated its fire analyses from the Callaway Plant Individual Plant Examination of External Events (IPEEE), submitted to the NRC staff in June 1995.

The licensee determined the fire frequency and suppression capability for 30 risk-significant fire areas. The fire frequencies and fire suppression system unavailabilities were taken from the

IPEEE based on industry guidance from the Electric Power Research Institute. A fire in an area was assumed to fail all equipment in the area, unless a detailed fire model was available as discussed below.

The normal charging pump and turbine-driven auxiliary feedwater pump (TDAFW) pump were generally not credited because the cable routing information was not available for most fire areas. The NRC staff notes that the assumed unavailability of these components is a conservative assumption in the risk analysis, since operation of these components could maintain reactor coolant pump seal integrity and core decay heat removal during fire events.

- For two fire areas, the licensee stated that detailed fire modeling was available, and had sufficiently low fire frequencies so as not to warrant further consideration.

- Twenty fire areas were identified as only affecting one train of mitigating equipment, and so by crediting the remaining train of equipment and considering fire suppression, the risk increases for these areas were small.

The remaining eight fire areas had fire scenarios which could potentially impact the opposite train of equipment (which relies upon the available ESW header):

- For two of these fire areas, credit was taken for use of the normal service water system to supply the protected train ESW header to restore a train of safety equipment.

- For the six remaining areas, the fire damage could directly affect the protected train equipment (and not just the service water supply) and, therefore, the use of normal service water would not be effective. For these areas, credit was taken for the use of normal service water to supply the inoperable ESW header for limited periods (all but 48 hours for the train A header, and all but 120 hours for the B header). Credit was also taken, consistent with the assumptions applied in the Individual Plant Examination for External Events (IPEEE) fire analyses, for manual fire response based on the licensee's proceduralized commitment for continuous fire watches in these areas.

The licensee performed risk evaluations of these fire scenarios, and the results are shown in Table 3.

Table 3: Internal Fire Events Risk

Risk Metric	Callaway Result
ΔCDF	6.80E-6/year
ΔLERF	1.63E-7/year
ICCDP	1.93E-6 (train A) 4.87E-6 (train B)
ICLERP	4.63E-8 (train A) 1.17E-7 (train B)

The licensee has committed to installing four supplemental DGs as an alternate AC power supply during the ESW extended outages. The DGs will be located in the switchyard, and will have about 1000 gallons of diesel fuel per unit, and two oil-filled transformers. In response to an NRC staff RAI regarding fire protection provisions for the DGs in the switchyard, the licensee identified that the design and implementation of this temporary modification will include the following considerations:

- Conform to the Callaway Final Safety Analysis Report (FSAR) Site Addendum Section 9.5 with respect to administrative control of flammable liquids using a combination of control of combustibles, physical separation, manual suppression, and fire barriers (if required) to assure a switchyard fire will not prevent safe shutdown of the plant.

- Comply with the requirements of National Fire Protection Association (NFPA) NFPA 30-1973, "Flammable and Combustible Liquids Code."

- Physical separation from the safeguards offsite power circuits in the switchyard will be maintained to the extent allowed by the switchyard configuration. The nearest component will be the safeguards transformer (V24), which is the preferred source of offsite power. The redundant safeguards transformer (V22) is outside the vicinity of the temporary installation. The temporary DGs will be located at the maximum available distance from the V24 transformer, and will be evaluated for their potential as a fire hazard.

- The supplemental DGs will be operated and load tested prior to entering each ESW train outage and no other testing or operation of the DGs will occur during the outage.

Seismic Events

The licensee's response to Generic Letter 88-20, Supplement 4, IPEEE, used a focused-scope evaluation applying a seismic margins assessment (SMA), and identified an overall high confidence of low probability of failure (HCLFP) capacity of 0.3g, which was also the review level earthquake. The licensee applied a pre-screening activity to reduce the number of components reviewed. As discussed in IPEEE, all but 22 plant components of the 592 components on the safe shutdown equipment list and containment systems equipment list were pre-screened from further consideration. A seismic capability walk down was performed for the 22 screened-in components focused on anchorage and interaction hazards, and on validating the pre-screening. Detailed HCLFP calculations were required on only a small number of these remaining components.

