NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

# LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Callaway Plant Unit 1 | 0 5 0 0 0 4 8 3 | 1 OF 0 4 |

TITLE (4)
ESF Actuations Due to Spurious Radiation Monitor Signals

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | DOCKET NUMBER(S) |
| 0 3 | 1 8 | 8 6 | 8 6 | 0 0 6 | 0 0 | 0 4 | 1 7 | 8 6 | | 0 5 0 0 0 |
| | | | | | | | | | | 0 5 0 0 0 |

| OPERATING MODE (9) | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | |
|---|---|---|---|---|
| 6 | 20.402(b) | 20.405(c) | X 50.73(a)(2)(iv) | 73.71(b) |
| POWER LEVEL (10) 0 1 0 | 20.405(a)(1)(i) | 50.36(c)(1) | 50.73(a)(2)(v) | 73.71(c) |
| | 20.405(a)(1)(ii) | 50.36(c)(2) | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | 20.405(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | |
| | 20.405(a)(1)(iv) | 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | |
| | 20.405(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| John D. Blosser - Assistant Manager, Operations & Maintenance | AREA CODE 3 1 4 6 7 6 - 8 1 9 1 0 |

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |

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)


Between the dates of 3/18/86 and 4/6/86, four incidents of unplanned Engineered Safety Feature (ESF) actuations occurred with the plant in Mode 6, Refueling, and Mode 5, Cold Shutdown.

The first resulted in a Fuel Building Ventilation Isolation, Containment Purge Isolation, and Control Room Ventilation Isolation (CRVI), and was caused by ESF cabinet cleaning. An I&C technician inadvertently loosened the connector which provides a cross-train trip resulting in a single train actuation. I&C technicians have been informed of this incident and cautioned to use care during cleaning evolutions.

The other three incidents resulted in CRVIs and were caused by spurious signals generated during gas sampling evolutions. Based on a review of previous CRVIs, directions have been given to appropriate personnel to place these monitors in bypass when performing evolutions that have historically resulted in spurious signals.

Since these incidents were not caused by actual radiation levels, the public health and safety were not endangered.




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| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Callaway Plant Unit 1 | 0 5 0 0 0 4 8 3 | 8 6 | — 0 0 6 | — 0 0 | 0 2 OF 0 4 |

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Between the dates of 3/18/86 and 4/6/86, four incidents of unplanned Engineered Safety Feature (ESF) actuations occurred.

The first two incidents occurred on 3/18/86 while in Mode 6 (Refueling). The first incident resulted in an 'A' Train Fuel Building Ventilation Isolation (FBVI), Containment Purge Isolation (CPI), and Control Room Ventilation Isolation (CRVI). At the time of the incident, I&C technicians were performing scheduled cleaning in a 'B' Train ESF cabinet(1) as part of a preventative maintenance program. At 0136 CST, the 'A' Train FBVI, CPI, and CRVI occurred due to a connector loosened during the cleaning in the cabinet. The connector, discovered unlocked and loose during subsequent troubleshooting, carries a cross-train trip signal from the 'B' Train ESF cabinet to the 'A' Train ESF cabinet.

Evidence which supports the conclusion that the loose connector caused the actuation is that the computer points associated with field inputs to the ESF Actuation System did not alarm. This implies that the actuation originated internal to the ESF cabinets. Also, during troubleshooting the connector was moved from a locked to an unlocked position which resulted in an 'A' Train FBVI, CPI, and CRVI and the same alarms received during the previous 0136 actuation. This troubleshooting was performed on 3/19/86.

The ESF actuation signals were reset at 0155 on 3/18/86 after the actuation was determined to be spurious and not the result of abnormal radiation levels. After identifying the loose connector as the probable cause, all connectors were verified to be in a locked position in the ESF cabinets. To prevent recurrence, I&C technicians were cautioned to use care during cleaning evolutions and a precaution statement was added to the preventative maintenance work authorizing document.

The second incident occurred at 0253 on 3/18/86 while restoring a containment atmosphere radiation monitor(2) to service and resulted in a CPI and CRVI signal. However, when the actuation signal occurred, the safeguard line-up was already present from the previous actuation. Flow to the containment atmosphere radiation monitor had been isolated for Local Leak Rate Testing (LLRT) of containment isolation valves(3) downstream of the radiation monitor. At 0228, during restoration from the LLRT with the isolation valves still closed, the sample pump for the radiation monitor was started but automatically shut down due to a low vacuum resulting from the valves being closed.

