AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

August 30, 2007

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

ULNRC05435

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Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2007-003-00
1 OTDT Channel Inoperable for greater than Tech Spec allowable time

The enclosed licensee event report is submitted in accordance with 10CFR50.73 to report one Over Temperature Delta Temperature (OTDT) protection channel being inoperable for greater than the Technical Specification allowed time.

This letter does not contain new commitments.

Sincerely,

Fadi M. Diya
Plant Director

FMD/CSP/slk

Enclosure

IE22
NRR

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NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

1 OTDT channel inoperable for greater than TS allowable time

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	09	2007	2007	- 003 -	00	08	30	2007	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
T. B. Elwood, Supervising Engineer, Regulatory Affairs and Licensing	573 676 6479

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

During calibration of Reactor Coolant System (RCS) Temperature Loop 3 on June 30, 2007, problems were identified which called into question the validity of a previous calibration on Loop 2. On June 30/July 1, 2007, Reactor Coolant System (RCS) Temperature Loop 2 calibration surveillance was performed to verify the results from the last loop calibration performed on June 9, 2007. It was determined that the Lower Flux input to the Over Temperature Delta Temperature (OTDT) setpoint circuit was Out of Tolerance (OOT). This condition was determined to have been sufficient to cause the OTDT setpoint to exceed its Technical Specification Allowable Value. The Loop 2 OTDT setpoint was inoperable for 21 days. The Temperature Loop 2 setpoint was returned to the correct value on July 1, 2007.

When RCS Temperature Loop 2 was calibrated on June 9, 2007 a wrong test configuration was used when making connections to simulate the Lower Flux input to the flux imbalance penalty circuitry in the Westinghouse 7300 system. The negative power supply lead must be grounded to properly simulate the input from the Nuclear Instrumentation System (NIS) cabinets; during the June 9, 2007 calibration this was not established. The calibration was performed on July 1, 2007 using the proper configuration. The loop calibration procedures have been revised to ensure the basis for this ground connection is clear.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

10CFR50.73(a)(2)(i)(B) – Any operation or condition which was prohibited by the plant's Technical Specifications

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

MODE 1 at approximately 100 percent power.

C. STATUS OF STRUCTURES, SYSTEMS OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

At the time the condition was discovered, a Reactor Coolant System Loop 2 Cold Leg Temperature Element (Temperature Loop 2) was out of service per Technical Specification 3.3.1 Condition E. The three other Temperature Loops were in service.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On June 30/July 1, 2007, Temperature Loop 2 calibration surveillance Job 07507752 was performed to verify the results from the last loop calibration performed on June 9, 2007 by Job 06521262. Problems had been identified during a Loop 3 calibration on June 30, 2007, that brought into question the validity of the previous Loop 2 results. Job 07507752 determined that the Lower Flux input to the Over Temperature Delta Temperature (OTDT) setpoint circuit was Out of Tolerance (OOT). This condition was determined to have been sufficient to cause the OTDT setpoint to exceed its Technical Specification (TS) defined Allowable Value. The Loop 2 OTDT setpoint was inoperable for 21 days without the required Improved Technical Specification (ITS) 3.3.1 actions being taken. The setpoint was returned to the correct value during performance of Job 07507752 on July 1, 2007.

Specifically, during performance of the Loop 3 Temperature Loop calibration surveillance, Job 07500216 on June 30, 2007, the technicians were unable to get the Lower Flux power supply on the Test Cart to energize. The Test Cart for Temperature Loop calibrations was built in-house in the early 1990s in order to consolidate the numerous pieces of test equipment into one functional unit. In this case, one of the built-in power supplies would not energize, and the technicians decided to proceed with the surveillance using an alternate power supply. Subsequently, the As-Found data for the Lower Flux input was found to be OOT. During the course of their investigation of this OOT condition, the technicians were eventually able to get the Lower Flux power supply on the Test Cart energized. They discovered that differing results were obtained depending on the power supply used, but only on the Lower Flux input, not on the Upper Flux input.

Another surveillance was being performed concurrently on the Nuclear Instrumentation System (NIS), which allowed technicians to compare Lower Flux input data obtained from the NIS surveillance with data obtained using each of the differing power supplies. This demonstrated that the correct results were obtained when using the Test Cart power supply, but not the alternate power supply. The Loop 3 surveillance was then completed with satisfactory As-Left results using the intended Lower Flux power supply on the Test Cart.