The IPEEE submittal concluded that there were no seismic vulnerabilities, and that Callaway was found to be a seismically resistant plant, with most components being over-qualified.

For this application, the licensee has identified a subset of the 22 screened-in components which are affected by the ESW CT extension:

- Ultimate Heat Sink cooling tower fans and motor control centers
- ESW self-cleaning strainers
- Diesel Generator intake air filters
- Diesel Generator intercooler heat exchangers

The licensee has committed to perform a walkdown of these components to look for obvious mounting or seismic interaction issues, such as lose parts or missing hardware, prior to entering the extended ESW outages.

Thus, given the seismic robustness identified in the Callaway IPEEE and the application-specific walkdowns committed by the licensee, the plant's seismic mitigation capability will be maintained during the extended CT and, therefore, the risk from seismic initiators will not be significant.

Other External Events

The IPEEE identified that the Callaway plant design conforms to the 1975 Standard Review Plan, and no potential vulnerabilities from high winds, tornadoes, external floods, or transportation or nearby facility accidents were identified.

Summary of External Events Risk

Based on the analysis of external events discussed above, and the commitments to establish periodic watches in areas of the plant significant for ESW flooding and fire damage to the protected train, the NRC staff concludes that the licensee has satisfied the intent of RG 1.177 (Section 2.3.2 and Section 2.3.6), RG 1.174 (Section 2.2.3), and SRP Section 19.2.

Shutdown and Transition Risk

The proposed TS change is not applicable during shutdown conditions, and would be used to allow continued power operation of the Callaway Plant. Therefore, shutdown and transition risk issues are not relevant. The NRC staff notes that the Callaway Plant would rely upon ESW during cold shutdown conditions as the ultimate heat sink for decay heat removal. Therefore, risk is avoided by conducting ESW maintenance during power operation, when secondary cooling via the steam generators and TDAFW pump is available, instead of during cold shutdown conditions. This avoided risk is conservatively not considered in calculating the risk impact of the proposed change.

Total Risk Evaluation

The NRC staff combined the internal events, flooding, and internal fire risk evaluations provided by the licensee to determine the total risk impact of the proposed one-time ESW extended CTs.

Table 4: Integrated Risk Results

Risk Metric	Acceptance Guidance*	Callaway Result			
		Internal	Flood	Fire	Total
ΔCDF	< 1E-5 per year – small RG 1.174 < 1E-6 per year – very small RG 1.174	2.04E-6 per year	6.06E-7 per year	6.80E-6 per year	9.45E-6 per year
ΔLERF	< 1E-6 per year – small RG 1.174 < 1E-7 per year – very small RG 1.174	4.72E-8 per year	1.45E-8 per year	1.63E-7 per year	2.25E-7 per year
ICCDP	< 5E-7 - RG 1.177	6.83E-7 (A) 1.36E-6 (B)	3.03E-7 (A) 3.03E-7 (B)	1.93E-6 (A) 4.87E-6 (B)	2.92E-6 (A) 6.53E-6 (B)
ICLERP	< 5E-8 - RG 1.177	1.25E-8 (A) 3.47E-8 (B)	7.27E-9 (A) 7.27E-9 (B)	4.63E-8 (A) 1.17E-7 (B)	6.61E-8 (A) 1.59E-7 (B)

*Applicable for permanent TS changes only, but used to characterize the results for a temporary change.

The one-time change results in a temporary annual risk increase (in the year of implementation) for ΔCDF and ΔLERF which are considered "small" per RG 1.174 criteria applicable to permanent TS changes. The risk impact of each individual entry into the TS measured by the ICCDP and ICLERP are higher than the RG 1.177 guidance for permanent changes, but are well below existing industry guidance for performing maintenance activities (NUMARC 93-01, Section 11, endorsed by the NRC staff in RG 1.182) of 1E-5 for ICCDP and 1E-6 for ICLERP.

