

LICENSEE EVENT REPORT (LER)

Facility Name (1) Dresden Nuclear Power Station, Unit 3 Docket Number (2) 0 5 0 0 0 2 4 9 Page (3) 1 of 0 6

TITLE (4) HPCI Area Temperature Switches Exceeded Technical Specification Limit Due to Instrument Setpoint Drift

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	2 19	8 8	8 8	0 0 6	0 1	0 1	2 6	8 8	N/A	0 5 0 0 0 2 3 7	

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name: Ronald Jackson, Technical Staff Engineer Ext. 2483 TELEPHONE NUMBER: AREA CODE 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	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
X	B J	T S	U 0 7 5	Y							

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) X NO

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

On March 29, 1988 at 0630 hours during a Unit 3 refuel outage, High Pressure Coolant Injection (HPCI) area temperature switches 3-2370D and 3-2371D tripped at 215.7°F and 250.0°F respectively while performing the HPCI temperature switch calibration surveillance. The temperature switches are required to trip within the Technical Specification limit of less than or equal to 200°F. While the Instrument Maintenance Department continued to calibrate the remaining temperature switches, five additional switches tripped above the Technical Specification limit.

The cause of the HPCI temperature switches' failure to trip within the required limit was attributed to instrument setpoint drift. The immediate corrective action consisted of recalibrating all the temperature switches to within the station limit of 175°F - 185°F. Corrective actions included establishing a Task Force to review the instrument configuration and calibration methods. Also, additional testing and augmented inspections of the temperature switches was performed. As a result of this review an improved calibration method was implemented.

The safety significance of this event was minimal since the remaining nine temperature switches were capable of isolating the HPCI system upon detection of a steam leak. A previous similar occurrence was reported by LER 86-28 on Docket #050237.

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LICENSED EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	Sequential Number	Sequential Number	Revision Number	Revision Number	Page	OF	Pages	
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	8 8	-	0 0 6	-	0 1	0 2	OF	0 6	

TEXT

PLANT AND SYSTEM IDENTIFICATION:

General Electric Boiling Water Reactor - 2527 Mwt rated core thermal power. Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

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

EVENT IDENTIFICATION:

High Pressure Coolant Injection (HPCI) Area Temperature Switches Exceeded Technical Specification Limit Due to Instrument Setpoint Drift.

A. CONDITIONS PRIOR TO EVENT:

Unit: 3	Event Date: March 29, 1988	Event Time: 0630 hours
Reactor Mode: N	Mode Name: Refuel	Power Level: 0%
Reactor Coolant System (RCS) Pressure: 0 psig		

B. DESCRIPTION OF EVENT:

On March 29, 1988 at 0630 hours during a Unit 3 refuel outage, HPCI [BJ] area temperature switches 3-2370D and 3-2371D tripped at 215.7°F and 250.0°F respectively during the performance of Dresden Instrument Surveillance (DIS) 2300-7, HPCI Area Temperature Switch Calibration and Maintenance Inspection. These temperature switches are required per Technical Specification Table 3.2.1 to trip at less than or equal to 200°F. While the Instrument Maintenance Department continued to perform the HPCI temperature switch calibration surveillance, temperature switch 3-2373C tripped at 255.6°F on March 30, 1988 and temperature switches 3-2370B, 3-2373B, 3-2371A and 3-2372A tripped at 202.0°F, 222.9°F, 218.6°F and 229.1°F respectively on April 4, 1988. All HPCI area temperature switches were subsequently recalibrated to within the station limit of 175°F - 185°F. The as found trip settings of each of the 16 switches are shown below:

2370A	177.5°F
* 2371A	218.6°F
* 2372A	229.1°F
2373A	186.5°F
* 2370B	202.7°F
2371B	189.5°F
2372B	155.3°F
* 2373B	222.9°F
2370C	183.4°F
2371C	134.2°F
2372C	177.6°F
* 2373C	255.6°F

LICENSED EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	///	Sequential Number	///	Revision Number				
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	8 8	-	0 0 6	-	0 1	0 3	OF	0 6	

TEXT

* 2370D	215.7°F
* 2371D	250.0°F
2372D	200.0°F
2373D	184.0°F

* Exceeded Technical Specification Limit

C. APPARENT CAUSE OF EVENT:

This event is being reported in accordance with Title 10 of the Code of Federal Regulations Part 50 Section 73(a)(2)(i)(B), which states that any operation prohibited by the plant's Technical Specifications must be reported.

The HPCI area temperature switches use a bulb type thermal assembly which is connected to a microswitch enclosure by a six foot long liquid filled capillary and bellows housing. A plunger is seated inside the bellows housing for actuation of the microswitch. When a high temperature is detected, the thermal material inside the bulb expands and causes the liquid to force the plunger to rise and actuate the microswitch. The Main Steam Line (MSL) tunnel area temperatures switches utilize a similar design.

