

September 8, 2000

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ULNRC- 04308

Gentlemen:

DOCKET NUMBER 50-483  
UNION ELECTRIC COMPANY  
CALLAWAY PLANT  
REVISION TO TECHNICAL SPECIFICATION 3.5.2, "ECCS - OPERATING"

References: 1. ULNRC-04307 dated September 7, 2000



Union Electric Company herewith transmits an application for an exigent amendment to Facility Operating License No. NPF-30 for the Callaway Plant.

This exigent amendment application would revise the Frequency for Surveillance Requirement (SR) 3.5.2.5 to annotate that verification of the automatic closure function of BNHV8812A shall be performed prior to startup from the first shutdown to MODE 5 occurring after September 8, 2000, but no later than June 1, 2001. Ostensibly, this would be during Refuel 11 scheduled for April 2001.

On August 29, 2000, a question was raised by Callaway staff members regarding the scope of the automatic valves covered by SR 3.5.2.5. This surveillance requires, on an 18 month Frequency, that each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, be demonstrated to actuate to its correct position on an actual or simulated actuation signal. After several discussions, some of which included NRC staff, a decision was made on September 7, 2000, that the RWST to RHR pump suction isolation valves (BNHV8812A/B) should be tested within the scope of SR 3.5.2.5. It was determined that BNHV8812B had been tested within the specified Frequency, but BNHV8812A had not been tested since a maintenance retest in April 1998. Reference 1 requested a Notice of Enforcement Discretion (NOED) from NRR, which was granted at 1042 hours CDT on September 8, 2000.

Pursuant to 10CFR50.91(a)(6), Union Electric hereby requests approval of this exigent amendment application. This situation could not have been foreseen and avoided since actions to resolve the issue were immediately initiated. Prior to the conversion to the Improved Technical Specifications (ITS), Current Technical

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Specification (CTS) 4.5.2.e.1) listed the automatic actuation signals that were required to be tested. It was not previously recognized that the surveillance should include subsequent valve actuations that are dependent on separate valves' position switch interlocks. The automatic closure of BNHV8812A/B was not previously included in the plant Technical Specification surveillance procedures because the valves do not actuate via a slave relay(s) and, therefore, were not recognized as being covered by this surveillance requirement. BNHV8812A/B do not automatically actuate to the closed position upon receipt of the signals listed in the SR 3.5.2.5 Bases (moved there from CTS 4.5.2.e.1) during the ITS conversion). BNHV8812A/B are interlocked with the containment recirculation sump to RHR pump suction isolation valves (EJHV8811A/B) and will automatically close after the full open position switches on EJHV8811A/B are actuated. It is requested that plant operation be allowed to continue until the proper plant conditions exist to fully test this function. Conversion to the ITS did not eliminate the need for enforcement discretion in this situation. It has also been determined that this amendment application does not involve a significant hazard consideration as determined per 10CFR50.92. Pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

The Callaway Plant Onsite Review Committee and the Nuclear Safety Review Board have reviewed this amendment application. Attachments 1 through 3 provide the Description and Assessment, Markup of Technical Specification Page 3.5-5, and Retyped Technical Specification Page 3.5-5, respectively, in support of this exigent amendment request. Corresponding SR 3.5.2.5 Bases changes will be implemented under our ITS 5.5.14 Bases Control Program after NRC approval of this exigent amendment application.

In accordance with 10CFR50.91(b), Union Electric Company will promptly provide the State of Missouri with a copy of this proposed amendment to ensure their awareness of this request.

If you have any questions on this amendment application, please contact us.

Very truly yours,



Alan C. Passwater  
Manager-Corporate Nuclear Services

**Attachments:**

- 1 - Description and Assessment**
- 2 - Markup of Technical Specification Page 3.5-5**
- 3 - Retyped Technical Specification Page 3.5-5**



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# ATTACHMENT ONE

## DESCRIPTION AND ASSESSMENT

## **DESCRIPTION AND ASSESSMENT**

### **1.0 INTRODUCTION**

This amendment application is an exigent request pursuant to 10CFR50.91(a)(6) to revise Technical Specification (TS) 3.5.2, "ECCS - Operating," for Callaway Plant. No changes to the FSAR are required as a result of this exigent amendment application.

### **2.0 DESCRIPTION**

Surveillance Requirement (SR) 3.5.2.5 is revised to annotate that verification of the automatic closure function of BNHV8812A shall be performed prior to startup from the first shutdown to MODE 5 occurring after September 8, 2000, but no later than June 1, 2001. Ostensibly, this would be during Refuel 11 scheduled for April 2001. Attachment 2 provides the Technical Specification markup.

### **3.0 BACKGROUND**

As discussed in the LCO Bases for TS 3.5.2, each ECCS train must be capable of taking suction from the RWST upon a Safety Injection (SI) signal and automatically transferring suction to the containment recirculation sump. The 100% flow requirement of TS 3.5.2 Condition A applies during both injection and recirculation phases after a LOCA.

