



November 13, 1992

U. S. Nuclear Regulatory Commission
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ULNRC-2724

Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
FACILITY OPERATING LICENSE NPF-30
VOLUNTARY LICENSEE EVENT REPORT 92-011-00
A LOSS OF MAIN CONTROL BOARD ANNUNCIATORS
CAUSED BY BLOWN POWER SUPPLY FUSES DURING
MAINTENANCE WAS NOT DECLARED AN ALERT DUE
TO LACK OF SYSTEM KNOWLEDGE**

The enclosed Licensee Event Report is submitted voluntarily to address the causes and corrective actions for the 10/17/92 loss of Main Control Board Annunciators for which an ALERT was not declared.

W. R. Campbell
Manager, Callaway Plant

WRC/TPS/MKD/lrj

Enclosure

cc: Distribution attached

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NRC Senior Resident Inspector

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Callaway Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 8 3	PAGE (3) 1 OF 0 7
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TITLE (4) **A Loss Of Main Control Board Annunciators Caused By Blown Power Supply Fuses During Maintenance Was Not Declared An ALERT Due To Lack Of System Knowledge**

EVENT DATE (6)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAMES	
1	0	1	7	9	2	9	2	0	1	1
1	0	1	7	9	2	9	2	0	1	1
1	0	1	7	9	2	9	2	0	1	1

OPERATING MODE (8) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more of the following) (11)				
POWER LEVEL (10): 1 0 3	20.402(b)		20.405(c)		60.731(a)(2)(iv)
	20.406(a)(1)(b)		60.36(c)(1)		60.731(a)(2)(v)
	20.406(a)(1)(b)		60.36(c)(2)		60.731(a)(2)(vi)
	20.406(a)(1)(b)		60.731(a)(2)(vii)		60.731(a)(2)(viii)(A)
	20.406(a)(1)(b)		60.731(a)(2)(viii)(B)		60.731(a)(2)(ix)
		20.406(a)(1)(v)		60.731(a)(2)(ix)	
		20.406(a)(1)(v)		60.731(a)(2)(ix)	
		20.406(a)(1)(v)		60.731(a)(2)(ix)	
		20.406(a)(1)(v)		60.731(a)(2)(ix)	
		20.406(a)(1)(v)		60.731(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME Thomas P. Sharkey, Supervising Engineer, Site Licensing		AREA CODE 3 1 4	
		NUMBER 6 7 6 - 8 3 3 5	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	1	8	J	X					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)		X NO				

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines)(16)

At 0100 CDT, on 10/17/92 during restoration from replacement of a failed power supply, all four field contact power supply output fuses blew causing all RK system Main Control Board (MCB) annunciators to become inoperable. Because only 371 of 683 (MCB) annunciators lit, the licensed operators incorrectly believed that those annunciators which had remained dark were operable. Therefore, an ALERT was not declared as required by plant Emergency Action Levels. The fuses were successfully replaced at 0156. The plant was in Mode 1 - Power Operations at 100 percent reactor power at the time of the event.

The cause of the initial failure of the power supply was a short in the power transformer internal to the field power supply. During restoration following replacement of this power supply, a short occurred while removing jumpers, causing the fuses to blow. The operators failed to declare an ALERT because inadequate knowledge of the RK system led them to believe that some annunciators remained operable.

Training will be provided to personnel on the operation of the annunciator system. Actions to be taken in case of annunciator failures have been detailed in procedures. A modification will be evaluated to improve the reliability of field power supplies and provide detection of power supply failures to the operating crews.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Callaway Plant Unit 1	0500048392	92	011	00	02 OF 07

TL / If more space is required, use additional NRC Form 365A (11/72)

BASIS FOR A VOLUNTARY REPORT:

On 10/19/92, at approximately 1240 CDT, utility engineers reviewing plant operation data from 10/16/92 and 10/17/92, determined that, between 0100 and 0156 on 10/17/92, all of the Main Control Board (MCB) RK system annunciators⁽¹⁾ were inoperable. A phone call was made at 1320, on 10/19/92, in accordance with 10CFR50.72(b)(v) to report an event that resulted in a major loss of emergency assessment capability. This report is being made voluntarily to address root cause and corrective action for the loss of annunciators and the failure to declare an ALERT.