A Task Force was assembled, including Instrument Maintenance, Technical Staff and Boiling Water Reactor Engineering Department (BWRED) personnel, to investigate this event. Accelerated testing intervals, discussion with vendor representatives, and review of calibration methods resulted in the following conclusions.

1. The calibration method employed an oven to provide the controlled environment for setting and verifying the temperature switch setpoints. Extensive testing revealed that the heatup rate of the oven was affecting the temperature switch trip setpoint repeatability. Since the oven heat addition rate was extremely difficult to control, a water bath calibration method was implemented.
2. Review of the instrument type indicates that improved monitoring of the steam environment in the HPCI room or MSL tunnel area during a postulated line break event could be provided by a different type of instrument. BWRED personnel are continuing a review of possible design changes to determine if a suitable replacement for the HPCI room and MSL tunnel area temperature switches can be found.

D. SAFETY ANALYSIS OF EVENT:

The purpose of the HPCI area temperature switches are to detect significant steam leaks in the HPCI pump room and initiate an isolation of the steam supply to the HPCI turbine. There are a total of 16 temperature switches connected in four one-out-of-two-twice logic channels (see Figure 1). These 16 temperature switches are located in four different areas of the HPCI pump room with four switches in each area. Upon detection of a HPCI area steam leak, the temperature switches actuate and energize relays 101A through 101D respectively, which in turn energize relays 125A and 125B. Energizing either the 125A or 125B relay will initiate a HPCI isolation (Group IV) closing the HPCI steam supply isolation valves, 3-2301-4 and 3-2301-5. Consequently, there are two trip systems for the HPCI auto-isolation system using this type of logic scheme. In the event of a HPCI steam line break, only 2 out of 4 temperature switches from any one group are capable of initiating a HPCI isolation (See Figure 1).

Technical Specification Table 3.2.1 states that four instrument channels shall be operable per trip system. This requirement was not met since the 101D relay was inoperable due to the failure of temperature switches 3-2370D and 3-2371D. However, the remaining three instrument channels (relays 101A, 101B and 101C) were capable of isolating the HPCI system upon detection of a steam leak. Therefore, the safety significance of this event was minimal.

LICENSED EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	///	Sequential Number	///	Revision Number				
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	8 8	-	0 0 6	-	0 1	0 4	OF	0 6	

TEXT

E. CORRECTIVE ACTIONS:

The immediate corrective action included recalibrating all the temperature switches to within the station limit of 175°F to 185°F per DIS 2300-7. Additionally, the calibration frequency was accelerated in order to determine the optimum calibration frequency such that instrument drift would not result in exceeding the Technical Specification limit of less than or equal to 200°F. This accelerated inspection program selectively calibrated those switches which experienced the largest instrument drift.

The testing program and investigation resulted in implementation of a water bath calibration method which provides excellent trip setpoint repeatability. The Unit 2 HPCI room and MSL tunnel area temperature switches have been recalibrated utilizing the water bath calibration method. The Instrument Maintenance Department will recalibrate the Unit 3 HPCI area temperature switches utilizing the revised calibration procedure under Work Request 81632 (249-200-88-03001). The Unit 3 MSL tunnel area temperature switches will be recalibrated during the upcoming Unit 3 refuel outage (249-200-88-03002). As calibration and testing data indicate that recalibration of the Unit 3 MSL tunnel area temperature switches will not result in non-conservative as-found trip setpoints, entry into the Unit 3 MSL tunnel area under power operation is not deemed appropriate prior to the refuel outage. BWRED personnel are also reviewing the HPCI room and MSL tunnel area temperature switches for possible replacement with an improved design under Action Item Record 12-86-45 (249-200-88-03003).

F. PREVIOUS EVENTS:

LER 86-28/Docket 050237 HPCI Area Temperature Switches Exceeded Technical Specification Limit Due to Instrument Setpoint Drift.

On December 8, 1986 during a Unit 2 refuel outage, HPCI area temperature switches 2371A, 2372A and 2373A tripped at 227°F, 208°F and 202.1°F respectively while performing DIS 2300-7. The root cause was attributed to instrument setpoint drift. These switches were recalibrated and action initiated to replace this style of switch with a different type.

DVR 12-2-84-101 HPCI Area Temperature Switches.

On October 15, 1984 during a Unit 2 refuel outage, temperature switch 23700 failed to trip due to unknown causes, while performing DIS 2300-7. The switch was replaced and calibrated per DIS 2300-7.

LER 83-38/Docket 050249 HPCI Area Temperature Switch Setpoint Above Limit.

