

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) <p style="text-align:center;">Dresden Nuclear Power Station, Unit 2</p>	Docket Number (2) <p style="text-align:center;">0 5 10 10 10 12 13 17</p>	Page (3) <p style="text-align:center;">1 of 0 5</p>
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Title (4)

HPCI Gland Seal Leakoff Condenser Drain Pump Failure Due to Degraded Motor Starting Circuit Capacitor

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	14	8	9	8	9	0	3	14	N/A	0 5 10 10 10 12 13 17
0	3	14	8	9	0	11	0	4	12	N/A	0 5 10 10 10 12 13 17

OPERATING MODE (9) N

POWER LEVEL (10) 0 9 9

<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 checked="" 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 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 <p style="text-align:center;">Jerry F. Lizalek, Technical Staff Engineer</p>	TELEPHONE NUMBER Ext. 2421
AREA CODE <p style="text-align:center;">8 1 5 9 4 2 - 2 9 2 0</p>	

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 A P	C 7 7 10	Y				

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) <input type="checkbox"/> Yes (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	Expected Month Day Year
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

At 1730 hours on March 14, 1989, with Unit 2 at 99% rated core thermal power, the Nuclear Station Operator (NSO) observed that the High Pressure Coolant Injection (HPCI) Gland Seal Leakoff (GSLO) condenser drain pump would not trip automatically on decreasing GSLO condenser hotwell level or by control switch manipulation. The GSLO condenser drain pump was then secured by opening the power supply breaker. The HPCI System was then declared inoperable at 1730 hours on March 14, 1989 and the operability surveillances of the redundant safety systems were initiated in accordance with Technical Specification 4.5.C.2. The root cause was determined to be a degraded capacitor within the GSLO condenser drain pump motor starting circuit, which was replaced in order to return the HPCI System to operable status. The safety significance of this event was minimal since automatic initiation of the HPCI System would not have been prevented by the inoperable GSLO condenser drain pump. Additionally, the Automatic Depressurization System and low pressure Emergency Core Cooling Systems (ECCSs) were available for reactor pressure and inventory control during postulated design basis accident conditions. A previous event involving the GSLO condenser drain pump was reported by LER 88-009/050237.

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

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:

High Pressure Coolant Injection (HPCI) [BJ] System Gland Seal Leakoff (GSLO) Condenser Drain Pump Failure Due to Degraded Capacitor in the Motor Starting Circuit.

A. CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: March 14, 1989 Event Time: 1730 hours

Reactor Mode: N Mode Name: Run Power Level: 99%

Reactor Coolant System (RCS) Pressure: 1005 psig

B. DESCRIPTION OF EVENT:

At 1730 hours on March 14, 1989, with Unit 2 operating at 99% rated core thermal power, the HPCI GSLO condenser hotwell level high/low annunciator alarmed in the Control Room. The Nuclear Station Operator (NSO) then verified that the HPCI GSLO condenser drain pump was operating normally to pump down the GSLO condenser. Following ten minutes of GSLO condenser drain pump operation, the NSO proceeded to verify that the GSLO pump had automatically tripped after returning the GSLO condenser hotwell to its normal level. Upon observing that the GSLO condenser drain pump was still operating the NSO dispatched an Equipment Attendant (EA) to locally verify the GSLO condenser hotwell level. When the EA reported back to the NSO that the GSLO condenser hotwell level was normal, the NSO then placed the Control Room GSLO condenser drain pump control switch in the "off" position. However, the GSLO condenser drain pump continued to operate. The EA was immediately instructed to secure the GSLO condenser drain pump via the local "stop" push button which also failed to stop the GSLO condenser drain pump. The GSLO condenser drain pump continued to operate, and was finally secured by opening the power supply breaker. The power supply breaker was subsequently reclosed; however, the GSLO condenser drain pump did not restart since the GSLO condenser hotwell level was below the pump "start" setpoint. The HPCI System was then immediately declared inoperable at 1730 hours on March 14, 1989 and demonstration of redundant safety system operability was initiated in accordance with Technical Specification 4.5.C.2. Work Request 83160 was initiated for the repair of the GSLO condenser drain pump. Upon completion of repairs, the HPCI System was returned to operable status at 1600 hours on March 16, 1989.

