



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

September 9, 2016

ULNRC-06326

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  
REPLY TO A NOTICE OF VIOLATION  
INSPECTION REPORT NO. 50-483/2016002**

This letter provides Ameren Missouri's response to the Notice of Violation identified for the Callaway Plant in NRC's letter dated August 12, 2016, "Callaway Plant - NRC Integrated Inspection report 05000483/2016002 and Notice of Violation," from Nicholas H. Taylor to Fadi Diya. The response to the violation is presented in the attachment to this letter.

None of the material in the response is considered proprietary.

This letter does not contain new commitments.

Please contact me for any questions you may have or for any additional information you may require in regards to this response.

Sincerely,

T. E. Herrmann  
Site Vice President

Attachment 1: Response to Violation

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September 9, 2016  
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cc: Mr. Kriss M. Kennedy  
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 O8H4  
Washington, DC 20555-0001

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Mr. Jay Silberg (Pillsbury Winthrop Shaw Pittman LLP)  
Missouri Public Service Commission

### **Statement of Violation**

During an NRC inspection conducted for the Callaway Plant from June 6, 2016 to June 30, 2016, a violation of NRC requirements was identified. The violation was documented in the Notice of Violation provided as Enclosure 1 to the NRC's letter "Callaway Plant - NRC Integrated Inspection report 05000483/2016002 and Notice of Violation," dated August 12, 2016. The violation was identified as follows:

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that conditions adverse to quality are promptly identified and corrected.

Contrary to the above, from November 2010 through June 2016, the licensee failed to promptly correct a condition adverse to quality. Specifically, the licensee failed to adequately resolve water hammer and corrosion issues which were previously identified by the NRC as non-cited violation 05000483/2010006-01. The failure to resolve these issues resulted in subsequent safety-related equipment failures.

This violation is associated with a Green Significance Determination Process finding.

### **Reason for the Violation**

Callaway staff and management involved in the water hammer and corrosion issues associated with the Essential Service Water (ESW) system did not recognize the aggregate risk presented by these issues and, in some cases, accepted symptoms of system degradation as part of normal operations. Management did not effectively leverage the Corrective Action Program to drive timely resolution of the equipment issues. Decisions surrounding priority and resource allocation to address corrosion issues did not reflect technical conservatism and resulted in continuing degradation rather than timely resolution.

### **Corrective Steps Taken and Results Achieved:**

Corrective actions that have been completed to date, including results achieved (as applicable), are as follows:

- Repairs or cooling coil replacements were completed on affected ESW-supplied copper-nickel room coolers and containment air coolers<sup>1</sup>. Specifically, cooling coil replacements were completed on three ESW-supplied copper-nickel room coolers: 'A' Safety Injection (SI) Pump

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<sup>1</sup> Affected ESW-supplied components include the: 'A' and 'B' Safety Injection (SI) Pump Room Coolers (SGL09A/B), 'A' and 'B' Residual Heat Removal (RHR) Pump Room Coolers (SGL10A/B), 'A' Centrifugal Charging Pump (CCP) Room Cooler (SGL12A), 'A' Containment Spray Pump Room Cooler (SGL13A), 'B' Motor Driven Auxiliary Feedwater Pump (MDAFP) Room Cooler (SGF02B), and 'B' and 'C' Containment Air Coolers (SGN01B/C). Prior to Refuel Outage(RF) 21 cooling coil replacements were completed for the 'A' Motor Driven Auxiliary Feedwater Pump Room Cooler (SGF02A), the 'A' and 'B' Component Cooling Water Room Coolers (SGL11A&B), the 'A' and 'B' Electrical Penetration Room Coolers (SGL15A&B), and the 'A' Spent Fuel Pool Cooling Pump Room Cooler (SGG04A).

Room Cooler (SGL09A), 'A' Centrifugal Charging Pump (CCP) Room Cooler (SGL12A), and 'B' Motor Driven Auxiliary Feedwater Pump (MDAFP) Room Cooler (SGF02B). Callaway entered Cycle 22 of operation with no corrosion-related ESW leakage. An evaluation of the susceptibility to corrosion-induced leakage is documented in a Prompt Operability Determination which concluded that the ESW System is Operable. The containment air cooler tube structural integrity has been evaluated as acceptable until Refuel Outage 25, based on the observed degradation mechanism and available margin.

