UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-8064

June 22, 2001

EA-01-130

Garry L. Randolph, Senior Vice
President and Chief Nuclear Officer
Union Electric Company
P.O. Box 620
Fulton, Missouri 65251

SUBJECT: NRC SPECIAL INSPECTION REPORT 50-483/01-09
PRELIMINARY WHITE FINDING - CALLAWAY PLANT

Dear Mr. Randolph:

On June 4, 2001, the NRC completed an inspection at your Callaway Plant. The enclosed report documents the inspection findings which were discussed on June 4, 2001, with you and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

This report discusses an issue that appears to have low to moderate safety significance. As described in Section 1R22 of this report, this issue was assessed using the applicable significance determination process as a potentially safety significant finding that was preliminarily determined to be White, i.e., an issue with some increased importance to safety, which may require additional NRC inspection. The issue has a low to moderate safety significance because a train of essential service water was rendered inoperable for approximately 132 hours. If a loss of offsite power had occurred while a train of essential service water was inoperable, the Train B safety systems supported by essential service water, including an emergency diesel generator, would not have been available to perform their safety function.

Technical Specification 3.7.8.B specified an allowed outage time of 72 hours with the plant in Mode 1, 2, 3, or 4. As a result of a 20-foot section of reinforced tygon hose falling into the suction bay of essential service water Pump B, the pump was inoperable for approximately 132 hours while the plant operated in Mode 1 between February 9-15, 2001. Failing to comply with Technical Specification 3.7.8.B is an apparent violation of NRC requirements and is being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's website at http://www.nrc.gov/OE.

Before the NRC makes a final decision on this matter, we are providing you an opportunity to request a Regulatory Conference where you would be able to provide your perspectives on the significance of the finding, the basis for your position, and whether you agree with the apparent violation. If you choose to request a Regulatory Conference, we encourage you to submit your evaluation and any differences with the NRC evaluation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a conference is held, it will be open for public observation. The NRC will also issue a press release to announce the conference.

Please contact Mr. William D. Johnson at (817) 860-8148 within 7 days of the date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for these inspection findings at this time. In addition, please be advised that the number and characterization of the apparent violation described in the enclosed inspection report may change as a result of further NRC review.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

***/RA/***

Ken E. Brockman, Director
Division of Reactor Projects

Docket: 50-483
License: NPF-30

Enclosure:

NRC Inspection Report
50-483/01-09

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| RIV:SRI:DRP/B | SRA:DRS | C:DRP/B | | |
|---|---|---|---|---|
| VGGaddy | KMKennedy | WDJohnson | GFSanborn | KEBrockman |
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| 6/14/01 | 6/14/01 | 6/14/01 | 6/18/01 | 6/22/01 |

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

| | |
|---|---|
| Docket: | 50-483 |
| License: | NPF-30 |
| Report No.: | 50-483/01-09 |
| Licensee: | Union Electric Company |
| Facility: | Callaway Plant |
| Location: | Junction Highway CC and Highway O<br>Fulton, Missouri |
| Dates: | May 31 through June 4, 2001 |
| Inspector: | V. G. Gaddy, Senior Resident Inspector |
| Approved By: | W. D. Johnson, Chief, Project Branch B |

ATTACHMENT: Supplemental Information

SUMMARY OF FINDINGS

Callaway Plant
NRC Inspection Report 50-483/01-09

IR 05000483-01-09; on 05/31-06/04/2001; Union Electric Co; Callaway Plant. Special Report; Surveillance Testing. One preliminary White finding.

This inspection was conducted by a resident inspector and documents the results surrounding the inoperability of essential service water Pump B. The inspection identified one finding that is an apparent violation of NRC requirements. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609 "Significance Determination Process." Findings for which the significance determination process does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

**Cornerstone: Mitigating Systems**

- White. On February 9, 2001, a 20-foot section of reinforced tygon hose entered the suction bay of essential service water Pump B, rendering the pump inoperable for approximately 132 hours while the plant operated in Mode 1. Technical Specification 3.7.8.B specified an allowed outage time of 72 hours with the plant in Mode 1, 2, 3, or 4. This is an apparent violation of Technical Specification 3.7.8.B.

