AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

July 9, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

ULNRC-05026

Ameren UE

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED-WATER REACTORS"

Ref: **1.** ULNRC-04884, dated August 8, 2003
2. ULNRC-04966, dated March 25, 2004
2. NRC letter to Mr. G. L. Randolph, dated April 26, 2004

References 1 and 2 transmitted the Callaway Plant response to Nuclear Regulatory Commission (NRC) Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" dated June 9, 2003. During the review of the responses, NRC developed a request for additional information (RAI) that was transmitted by Reference 3. Attachment II to this letter provides the additional information in response to the NRC questions contained in the RAI request.

In addition, AmerenUE is revising its response to Bulletin 2003-01 contained in reference 1. In response item 2, bullet 3, it is stated that Callaway does not plan to remove the secondary shield wall radiation barrier doors. During Refuel 13 it was decided that these doors should be removed as an interim compensatory measure until engineering can complete an evaluation to determine the impact the doors have on blocking containment drainage paths. Depending on the evaluation conclusions, the secondary shield wall radiation barrier doors may be reinstalled.

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If you have any questions regarding this submittal, please contact me at (573) 676-8659 or Mr. Dave Shafer, Superintendent – Licensing at (314) 554-3104.

Sincerely,

Keith D. Young
Manager - Regulatory Affairs

Attachments: I – Affidavit
II - RAI Responses
III- List of Commitments

Enclosure

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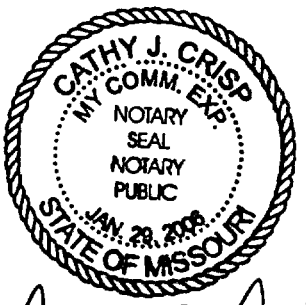

STATE OF MISSOURI)
) S S
COUNTY OF CALLAWAY)

Cathy J Crisp
Notary Public
State of Missouri Expiration 1-29-06

Keith D. Young, of lawful age, being first duly sworn upon oath says that he is Manager, Regulatory Affairs for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Keith D. Young
Keith D. Young
Manager, Regulatory Affairs

SUBSCRIBED and sworn to before me this 8th day of July, 2004.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED TO BULLETIN 2003-01, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED WATER REACTORS"

By letters dated August 8, 2003 and March 25, 2004 Union Electric Company (AmerenUE) submitted the responses for Callaway Plant to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors [PWRs]," dated July 9, 2003. The NRC issued a request for additional information (RAI) by letter dated April 26, 2004. Below are the RAIs from that letter followed by AmerenUE's responses:

1. The Westinghouse Owners Group (WOG) has developed operational guidance in response to Bulletin 2003-01 for Westinghouse and Combustion Engineering (CE)-type PWRs. For Callaway, the response stated that the licensee will consider plant specific procedural modifications that would delay the switchover to containment sump recirculation after the WOG program has been completed. Please provide a discussion of the WOG recommended compensatory measures that have been or will be implemented for Callaway. Include a discussion of the evaluations or analyses performed to determine that these compensatory measures are acceptable for Callaway and provide technical justification for those WOG compensatory measures not being implemented. Also include a detailed discussion of the procedures being modified, the operator training being implemented, and the schedule for implementing these compensatory measures.

AmerenUE Response:

Westinghouse WCAP 16204, "Evaluation of Potential ERG and EPG Changes to Address NRC Bulletin 2003-01 Recommendations" was generated to provide a generic evaluation of potential changes to the Westinghouse Emergency Response Guidelines (ERGs) to address NRC Bulletin 2003-01. The potential changes to the ERGs are compensatory measures that are intended to reduce the risk of concerns identified in Bulletin 2003-01 until completing actions necessary to resolve GSI-191.

Candidate Operator Actions (COAs) Selected for Implementation

The following operator actions have been selected for implementation at Callaway pending final analysis and validation:

- **COA 1A - Operator action to secure one spray pump before recirculation alignment**

Basis for implementation: The preliminary assessment for this operator action indicated acceptability. Engineering analysis and operator training including simulator validation will be performed to ensure that this operator action is acceptable.

