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March 12, 1992

CWS LTR #92-148

U.S. Nuclear Regulatory Commission
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Licensee Event Report 92-07, Docket 050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(V)(D).

L. F. Hermes for 3/12/92
Charles W. Schroeder
Station Manager
Dresden Nuclear Power Station

CWS/cfq

Enclosure

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

(ZDVR/504)

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Dresden Nuclear Power Station, Unit 2	0 5 0 0 0 2 3 7	1 of 0 4

Title (4) HPCI Declared Inoperable Due to Turning Gear Engagement 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)
										None	
0 2	1 8	9 2	9 2	---	0 0 7	0 0	0 3	1 2	9 2		

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
	N	___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)
POWER LEVEL (10)	0 4 4	___ 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	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	B J	T G B	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 February 18, 1992 at 0740 hours, with Unit 2 at 44% rated core thermal power, while performing Dresden Operating Procedure (DOP) 2300-2, High Pressure Coolant Injection (HPCI) System Turning Gear Operation, the HPCI turning gear (TGR) could not be engaged from the Control Room. The HPCI system was declared inoperable and a seven day Limiting Condition for Operation (LCO) was entered per Technical Specification (TS) 3.5. The Technical Staff System Engineer was contacted to perform a walkdown of the engagement circuit. The walkdown identified degraded relay contacts in the auto-engage circuit; certain auxiliary contacts were also checked and found to be out of adjustment. In addition, due to a mispositioned spring clip, upon disengaging the TGR, the engagement arm was found to travel past its intended stop position. The Electrical Maintenance Department (EMD) replaced the auxiliary contacts and adjusted the engagement solenoid linkage to stop the engagement arm in the correct position when disengaged. The HPCI TGR was tested satisfactorily, and the seven day LCO was terminated on February 20, 1992. The Safety Significance of this event is minimal in that the HPCI System was available for core injection, if needed, and since all other Emergency Core Cooling Systems (ECCs) required by TS 3.5.C.2.a were operable. A previous non-reportable event involving Unit 3 HPCI TGR engagement difficulty occurred in August 1991.

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 Turning Gear Engagement Failure

A. CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: February 18, 1992 Event Time: 0740 Hours

Reactor Mode: N Mode Name: Run Power Level: 44%

Reactor Coolant System (RCS) Pressure: 959 psig

B. DESCRIPTION OF EVENT:

While performing Dresden Operating Procedure (DOP) 2300-2, High Pressure Coolant Injection (HPCI) System Turning Gear (TGR) Operation with Unit 2 at 44% power after startup from a maintenance outage, the Unit 2 Nuclear Station Operator (NSO) was unable to engage the HPCI TGR from the Control Room. The HPCI System Engineer was contacted to perform a walkdown of the TGR circuit. The walkdown identified degraded contacts associated with the engagement circuit. With the TGR not operating properly, the HPCI system was declared inoperable and a seven day Limiting Condition for Operation (LC0) was entered per Technical Specification (TS) 3.5. Work Request (WR) 06756 was written to investigate and repair the problem. The investigation revealed that the TGR Motor Auxiliary Contacts and the engagement solenoid spring clip and linkage were out of adjustment. The improper closure of these contacts prevented full voltage across the engagement solenoid. Further, the misadjustment of the engagement solenoid linkage and spring clip resulted in the engagement arm traveling past its intended stop position and binding when disengaging the TGR. The auxiliary contacts were replaced, and the solenoid linkage and spring clip were adjusted to prevent the engagement arm from traveling past its intended stop position when the TGR was disengaged. The TGR was tested satisfactorily and the seven day LCO was terminated at 2005 hours on February 20, 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. It should be noted, however, that this condition would not have prevented initial HPCI initiation for core injection.

The engagement solenoid consists of two coils. The purpose of the first coil, the engagement coil, is to engage the TGR when energized. Once the TGR is fully engaged, the purpose of the second coil, the holding coil, is to hold the mechanism in place for five seconds to allow time for the turning gear to catch and hold itself in place. Upon energizing the holding coil, current in the circuit is also reduced to minimize the potential for arcing when the relay contacts are opened.

