Commonwealth Edison
Dresden Nuclear Power Station
R.R. #1
Morris, Illinois 60450
Telephone 815/942-2920

October 27, 1992

CWS LTR #92-643

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

Licensee Event Report 92-019, Docket 050249 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73 (a)(2)(v)(D).

Sincerely,
11/2/92
Charles W. Schroeder
Station Manager
Dresden Nuclear Power Station

CWS/glt

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

060094

(ZDVR/774)

IE22
1/1

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	1 of 0 5

Title (4) HPCI System Declared Inoperable Due to Signal Converter Failure

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)
1 0	0 5	9 2	9 2	0 1 9	0 0	1 0	2 6	9 2		

OPERATING MODE (9)	N
POWER LEVEL (10)	0 9 6

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)
___ 20.405(a)(1)(i)	___ 50.36(c)(1)	X 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)
___ 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
Mark Churilla Technical Staff System Engineer Ext. 2788	8 1 5 9 4 2 - 2 9 2 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
X	B J	C N V	G 0 8 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)

On October 5, 1992 at 1400 hours, with Unit 3 at 96% rated core thermal power, while performing Dresden Operating Surveillance (DOS) 2300-3, High Pressure Coolant Injection (HPCI) Monthly Operability Verification, a Signal Converter Failure alarm annunciated. The HPCI System was declared inoperable and a seven day Limiting Condition for Operation (LCO) was entered per Technical Specification (TS) 3.5. The investigation which followed could not identify the cause for the alarm or reproduce the alarm. However, during the investigation, a wiring discrepancy was discovered in the Signal Converter power monitoring circuit. Further investigation into the wiring discrepancy determined that the associated circuit card was not functioning. The Instrument Maintenance Department (IMD) replaced the card and corrected the wiring to what was reflected on the station drawings. The Circuit was tested satisfactorily, and the seven day LCO was terminated on October 9, 1992. The safety significance of this event is minimal in that the ability of the HPCI System to initiate and inject was not affected by the wiring discrepancy, and all other Emergency Core Cooling Systems (ECCs) required by TS 3.5.C.2.a were operable during the repair. A previous non-reportable event involving Unit 2 HPCI Signal Converter occurred in December 1989.

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 MWt rated core thermal power

Nuclear Tracking System (NTS) tracking code numbers are identified in the text as (XXX-XXX-XX-XXXXX)

EVENT IDENTIFICATION:

HPCI [BJ] Declared Inoperable Due to Signal Converter Failure

A. CONDITIONS PRIOR TO EVENT:

Unit: 3 Event Date: October 5, 1992 Event Time: 1400 Hours

Reactor Mode: N Mode Name: Run Power Level: 96%

Reactor Coolant System (RCS) Pressure: 993 psig

B. DESCRIPTION OF EVENT:

While performing Dresden Operating Surveillance (DOS) 2300-3, High Pressure Coolant Injection (HPCI) System Monthly Operating Verification, with Unit 3 at 96% of rated core thermal power, a HPCI Signal Converter Failure alarm annunciated. A failure of the signal converter causes a loss of automatic flow control of the HPCI System. The HPCI System was declared inoperable and a seven day Limiting Condition for Operation (LCO) was entered per Technical Specification (TS) 3.5. However, the alarm cleared approximately seven minutes later and remained reset. Work Request (WR) 13037 was initiated to investigate and repair the problem. The investigation could not determine the cause of the spurious signal converter alarm and verified that the signal converter responded correctly to flow inputs. However, during the investigation a wiring discrepancy was discovered on one of the power monitoring alarm cards for the signal converter. The alarm card was determined not to be functioning and a replacement card was obtained from Quad Cities Nuclear Power Station (QCNPS). During the procurement process of the QCNPS card, the HPCI system was tested to satisfy the monthly testing requirements under DOS 2300-3. The test was satisfactorily completed on October 7, 1992. However, since the signal converter power monitoring circuit was degraded the HPCI System remained inoperable pending card replacement. The card was installed per station drawings and tested satisfactorily on October 9, 1992. The Auxiliary Oil Pump (AOP), which had been taken Out of Service during the replacement of the card, was verified to operate properly and the seven day LCO was terminated at 1710 on October 9, 1992.

C. APPARENT CAUSE OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(2)(v)(D), which requires the reporting of any condition that could have prevented the fulfillment of a safety system needed to mitigate the consequences of an accident.