This candidate operator action was chosen for implementation at Callaway since it will reduce the flow rate to the sump and the pressure differential across the sump screen if excessive debris buildup on the screen does occur. Additionally, the procedure changes will yield risk benefits for Bulletin 2003-01 concerns. Emergency Operating Procedure (EOP) E-1, "Loss Of Reactor Or Secondary Coolant", will need to be revised to incorporate this action.

- **COA 5 - Refill of RWST**

Basis for implementation: The preliminary assessment for this operator action indicated acceptability. Engineering analysis and operator training including simulator validation will be performed to ensure that this operator action is acceptable.

This candidate operator action was chosen for implementation at Callaway since it would provide additional inventory for injection to containment using EOP ES-1.3, "Transfer to Cold Leg Recirculation". Starting RWST refill after transfer to recirculation is anticipated to provide an additional volume of water to be used for injection if containment sumps are not available. Additionally, new EOP ECA-1.3, "Control Room Sump Blockage Response", will be implemented to provide guidance for using the RWST water. This action will yield risk benefits for Bulletin 2003-01 concerns.

- **COA 7 - More aggressive cooldown and depressurization guidance for small break LOCA**

Basis for implementation: This operator action was chosen since it is characteristic of the current typical operation of Westinghouse plants, such as Callaway, to allow cooldown at the Technical Specification limit. Therefore, Callaway intends to credit existing training and procedural actions from procedure EOP ES-1.1, "SI Termination", as a response to this COA and does not anticipate the need for further actions to implement.

- **COA 8 - Provide guidance on symptoms and identification of containment sump blockage**

Basis for implementation: This operator action was chosen to directly address the postulated problems due to containment sump blockage and provide guidance to increase operator awareness of sump clogging indications. This will involve engineering analysis and operator training including simulator validation associated with implementation of SBCRG (Sump Blockage Control Room Guideline) by adding new procedure EOP ECA-1.3, "Control Room Sump Blockage Response", to provide indications of the sump blockage and also, with EOPs ECA-1.1, "Loss Of Emergency Coolant Recirculation", and ES-1.3, "Transfer To Cold Leg Recirculation", to provide indications to monitor for sump blockage. This additional awareness allows the operator to take designated actions once sump blockage symptoms are identified to protect the ECCS and containment spray pumps and to establish and maintain optimum ECCS flow.

- **COA 9 - Develop contingency actions to be taken in response to containment sump blockage**

Basis for implementation: The preliminary assessment for this operator action indicated acceptability. Engineering analysis and operator training including simulator validation will be performed to ensure that this operator action is acceptable.

This operator action was chosen to directly address the postulated problems due to containment sump blockage and provide explicit guidance to the operator for the appropriate response. A SBCRG (Sump Blockage Control Room Guideline) will be implemented by adding new EOP ECA-1.3, "Control Room Sump Blockage Response", which has been developed to address sump blockage that occurs in both trains where recirculation cannot be established or maintained in either train. This guidance allows the operator to take designated actions once sump blockage symptoms are identified to protect the ECCS and containment spray pumps and to establish and maintain optimum ECCS flow.

Candidate Operator Actions That Were Not Selected And Justification For Not Selecting

The following operator actions have not been designated for implementation at Callaway at this time:

- **COA 1B - Operator action to secure both spray pumps before recirculation alignment:**

Basis for not implementing: This COA was not considered due to risk since it may not be possible to accurately assess core damage within the time period associated with recirculation swapover. The preliminary assessment indicated that containment pressure and temperature may not remain below the analyzed containment pressure-temperature profile during the time delay to start the secured spray pumps.

- **COA 2 - Manually establish one train of containment sump recirculation prior to automatic recirculation swapover**

Basis for not implementing: This COA was not considered due to additional operator action that may invalidate other time critical operator actions after a postulated accident. The FSAR shows that RHR recirculation swapover may occur within approximately 13 minutes from the accident commencement and containment spray swapover may occur after approximately 25 minutes. In order for this action to be accomplished, operators would need to establish one train of the containment sump recirculation prior to the minimum FSAR swapover allowance.

