NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

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) Engineered Safety Feature Actuation Due to a Spurious High Output Alarm on the Main Control Room Air Intake Process Radiation Monitor

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
1 1	1 0	8 6	8 6	0 1 9	0 0	1 2	1 0	8 6		0 5 0 0 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)								
POWER LEVEL (10)	0 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
D. W. Hillyer, Director-Plant Radiation Protection, Ext. 3233 (Alt.) J. R. Lockridge, Sup. Radiological Engrg., Ext. 3697	AREA CODE 2 1 7 9 3 5 - 8 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	
B	I L	C O N	E 0 7 0	No							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 1	3 0	8 7

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

ABSTRACT

On November 10, 1986 at 0408 hours, with the plant in mode 5, 0% reactor power and following initial fuel loading, a Main Control Room Air Intake Process Radiation Monitor (PRM) (1RIX-PR009A) received a High Alarm signal causing the B Control Room Ventilation Train to shift into the High Radiation Mode of Operation. On November 24, 1986, at 0712 hours, with the plant in the same status, 1RIX-PR009A again received a High Alarm signal causing the same action to occur. On each occasion a radiation survey was conducted at the location of the detector with results less than 0.1 mR/hr. The Main Control Room Air Intake PRM was placed in a downscale tripped condition and after the second event a temporary modification was put into effect, to prevent Main Control Ventilation Trains A and B shifting into the High Radiation Mode of operation as a result of High Radiation Alarm signals from Main Control Room Air Intake PRMs, pending corrective action. Investigation determined that electrical connection and ground problems at the detector-interface box, which is mounted in a location exposed to outside environmental conditions, contributed to cause these events. Investigation is continuing regarding the causes, and results of this investigation will be submitted in a supplemental report. These events are reportable in accordance with 10CFR50.73 (a)(2)(iv), as an Engineered Safety Feature was actuated.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station	0 5 0 0 0 4 6 1	8 6	— 0 1 9	— 0 0	0 2 OF 0 4

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

DESCRIPTION OF EVENT

On November 10, 1986 at 0408 hours, with the plant in mode 5, 0% reactor power, a spurious High Radiation signal from a Main Control Room Air Intake Process Radiation Monitor (PRM) (1RIX-PR009A) shifted the B Control Room Ventilation System (VC) train into the High Radiation Mode of operation as designed. Radiation Protection personnel were notified to perform a radiation survey at the area of the affected detector with results indicating area radiation levels of less than 0.1 mR/hr. Three other Main Control Room Air Intake PRMs had readings of 0.0911 mR/hr, 0.194 mR/hr and 0.0566 mR/hr at this time. The affected PRM was observed to have erratic readings ranging from 11.1 to 713 mR/hr (High Alarm Setpoint is 10mR/hr) over the next one hour period. At 0459 a Maintenance Work Request was initiated to investigate the cause and repair the affected PRM and at 0505 1RIX-PR009A was declared inoperable and placed in a downscale tripped position. On November 15, 1986, 1RIX-PR009A was placed in the Normal mode of operation and the B Control Room Ventilation System train was placed in normal operation. No other systems, other than those described above, contributed to or were affected by this event.

On November 24, 1986, at 0712 hours, with the plant in the same status as above, a spurious High Radiation signal from 1RIX-PR009A again shifted the B Control Room Ventilation train into the High Radiation mode of operation. A radiation survey at the area of the detector indicated area radiation levels of less than 0.1 mR/hr. Three other Main Control Room Air Intake PRMs had readings of 0.101mR/hr, 0.176 mR/hr and 0.066/mR/hr at this time. 1RIX-PR009A was observed to have erratic readings ranging from 0.11 to 44.3 mR/hr over the next one hour period. At 0800 1RIX-PR009A was declared inoperable and placed in a downscale tripped position and a Maintenance Work Request was initiated to investigate the cause and repair 1RIX-PR009A. No other systems, other than those described above, contributed to or were affected by this event.

Main Control Room Air Intake Process Radiation Monitors operate on a one-out-of-four trip logic to initiate the High Radiation Mode of operation on the A and B trains of the Control Room Ventilation System. The events described above satisfied this logic which resulted in actuation in each case.