PLANT CONDITIONS AT TIME OF EVENT:

Mode 1 - Power Operations

100 percent reactor power

DESCRIPTION OF EVENT:

At 1840, on 10/16/92, an annunciator (RK system) field contact power supply⁽²⁾ failed, causing approximately 76 MCB annunciator windows to be lit. At 0058, on 10/17/92, the power supply was replaced and all applicable annunciators cleared.

At 0100, during restoration from the power supply replacement, all four field contact power supply output fuses⁽³⁾ blew, causing all RK system MCB annunciators to become inoperable. This resulted in 371 of 683 MCB annunciators to be lit. Although loss of all RK system annunciators is considered an ALERT under the plant's Emergency Action Levels, the licensed operators incorrectly believed that those annunciators which had remained dark were operable. The licensed operators were also not aware that all four power supply output fuses had been blown. Therefore, an ALERT was not declared on 10/17/92.

Troubleshooting by the Instrumentation and Controls (I&C) technicians revealed the four blown field power supply fuses. They were successfully replaced at 0156. Other fuses in the logic cabinets⁽⁴⁾ of the annunciator system had also failed sometime during the 0100 restoration, but were not initially discovered. Therefore, 164 of the annunciators (those with reflash capabilities) remained inoperable, although the work document was signed off as complete.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">YEAR</td> <td style="width: 10%;">SEQUENTIAL NUMBER</td> <td style="width: 10%;">REV NO.</td> </tr> <tr> <td>92</td> <td>011</td> <td>00</td> </tr> </table>	YEAR	SEQUENTIAL NUMBER	REV NO.	92	011	00	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">PAGE (3)</td> <td style="width: 10%;">PAGE (3)</td> <td style="width: 10%;">PAGE (3)</td> </tr> <tr> <td>02</td> <td>OF</td> <td>07</td> </tr> </table>	PAGE (3)	PAGE (3)	PAGE (3)	02	OF	07
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Callaway Plant Unit 1	05000483														

TEXT (if more space is required, use additional NRC Form 365A's)(17)

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TEXT: If more space is required, use additional NRC Form 288A's(117)

During the day shift on 10/17/92, I&C technicians and the system engineer continued to troubleshoot what was originally believed to be individual annunciator window problems. At 1400, a logic power supply fuse was replaced, reducing the number of inoperable annunciators to 135. At 1800, an additional seven fuses in the logic power supplies were replaced. At 1937, all RK system annunciators were retested and verified operable.

ROOT CAUSE:

A. Failure to Declare an ALERT

The failure to declare an ALERT at 0100, when all RK system annunciators were lost, can be attributed to inadequate knowledge by plant personnel of how the annunciator system functions. Although the licensed operators involved with this event were aware that an ALERT should be called if all annunciators were lost, the fact that about half of the annunciators failed in an unlit state led the licensed operators to believe that those annunciators remained operable. There is no MCB indication of a total loss of RK system annunciators.

Inadequate training exists on the annunciator system for engineers and Operations Department personnel. The lack of knowledge did not allow the determination that the blown fuses resulted in a loss of all MCB annunciators.

B. Equipment Failures

The cause of the initial failure of the field power supply was a turn-to-turn short in the power transformer internal to the field power supply. An evaluation has determined that a short which occurred while removing jumpers following the power supply replacement caused the four field contact power supply fuses to blow. The logic power supply fuses were probably also blown as a result of this short.

C. Contributing Factors

Several other factors were determined to have contributed to this event.

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1. Lack of Communication.

Prior to the troubleshooting to replace the failed field power supply, there was no pre-job briefing between the operating crew and the I&C technicians, planner and engineer performing the work. In addition, the fact that all four power supplies fuses were blown was not conveyed to the licensed operators by the personnel working in the RK system cabinets located behind the MCB.

2. Supervision

There was no direct supervision of the I&C technicians during the power supply replacement. An engineer and a planner were providing technical assistance to the technicians, but their supervisory responsibilities were not clearly defined.