However, it should be noted that this guidance is intended to assess plant configurations associated with maintenance activities not explicitly addressed by a plant's TS. It should not be inferred that the NRC staff endorses this guidance as risk-acceptance criteria for individual system/function one-time CT changes. Rather, this guidance provides an additional perspective on the risk impact.

The NRC staff concludes that the licensee has satisfied the intent of RG 1.177 (Section 2.4), RG 1.174 (Sections 2.2.4 and 2.2.5), and SRP Section 19.2.

Uncertainty

The licensee's risk analyses are point estimates of the mean value. In response to an RAI, the licensee provided an estimate of the mean value accounting for parametric uncertainties in the data. The results demonstrated that the results are not overly sensitive to the uncertainties in the underlying data, and the point estimate is, therefore, a reasonable approximation of the true mean values.

The licensee also investigated potential sources of uncertainty from assumptions in the PRA model used for this application by reviewing the PRA basic events found in the configuration-specific cutsets whose risk achievement worth exceed a value of 2.0. Three sources of uncertainty which potentially impact this application were identified: 1) LOOP frequency

reduction of 50 percent based on administrative controls on switchyard access and weather monitoring, 2) no adjustment of offsite power nonrecovery probabilities based on potential increase in mean LOOP duration, and 3) RCP seal model. The licensee identified sensitivity studies conducted to determine the potential impact on the risk metrics due to these assumptions. The studies demonstrated that the potential increase in mean LOOP duration and the choice of RCP seal model had only a small impact on the risk metrics. However, eliminating the assumption of a 50 percent reduction in LOOP frequency resulted in a 43 percent increase in risk. The licensee further investigated this assumption by reviewing the industry data relevant to the LOOP frequency, to identify the events which would not occur based on switchyard compensatory measures in effect during the extended ESW outages. The licensee identified that of the 22 switchyard-related events in the generic data, 11 events would not be expected to occur during the ESW outage. Therefore, the licensee assumption of a 50 percent reduction in LOOP frequency for grid-related events is justified.

3.1.3.5.2 Tier 2 - Avoidance of Risk-Significant Plant Configurations

The second tier requires a licensee to provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out-of-service in accordance with the proposed TS change.

In its letter dated July 10, 2008, the licensee identified Tier 2 restrictions and compensatory measures applicable during implementation of each extended CT:

- When the normal service water is unavailable to the inoperable ESW header (as estimated by the licensee as 48 hours for train A and 120 hours for train B), no PRA-modeled equipment, other than the affected ESW train and supported systems rendered inoperable by that ESW train, will be voluntarily taken out-of-service during the one-time extended CT taken on each train. For the remaining times when normal service water is available, no PRA-modeled equipment on either train will be voluntarily taken out-of-service.

- Access to the switchyard will be limited and no work will be allowed in the switchyard which could cause a LOOP during the one-time extended CT.

- A temporary alternate power source consisting of diesel generators, with combined capacity equal to or greater than the capacity of either one of the installed emergency DGs, will be available as a backup power source.

- The one-time extended CT will not be scheduled during forecasted inclement weather conditions. National Weather Service reports will be monitored prior to and throughout each ESW train outage.

- The one-time extended CT will be used such that the piping tie-in (new underground polyethylene ESW piping to the rest of the system) will be performed with the normal service water system cooling the affected ESW train heat load for most of the 14-day period (minus 48 hours for the A train and 102 hours for the B train). During the portion of the extended CT that the normal service water is supplying the ESW loads, automatic closure signals for the

normal service water to ESW supply and return cross-connect valves will be defeated. Automatic open signals for the ESW return to the ultimate heat sink valves will also be defeated during this portion of the extended CT as well.