The HPCI Signal Converter function is to position the Motor Gear Unit (MGU) to control turbine speed. The signal converter inputs a flow demand signal from the HPCI Flow Indicating Controller (FIC) 3-2340-1 and outputs a corresponding signal to the MGU controller circuit. The system is stabilized by the feedback of the Linear Variable Differential Transformer (LVDT). The LVDT output corresponds to MGU position.

The HPCI Signal Converter is provided with three alarm functions to alert the NSO of a problem. The alarm occurs if there is a loss of supply voltage to the signal converter or a failure of the feedback circuit. The loss of supply voltage to the circuit will cause alarm relay 27 (Refer to Figure 1) to de-energize and cause the failure alarm. The feedback circuit has two cards, 27X and 27Y, which monitor voltage on the LVDT. A loss of voltage in the feedback circuit causes the 27X or 27Y card to energize a relay on the 27X or 27Y card. The relays on the cards have Normally Closed (NC) contacts in series with the Normally energized alarm relay 27. If either of the alarm card relays energize, the alarm relay de-energizes and causes the HPCI Signal Converter Failure alarm to occur.

Investigation into the HPCI Signal failure alarm could not identify the cause of the signal converter alarm encountered on October 5, 1992. However, a wiring discrepancy was discovered on the output of the 27X alarm card. The alarm card output had been wired to the Normally Open (NO) contacts instead of the NC contacts. Voltages measured on the card indicated that the relay on the 27X card never de-energized causing the NO contacts to remain closed. Voltages measured on the 27Y card indicated that card to be operating properly. Apparently, the 27X alarm card had failed sometime previously, causing the relay on the card to remain energized. The failure of the card would cause the Signal Converter Failure Alarm to annunciate. In order to clear the alarm without replacing the degraded card, the output contacts for the 27X card relay would have to be wired to the NO contacts which are closed due to the card failure. The wiring to the output contacts on the 27X card showed that it had been originally trained to the NC contacts.

Therefore, the original alarm encountered on October 5, 1992, is believed to have been spurious based on the alarm clearing and that no problems which would have caused the condition were identified during troubleshooting. The wiring discrepancy discovered during troubleshooting was caused by inadequate management control of work activities in the plant. It is believed that the wiring change was performed several years ago, before the enhanced management controls now in place existed which would prevent such an occurrence.

A review of the work performed on the Unit 3 signal converter showed that it was tuned during D3R12 in February 1992. The tuning process involved the verification of the 27 alarm relay functions. The alarms were verified, however, the individual alarm cards were not verified to be functioning. There were no other Work Requests identified that performed work on the signal converter alarm circuit.

D. SAFETY ANALYSIS OF EVENT:

The HPCI Signal Converter is used to control flow when using the Flow Indication Controller (FIC) 3-2340-1 in the manual or automatic mode. A signal converter failure would require the Operator to control flow manually by using either the Motor Gear Unit (MGU) or the Motor Speed Changer (MSC) control switches. All of these functions are verified on a monthly basis using DOS 2300-3. If a failure of the LVDT circuit were to occur and not be alarmed due to the bad 27X alarm card, it would be identified during the applicable monthly surveillance. It should be noted that the 27Y alarm card functioned properly and would have alarmed if a LVDT failure condition occurred. Therefore, since the HPCI System would initiate and supply the necessary flow and discharge pressure, and flow control is capable by using the MGU or MSC control switches, the safety significance of this event is minimal.

E. CORRECTIVE ACTIONS:

The 27X board was replaced and tested satisfactorily on October 9, 1992.

It is believed that this is an isolated case and that the wiring change was performed several years ago, before the enhanced management controls now in place existed which would prevent such an occurrence. The Integrated Reporting Process will continue to monitor for further events involving this type of an occurrence. If future events indicate that this is a reccurring trend further investigation will be conducted.

The Unit 2 Signal Converter circuits were verified to match the station drawings.

A request has been submitted to the Nuclear Engineering Department (NED) to perform the following: 1) Perform a historical operability determination 2) Develop criteria with General Electric (GE) guidance for verifying the LVDT power monitoring circuit by March 1, 1993 (249-180-92-12801).

The IMD surveillance coordinator will make a General Surveillance (GSRV) entry requiring that the signal converter circuit be tuned every Unit 2 and Unit 3 respective refuel outage. The entry will be made by December 1, 1992 (249-180-92-12802).

The IMD will prepare a tailgate item and review the event with the entire Department by December 15, 1992 (249-180-92-12803).

F. PREVIOUS OCCURENCES:

DVR Number	Title
12-2-89-172	HPCI System Made Inoperable for Repair of the Motor Gear Unit

Two capacitors failed in the signal converter DC supply circuit. The capacitors were replaced and the signal converter was tested satisfactorily.