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with 10CFR50.73(a)(2)(v)(D), which requires the reporting of any event or condition that alone could have prevented the fulfillment of the safety function of a system required to mitigate the consequences of an accident. As discussed in Section D of this report, this event would not have prevented automatic initiation of the HPCI System during a postulated design basis accident; however, the HPCI System was conservatively declared inoperable in accordance with Station policy.

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Investigation by the Electrical Maintenance Department (EMD) under Work Request 83160 revealed abnormalities within the GSLO condenser drain pump motor starting circuit. See Figure 1 for a simplified circuit diagram. It was discovered that GSLO condenser drain pump motor armature resistance short out contactor TA (Cutler-Hammer No. 538, Definite Time Armature Accelerating Contactor) was fused in the closed position. Carbon deposits were also found covering the contacts. The armature resistance short out contactor is normally closed only during the GSLO condenser drain pump motor start sequence. The GSLO condenser drain pump motor is a reduced starting voltage compound direct current (DC) motor. During its start cycle it draws an in-rush current greatly exceeding its normal operating current. To limit the in-rush current, a resistor (Resistor 3; Figure 1) is placed in series with the motor armature for the first four seconds of motor operation. Subsequent to four seconds of motor operation, Capacitor 1 (Figure 1) discharges fully and coil TA (Figure 1) becomes de-energized. With coil TA de-energized, contact TA closes, shorting out Resistor 3, allowing the GSLO motor to receive full running current.

During this event, Capacitor 1 discharged immediately, allowing contact TA to close instantaneously and experience an unreduced starting current. The excessive current fused the TA contact and momentarily fused the two motor contacts resulting in the initial inability to trip the GSLO pump. Therefore, the root cause of this anomaly was the degraded capacitor. The capacitor was tested and its "as found" capacitance was 3 microfarads. Design capacitance for Capacitor 1 is 50 microfarads.

Additionally, while performing the root cause investigation, it was determined that the local "stop" push button was not wired as indicated by the schematic diagram. The wiring discrepancy had no effect on this event as local push button operation would not have been able to stop the GSLO condenser drain pump motor due to the above mentioned fused contacts.

D. SAFETY ANALYSIS OF EVENT:

Upon a HPCI System initiation, leakoff collected by the HPCI Turbine Gland Seal System is routed to the GSLO condenser and condensed. The condensate is then returned to the HPCI pump suction via the GSLO condenser drain pump. All non-condensibles are discharged to the Standby Gas Treatment (SBGT) [BH] System via the GSLO blower. If the GSLO condenser drain pump were inoperable, the GSLO condensate would overflow into the HPCI room. This occurrence alone would not have prevented use of the HPCI System for injection if necessary during a design basis accident. Loss of the GSLO drain pump and subsequent condensate overflow into the HPCI room could, however, be postulated to cause increased HPCI room radiation and temperature levels during extended periods of HPCI operation. Potentially, automatic isolation of the HPCI System on high HPCI room temperature could occur. (Technical Specification setpoint 200°F).

During this event, the Isolation Condenser [BL] was operable. The Automatic Depressurization System [SB] and low pressure Emergency Core Cooling Systems (ECCSs) [BM, BO] were also available to provide reactor pressure and inventory control during any postulated design basis accident. For these reasons the safety significance of this event is considered to be minimal.

E. CORRECTIVE ACTIONS:

A Problem Analysis Data Sheet (PADS) was performed to evaluate the root cause and establish adequate corrective actions. The root cause was identified and the following corrective actions were established. The GSLO pump motor armature resistance short out contactor TA (Cutler-Hammer No. 538, Definite Time Armature Accelerating Contactor) was replaced. Additionally, a new capacitor was installed. The motor contacts were also inspected for pitting. No pitting was observed. Additionally, a logic check of the GSLO condenser drain pump circuit was performed. During this check, a local

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"start" push button wiring discrepancy was identified. The pushbutton wiring was then changed to reflect the current electrical schematic (12E2532 Rev. W). Additionally, the current wiring diagram, 12E2684B Rev. L, was changed to reflect schematic 12E2532 Rev. W and actual field wiring. The change was performed under Drawing Change Request (DCR) 12-89-50.