SR 3.5.2.5 requires that each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position will actuate to its correct position on an actual or simulated actuation signal. The actuation signals are specified in the Bases for SR 3.5.2.5 to include the SI signal and the RWST Level Low-Low 1 Automatic Transfer signal coincident with an SI signal. The Frequency of SR 3.5.2.5 is 18 months. The RWST Level Low-Low 1 Automatic Transfer signal coincident with an SI signal automatically opens the containment sump to RHR pump suction isolation valves (EJHV8811A/B). Switchover from the injection mode (suction from the RWST) to the recirculation mode (containment recirculation sump) involves the sequential opening of the RHR containment sump isolation valves (EJHV8811A/B), followed by the closing of the RWST to RHR pump suction isolation valves (BNHV8812A/B). BNHV8812A/B are interlocked with EJHV8811A/B and will automatically close after the full open position switches on EJHV8811A/B are actuated.

The Bases for SR 3.5.2.5 will be revised appropriately under our Bases Control Program to clarify the applicability of this SR after approval of this exigent amendment application.

The automatic closure function of BNHV8812A has not been functionally tested within the specified Frequency, plus allowed extension of SR 3.0.2. This feature has not been fully tested since a maintenance retest in April 1998 (during Refuel 9) for the "A" train of ECCS. The automatic closure of BNHV8812A/B was not previously included in the plant Technical Specification surveillance procedures because the valve does not actuate via a slave relay and, therefore, was not recognized as being covered by this surveillance requirement. SR 3.0.3 was entered at 1135 hours CDT on September 7, 2000. Enforcement discretion was sought in Reference 1 to increase the time allowed by SR 3.0.3 to perform this surveillance from 24 hours to the next MODE 5 shutdown (ostensibly the next refueling outage in April 2001). Prior to expiration of the 24-hour extension allowed by SR 3.0.3 to perform the surveillance, a Notice of Enforcement Discretion (NOED) was granted by NRC effective as of 1042 hours CDT on September 8, 2000. This exigent amendment application follows up the commitment made in Reference 1.

Valves EJHV8811A/B are encapsulated and are tested only during plant shutdown (MODES 5 or 6) conditions during inservice testing (IST). The NRC-reviewed IST Cold Shutdown Frequency Justification EJ-06, which discusses the cold shutdown frequency justification for these encapsulated valves, concludes that the additional risk encountered and amount of time to test the encapsulated valves on-line do not justify the small incremental assurance gained by the testing. EJHV8811A/B are encapsulated in a pressure vessel, which is leak-tight at containment design pressure. This encapsulation is an extension of containment integrity and is, therefore, required to remain intact during MODES 1 through 4. In the event EJHV8811A is opened for surveillance testing, and fails to close following testing, the encapsulation would require removal.

LCO 3.5.2 requires that two ECCS trains be OPERABLE in MODES 1, 2, and 3. Condition A covers the situation where one or more trains are inoperable and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. Required Action A.1 requires that the inoperable train(s) be restored within 72 hours. If the Completion Time for Required Action A.1 is not met, Condition B is entered. Required Actions B.1 and B.2 require the plant to be shutdown to MODE 3 within 6 hours and to MODE 4 within 12 hours.

## **4.0 TECHNICAL ANALYSIS**

### **Design Basis Function**

At the end of the injection phase of a LOCA, the RWST will be nearly empty. Continued cooling must be provided by the ECCS to remove core decay heat. Containment spray operation in the recirculation phase may also be required. The suction source for the ECCS and containment spray pumps is switched to the containment recirculation sumps. The low head Residual Heat Removal (RHR) pumps and containment spray pumps take suction from the containment recirculation sumps. The RHR pumps direct flow to the RHR heat exchangers and, depending on RCS pressure, recirculate the fluid back to the RCS directly or via the safety injection and centrifugal charging pumps. The ECCS switchover from injection to recirculation is initiated automatically upon receipt of the RWST Level Low-Low 1 Automatic Transfer signal coincident with an SI signal and is completed via timely operator action at the main control board after automatic switchover verification has occurred. Switchover from the RWST to the containment recirculation sumps must be completed before the RWST empties to prevent damage to the ECCS and containment spray pumps and a loss of core cooling capability. For similar reasons, switchover must not occur before there is sufficient water in the containment recirculation sumps to support ECCS and containment spray pump operation. Furthermore, switchover must not occur before ensuring that sufficient borated water is injected from the RWST. This ensures the reactor remains shut down in the recirculation mode.