3. Work Controls

A caution existed in the work package to warn personnel that a loss of all MCB annunciators would require the declaration of an ALERT. However, only the planner who prepared the work request and the operating crew read the work package and were familiar with the caution noted thereon. The specific fuses that were replaced during the job performance were not noted on the work completion form.

4. Retest Considerations

No retest was specified on the work document for the field power supply replacement. The retest performed measured voltage across the field contact power supply outputs and performed a lamp test of the system. However, this did not reveal that the logic power supply fuses were blown.

5. System Design

The design of the annunciator system requires the power supplies to be connected in parallel. Thus, temporary jumpers are required whenever one of the power supplies is being replaced. The configuration also causes difficulty in troubleshooting the system, and tends to make individual logic power supply failures undetectable. This design is in part attributable to the fact that the annunciator system is non-safety related.

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CORRECTIVE ACTIONS:

A. Failure to Declare an ALERT

Training will be provided to Operations and Engineering personnel to assure a greater level of expertise on the operation of the annunciator system. Actions to be taken in case of annunciator failures have been detailed in Operations Department procedures.

B. Equipment Failures

A modification will be evaluated to improve the reliability of RK system field power supplies, improve DC power redundancy and provide detection of power supply failures to the operating crews.

C. Contributing Factors

The circumstances surrounding this event have been reviewed with the individuals involved to ensure management expectations are understood. In order to enhance future power supply replacement work practices, the following actions are being taken:

1. A guidance has been developed for retesting of RK system power supplies. This will ensure that Engineering personnel are contacted to determine the scope of retest.
2. Requirements for direct field supervision of critical maintenance activities will be clarified.
3. The requirements for pre-job briefings for critical maintenance activities will be defined and communicated to appropriate personnel.
4. Work completion documentation associated with the fuse replacement has been upgraded to document the fuses which were replaced.

SAFETY SIGNIFICANCE:

Compensatory alarming and non-alarming indications were available to the control room operators throughout the event. These included:

- Engineering Safety Features (ESF) Status Panels with alarm indication for safety-related valves, pumps, and breakers which enables the operators to assess ESF system status and performance.

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- Safety Parameter Display System (SPDS) to assist the operators to assess the onset and severity of accident conditions.
- Digital Rod Position Indication, Control Rod Group Demand Indication, Power Range Nuclear Instruments, and the automatic Reactor Protection System (RPS) to enable the operators to initiate a manual reactor trip, if required, or to be made aware of an automatic RPS actuation.
- Partial Trip Status Panel to indicate a potential or actual RPS or ESF actuation signal is present.
- Permissive/Interlock status panel for OT delta T rod stops, overpower stops, steam dump arming, and condenser availability.
- Radiological Release Information System (RRIS) and the RM-11 Radiation Monitoring panel were available to assist the operators in monitoring meteorological data and radiological monitoring systems in the case a release has occurred.
- MCB analog indications of power, pressures, temperatures, levels, flows, valve positions, etc. to assist the operators in controlling the various plant systems.
- Plant computer CRT displays and alarm typer for approximately 2,836 field input computer points.

Corrective maintenance on the annunciator system was near completion at the time of the unplanned loss of the field contact power supplies. The operators had previously undergone a crew brief of this planned maintenance and were aware of the risk of losing additional annunciators. Therefore, they had a heightened awareness of the MCB indications and a desire to maintain steady state plant conditions by avoiding any distractions or operator induced transients. Due to the loss of the annunciators, the licensed Shift Supervisor delayed the scheduled weekly testing of the main turbine to preclude any change in the plant's steady operation.

Even though the annunciator system is not safety related, the importance of the annunciators to the operators is recognized. The loss of non-safety related annunciators alone for this event did not pose a threat to the public health and safety.

PREVIOUS OCCURRENCES:

None.

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FOOTNOTES:

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

(1) System - IB, Component - ANN

(2) System - IB, Component - JX

Manufacturer - PANALARM

Model #70-IDC-2

(3) System - IB, Component - FU

(4) System - IB, Component - CAB