As further long term corrective action, Work Requests 83831, 83832, 83833, 83834, 83835, 83836, 83837, 83838, 83839, 83840, 83841, 83842, 83843, 83844 and 83845 have been submitted for replacement of other similar capacitors associated with Cutler-Hammer Direct Current Motor Starter for other Station systems (237-200-89-06301). Additionally, a procedure inquiry has been initiated for the Electrical Maintenance Department to evaluate revision of Dresden Maintenance Procedure (DMP) 8300-3, Inspection and Maintenance of Cutler-Hammer Direct Current Motor Starters, to include testing of starting capacitor and a periodic Preventive Maintenance (PM) replacement of the capacitor (237-200-89-06302).

F. PREVIOUS OCCURRENCES:

LER Number/Docket Title

88-009/050237 HPCI System Inoperable Due to Tripping of the Gland Seal Leak Off Pump.

During this event the GSLO pump tripped after approximately one second of operation. The root cause of the anomaly was determined to be a cracked DC motor brush mounting bracket. The motor was replaced and added to the Preventive Maintenance program.

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
Cutler-Hammer	Accelerating Contactor	538	N/A

An NPRDS data base search could not be performed at this time as the NPRDS search network is currently unavailable.

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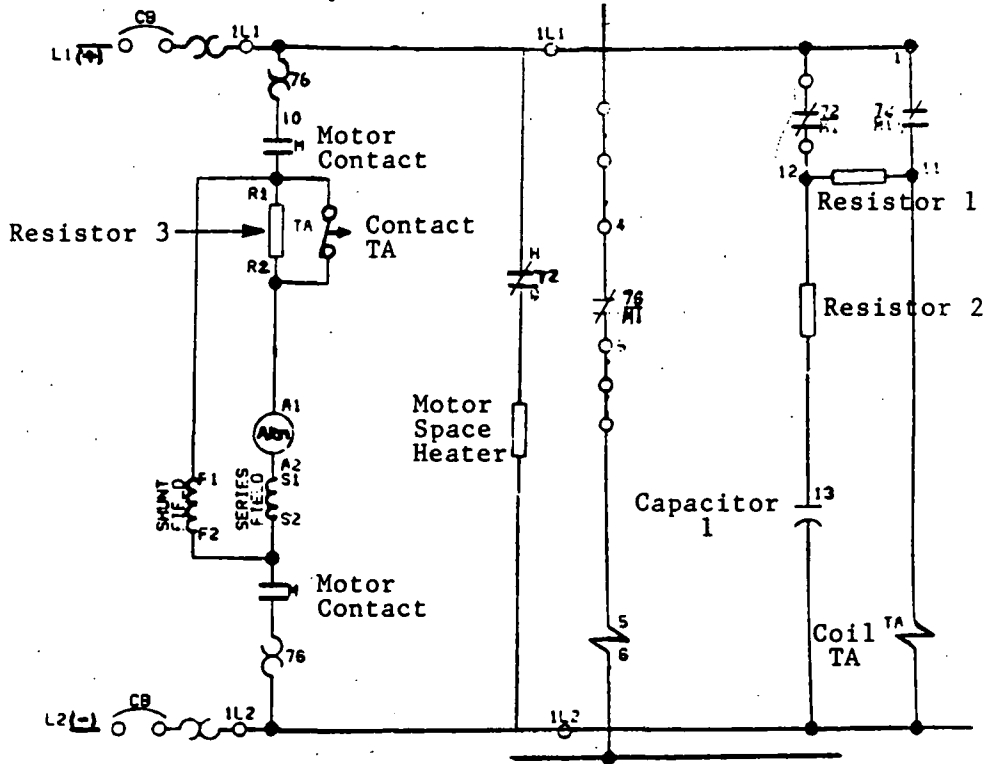
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8 | 9 | - | 0 | 1 | 1 | - | 0 | 0

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SIMPLIFIED CIRCUIT DIAGRAM
GLSO CONDENSER DRAIN PUMP MOTOR
STARTING CIRCUIT

Figure 1



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Telephone 815/942-2920

April 12, 1989

EDE LTR #89-301

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

Licensee Event Report #89-011-0, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR50.73(a)(2)(v)(D).

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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