G. COMPONENT FAILURE DATA:

Manufacturer	Nomenclature	Model Number	Mfg. Part Number
General Electric	Voltage sensing card	N/A	3s75113KF212-G14

An industry-wide NPRDS data base search revealed that Quad Cities and Dresden Nuclear Power Stations have had several signal converter failures. The failures reported did not involve the failure described in this report. It should be noted that Quad Cities and Dresden are the only commercial nuclear stations which have the General Electric HPCI equipment.

POSITION FEEDBACK AND ALARM CIRCUIT

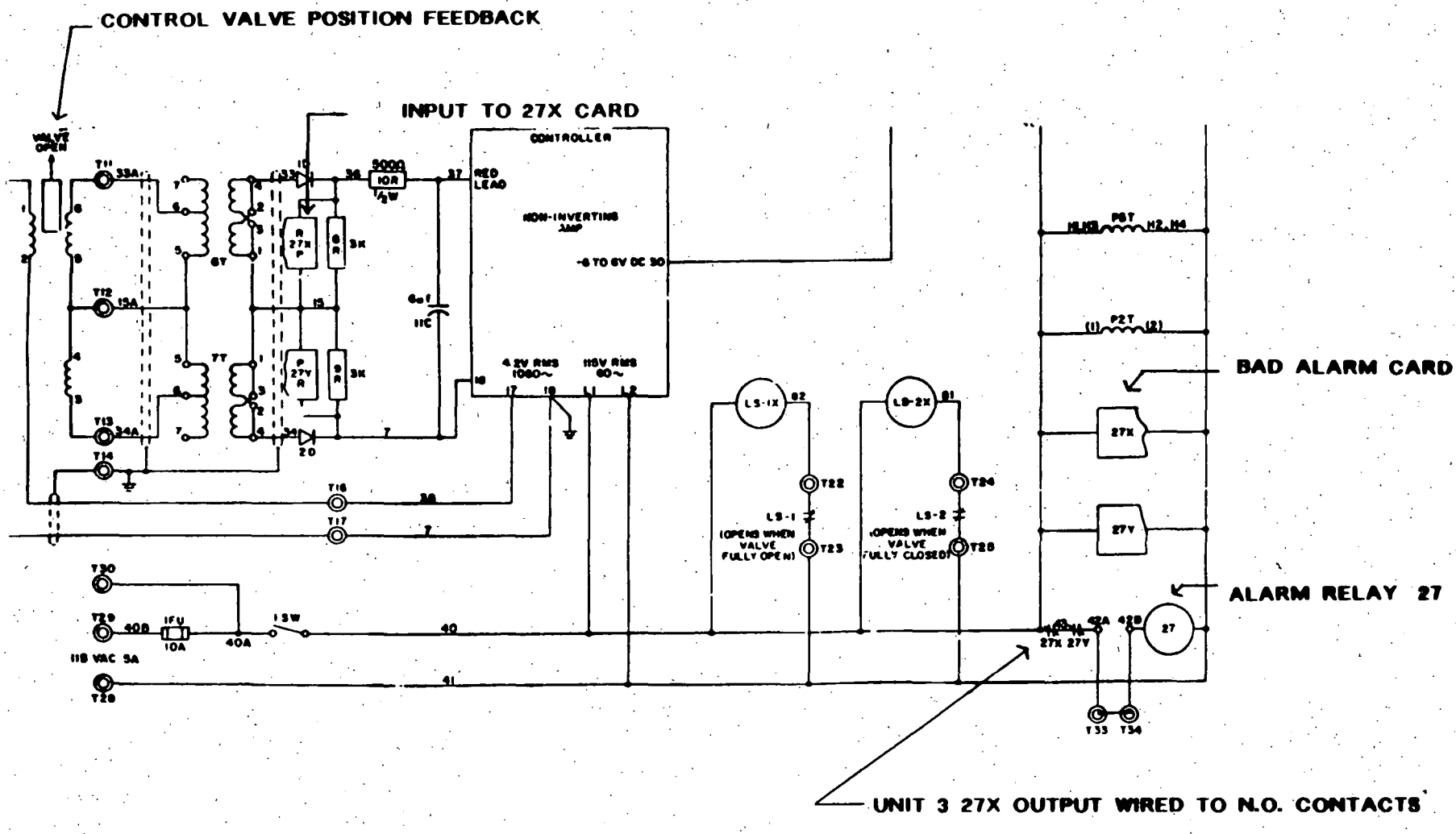

FIGURE 1