  This finding had greater than minor significance because it had an actual impact on safety, in that a train of essential service water (mitigating system) was inoperable for approximately 132 hours. It has been preliminarily determined to have low to moderate safety significance (White) using the significance determination process worksheet for loss of offsite power. If a loss of offsite power had occurred while the train of essential service water was inoperable, the Train B safety systems supported by essential service water, including an emergency diesel generator, would not have been available to perform their intended functions to mitigate the consequences of the loss of offsite power event. This violation was entered into the licensee's corrective action program as Suggestion-Occurrence-Solution Report 01-0515.

Report Details

## 1. REACTOR SAFETY
**Cornerstones: Mitigating Systems, Barrier Integrity**

1R22 Surveillance Testing (71111.22)

(Closed) Unresolved Item 50-483/01-02-02: Inoperability of Essential Service Water Pump B

The unresolved item was determined to be an apparent violation. It has been preliminarily determined to have low to moderate safety significance (White).

This issue was previously discussed in NRC Inspection Report 50-483/01-02 and involved the inoperability of essential service water Pump B in excess of the Technical Specification allowed outage time of 72 hours. The pump was inoperable for approximately 132 hours. The pump became inoperable on February 9 when a 20-foot section of reinforced tygon hose entered the pump's suction bay. The hose remained undetected in the suction bay until February 14 when the pump was started as directed by Surveillance Procedure OSP-SA-0017A, "Train A SIS/CSAS Slave Relay Test." Following the start at 8:51 a.m., the pump failed to achieve rated flow and discharge pressure.

The pump was secured and inspected by maintenance and engineering personnel. The pump was restarted and failed to achieve flow and discharge pressure. Normal discharge pressure and discharge flow were approximately 140 psi and 7 Mlbm/hr, respectively. Actual discharge pressure and discharge flow were approximately 80 psi and 4 Mlbm/hr, respectively. The actual discharge pressure and discharge flow were insufficient for the pump to perform its safety function. Additionally, pump vibration was excessive. Normal vibration measured at the motor was approximately 0.1 inches/second. Actual vibration at the motor was approximately 0.5 inches/second. The inservice testing required action level for motor vibration was 0.5 inches/second. The pump was declared inoperable as of 8:51 a.m.

A diver was dispatched to inspect the suction bay of the pump. The diver discovered the 20-foot section of reinforced tygon hose wrapped around the rotor assembly in the first stage impeller of the pump casing, blocking a portion of the pump's suction path, preventing the pump from performing its safety function. The tygon hose was removed and the pump was restored to an operable status on February 15.

The Technical Specification allowed outage time for an inoperable essential service water pump was 72 hours with the plant in Modes 1, 2, 3, or 4. The tygon hose in the suction bay of the pump caused the pump to be inoperable from February 9-15 (approximately 132 hours) with the plant in Mode 1. Exceeding the allowed outage time of Technical Specification 3.7.8.B for essential service water Pump B was an apparent violation (AV 50-483/01-09-01). This apparent violation is in the licensee's corrective action program as Suggestion-Occurrence-Solution Report 01-0515.

The inspector evaluated this issue using the significance determination process. The inoperability of essential service water Pump B was determined to be more than minor because a safety train was not available to perform its function. This issue also affected the operability, availability, and function of a train of mitigating system equipment.

Significance Determination Process Phase 1 Analysis

The inoperability of essential service water Pump B resulted in degradation in the mitigation system and containment barrier cornerstones. Specifically, the essential service water system provided cooling water to the following systems:

- Pump room coolers for emergency core cooling, containment spray, auxiliary feedwater, component cooling water, and spent fuel pool systems
- Diesel generator coolers
- Component cooling water heat exchangers
- Containment fan cooler units
- Class 1E switchgear rooms and control room air conditioning units

Since the finding resulted in the degradation of two areas, mitigating systems and containment barriers, a Phase 2 significance determination process analysis was performed. In addition, Question 3 of the Phase 1 worksheet for mitigation systems asks "Does the finding represent an actual loss of safety function of a single train, for greater than its Technical Specification Allowed Outage Time?" Since the Technical Specification allowed outage time for the essential service water pump was 72 hours, and the pump was inoperable for approximately 132 hours, a Phase 2 significance determination process analysis was required.

Significance Determination Process Phase 2 Analysis

The Risk-Informed Inspection Notebook for Callaway Plant, Unit 1, Revision 0, January 24, 2001, was utilized for the Phase 2 evaluation of the inoperable essential service water pump. The following steps and the associated findings are listed below:

- Select or define the applicable initiating event scenarios:

  An error was identified in Table 2, "Initiators and System Dependency for Callaway Nuclear Generating Station, Unit 1," of the Risk-Informed Inspection Notebook. Table 2 indicated that, for conditions affecting the essential service water system, only the loss of service water initiating event should be evaluated. However, since the essential service water system is a support system for numerous safety-related systems, Table 2 should indicate that all initiating event scenarios will be analyzed. As a result, all initiating events were evaluated.