- **COA 3 - Terminate one train of safety injection after recirculation alignment**

Basis for not implementing: Current Callaway licensing bases indicates adequate post-LOCA core cooling with only one train of ECCS in operation. The analysis assumes that the other redundant train is lost due to single failure of an emergency diesel generator. A single failure of the operating ECCS train after the plant operator has secured one train of ECCS would result in an interruption of ECCS flow until the operator could manually re-start the secured ECCS train. Since the current FSAR Chapter 15 analyses does not account for this potential interruption in ECCS flow, significant reanalysis and a potential licensing amendment would be required. This scenario has been analyzed in WCAP-16204 Appendix B using the RELAP5 computer code. Westinghouse has concluded that because fuel clad surface temperatures would rise very rapidly, it is expected 10CFR50.46 peak cladding temperature acceptance criterion could be exceeded. Additionally, it is not expected that sufficient time would be available for operators to perform effective mitigative actions. Based on the above discussions, Callaway has not selected COA 3 for implementation.

- **COA 4 - Early termination of one RHR pump prior to recirculation alignment**

Basis for not implementing: As described in WCAP 16204, this COA is not applicable for Westinghouse designed plants, such as Callaway.

- **COA 6 - Injection of more than one RWST volume or alternate water source bypassing RWST**

Basis for not implementing: Injection of more than one RWST volume from a refilled RWST or by bypassing the RWST will only be performed as part of the recovery actions prescribed by the SBCRG, developed to address COA-9. In the SBCRG, water from the RWST or from an alternate source is injected to the RCS to provide sufficient core cooling as indicated by RVLIS level above the core with core exit thermocouples stable or decreasing. COA-6 implies a greater scope for use of the water source, specifically, by direct injection into containment resulting in containment flooding to the elevation of the RCS loops. This scope is beyond that prescribed in the SBCRG. Therefore, COA-6 will not be selected for implementation as a separate action.

- **COA 10 - Termination of one train of HPSI prior to recirculation**

Basis for not implementing: As indicated in WCAP 16204, this COA was not chosen due to unacceptable consequences demonstrated by single failure analysis.

- **COA 11 - Prevent containment spray for small break LOCAs**

Basis for not implementing: As indicated in WCAP 16204, this COA is only applicable for plants with ice-condenser containments and will not be selected for implementation at Callaway.

Operator Training Being Implemented

Candidate Operator Action 7 has been implemented by existing procedures as discussed above.

The implementation of the remaining operator actions associated with the COA's above will require several steps. These steps include, but are not limited to:

1. Engineering evaluation of the operator action
2. Prepare EOP revision draft
3. Verification of EOP draft
4. Validation of EOP draft via simulator
5. Approval of the EOP draft for training
6. Use of the approved EOP in two Operations training cycles
7. Final implementation of EOP

The implementation of these actions will be coordinated as part of the Callaway Plant EOP upgrade to Revision 2 of the Westinghouse Emergency Response Guidelines.

Schedule of Implementation for Operator Actions

Candidate Operator Action 7 has been implemented by existing procedures as discussed above.

Implementation of the remaining candidate operator actions given above will require two operator training cycles estimated to start in November 2004 with completion in April 2005. The implementation date for all operator actions chosen and described above will be April 29, 2005 as part of the overall Callaway EOP upgrade project.

The April 29, 2005 implementation date is contingent on acceptable engineering evaluations and simulator validation for each of the candidate operator actions, excluding those for COA 7 since it has already been implemented as discussed above.

2. In the response to Bulletin 2003-01, it is stated that the licensee will be implementing operator training on indications of and responses to sump clogging. However, the response does not completely discuss the operator training to be implemented. Please provide a detailed discussion of the operating procedures to be modified, the indications of sump clogging that the operators are instructed to monitor, and the response actions the operators are instructed to take in the event of sump clogging and loss of emergency core cooling system recirculation capability.

AmerenUE Response:

In our original response, Callaway stated that no plant specific changes would be made to the Callaway Emergency Operating Procedures (EOP's) until after the Westinghouse Owners Group (WOG) evaluation had been completed. Our response to Question 1 above discusses the operator actions that will be incorporated into the EOP's based on the WOG recommendations.