Investigation into the problem revealed that the voltage drop across the engagement coil was low. With a low voltage to the engagement coil, the solenoid could not fully engage the TGR. Without the TGR fully engaged, the holding coil could not energize and reduce system current; therefore, when the relay contacts attempted to open, arcing occured. It was determined that the low voltage to the coils was caused by misadjusted TGR Motor Auxiliary Contacts in the engagement circuit. These contacts are located in a 250 VDC [EI] Distribution Cabinet, in Motor Control Center (MCC) 2A. This problem was compounded by the misadjusted engagement solenoid linkage and its associated spring clip. This misadjustment would sometimes allow the engagement arm to travel past its intended stop position and bind when the TGR was disengaged.

Investigation also revealed that a conduit was rerouted one day prior to the TGR event. Interference between the conduit and the solenoid linkage had been preventing the TGR engagement lever from fully disengaging. However, once the conduit was rerouted, the engagement arm began to travel past its intended stop position when disengaged due to the misadjusted engagement solenoid linkage and spring clip.

The engagement solenoid linkage was adjusted to prevent it from traveling past its intended position. In addition the auxiliary contacts were replaced to provide better solenoid voltage. The degraded relay contacts which arced when opened during high current were also changed following successful testing. The TGR was then engaged satisfactorily from the Control Room on February 20, 1992.

A history review indicated that a previous event involving Unit 3 HPCI TGR engagement difficulty occurred in August, 1991. During the investigation of this previous Unit 3 TGR concern, it was determined that contacts in the auto engage circuit degraded as a result of dirty auxiliary contacts in the TGR Motor circuit. As a result, the System Engineer conducted a review as well as a walkdown of the engagement circuitry to determine if immediate adjustments were needed for the Unit 2 TGR. No deficiencies in the engagement circuitry were identified at that time, although further inspection was planned for a later time when HPCI operability was not required. No Unit 2 TGR difficulties of this type had been encountered during the current operating cycle prior to the recent maintenance outage.

D. SAFETY ANALYSIS OF EVENT:

The HPCI TGR is used to cool the turbine shaft after system operation. Without the TGR, there is a possibility of the shaft bowing after prolonged system use. An Operability Evaluation was written on August 13, 1991 that addressed the operability of the HPCI system without TGR. The Evaluation concluded that the TGR function is needed to support HPCI restart under design basis accident conditions, and the ability to remotely engage the TGR is necessary to declare the HPCI system operable. Without the TGR, the HPCI system would still initiate and supply the necessary pump discharge pressure and flow. If the system were to operate for a prolonged period of time the shaft could manually be turned at the turbine to prevent bowing. In addition, the Isolation Condenser [BL] and Automatic Depressurization [SB] systems were operable throughout this event. Therefore, since HPCI initiation was possible without TGR and the necessary safety systems were operable during the time of this event, the safety significance of this event is minimal.

E. CORRECTIVE ACTIONS:

Due to the previous engagement problems, the System Engineer has submitted a request to Nuclear Engineering to review and evaluate TGR operation and design (249-200-91-05103).

A preventative maintenance (PM) program has been initiated by the Maintenance staff to check the TGR every refuel outage. This maintenance will include a functional test with voltage monitoring equipment by Electrical Maintenance Department (EMD) to determine if the engagement coils are functioning correctly. The gear will also be inspected by the Mechanical Maintenance Department (MMD) to determine if any adjustments are needed. The PM program will also inspect/replace other major components of TGR (i.e. TGR motor, Aux. DC contacts). This PM program will be in place by the Unit 2 D2R13 Refuel outage (249-200-91-05105).

F. PREVIOUS OCCURENCES:

A previous non-reportable event involving the Unit 3 HPCI TGR is listed below.

DVR NUMBERS	Title
12-3-91-51	HPCI Turning Gear Failure Due to Unknown Causes

Following planned maintenance to the HPCI TGR engagement circuit the TGR would not remain engaged. Corrective actions include adjustments to the TGR gears and linkage, initiation of a work request to diassemble and inspect the TGR, submission of a request for an evaluation by the Nuclear Engineering Department (NED), and the creation of various Preventative Maintenance (PM) programs to be conducted during refuel outages.

G. COMPONENT FAILURE DATA:

Manufacturer	Nomenclature	Model Number	Mfg. Part Number
General Electric	Turning Gear	N/A	N/A

An industry wide NPRDS data base search revealed several occurrences of TGR malfunction. These malfunctions were only reported by Dresden and Quad Cities Nuclear Power Stations. All of the failures involved the failure of the TGR to engage.