- The normal charging pump will remain functional during the extended CT and the plant will be shut down, will be commenced in accordance with TS, in the event that the pump becomes non-functional.

- The TDAFW pump will be operable during the extended CT, as required by TS 3.7.5 condition D. Access restrictions will also be in place for the TDAFW pump, the remaining operable MDAFW pump, and the condensate storage tank (which supplies the AFW pumps).

- Prior to entering the extended CT, important plant design features for fire protection and flood mitigation will be verified available, including plant walkdowns to assure transient combustible material is not improperly stored in risk-significant areas.

- Flood and fire watches will be posted in risk-significant areas.

In addition to the above considerations, the licensee identified existing plant guidelines for operation of the TDAFW pump during a loss of AC and DC power, though this capability is not credited in the risk assessment.

Based on the above, the NRC staff finds that the licensee's Tier 2 evaluation of potential risk significant configurations and the proposed Tier 2 restrictions support the implementation of changes to TS, and is acceptable to the staff.

3.1.3.5.3 Tier 3 - Risk-Informed Configuration Risk Management

The third tier requires a licensee to develop a program that ensures that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity.

The licensee identified plant procedures (APA-ZZ-00315, "Configuration Risk Management Program," and EDP-ZZ-01129, "Callaway Plant Risk Assessment"), and its configuration risk management program (CRMP) which assure risk is assessed and managed during the extended CT, in conformance with the requirements of 10 CFR 50.65(a)(4). The CRMP is required to be used to reassess emergent conditions. The licensee identified the plant-specific risk thresholds and corresponding administrative restrictions. The CRMP for Callaway has been previously reviewed by the NRC staff in support of Callaway license amendment 165.

Based on the licensee's conformance to the guidelines of RG 1.177, the NRC staff finds the licensee's Tier 3 program supports the proposed changes to TS, and is acceptable.

3.2 Staff Findings

The risk impacts as estimated by the licensee are reasonably consistent with the acceptance guidelines for RG 1.174, applicable to permanent changes to the TS, for the proposed one-time

change to the ESW and DG TS. The licensee's Tier 2 analysis and commitments provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out-of-service in accordance with the proposed TS change. The licensee's Tier 3 CRMP was found to be consistent with the RG 1.177 CRMP guidelines. The licensee's regulatory commitments and the NRC staff's findings are discussed in section 3.3 below.

3.3 Regulatory Commitments

The licensee specified regulatory commitments, which were made in support of its amendment application, in an attachment to its supplemental letter dated July 10, 2008. The regulatory commitments are listed in a table on the following four pages and encompass the compensatory measures discussed in this safety evaluation. The due date/event column in the table refers to when the licensee stated that the commitment will be in place and effective after the amendment is approved. This due date is when the administrative controls will be in place at the time the amendment is implemented. This due date is acceptable to the NRC staff because the amendment has to be implemented before the licensee may use the extended CTs that are being approved in the amendment.

Although the licensee did not state a due date for its second commitment in the following table, the licensee stated that this commitment applies as long as the one-time 14-day CT extension is in use. The NRC staff concludes that the stated due date for the second commitment is not significant.

The first commitment in the supplemental letter applies to when the licensee agrees to implement the amendment after it is approved by the NRC. This is an administrative commitment that simply agrees with the required date stated in the amendment on page 2 of Enclosure 1 to the cover letter for the amendment. This commitment is not listed in the following table.

The NRC staff reviewed the 10 regulatory commitments in the following table in the context of the requested amendment and made the following findings.