CAUSE OF EVENT

During investigation several factors were found which could cause spurious detector signals. The connector which electrically connects the detector-interface box to an associated terminal box was found to contain dust and moisture. Previous problems associated with exposure to the environment with detector-interface box connectors on other Main Control Room Air Intake PRMs and dust and moisture found within this PRM's detector-interface box receptacle and cable connector indicated inadequate sealing. When contacted, the Amphenol Vendor who supplies this connector to the Eberline Instrument Corporation stated the connector was not intended for outside environment uses. Also, during repair of this detector, 15 ohms were observed in a ground circuit. The impact of resistance in this circuit is not known and investigation is continuing. A calibration test performed on the detector-interface box and a channel functional test performed on the microprocessor were satisfactory indicating these components are operating as designed.

ANALYSIS OF EVENT

Main Control Room Air Intake PRMs operate on a one-out-of-four trip logic to initiate the High Radiation Mode of operation of the Control Room Ventilation System. The failed detector was placed out of service for approximately 5 days after the first event and as of the second event, the monitor has not been placed back in service. The PRM was operable prior to both events. Due to the detector-interface box electrical connector not being intended for use in outside environments, a potential 10CFR Part 21 referral has been initiated to evaluate the reportability of this matter. The supplemental report will provide further status of this referral. This report is being submitted in accordance with 10CFR50.73 (a)(2)(iv), due to unplanned actuations of an Engineered Safety Feature.

SAFETY SIGNIFICANCE

No adverse impact on safety of the plant would result from this event since the automatic initiation of the High Radiation Mode of operation in the Main Control Ventilation System ensures outside air being supplied to the Main Control Room is treated to remove radioactive particulates and iodines prior to release into the Main Control Room atmosphere. This mode of operation places the Main Control Ventilation in a higher safety level than during normal operation. The Main Control Room Air Intake PRMs monitor outside air conditions which provide actuations only to the Main Control Room ventilation system.

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Clinton Power Station	0 5 0 0 0 4 6 1	8 6	— 0 1 9	— 0 0	0 4 OF 0 4

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

CORRECTIVE ACTION

As a result of the initial investigation of this event, the receptacle and cable connector on Main Control Room Air Intake PRM 1RE-PR009A were replaced. The detector was recalibrated and a channel functional test was performed on 1RIX-PR009A as post maintenance testing. A plant modification to provide a positive ground to the detector-interface box to ensure a more reliable signal path for detector signals and to provide an environmental seal to the detector-interface box and connector was initiated after the first event but was not completed when the second event occurred. After the second event, the detector-interface box circuit board and detector were replaced. The detector was recalibrated and a channel functional test was performed as post maintenance testing. Additional corrective actions taken as a result of the continuing investigation will be detailed in the supplemental report.

As Process Radiation Monitors are arranged in a one-out-of-four logic for actuating the High Radiation Mode of operation of the Control Room Ventilation System, any spurious alarm signal received from any one Main Control Room Air Intake PRM will cause an engineered safety feature to actuate. Additional investigation into the adequacy of this existing system logic is continuing. A temporary modification will remain in place which prevents Main Control Ventilation Trains A and B automatically shifting into the High Radiation Mode of operation as a result of High Radiation Alarm signals from Main Control Room Air Intake PRMs. This temporary modification will remain until corrective action has been identified and implemented. This is in accordance with Technical Specifications which do not require the Control Room Ventilation System to be operable prior to initial criticality. A supplemental report will be submitted by January 30, 1987.

ADDITIONAL INFORMATION

No previous events of this type have been recorded as LERs for Clinton Power Station. Main Control Room Air Intake PRMs are Eberline Instrument Corporation Model DA1-6HTCC detector assemblies connected to an Eberline Instrument Corporation DAM-1 data acquisition module.

For further information regarding this event contact D. W. Hillyer, Director-Plant Radiation Protection at (217) 935-8881 extension 3233 or (alternate) J. R. Lockridge, Supervisor - Radiological Engineering, at extension 3697.

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ILLINOIS POWER COMPANY

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

December 10, 1986

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. 86-019-00

Dear Sir:

Please find enclosed Licensee Event Report No. 86-019-00: Engineered Safety Feature Actuation Due to a Spurious High Output Alarm on the Main Control Room Air Intake Process Radiation Monitor. This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg
Manager - Licensing and Safety

RLC/ckc

Enclosure

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

IE22
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