

**LICENSEE EVENT REPORT (LER)**

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the information and Records Management Branch (t-6 f33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office Of Management And Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)  
**Dresden Nuclear Power Station, Unit 2**

DOCKET NUMBER (2)  
**05000237**

PAGE (3)  
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TITLE (4)  
**Recirculation Loop Temperature Thermocouple Failure Cause Shutdown Cooling Inoperability**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON TH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	22	1999	1999	006	00	01	21	2000	N/A	N/A
OPERATING MODE (9) <b>1</b>			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)							
POWER LEVEL (10) <b>100</b>			20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)	50.73(a)(2)(viii)
			20.2203(a)(i)			20.2203(a)(3)(i)			50.73(a)(2)(ii)	50.73(a)(2)(x)
			20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)			50.36(c)(1)		X	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	

**LICENSEE CONTACT FOR THIS LER (12)**

NAME  
**Arjun Karadi, System Engineer**

TELEPHONE NUMBER (Include Area Code)  
**(815) 942-2920 ext 3174**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**SUPPLEMENTAL REPORT EXPECTED (14)**

**YES**  
(If yes, complete EXPECTED SUBMISSION DATE). **X** **NO**

**EXPECTED SUBMISSION DATE (15)**

MONTH DAY YEAR

**ABSTRACT (Limit to 1400 spaces, i. e., approximately 15 single-spaced typewritten lines) (16)**

On December 22, 1999 at approximately 1356 hours the "B" Reactor Recirculation Loop temperature recorder and electronic temperature switch failed upscale due to a degraded connection in the temperature measurement loop. This failure would have prevented the operation of the Shutdown Cooling (SDC) System in the event of a unit scram or shutdown. Operations entered the appropriate Technical Specifications Limiting Conditions for Operation (LCO). This connection was immediately repaired. The loop calibration was checked and found satisfactory. During trouble shooting, all other connections for the loop components were verified to be satisfactory. Operations exited the LCO at approximately 2020 hours.

The overall safety significance of this event was minimal.

This event is being reported pursuant to 10 CFR 50.73 (a) (2) (v), which requires the reporting of any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to Remove Residual Heat.

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		YEAR <b>1999</b>	SEQUENTIAL NUMBER <b>006</b>	REVISION NUMBER <b>00</b>	

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

**PLANT AND SYSTEM IDENTIFICATION:**

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

Energy Industry Identification System (EIS) Codes are identified in the text as [XX] and are obtained from IEEE Standard 805-1984, IEEE Recommended Practice for System Identification in Nuclear Power Plants and Related Facilities.

**EVENT IDENTIFICATION:**

Recirculation Loop Temperature Thermocouple Failure Cause Shutdown Cooling Inoperability

**A. PLANT CONDITIONS PRIOR TO EVENT:**

Unit: 2	Event Date: 12-22-99	Event Time: 13:56
Reactor Mode: 1	Mode Name: Run	Power Level: 100
Reactor Coolant System Pressure: 1002 psig		

**B. DESCRIPTION OF EVENT:**

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(v)

On December 22, 1999 the "B" Reactor Recirculation [AD] Loop temperature recorder and the electronic temperature switch failed upscale due to the degraded thermocouple (T/C) input. Failure of the temperature switch would prevent opening of the Shutdown Cooling System (SDC) [BO] Isolation valves. In the event of a unit shutdown or reactor scram these valves must be opened for the SDC system to function.

Operations entered the LCO per Technical Specifications 3.2.A. T/C cables to the millivolt to current (MV/I) converter were disconnected and T/C output checked. Output appeared normal. Due to input impedance differences between the test equipment and the installed MV/I converter, some resistance buildup in T/C cable may not be detected. Therefore the T/C cable was shocked with high voltage to remove possible resistance build-up in the wire splices. A calibration check of all other components in the loop was made and found satisfactory. T/C cables were reconnected to MV/I converter. The measurement loop then operated satisfactorily. No other systems, components or structures were identified which contributed to the isolation event. Operations exited the LCO.

All ECCS and ESF systems were operable during this event.

**C. CAUSE OF EVENT:**

A degraded connection in the T/C in the temperature measurement circuit caused the temperature switch to open, defeating the interlock. The failed interlock would prevent the opening of the SDC system isolation valves should a Reactor Scram occur requiring SDC system operation. (NRC Cause Code B)

**D. SAFETY ANALYSIS**

The purpose of the Reactor Recirculation Coolant temperature interlock, SDC System Cut-In-Permissive, is to protect the SDC system components from seeing an over-temperature condition.

Reactor Recirculation Coolant temperature is measured by a T/C and a Resistance Temperature Detector (RTD) in each loop. The T/C feeds the MV/I, which outputs to both a recorder and a temperature switch in a series loop. The temperature switch provides an actuation signal to the SDC system motor operated inboard and outboard isolation

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valves. The isolation valves are interlocked with the above temperature switches. Both switches, one from each loop, are arranged in series. Therefore, high temperature indication in either recirculation loop will prevent opening of isolation valves to the SDC system. This contact opens when temperature rises above the set point, 350 Degrees F, preventing the opening of the isolation valves during normal reactor operation. During this event the "B" loop temperature switch failed upscale, which would prevent opening the SDC isolation valves, should reactor coolant temperature drop below 350 Degrees F, (e.g., a reactor scram) and subsequent need for SDC system operation. However recirculation loop "A" indication was available at the recorder and on a digital indicator. In addition the RTD in each recirculation loop provides computer point generated display. These indications could be used to verify coolant temperature and DOA 1000-01, "Residual Heat Removal Alternatives," could be used to cool down the reactor coolant inventory. Below 212 degrees F, MODE 4, the temperature switch contacts can be bypassed and SDC put in service.

Reactor operation continued during this event. SDC was not required during this event. Alternate coolant temperature indication was available. The operator could have used these indications and used DOA 1000-01, if the need arose. Therefore, the safety significance of this event is considered minimal.

**E. CORRECTIVE ACTIONS:**

1. Thermocouple outputs from both loops were checked and found acceptable. MV/I, recorder, temperature switch, and digital indicator calibration for both loops was checked and found satisfactory. Cables to the thermocouple B were disconnected and shocked with high voltage to clear possible resistance buildup at the degraded connections. Upon reconnecting the thermocouple to the "B" loop MV/I converter, the entire loop functioned as expected. (Complete)
2. Unit 2B thermocouple, cables and connections for the Shutdown Cooling System will be inspected. Replacement of the thermocouple, cables and connections will be performed as necessary. (ATI # 21181)
3. Based on the results of the Unit 2B loop inspection, System Engineering will determine Unit 2A, Unit 3A and B loops inspection requirements and schedule additional inspections as required. (ATI # 21181)

**F. PREVIOUS OCCURRENCES:**

1. Unit 2: 5/13/95. Ref. PIF D1995-1235

Recirculation Loop "B" temperature recorder failed high causing SDC Inoperability. T/C wire splices had degraded. Cabling to the T/C was shocked with high voltage. SDC system operation was restored.

2. Unit 3: 2/2/99. Ref. PIF D1999-00532

Unit 3 experienced loss of SDC system during refueling/shutdown. Due to high activity in the Drywell the T/C and associated cabling may have generated a signal spike as a result of induced noise. The temperature switch was bypassed in accordance with the guidance in DOA 1000-01. SDC system operation was restored.

**G. COMPONENT FAILURE DATA:**

N/A