The proposed amendment is for a one-time extension of the CT that an ESW train and a DG train in Modes 1 through 4 before the plant has to shut down in order to allow the licensee to replace ESW underground piping with new piping. The replacement is done one ESW train at a time. This work was planned to be done outside the currently ongoing 2008 fall refueling outage. The licensee started work before the refueling outage to replace the ESW piping by beginning the excavation of the underground piping for one ESW train, but at this time the licensee has not made an ESW/DG train inoperable to replace the ESW piping, and will not until after the refueling outage when the plant will return to stable operation. At that time, one ESW train will be made inoperable, with the other ESW train operable and able to perform its safety function of providing cooling water to the plant. Only one ESW train is needed to perform the ESW safety functions. The work to replace piping in both ESW trains will be completed by December 31, 2008, because the proposed amendment does not allow a CT of 14 days for an inoperable ESW/DG train after December 31, 2008.

LIST OF REGULATORY COMMITMENTS MADE BY THE LICENSEE

ATTACHMENT 2 TO SUPPLEMENTAL LETTER DATED JULY 10, 2008

	COMMITMENT	DUE DATE/EVENT
1.	For no more than 48 hours during the 'A' ESW train LCO outage, and no more than 120 hours during the 'B' ESW train LCO outage, normal service water will not be available to the out-of-service ESW train. During these time limits, no PRA-modeled equipment, other than the out-of-service ESW train and supported systems rendered inoperable by that ESW train being out-of-service, will be voluntarily taken out-of-service during the one-time extended Completion Time taken on each train. This applies only to PRA-modeled equipment in the protected ESF train (ESF train not served by the inoperable ESW train) during these time limits that normal service water is unavailable. No work will be allowed on the protected (operable) ESW train. The preceding was credited in the risk metric calculations supporting this license amendment request. No work will be allowed in the area of equipment in the protected [Engineered Safety Features] ESF train (within 20 feet unless there is an intervening barrier) except for yard piping work and work in control building room 3101 where the underground piping enters the control building.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.
2.	For the rest of the 'A' ESW train and 'B' ESW train LCO outages (the one-time 14-day Completion Times per ESW train minus the time limits noted above), the out-of-service ESW train loads will be cooled by normal service water. Credit has been taken in the risk metric calculations for the ESF equipment serviced by the protected ESW train and for the ESF equipment that can be serviced by normal service water associated with the out-of-service ESW train. None of the PRA-modeled equipment in either train will be voluntarily taken out of service during the time that normal service water is available to supply the out-of-service ESW train loads. This commitment applies as long as the one-time 14-day Completion Time extension of TS 3.7.8 Condition A and TS 3.8.1 Condition B is in use; this commitment expires when these TS Conditions are exited.	
3.	Access to the switchyard will be limited to personnel with a demonstrable need (operator rounds involving no equipment manipulation and staff associated with performing the 8-hour readiness checks on the temporary DGs) and no pre-planned work or testing or preventive maintenance will be allowed in the switchyard, or other areas of the plant, that could cause a loss of offsite power (LOOP) event during the one-time 14-day extended Completion Time. Credit was taken for this commitment in the risk metric calculations supporting this license amendment request. The only other access to the switchyard that would be considered would be for corrective maintenance that would address an emergent condition before it led to a LOOP event.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.

	COMMITMENT	DUE DATE/EVENT
4.	The one-time 14-day extended Completion Time will not be entered if, prior to entry, inclement weather conditions are forecasted, i.e., work under the extended Completion Time will not be started if Severe Weather as defined in OTO-ZZ-00012 is forecasted to occur within 140 miles of the plant. National Weather Service reports will be monitored prior to and throughout each ESW train LCO outage.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.
5.	From EDP-ZZ-01129 Appendix 2 for a DG or ESW outage and TS 3.7.5, the following Tier 2 commitments are also added to the scope of this amendment request: • The turbine-driven auxiliary feedwater pump (TDAFP) will remain Operable. If the TDAFP were to become inoperable during the 14-day LCO outage, TS 3.7.5 Condition D would require a plant shutdown to MODE 3 within 6 hours and to MODE 4 within 12 hours since one MDAFW train is already inoperable at the beginning of the LCO outage. • The TDAFP pump room and associated valve rooms will be posted as restricted access. • The protected train motor-driven auxiliary feedwater pump (MDAFP) pump room and associated valve rooms will be posted as restricted access. • The condensate storage tank (CST) will be posted as restricted access. • No work will be allowed on the Security Diesel.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.
6.	For the time limits (14 days minus 48 hours on ESW train 'A' and 14 days minus 120 hours on ESW train 'B') noted above in commitment 2, the piping tie-in (new underground PE [polyethylene] ESW piping to the rest of the system) will be performed with the normal service water system cooling the out-of-service ESW train heat loads. During the portion of the extended Completion Time that normal service water is supplying the ESW loads, the normal service water to ESW supply and return cross-connect valves will be opened and power removed from the operators. Credit was taken for the preceding in the risk metric calculations supporting this license amendment request. The ESW return to UHS valves will be closed and power removed from the operators during this portion of the extended 14-day Completion Time as well.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment. Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.