- More robust gaskets were installed at locations that experienced damage during Engineered Safety Features Actuation System (ESFAS) tests, as well as at locations included by an extent of condition review<sup>2</sup>.
- A test simulating a Loss of Offsite Power (LOOP) was conducted on the 'B' train of the ESW system. The test demonstrated that the system and components are capable of withstanding pressure transients representative of an actual event. The test results and an evaluation of differences between the test and the most limiting pressure transient are documented in a Prompt Operability Determination which concluded that the ESW System is Operable.
- A thorough Extent of Condition review was performed. As part of this Extent of Condition review, prior NRC findings dating back to 2010 against 10 CFR Part 50 Appendix B Criterion XVI were reviewed to verify that compliance has been restored. Additionally, open "Long Term Corrective Actions" and recurring adverse conditions related to high risk significant systems were reviewed to confirm compliance with the station's Quality Assurance Program. No additional adverse conditions were identified.
- The station performed upper tier cause evaluations for Condition Report (CR) 201507734, "CAP Behaviors and Leadership Oversight," and CR 201506340, "AP-913 Consequential Failure Events Negative Trend." These evaluations focused significantly on organizational behaviors and issues. Specifically, actions from CR 201507734 address the Corrective Action Program as a foundational element, including behaviors and accountability that relate to timely resolution of Conditions Adverse to Quality. Actions from CR 201506340 address behaviors related to risk recognition, technical advocacy, and proactive resolution of equipment issues including assignment of priorities and resources. All corrective actions associated with these evaluations have been completed, and the station is in full compliance with Criterion XVI of 10 CFR Part 50, Appendix B.

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<sup>2</sup> Robust replacement gaskets were installed at the 'A' and 'B' Control Room Air Conditioning Unit (SGK04A/B) inlets and outlets, 'A' and 'B' Class 1E Air Conditioning Unit (SGK05A/B) inlets and outlets, and the 'B' CCW Room Cooler (SGL11B) header.

**Corrective Steps That Will Be Taken:**

Corrective steps remaining for the water hammer and corrosion issues cited in the Notice of Violation are as follows:

- Replace remaining safety-related ESW-supplied copper-nickel room cooler coils by the end of Refueling Outage 22 (Fall 2017).<sup>3</sup>
- Replace containment air cooler coils, with a design to enhance corrosion resistance of the coils, by the end of Refueling Outage 25 (Spring 2022).
- Develop the ESW System Transient Design Basis for a limiting water column separation and collapse pressure transient. This will involve a transient analysis to determine pressures and dynamic forces experienced by components in the ESW system during such a limiting transient, as well as a comparison of peak momentary pressures and forces to design requirements. Any nonconforming components identified from the analysis will be documented and resolved through the Corrective Action Program. This analysis of the piping, hangers, and major components will be complete by April 30, 2017.

**Date when Full Compliance will be Achieved:**

Corrective actions to address the programmatic shortfalls are complete. The station is in full compliance with 10 CFR Part 50, Appendix B, Criterion XVI.

ESW corrosion and pressure transient issues requiring further resolution are as follows:

- Corrosion issues affecting safety-related ESW-supplied copper-nickel room coolers will be resolved through room cooler coil replacements to be completed by the end of Refueling Outage 22 (Fall 2017).
- Corrosion issues affecting containment air coolers will be resolved by replacing the coils with a design to enhance corrosion resistance of the coils. Replacement of the coils in all four containment air coolers will be completed by the end of Refueling Outage 25 (Spring 2022).
- The ESW System transient analysis and identification of non-conforming structural components (piping, hangers, and major components) will be completed by April 30, 2017. A supplemental response identifying actions required as a result of the analysis will be provided by June 30, 2017.

The above actions will be tracked to completion by the Corrective Action Program.

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<sup>3</sup> Room coolers to be replaced by the end of Refueling Outage 22 (Fall 2017) include: 'B' Safety Injection (SI) Pump Room Cooler (SGL09B), 'A' and 'B' Residual Heat Removal (RHR) Pump Room Coolers (SGL10A/B), 'B' Centrifugal Charging Pump (CCP) Room Cooler (SGL12B), 'A' and 'B' Containment Spray Pump Room Coolers (SGL13A/B), and 'B' Spent Fuel Pool (SFP) Room Cooler (SGG04B).