Training was conducted during training cycle 2003-05 for Licensed Operator Continuing Training. This training was developed specifically to heighten awareness of the potential for recirculation sump blockage following a high energy line break in containment and the action that can be taken. A scenario was developed for the simulator focused on ECCS Degraded Recirculation. The training had four objectives:

A. Respond to a Loss of Reactor or Secondary Coolant per EOP E-1
B. Respond to an RWST Level Lo AUTO XFER per EOP ES-1.3
C. Discuss NRC Bulletin 2003-1 "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors"
D. Discuss ULNRC-04884, "Response to NRC Bulletin 2003-01"

During the scenario the operators were provided indications of degraded operating conditions on Residual Heat Removal (RHR) and Containment Spray (CS) pumps due to recirculation sump blockage. Indicators of sump blockage include, but are not limited to:

- RHR and/or CS pump indications of 1) low discharge flow, 2) low discharge pressure, and 3) amperage fluctuations.
- Recirculation sump level being low as an indication of water not entering the sumps.

The training covered that recirculation sump blockage would most likely be diagnosed while performing EOP ES-1.3, "Transfer to Cold Leg Recirculation". In EOP ES-1.3 if recirculation cannot be established or maintained the operators are direct to EOP ECA-1.1, "Loss of Emergency Coolant Recirculation".

Each class performed a desktop walk through of EOP ECA-1.1. This walkthrough went through the procedure step by step to identify the operator actions to be taken and what affect this action would have on restoring emergency core cooling system recirculation

capability. In this procedure step 28 provides guidance on adding makeup water to the Reactor Coolant System from alternate sources.

This training also covered the Operations Information Report that is currently active for Operations that discusses NRC Bulletin 2003-01 and Standing Order 03-002, which raised the RWST level to a minimum of 97%.

3. In the supplemental response to Bulletin 2003-01 dated March 25, 2004, it is stated that the sump screen inspection acceptance criteria has been modified by adding acceptable tolerances to each criterion associated with breaches in the sump screens. Please provide the technical basis for these tolerances, including how they were determined, and why they are acceptable.

AmerenUE Response:

The tolerance band +/- 1/16" for the containment sump inner screen and +/-1/8" for the containment sump middle screen, were chosen for acceptance of the screen openings based on what could reasonably be expected to discern for the as-built condition during visual inspection. These tolerances were analyzed under engineering evaluations and determined to be sufficient to assure that the containment sump screens can perform their design functions.

Middle sump screen gap tolerance

The performance of the middle screen is essentially unaffected by allowing a tolerance of +/- 1/8 inch on the screen opening sizes. The middle screen is wire cloth with nominal openings 1/2 inch square. Some of the openings are expected to be larger than the nominal size and some are expected to be less than the nominal size. The openings that are slightly larger than the nominal may allow slightly more debris to pass through, but those that are smaller will allow less debris to pass through. Assuming the size distribution of transportable debris in the flow to the sump is approximately uniform for the size range 3/8 to 5/8 inch, the fraction of debris filtered out by the middle screen will be unaffected by the allowed size distribution for the openings. Because the function of the middle screen is to reduce the debris loading on the inner screen, only the total fraction of debris removed by the middle screen is important. Therefore, the efficiency of the middle screen will be in accordance with the design basis with a nominal opening size distribution from 3/8 to 5/8 inch.

Inner sump screen gap tolerances

The basis for acceptability of the 1/16 inch gap tolerance stated in the acceptance criteria section above for the inner screen is based on the engineering evaluations that considered the downstream effects including the effect of debris on:

- Containment spray and ECCS pumps
- Containment spray nozzles
- Passages in fuel assemblies
- Throttle valves

The engineering evaluations determined that use of the 1/16 inch tolerance on the inner sump screen will not adversely impact the plant due to the downstream effects.

LIST OF COMMITMENTS

The following table identifies those actions committed to by AmerenUE in this document. Any other statements in this document are provided for information purposes and are not considered commitments. Please direct questions regarding these commitments to:.

COMMITMENT	Due Date/Event
Implementation of the following WOG candidate operator actions at the Callaway Plant as part of the overall Emergency Operating Procedure (EOP's) upgrade effort. • COA 1A - Operator action to secure one spray pump before recirculation alignment • COA 5 - Refill of RWST • COA 8 - Provide Guidance on Symptoms and Identification of CTMT sump blockage • COA 9 - Develop contingency actions to be taken in response to CTMT sump blockage	April 29, 2005