	COMMITMENT	DUE DATE/EVENT
7.	Prior to entering the extended 14-day ESW Completion Times, the Operations department will verify the availability of fire protection equipment per Callaway procedure APA-ZZ-00703 (operability requirements are spelled out in FSAR Section 9.5.1.7 and Table 9.5.1-2 will apply throughout the 14-day LOC outage subject to the applicable modes column of Table 9.5.1-2) and flood mitigation (drains, watertight doors) equipment to assure that important plant design features, for mitigation of fires or floods that could impact the protected train, are available. In addition, prior to entering the extended ESW CTs, a walkdown of the above ground portion of the protected ESW train will be performed for transient combustibles, except for the portion of the protected train inside containment or otherwise excluded by the Radiation Protection department. Removal of any transient combustibles, pursuant to this walkdown, was credited in the fire risk quantification performed to support this license amendment request. This walkdown will also address the seismic interaction commitments made in response to RAI 3.(a) in ULNRC-05500. The 14-day LCO outage on each ESW train will not proceed until all transient combustibles that could affect the protected ESW train and the ESF equipment it serves are removed, watertight doors protecting ESF equipment associated with the protected ESW train are verified to be closed and functional, drains in rooms serving ESF equipment associated with the protected ESW train are verified to be unobstructed, and fire detection and suppression equipment in fire areas associated with the protected ESW train are verified to be available.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.
8.	Continuous, one-hour, and eight-hour fire and flood watches will be instituted on the protected ESW train as discussed in the response to RAI s 3.b and 3.c in ULNRC-05500 and footnote 6 in ULNRC-05520. The NCP [normal charging pump] will remain functional and its room will be posted as restricted access. The preceding commitments were credited in the fire and flooding risk metric quantifications performed to support this license amendment request. If the NCP were to become non-functional during the 14-day LCO outage such that the pump becomes unable to provide the required RCP seal cooling, administrative controls will require a plant shutdown to MODE 3 within 6 hours and to MODE 4 within 12 hours.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.
9.	Appropriate training will be provided to operations personnel on this TS change and the associated ESW modification, as well as the compensatory measures to be implemented during the one-time extended Completion Time. This training will identify the dominant internal events, fire and internal flooding core damage scenarios, associated with the plant configuration during the extended ESW Completion Time, and include a discussion of mitigation strategies for these scenarios.	Administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.

	COMMITMENT	DUE DATE/EVENT
10.	A temporary alternate power source consisting of diesel generators, with combined capacity equal to or greater than the capacity of either one of the installed emergency DGs, will be available as a backup power source. This temporary alternate AC source could power protected train loads in the unlikely event a loss of offsite power event occurred and the protected train's DG failed to start and run. Prior to entering the extended 14-day CT on each ESW train, these temporary diesel generators will be load tested to provide a load equal to the continuous rating of the inoperable DG. After entering the extended ESW CT on each train, this source will be verified available every 8 hours and treated as protected equipment. This temporary alternate power source is credited in the internal events risk metric calculations performed to support this license amendment request.	Equipment and administrative controls in place at the time the amendment is implemented. This is a Tier 2 commitment.