### **Impact on Nuclear Safety**

Based on the following points, it is prudent to defer testing until the next shutdown to MODE 5 (ostensibly the next refueling outage). This will minimize the potential safety consequences from either a unit shutdown or testing in MODE 1. A shutdown could initiate unexpected transients, potentially cause electric grid instability which may affect offsite power sources, and place an unnecessary thermal cycle on safety significant equipment.

- The redundant train "B" of ECCS is operable.
- BNHV8812A can be manually closed from the main control room as demonstrated during quarterly IST surveillance testing. A sensitivity calculation (based on conservative times obtained from Callaway simulator exercises performed during the verification and validation process on the last revision of EOP ES-1.3) has been performed which demonstrates there is

sufficient time for manual operator action to close both BNHV8812A and B while following the Emergency Operating Procedures to complete the switchover to the recirculation phase for ECCS.

- There is no reason to question the ability of BNHV8812A to automatically close after EJHV8811A has fully opened. Only the frequency of demonstrating this function is at issue. All of the circuitry, with the exception of the EJHV8811A open interlock limit switch and associated cabling, have been tested within the last 18 months and all components have been tested since Refuel 9 (April 1998) when a completely new Limitorque actuator was installed. The EJHV8811A open interlock limit switch was also verified to operate properly three times prior to the Refuel 9 actuator replacement as a retest activity following maintenance evolutions on this valve actuator.
- Heightened operator attention will be assured by issuing a night order explaining the issue of BNHV8812A not being tested within the required frequency. Just in time training will also be conducted with operating crews covering the existing contingency steps in Emergency Operating Procedure ES-1.3 should BNHV8812A fail to close.

#### Probabilistic Safety Assessment (PSA) Evaluation

The Callaway PRA does not require BNHV8812A/B to automatically close for successful ECCS or containment spray recirculation. The basis for not requiring these valves to close for ECCS recirculation is that failure of these valves to close is postulated to result in an equalization of levels in the RWST and containment recirculation sumps at an elevation above the NPSH required for the RHR and containment spray pumps.

A calculation was performed where it was assumed that BNHV8812A must go closed and the auto-closure feature was inoperable. The calculation determined the incremental conditional core damage probability (ICCDP) incurred due to operating until the next refueling outage without surveillance testing the auto-closure feature for BNHV8812A. The calculated maximum ICCDP is  $1.47E-6$ , which assumes zero limit switch reliability for the remainder of this cycle. Note that this value credits the core damage probability averted due to not shutting down and restarting the plant. This valve is expected to operate properly as discussed previously in this section.

## **5.0 REGULATORY ANALYSIS**

### **5.1 No Significant Hazards Determination**

The proposed change does not involve a significant hazards consideration because operation of Callaway Plant in accordance with this change would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

Overall protection system performance will remain within the bounds of the previously performed accident analyses since there are no hardware changes. The Reactor Trip System (RTS) and Engineered Safety Feature Actuation System (ESFAS) instrumentation will be unaffected. These protection systems will continue to function in a manner consistent with the plant design basis. All design, material, and construction standards that were applicable prior to the request are maintained.

The proposed request will not affect the probability of any event initiators. There will be no degradation in the performance of, or an increase in the number of challenges imposed on, safety-related equipment assumed to function during an accident situation. There will be no change to normal plant operating parameters or accident mitigation performance.

The proposed request will not alter any assumptions or change any mitigation actions in the radiological consequence evaluations in the FSAR.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated.

There are no hardware changes nor are there any changes in the method by which any safety-related plant system performs its safety function. This request will not affect the normal method of plant operation. No performance requirements will be affected.

No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of this request. There will be no adverse effect or challenges imposed on any safety-related system as a result of this request.

This request does not alter the design or performance of the 7300 Process Protection System, Nuclear Instrumentation System, or Solid State Protection System used in the plant protection systems.

Therefore, the proposed request does not create the possibility of a new or different kind of accident from any previously evaluated.

(3) Involve a significant reduction in a margin or safety.

There will be no effect on the manner in which safety limits or limiting safety system settings are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. There will be no impact on the overpower limit, departure from nucleate boiling ratio (DNBR) limits, heat flux hot channel factor ( $F_Q$ ), nuclear enthalpy rise hot channel factor ( $F_{\Delta H}$ ), loss of coolant accident peak cladding temperature (LOCA PCT), peak local power density, or any other margin of safety. The radiological dose consequence acceptance criteria listed in the Standard Review Plan will continue to be met.

Therefore, the proposed request does not involve a significant reduction in any margin of safety.

Conclusion:

Based on the preceding information, it has been determined that the proposed request meets the requirements of 10CFR50.92(c) and does not involve a significant hazards consideration.

## **5.2 Regulatory Safety Analysis**

### Applicable Regulatory Requirements/Criteria

The regulatory bases for TS 3.5.2 are 10CFR50.46 and 10CFR Appendix A, GDCs 35, 36, and 37.