- Estimate the likelihood of scenario initiating events and conditions:

  The inoperability of the essential service water pump existed for approximately 132 hours. As a result, all scenarios were evaluated using an exposure time of 3 to 30 days. After completing the significance determination process worksheets, the inspector determined that the worst case scenario involved the loss of offsite power initiating event. The Estimated Likelihood Rating for loss of offsite power was determined to be C for Table 1, "Categories of Initiating Events for Callaway Nuclear Generating Station, Unit 1."

- Estimate the remaining mitigation capability:

  Using the significance determination process worksheet for loss of offsite power (Table 3.7), Sequence 6, Loss of Offsite Power (LOOP) - Emergency AC Power (EAC) - Recovery of AC Power in less than 5 hours (REC5), was determined to be the worst case sequence. The following mitigation capability rating was assigned for each of these terms:

  EAC - 2 (one diesel generator unavailable due to essential service water Pump B being inoperable)

  REC5 - 1

No credit was given for the recovery of the failed train. As a result, the total mitigation capability rating for Sequence 6 was determined to be 3.

- Estimate the risk significance of the inspection finding:

  Table 4, "Risk Significance Estimation Matrix," was entered with an Initiating Event Likelihood of C and a Remaining Mitigation Capability Rating of 3. The color for Cell C3 was determined to be White. The remaining sequences for the loss of offsite power, and all other worksheets, resulted in Green findings.

As a result of the White finding in the Phase 2 evaluation, a Phase 3 evaluation was performed.

Significance Determination Process Phase 3 Analysis

A Region IV senior reactor analyst performed a quantitative and qualitative risk assessment of the inoperability of essential service water Pump B for approximately 132 hours. The following information was used for the quantitative risk assessment:

Core Damage Frequency (CDF) (baseline including maintenance) = 2.45E-5/yr

Risk Achievement Worth (RAW) for essential service water Pump B fail to run = 6.39

Total time essential service water Pump B out of service = 132.3 hours

The change to CDF is given by:

delta CDF = (baseline CDF*RAW - baseline CDF) * duration of condition

delta CDF = (2.45E-5/yr x 6.39 - 2.45E-5/yr) * 132.3 hours * 1yr/8760 hours

delta CDF = 2E-6/yr

This represents a White finding.

The senior reactor analyst performed a qualitative assessment of the effects of external initiating events on the risk assessment using insights from the licensee's Individual Plant Evaluation of External Events. The analyst did not identify any external initiating events that would result in a significant increase in the change in CDF resulting from this condition. In addition, the analyst reviewed Manual Chapter 0609, Appendix H, "Containment Integrity SDP," to determine if the inoperability of essential service water Pump B had an impact on large early release frequency. The analyst found that, for a large, dry containment, the condition had a negligible impact on large early release frequency.

Using their probably risk assessment model, the licensee evaluated the risk associated with the inoperability of essential service water Pump B and determined that the change in CDF (delta CDF) resulting from this condition was 2.32E-6.

Conclusion

This apparent violation of Technical Specification 3.7.8.B was preliminarily determined to have low to moderate safety significance (White).

4OA6 Management Meetings

Exit Meeting Summary

The resident inspector presented the results of this special inspection to Mr. Garry Randolph and other members of licensee management on June 4, 2001.

The inspector asked the licensee whether any materials examined during the inspection should be considered propriety. No propriety information was identified.

## KEY POINTS OF CONTACT

Licensee

K. G. Connelly, PRA Engineer
J. V. Laux, Manager Quality Assurance
G. L. Randolph, Senior Vice President and Chief Nuclear Officer
M. A. Reidmeyer, Regional Regulatory Affairs Supervisor
D. E. Shafer, Superintendent, Licensing
W. A. Witt, Manager, Callaway Plant

## ITEMS OPENED AND CLOSED

Opened

| | | |
|---|---|---|
| 50-483/01-09-01 | AV | Essential service water pump inoperable for greater than the Technical Specification allowed outage time (Section 1R22) |

Closed

| | | |
|---|---|---|
| 50-483/01-02-02 | URI | Inoperable essential service water pump (Section 1R22) |