



Timothy E. Herrmann, P.E.
Site Vice President
Ameren Missouri
Callaway Energy Center
T 573.619.2155
F 573.676.4056
thermann@ameren.com

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ULNRC-06493

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

10 CFR 2.201

Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
SUPPLEMENTAL RESPONSE TO NOTICE OF VIOLATION
INSPECTION REPORT NO. 50-483/2016002**

References:

1. Letter dated August 12, 2016 from Nicholas H. Taylor, USNRC, to Fadi Diya, Union Electric Company, "Callaway Plant – NRC Integrated Inspection Report 05000483/2016002 and Notice of Violation" (ADAMS Accession Number ML16225A577)
2. ULNRC-06326, "Reply to a Notice of Violation Inspection Report No. 50-483/2016002," dated September 9, 2016 (ADAMS Accession Number ML16253A225)
3. Letter dated September 14, 2016 from Nick Taylor, USNRC, to Fadi Diya, Union Electric Company, "Callaway Plant – Response to Notice of Violation (NRC Inspection Report 05000843/2016002)" (ADAMS Accession Number ML16258A043)
4. ULNRC-06365, "Updated Response to Notice of Violation Inspection Report 50-483/2016002," dated April 27, 2017 (ADAMS Accession Number ML17117A275)
5. ULNRC-06378, "Supplemental Response to Notice of Violation Inspection Report 50-483/2016002," dated June 27, 2017 (ADAMS Accession Number ML17178A225)

On August 12, 2016, Union Electric Company (dba Ameren Missouri) received a Notice of Violation (NOV) identified for the Callaway Plant (per Reference 1). Ameren Missouri's 30-day written response to the NOV was provided in Reference 2, and the NRC's acknowledgement and review of the response to the NOV was documented in Reference 3.

In Reference 2, Ameren Missouri committed to perform an Essential Service Water (ESW) system transient analysis and identify non-conforming structural components by April 30, 2017. In addition, a supplemental response identifying actions required as a result of the transient analysis was committed to be provided by June 30, 2017.

In Reference 4, Ameren Missouri reported that, as of April 2017, the preliminary results from the ESW system transient analysis were still being finalized. It was noted that the commitment to provide a supplemental response identifying actions required as a result of the transient analysis would still be met for the originally identified due date of June 30, 2017.

In Reference 5, Ameren Missouri provided a supplemental response to the subject NOV, including identification of actions required as a result of the analyses that were performed for the ESW system. The information that was provided addressed each of the three concerns/actions that were identified as requiring further resolution in Ameren Missouri's September 9, 2016 NOV response. Of those three concerns, the first two have been resolved via cooling coil replacements for the identified heat exchangers. For the third concern, involving the completion of system transient analyses to determine what additional actions (i.e., plant design changes) are needed, it was reported that progress was being made on a conceptual design for a plant modification. It was noted that an engineering change package would be developed and that the design change(s) would be fully implemented and tested no later than completion of Refuel 23, which is now in progress at Callaway.

In 2018, significant progress was made on finalizing the design for the modification selected to resolve the ESW system pressure transient concern. In December 2018, however, a previously unanalyzed failure mode for either of the UHS cooling tower bypass valves (EFHV0065 for the "A" train and EFHV0066 for the "B" train) was recognized. It was then determined that the additional failure mode would affect the previously completed transient analysis.

The previously unanalyzed failure mode identified for the normally open EFHV0065/66 valves is that with either valve in an initially closed position, which is the case only during certain plant evolutions such as when using the ultimate heat sink (UHS) cooling tower to cool the UHS retention pond for temperature control, a failure of the valve(s) to open could occur following activation of the load sequencer in the event of a loss-of-coolant accident (LOCA) and/or a loss of offsite power (LOOP). The failure of the valve to open may be postulated to occur during the time when, following the onset of the accident/event, load shedding has already occurred and the sequencing/re-energizing of loads is ongoing, specifically when the sequencer re-energizes the motor control center that supplies the EFHV0065/66 valve operator motor.

Preliminary analysis of such a failure indicates that a pressure transient event is more severe for the affected train when the EFHV0065/66 valve is closed (i.e., failed closed) at the time of ESW pump restart in the associated train. Since the previously completed transient analysis is no longer bounding (i.e., without the additional failure mode taken into account), the original modification planned for installation in Refuel 23 will not alone be sufficient to completely resolve the nonconforming condition (in regard to Code/design margins for structural components needed to withstand the postulated ESW pressure transient). Based on this new information, an additional plant modification(s) will likely be needed to fully resolve the issue.

It should be noted that although the need for an additional plant modification(s) is likely, sufficient analysis has been performed to assess the acceptability of the plant configuration that existed going into the current plant outage as well as the configuration that will exist following the outage (i.e., following implementation of the originally planned modification during the outage). In regard to the former, a Past Operability evaluation (POPE) was performed for the time period over the last three years, which includes the time periods before and after implementation of the corrective actions taken in response to initial identification of the system pressure transient issue in early 2016 (as reported per Licensee Event Report 16-001 (and 16-001-01) and as addressed by the NOV). From the analysis performed in support of the POPE, no new or previously unrecognized inoperability was identified for the period of time before the 2016 corrective actions were taken. For the period subsequent to that, although some non-conforming conditions (i.e., reduced design margins) were identified, past Operability was confirmed to have existed for the ESW system and its loads, as well as for the UHS.

In regard to the plant configuration that will exist subsequent to the current plant outage, the originally intended modification is still being installed during the outage (as noted above), and sufficient post-modification testing will be performed during the outage to demonstrate that upon ESW actuation following a LOCA and/or LOOP, all plant components remain capable of performing their required functions, even with the EFHV0065/66 valve(s) in the closed position upon ESW pump start.

At present, there is insufficient time to precisely analyze, design and implement a revised/additional modification to fully restore design margins prior to the completion of Refuel 23. However, in light of the improved pressure transient mitigation capability afforded by the modification being installed during the outage, a basis exists to enable completion of an operability determination with the originally designed modification installed. The ESW system will thus be considered operable but degraded or non-conforming when the plant is returned to operation at the end of Refuel 23. The justification for operability will be documented in a Prompt Operability Determination in accordance with NRC-accepted guidance (IMC 0326).

The additional modification(s) for restoring the ESW system and/or affected components to their intended design (i.e., with all design margins fully restored) will be implemented and tested no later than completion of Refuel 24 (Fall 2020).

None of the information in this supplemental response is proprietary. Further, this letter does not contain new commitments.

If there are any questions concerning this letter, please contact Mr. Eric Olson, Director, Engineering Design & Projects at (573) 676-8280.

Sincerely,

A handwritten signature in black ink, appearing to read 'T.E.H.', with a long horizontal flourish extending to the right.

T.E. Herrmann
Site Vice President



cc: Mr. Scott A. Morris
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. L. John Klos
Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O9E3
Washington, DC 20555-0001

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