To provide compensatory measures while the piping for one or the other ESW train is being replaced, the licensee has proposed the 11 regulatory commitments in its letter dated July 10, 2008. Except for the first commitment, the 10 regulatory commitments listed in the above table provide specific statements about what the licensee will be doing from the time the amendment is implemented, and one of the ESW trains is made inoperable to do the pipe replacement, to when the work on both trains is completed. This time period to December 31, 2008, is a relatively short time of about 2 months from the date of this approval. Also, the commitments document administrative controls that would follow under maintenance rule, 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," if there was no amendment needed to perform the ESW pipe replacement. In 10 CFR 50.65, when taking a structure, system, or component (SSC) out of service (i.e., make the SSC inoperable, like the ESW piping) for maintenance, the licensee is required before performing the maintenance to assess and manage the risk of performing the maintenance on the SSC. The compensatory measures adopted through regulatory commitments are the management of the risk by the licensee in replacing the ESW piping that could have been required by 10 CFR 50.65 if an amendment was not needed. However, an amendment is required for the pipe replacement and the compensatory measures have been proposed by the licensee as regulatory commitments.

Based on the proposed administrative controls in the commitments are not special or out of the ordinary compensatory measures, but are normal controls that could have come from 10 CFR 50.65, and on the short time that these administrative controls are needed, the NRC staff concludes that reasonable controls for the implementation and for subsequent evaluation of proposed changes pertaining to the following regulatory commitments are best provided by the licensee's administrative processes, including its commitment management program and commitment tracking system. The commitment management program was last audited by the NRC staff in August 2007. In its audit report dated October 31, 2007, the NRC staff concluded that the licensee has an adequate commitment management program to implement and manage regulatory commitments. Therefore, there is no reason to require that these compensatory measures be license conditions, which could result in a future amendment to remove the license conditions once they expire on January 1, 2009. Following the replacement of the ESW piping, the license conditions would no longer apply to plant operation.

Based on the above findings, the NRC staff concludes that the commitments do not warrant the creation of regulatory requirements which would require prior NRC approval of subsequent changes. The NRC staff has agreed that NEI 99-04, Revision 0, "Guidelines for Managing NRC Commitment Changes," provides reasonable guidance for the control of regulatory commitments made to the NRC staff. See Regulatory Issue Summary 2000-17, "Managing Regulatory Commitments Made by Power Reactor Licensees to the NRC Staff," dated September 21, 2000. The NRC staff may choose to verify the implementation and maintenance of these commitments in a future inspection or audit.

4.0 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.

5.0 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 published in the *Federal Register* on December 31, 2007 (72 FR 74362). 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.

6.0 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 Contributors: A. Howe
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M. McConnell
R. Young
J. Donohew

Date: October 31, 2008

October 31, 2008

Mr. Adam C. Heflin
Senior Vice President and
Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, MO 65251

SUBJECT: CALLAWAY PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE: ONE-TIME EXTENSION OF COMPLETION TIME FOR ESSENTIAL SERVICE WATER SYSTEM PIPING REPLACEMENT (TAC NO. MD7252)

Dear Mr. Heflin:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 186 to Facility Operating License No. NPF-30 for the Callaway Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated October 31, 2007, as supplemented by letters dated February 21, March 7, May 6, July 10, and August 13, 2008.

The amendment revises the TSs to allow a one-time extension to the Completion Times for both essential service water (ESW) trains and the emergency diesel generators from 72 hours to 14 days. The revision to the TSs would apply when each train of the ESW system is inoperable during respective ESW system piping replacements.

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

Sincerely,

/RA/

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-483
Enclosures:
1. Amendment No. 186 to NPF-30
2. Safety Evaluation
cc w/encls: See next page

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ADAMS Accession No. ML082810643 (*)SE Input.

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DATE		10/14/08	8/19/08	4/30/08
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DATE		10/28/08	10/31/08	10/31/08

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