At this point, the technicians recalled that there had been previous problems with the Lower Flux power supply on the Test Cart during the recent Loop 2 calibration, and had similarly substituted an alternate power supply for the one that could not be energized. The System Engineer recalled that the Loop 2 calibration had identified an OOT on the lower flux input into the OTDT setpoint. The OOT condition had been attributed to a deficient potentiometer on the input circuit board. A decision was made to go back and verify the Loop 2 calibration results based on the power supply problems identified during the Loop 3 surveillance. The Loop 2 results from Job 07507752 were found to be OOT, apparently associated with the use of an alternate power supply during the last calibration on June 9, 2007.

TS table 3.3.1-1 specifies that, for the OTDT function, 4 channels are required to be operable in MODES 1 and 2 and that Action Condition E applies. Condition E specifies required actions to be taken for 1 inoperable channel. It does not address more than 1 inoperable channel. If more than 1 channel is inoperable or the required completion times are not met, then TS 3.0.3 applies.

The Loop 2 OTDT function of the Reactor Trip System (RTS) Instrumentation was inoperable from the time an out of tolerance condition was introduced into the circuit on June 9, 2007 until it was corrected on July 1, 2007. That was 21 days, 8 hours, which exceeds the time for inoperability allowed in TS 3.3.1 Action Condition E. Technical Specification 3.0.3 was also applicable since the provisions of Action Condition E were not met.

Loop 3 was taken out of service on June 30, 2007, at 8:05 AM for a scheduled channel operational test. Loop 3 was returned to service the same day at 10:02 PM. Loop 3 was essentially out of service for 14 hours. The duration complied with the provisions of Condition E, however, in hindsight, Loop 3 was inoperable at the same time as Loop 2. Since two loops were inoperable at the same time the provisions of Technical Specification 3.0.3 were applicable.

For purposes of this report, the discovery date is July 1, 2007, when Operations was notified of the non-conservative As-Found data for the flux input to the Loop 2 OTDT setpoint. The event date is June 9, 2007, when Loop 2 was calibrated using an alternate power supply.

E. METHOD OF DISCOVERY OF EACH COMPONENT, SYSTEM FAILURE, OR PROCEDURAL ERROR

The method of discovery of the calibration error is discussed in the above narrative and in the section describing the causes and corrective actions.

II. EVENT DRIVEN INFORMATION

A. SAFETY SYSTEMS THAT RESPONDED

Not Applicable

B. DURATION OF SAFETY SYSTEM INOPERABILITY

The Loop 2 OTDT function of the Reactor Trip System (RTS) Instrumentation was inoperable from the time an out of tolerance condition was introduced into the circuit on June 9, 2007 until it was corrected

on July 1, 2007. The Loop 2 setpoint was inoperable for 21 days 8 hours without the required ITS 3.3.1 actions being taken. This was due to the time the inoperability was discovered in relation to the time the out of tolerance condition was introduced.

Loop 3 OTDT function of the RTS Instrumentation was taken out of service on June 30, 2007, at 8:05 AM for a scheduled channel operational test. The loop was returned to service the same day at 10:02 PM. Loop 3 was essentially out of service for 14 hours. At the time Loop 3 was out of service it was not known that Loop 2 was inoperable.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.

ITS 3.3.1 "Reactor Trip System (RTS) Instrumentation" requires the RTS instrumentation for each Function in Table 3.3.1-1 to be Operable. Function 6 requires four channels of OTDT to be Operable in Modes 1 and 2. Per Note 1 for the ITS Allowable Value, the Overtemperature Delta-T function Allowable Value shall not exceed the setpoint by more than 1.23% of Delta-T span.

Based on the As-Found data obtained by Job 07507752, in procedure ISL-BB-0T421 Section 6.8 for the "Loop Response from a Negative Flux Imbalance", at a Lower Flux input of 62.5% and Upper Flux input of 42.5%, the OTDT setpoint was found to be OOT high at 8.690 VDC with a required value of 7.791 +/- 0.113. This represented an error of +8.99 %, which exceeded the maximum +1.23%. Factoring in other errors in the loop using Attachment 1 of ISL-BB-0T421, the total error could have been as high as +9.29% at this point.