Health Physics technicians were contacted to troubleshoot the problem, but before troubleshooting began, the CPI and CRVI initiated by the containment atmosphere radiation monitor occurred. The sample pump was restarted, the radiation monitor returned to service, and the CPI and CRVI signals were reset at 0334. Although the abnormal line-up cannot

be conclusively identified as the cause of the event, it is believed the unstable flow condition was a principle contributor.

Corrective actions include 1) a review of the CRVIs experienced at Callaway to determine if additional actions can practicably be taken to reduce the frequency of these occurrences and 2) directing Operations personnel to place radiation monitors in bypass if the monitor (including sample pump and valves) is to be placed in other than its normal configuration. Operations Department Night Orders were issued on 4/6/86 to inform the Operators to place the radiation monitors in bypass.

The third and fourth incidents occurred at 2113 on 4/1/86 and at 1330 on 4/6/86, respectively, while in Mode 5 (Cold Shutdown) and resulted in CRVIs. Each CRVI occurred when the sample pump for a Control Room HVAC (Heating, Ventilation, and Air Conditioning) radiation monitor GK-RE-05,(4) was stopped for replacement of filter media. Prior to each actuation, the filter media was replaced for the redundant Control Room HVAC radiation monitor GK-RE-04(4) without any abnormal conditi ns noted. After each actuation, I&C technicians performed troubleshooting of the monitor and returned it to service without observing any additional abnormal behavior.

The root cause of these spurious actuations is believed to be due to a fault in the vacuum sensing circuitry in the sampling line. This circuitry sends a signal to the alarm/protection circuitry to correct the output signal of the radiation detector for the density of the sample gas. It is believed a faulty vacuum transducer(5) in this circuitry resulted in a spurious signal during pressure changes in the sampling line, i.e., stopping the sample pump. The resultant spurious signal coupled with the increased sample activity, due to the decrease in vacuum and increase in gas density, could result in a signal of sufficient magnitude to initiate the ESF actuations.

Further testing required to verify the vacuum transducer as the cause of these actuations is pending receipt of a replacement transducer. The corrective action taken to prevent recurrence is to place the Control Room HVAC radiation monitor (as well as other radiation monitors that initiate protective actions) in bypass, if the monitor is to be placed in other than its normal configuration. Operations Department Night Orders were issued on 4/6/86 to implement this corrective action.

Additionally, the review conducted of previous CRVIs indicated that further preventive measures could be taken to reduce the probability of spurious CRVIs, CPIs, and FBVIs. This would involve removing the downscale trips from the radiation monitors that provide protective actions. Although unrelated to these four events, such an action would

have prevented several previously reported actuations. An evaluation of the feasibility of the elimination of the downscale trip is being conducted under Request for Resolution (RFR) 2214. It is noted that downscale alarms already exist for these radiation monitors.

These incidents did not threaten the public health and safety since the actuations were spurious and not the result of actual abnormal radiation levels.

Previous occurrences: none from these specific causes, however the review included these Callaway Licensee Event Reports concerning previous CRVIs, CPIs, and/or FBVIs: 84-003-00, 84-004-03, 84-011-00, 84-018-00, 84-019-00, 84-025-01, 84-027-00, 84-032-00, 84-036-00, 84-062-00, 84-063-00, 84-067-00, 85-003-01, 85-004-01, 85-006-00, 85-008-00, 85-014-00, 85-023-00, 85-050-00, 86-001-00, and 86-005-00.

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Footnotes

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

(1) System - JE, Component - CAB

(2) System - IK, Component - RE

(3) System - IK, Component - ISV

(4) System - IL, Component - RE

(5) System - IL, Component - TD

UNION ELECTRIC COMPANY
Callaway Plant

April 17, 1986

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

ULNRC-1297

Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 86-006-00
ESF ACTUATIONS DUE TO SPURIOUS RADIATION MONITOR SIGNALS

The enclosed Licensee Event Report is submitted pursuant to 10 CFR 50.73(a)(2)(iv) concerning several instances of Engineered Safety Features Actuations initiated by spurious signals from radiation monitors.

G L Randolph
G. L. Randolph
Manager, Callaway Plant

JDB/TPS/JWK/drs
Enclosure

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