TS 3.5.2 helps to ensure that the following acceptance criteria, established by 10CFR50.46, will be met following a LOCA:

- a. Maximum fuel element cladding temperature is  $\leq 2200^{\circ}\text{F}$ ;
- b. Maximum cladding oxidation is  $\leq 0.17$  times the total cladding thickness before oxidation;
- c. Maximum hydrogen generation from a zirconium-water reaction is  $\leq 0.01$  times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to react;
- d. Core is maintained in a coolable geometry; and
- e. Adequate core cooling capability is maintained.

GDC 35, "Emergency Core Cooling," requires that a system be provided for abundant emergency core cooling. The GDC requires redundancy be provided such that the safety function of the ECCS shall be met while energized from either offsite or onsite power, assuming a single failure.

GDC 36, "Inspection of Emergency Core Cooling System," requires the ECCS to be designed to permit periodic inspections.

GDC 37, "Testing of Emergency Core Cooling System," requires the ECCS to be designed to permit periodic demonstrations of the full operational sequence that brings the system into operation.

### Analysis

There have been no changes to the ECCS design such that any of the above regulatory requirements and criteria would not be met. This exigent amendment application only involves the duration between surveillance performances for BNHV8812A. The discussions presented under "Impact on Nuclear Safety" in Section 4.0 above establish the prudence of granting this exigent amendment application.

The requested extension until the next MODE 5 shutdown would provide the proper unit conditions for performing the testing of the auto-closure function for BNHV8812A. This testing requires that EJHV8811A be stroked fully open. This valve is encapsulated and is tested only during plant shutdown (MODES 5 or 6) conditions during IST testing. The NRC-reviewed IST Cold Shutdown Frequency Justification EJ-06, which discusses the cold shutdown frequency justification for this encapsulated valve, concludes that the additional risks encountered and

amount of time to test the encapsulated valves on-line do not justify the small incremental assurance gained by the testing. The ability to remotely operate EJHV8812A from the Control Room will continue to be tested quarterly in accordance with Callaway's Pump and Valve Program.

### Conclusion

The evaluation performed by Union Electric Company concludes that Callaway Plant continues to comply with the above regulatory requirements.

## **6.0 ENVIRONMENTAL EVALUATION**

Union Electric Company has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. Union Electric Company has evaluated the proposed change and has determined that the change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22 (c)(9). Therefore, pursuant to 10CFR51.22 (b), an environmental assessment of the proposed change is not required.

## **7.0 REFERENCES**

1. ULNRC-04307 dated September 7, 2000

## ATTACHMENT TWO

MARKUP OF TECHNICAL SPECIFICATION PAGE 3.5-5

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.5	Verify each ECCS 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 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	18 months
SR 3.5.2.7	Verify, for each ECCS throttle valve listed below, each mechanical position stop is in the correct position.  <div style="text-align: center;"><u>Valve Number</u></div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: left;">                     EMV0095 EMV0096 EMV0097 EMV0098                 </div> <div style="text-align: left;">                     EMV0107 EMV0108 EMV0109 EMV0110                 </div> <div style="text-align: left;">                     EMV0089 EMV0090 EMV0091 EMV0092                 </div> </div>	18 months
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	18 months

\* Verification of the automatic closure function of BNHV8812A shall be performed prior to startup from the first shutdown to MODE 5 occurring after September 8, 2000, but no later than June 1, 2001.

**ATTACHMENT THREE**

**RETYPE TECHNICAL SPECIFICATION PAGE 3.5-5**

**SURVEILLANCE REQUIREMENTS (continued)**

SURVEILLANCE		FREQUENCY												
SR 3.5.2.5	Verify each ECCS 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 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	18 months												
SR 3.5.2.7	<p>Verify, for each ECCS throttle valve listed below, each mechanical position stop is in the correct position.</p> <p style="text-align: center;"><u>Valve Number</u></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td>EMV0095</td> <td>EMV0107</td> <td>EMV0089</td> </tr> <tr> <td>EMV0096</td> <td>EMV0108</td> <td>EMV0090</td> </tr> <tr> <td>EMV0097</td> <td>EMV0109</td> <td>EMV0091</td> </tr> <tr> <td>EMV0098</td> <td>EMV0110</td> <td>EMV0092</td> </tr> </table>	EMV0095	EMV0107	EMV0089	EMV0096	EMV0108	EMV0090	EMV0097	EMV0109	EMV0091	EMV0098	EMV0110	EMV0092	18 months
EMV0095	EMV0107	EMV0089												
EMV0096	EMV0108	EMV0090												
EMV0097	EMV0109	EMV0091												
EMV0098	EMV0110	EMV0092												
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	18 months												

\* Verification of the automatic closure function of BNHV8812A shall be performed prior to startup from the first shutdown to MODE 5 occurring after September 8, 2000, but no later than June 1, 2001.