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) |
|---|---|---|
| Clinton Power Station | 0 5 0 0 0 4 6 1 | 1 OF 0 4 |

TITLE (4) Inadequate Access and Visibility During Radiation Detector Assembly Result in Damaged Detector Signal Cable and Standby Gas Treatment System Auto-Start

| 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) |
| | | | | | | | | | NONE | 0 5 0 0 0 |
| 0 2 | 2 9 | 8 8 | 8 8 | 0 0 6 | 0 0 | 0 3 | 2 5 | 8 8 | | 0 5 0 0 0 |

| OPERATING MODE (9) | 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 0 | 20.402(b) | 20.405(c) | X 50.73(a)(2)(iv) | 73.71(b) |
| | | 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 |
|---|---|
| | AREA CODE |
| T. J. Camilleri, Assistant Manager - Plant Maintenance, X3204 | 2 1 7 9 3 5 - 1 8 8 1 |

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 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X | I L | M O N | E 0 7 0 | Y | | | | | | | |
| | | | | | | | | | | | |

| 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)


## ABSTRACT

On February 29, 1988, with the plant in Mode 1 (POWER OPERATION), at 100% reactor power, a Division II containment exhaust process radiation monitor (PRM) tripped to the low-fail condition resulting in an auto-start of both Standby Gas Treatment System trains and isolation of the continuous containment purge, fuel building ventilation, and process sampling systems. The initiations occurred while the remaining Division II containment exhaust PRM was in the trip condition for maintenance. Troubleshooting of the PRM identified a damaged detector signal cable. The cause of the event is attributed to a personnel error due to inadequate accessibility and visibility of the detector during detector assembly. These conditions, combined with the detector's designed construction which makes correct assembly indiscernible even under ideal conditions, led to an improper assembly of the detector. Corrective actions include, redesigned scaffolding for improved access, training of technicians to improve installation methods, and issuance of new procedures that will reduce frequency of detector assembly activities by eliminating the detector removal requirement during calibration. Investigation of detector failure frequency at Clinton Power Station determined that the failure rate for detector tubes is within expected rates with respect to industry standards.




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DESCRIPTION OF EVENT

On February 29, 1988, at approximately 1839 hours, with the plant in Mode 1 (POWER OPERATION), at approximately 100% reactor [RCT] power, a Division II containment exhaust [VA] process radiation monitor (PRM) [MON] 1RIX-PR001B [IL] tripped to the low-fail condition while Control and Instrumentation (C&I) technicians were performing preventative maintenance on Division II containment exhaust PRM 1RIX-PR001D. PRM 1RIX-PR001D was in the tripped condition for the maintenance activity. The trip resulted in the automatic start of both standby gas treatment system (SGTS) [BH] trains and isolation of the continuous containment purge system [VB], process sampling system [KN], and fuel building ventilation system [VG]. The maintenance activity on 1RIX-PR001D was immediately terminated. Operators performed the automatic isolation checklist satisfactorily and verified that both SGTS trains were operating normally. PRM 1RIX-PR001B was placed in the tripped condition. At 1907 hours, SGTS train "B" was shut down. PRM 1RIX-PR001D was declared operable, and the continuous containment purge system was returned to normal status at approximately 2100 hours. SGTS trains "A" and "B" and the fuel building ventilation system were returned to normal status at approximately 2140 hours. The process sampling system was returned to normal status by approximately 2210 hours on February 29, 1988.

Troubleshooting of PRM 1RIX-PR001B identified that the signal cable for the detector was damaged. The cable was repaired and the monitor was declared operable at 1415 hours on March 1, 1988.

No other automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No other equipment or components were inoperable such that their inoperable condition contributed to this event.

CAUSE OF EVENT

The root cause of this event is attributed to personnel error due to inadequate accessibility and visibility of the detector. These conditions, combined with the detector's designed construction which makes correct assembly indiscernible even under ideal conditions, resulted in the detector signal cable becoming pinched following detector assembly replacement. The detector assembly for 1RIX-PR001B had been replaced by a C&I technician on February 27, 1988, as a result of an unsatisfactory calibration.

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

Review of the event identified that the monitor is located about fifteen feet above the floor and a few inches below cable run ducting. Access to the monitor is from scaffolding; however, piping and ducting interferences require that the scaffold be displaced from the monitor about three feet. The cable run ducting as installed precludes adequate access for work and visual inspection of work performed. In addition, clearances are such that a technician must reach up and over the piping interference to work on the monitor. The scaffolding used for access to the monitor can only accommodate one man.