To better quantify the maximum error that this misadjusted board introduced into the OTDT setpoint derivation circuit under these calibration conditions, an error analysis was performed. As noted within this analysis, the conservatism which exists within the current incore/excore relationship within this circuit (i.e., gain of circuit card BBNY0421 being 2.0 versus 1.87) was accounted for within this analysis. This evaluation concluded that the maximum error induced under these calibration conditions within the OTDT setpoint circuit as a result of this condition, and the other inaccuracies which were recorded during the performance of Job 07507752, resulted in a maximum induced error of 0.624 VDC, which corresponds to 6.24 % of the delta T span, as compared to the 1.23 % allowable value specified within the Technical Specifications. In terms of rated thermal power (RTP), this inaccuracy equates to a maximum inaccuracy of 9.36 % RTP, as compared to the allowable value of 1.85 % RTP outlined within the Technical Specifications.

Although the above resulted in a nonconservative impact on the function of the lower flux imbalance penalty circuit, this nonconservatism is bounded by the Callaway Safety Analysis. As a result, this inaccuracy was deemed to have minimal safety significance.

III. CAUSE(S) OF THE EVENT AND CORRECTIVE ACTION(S)

When RCS Temperature Loop 2 was calibrated on June 9, 2007, using an alternate power supply, a wrong test configuration was used. When making connections to simulate the Lower Flux input to the flux imbalance penalty circuitry in the Westinghouse (W) 7300 system, the negative power supply lead must be grounded to properly simulate the input from the NIS cabinets.

NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

The incorrect test configuration resulted in a recalibration on the input card, which was subsequently replaced due to erratic potentiometer performance. The test configuration problem was later discovered when similar problems were encountered during the performance of the Loop 3 calibration on June 30, 2007. Immediate actions included re-performing the Loop 2 calibration, in which the OOT was discovered and corrected; restricting use of the alternate power supplies; and writing a Job to repair the Test Cart power supply switch.

Calibration procedures had incorporated grounding steps in April 1986. In 1987, Westinghouse issued technical bulletin NSID-TB-87-07, Testing of Over Temperature Delta-T (OTDT) Flux Penalty in 7300 Process Cabinets, recommending this be done. No basis or reference to the Technical Bulletin was provided in the procedure steps to indicate that this test connection was necessary in order to properly simulate the two NIS inputs. This requirement was not covered in any type of formal training. Tribal knowledge of the technicians was not sufficient to prevent this event.

When the Test Cart was built, the required grounding for the Upper and Lower Flux power supplies (two of six on the cart) was incorporated into the Test Cart design. At that time, one of the two procedure steps directing the power supply leads to be grounded was removed, since only one ground connection was needed for the Test Cart. The step that was removed was associated with the connection of the Lower Flux power supply. The step that was left intact was associated with the Upper Flux power supply.

A failed power switch for the Lower Flux power supply on the cart was encountered during its use on June 9, 2007 and directly led to the use of an alternate power supply. Use of the alternate power supply did not incorporate or require grounding to the test cabinet. The need to have the negative test lead of the alternate power supply grounded to the cabinet was not recognized by the technicians. The internal grounding configuration of the Test Cart was not apparent.

Corrective actions include repair of the Test Cart switch. The loop calibration procedures have been revised to ensure the basis for this ground connection is clear, including a reference to the Technical Bulletin which provides a more detailed explanation. Technicians were coached on the need to ensure test equipment deficiencies are resolved in a timely manner. Information related to this grounding issue will also be incorporated into initial and continuing Instrumentation and Controls training.

IV. PREVIOUS SIMILAR EVENTS

A review of the work control system for jobs between June 1, 2004, and June 30, 2007, showed that an ungrounded power supply was not used to calibrate the OTDT functions other than the specific cases which are the subject of this Licensee Event Report.

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V. ADDITIONAL INFORMATION

The Test Cart referred to in the above text is a custom built cart used for Westinghouse 7300 Temperature Loop Calibrations. The Cart includes: 4 Decade Resistance Boxes, 4 Ungrounded Power Supplies, 2 Grounded Power Supplies, 8 Digital Mulitmeters and numerous harnessed test leads.

The system and component codes listed below are from the IEEE Standard 805-1984 and IEEE Standard 803A-1983, respectively.

System: JC, Plant Protection System

Component: CDB, Control Board