On October 19, 1983 during a Unit 3 refuel outage, temperature switch 2371A tripped at 203.9°F while performing DIS 2300-7. The root cause was attributed to instrument setpoint drift. The temperature switch was subsequently recalibrated per DIS 2300-7.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			Page (3)		
		Year	Sequential Number	Revision Number			
Dresden Nuclear Power Station, Unit 3	0 5 0 0 0 2 4 9	8 8	- 0 0 -6	- 0 1	0 5	OF	0 6

TEXT

LER 83-09/Docket 050237 Unit 2 HPCI Area Temperature Sensors Calibration.

On January 13, 1983 during a Unit 2 refuel outage, temperature switch 2370A tripped at 204.7°F while performing DIS 2300-7. The root cause was attributed to instrument setpoint drift and the switch was recalibrated per DIS 2300-7.

LER 80-08/Docket 050249 HPCI Area Temperature Switches Trip at Greater Than or Equal To 200°F.

On March 7, 1980 during a Unit 3 refuel outage, temperature switches 2371B, 2370D and 2370B tripped at 204.8°F, 273.6°F and 235.7°F respectively while performing DIS 2300-7. These failures were attributed to instrument setpoint drift, caused by excessive gap between actuator and switch plunger or dirty contacts. The necessary adjustments were made to the switches and calibration per DIS 2300-7 completed.

G. COMPONENT FAILURE DATA:

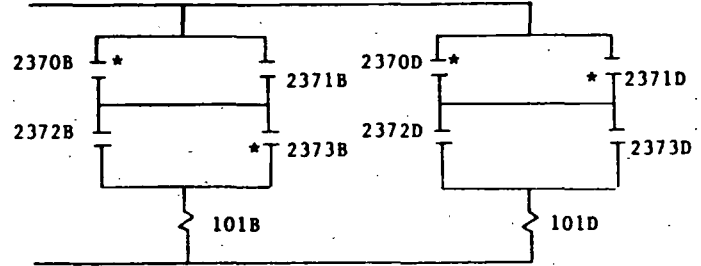
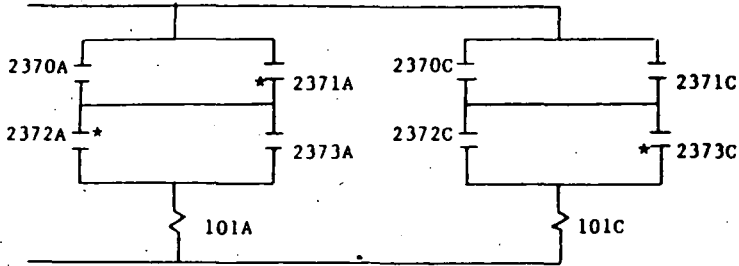
Manufacturer: United Electric Controls Co.
 Nomenclature: Temperature Switch
 Type: F7
 Model: 76B

An industry-wide NPRDS search was conducted on this type of temperature switch. The results of the search indicated that 16 reported failures occurred with this type switch, of which 12 failures were attributed to setpoint drift. All reported failures occurred at Dresden Station.

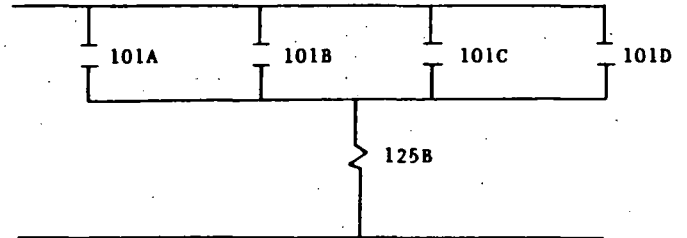
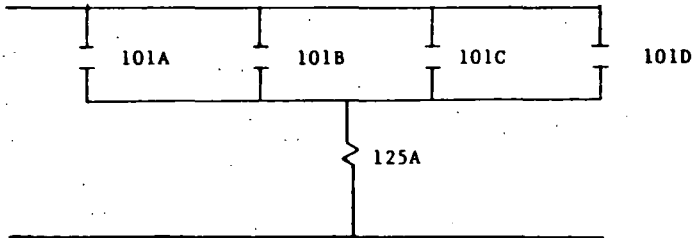
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Dresden Nuclear Power Station, Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 4 9	LER NUMBER (6)						Page (3)		
		Year 8 8	Sequential Number - 0 0 6	Revision Number - 0 1	0 6	OF	0 6			

TEXT



* Exceeded Technical Specification Limit



SIMPLIFIED HPCI HIGH TEMPERATURE ISOLATION LOGIC

Figure 1



Commonwealth Edison

Dresden Nuclear Power Station

R.R. #1

Morris, Illinois 60450

Telephone 815/942-2920

January 26, 1989

EDE LTR #88-315

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

Licensee Event Report #88-006-1, Docket #050249 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(i)(B). This revised report is submitted in order to provide an update regarding the corrective actions that have been implemented to prevent recurrence.

E.D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/ade

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
File/NRC
File/Numerical

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