To replace the detector, the technician must remove four securing bolts from the backplate of the monitor, lift the lead backplate (approximately 40 pounds) clear, and remove the detector. Reinstallation of the detector is the reverse process, however, the requirement to have the backplate and detector exactly aligned such that the detector cable fits in a groove in the backplate while installing the securing bolts, makes proper reinstallation difficult. Because of the arrangement, confirmation of correct cable alignment is not possible. The technician who reinstalled the detector was aware of the risks involved and therefore, left the backplate securing bolts finger tight to reduce the possibility of pinching the cable. No torque specification is indicated in the procedure; however, shop practices dictate that all fasteners be "snug tight" unless specified otherwise.

When repairs were conducted to 1RIX-PR001B on February 29, 1988, after the low-fail trip, the bolts were found more than finger tight and the cable was found pinched inside the backplate. Since the monitor had been tested and worked satisfactorily for almost two days, the failure probably occurred as a result of extrusion of pinched cable insulation over time or the backplate moving against the bolts and pinching the detector cable.

Detectors for three other monitors have similar location problems. Technicians acknowledged that conditions for detector replacement on these monitors under the conditions described are difficult. A similar cable failure occurred on April 19, 1987, on PRM 1RIX-PR001D. This failure was reported in LER 87-023-00. Completed LER 87-023-00 corrective actions included adding a precaution to CPS Procedure 9910.72, "Calibration of Safety Related Process Radiation Monitors," to exercise care when reinstalling these detectors; however, no action was initiated to improve the working conditions at the monitors.

CORRECTIVE ACTION

Existing scaffolding will be replaced with scaffolding designed for better access that will provide room for at least two technicians to work on the detectors. The new scaffolding will be in place prior to the next maintenance activity on the process monitor detectors.

C&I technicians have received training including use of inspection mirrors and drop lighting that will improve installation methods. The practice of tightening fasteners to a nominal "snug tight" condition unless otherwise specified has been reemphasized to all C&I technicians.

New procedures being drafted for these monitors will eliminate disassembly and subsequent reassembly of detectors during calibration activities. These procedures are expected to be issued by June 30, 1988.

Additionally, Illinois Power Company investigated the frequency of detector failures to determine if additional actions were required to improve component reliability. The investigation determined that the failure rate for detector tubes at Clinton Power Station is within expected rates with respect to industry standards and that no additional actions are required at this time.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(iv) due to an automatic actuation of an engineered safety feature.

Review of the event indicates that monitor 1RIX-PR001B was inoperable from approximately 1839 hours on February 29, 1988, until approximately 1415 hours on March 1, 1988.

PRM 1RIX-PR001B provides input to a one-out-of-two-twice logic to isolate the continuous containment purge and fuel building ventilation systems and to automatically start the standby gas treatment system. Additionally, PRM 1RIX-PR001B provides a one-out-of-one logic to isolate Division II process sampling system containment isolation valves.

Assessment of the safety consequences and implications of this event indicates that this event was not safety significant for existing or other plant conditions since the SGTS, continuous containment purge system, and the process sampling system responded, as designed, to the containment exhaust PRM trip signal.

ADDITIONAL INFORMATION

The containment exhaust process radiation monitor, 1RIX-PR001B is a model number DAM-1 manufactured by Eberline Instrument Corporation.

LER 87-023-00 discussed an automatic isolation of the Division II Hydrogen/Oxygen Monitor that resulted when the detector cable for containment exhaust process radiation monitor 1RIX-PR001D was damaged during reinstallation of the detector following removal for calibration.

For further information regarding this event, contact T. J. Camilleri, Assistant Manager - Plant Maintenance at (217) 935-8881, extension 3204.

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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

10CFR50.73

March 25, 1988

Docket No. 50-461

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

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 88-006-00

Dear Sir:

Please find enclosed Licensee Event Report No. 88-006-00: Inadequate Access and Visibility During Radiation Detector Assembly Result in Damaged Detector Signal Cable and Standby Gas Treatment System Auto-Start. This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg, III
Manager - Licensing and Safety

RSF/krm

Enclosure

cc: NRC Resident Office
NRC Region III, Regional Administrator
INPO Records Center
Illinois Department of Nuclear Safety
NRC Clinton Licensing Project Manager

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