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10 CFR 50.73

March 30, 2004

SVPLTR: #04-0013

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station, Units 2 and 3
Facility Operating License Nos. DRP-19 and DRP-25
NRC Docket Nos. 50-237 and 50-249

Subject: Licensee Event Report 2004-002-00, "Unit 3 Automatic Scram Due To Main Turbine Low Oil Pressure Trip and Subsequent Discovery of Inoperability of the Units 2 and 3 High Pressure Coolant Injection Systems"

Enclosed is Licensee Event Report 2004-002-00, "Unit 3 Automatic Scram Due To Main Turbine Low Oil Pressure Trip and Subsequent Discovery of Inoperability of the Units 2 and 3 High Pressure Coolant Injection Systems," for Dresden Nuclear Power Station. These events are being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section," and 10 CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident."

Should you have any questions concerning this report, please contact Jeff Hansen, Regulatory Assurance Manager, at (815) 416-2800.

Respectfully,

Danny G. Bost
Site Vice President
Dresden Nuclear Power Station

Enclosure
cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Dresden Nuclear Power Station

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OBM NO. 3150-0104 EXP 7-31-2004
LICENSEE EVENT REPORT (LER)	Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

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4. TITLE Unit 3 Automatic Scram Due To Main Turbine Low Oil Pressure Trip and Subsequent Discovery of Inoperability of the Units 2 and 3 High Pressure Coolant Injection Systems

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Dresden Unit 2	05000237
01	30	2004	2004	– 002	– 00	03	30	2004	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	1
10. POWER LEVEL	097

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)	X	50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
George Papanic Jr.	(815) 416-2815

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED			15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On January 30, 2004, at 1155 hours (CST), with Unit 3 at 97 percent power in Mode 1, an automatic scram occurred due to a Main Turbine trip from low lube oil pressure. The event occurred during a swapping of lube oil coolers. After the scram, reactor water level increased above the Reactor Feed Pump High Level trip set point. Reactor water level was subsequently restored to normal and the Reactor Feed Pumps were restarted.

On February 1, 2004, at 0400 hours (CST), subsequent investigations into the January 30, 2004, event determined that the High Pressure Coolant Injection Systems for Dresden Units 2 and 3 were inoperable. The inoperability was due to evaluations that determined that the Feedwater Level Control System would not maintain the post scram reactor water level below that which would prevent water from entering the High Pressure Coolant Injection System's turbine steam line.

The root cause of the automatic scram was inadequate procedural guidance for the swapping of Main Turbine lube oil coolers. The root cause of the High Pressure Coolant Injection System inoperability was low margin in the Feedwater Level Control System to accommodate changes to the post-scram vessel level response. The corrective action to prevent reoccurrence of the scram is to modify procedure DOP 5100-04, "Turbine Oil Cooler Operation." The corrective action to prevent reoccurrence of the High Pressure Coolant Injection Systems inoperability is to modify the post-scram response of the Feedwater Level Control System.

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

Dresden Nuclear Power Station Units 2 and 3 are General Electric Company Boiling Water Reactors with a licensed maximum power level of 2957 megawatts thermal. The Energy Industry Identification System codes used in the text are identified as [XX].

A. Plant Conditions Prior to Event:

Unit: 03 Event Date: 1-30-2004 Event Time: 1155 CST
Reactor Mode: 1 Mode Name: Power Operation Power Level: 97 percent
Reactor Coolant System Pressure: 1000 psig

B. Description of Event:

On January 30, 2004, the Shift Manager decided to swap the Unit 3 Main Turbine Lube Oil Coolers [TD] as the Turbine Oil Continuous Filter Differential Pressure had been increasing for several days. On January 30, 2004, at 1155 hours (CST), with Unit 3 at 97 percent power in Mode 1, an automatic scram occurred due to a Main Turbine trip from low lube oil pressure. The event occurred during a swapping of lube oil coolers. Immediately following the scram, the position of the Feedwater Regulating Valves (FRVs) [SJ] increased from 56 percent (%) open to 63 %. The increase in the position of the FRVs, combined with the post-scram decreasing reactor pressure, caused an increase in total feedwater flow that led to the trip of the "B" Reactor Feedwater Pump (RFP) [P] on low suction pressure. Additionally, subsequent FRVs response to increasing reactor vessel level was not fast enough to prevent the level from reaching the RFP High Level trip set point and resulted in the tripping of the "A" and "C" RFPs. Reactor water level was subsequently restored to normal and the RFPs were restarted. All rods inserted and other than the feedwater response, all other system responded as expected to the automatic scram.

An Emergency Notification System (ENS) call was made on January 30, 2004, at 1335 hours (CST) for the above-described scram event. The assigned ENS event number was 40491.

On February 1, 2004, at 0400 hours (CST), subsequent investigations into the January 30, 2004 event determined that the High Pressure Coolant Injection (HPCI) Systems [BJ] for Dresden Units 2 and 3 were inoperable. An evaluation by engineering determined that the Feedwater Level Control System (FWLCS) [SJ] would not maintain the post-scram reactor water level below that which would prevent water from entering the HPCI turbine steam line. Dresden Units 2 and 3 have separate HPCI nozzles in the reactor vessels that are located approximately 50 inches below the main steam nozzles. Technical Specification (TS) 3.5.1, "ECCS-Operating," requires HPCI operable in Modes 1, 2 and 3 with reactor steam dome pressure greater than 150 pounds per square inch gage (psig). At the time of discovery, Unit 2 was in Mode 1 and Unit 3 was in Mode 4.

An ENS call for Unit 2 was made on February 1, 2004, at 0854 hours (CST) for the above-described HPCI event. The assigned ENS event number was 40494.

The Units 2 and 3 FWLCS post-scram level setpoints were modified on February 2, 2004 and HPCI was declared operable. Unit 3 was synchronized to the grid on February 2, 2004, at 1813 hours (CST).

These events are being reported in accordance with:

- 10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." The automatic actuation of the reactor protection system is listed in 10 CFR 50.73(a)(2)(iv)(B).

- 10 CFR 50.73(a)(2)(v)(D), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident." The HPCI is a single train system and the water was in the HPCI turbine steam line for approximately 20 minutes.

C. Cause of Event:

The root cause of the scram event was incorrect procedural guidance in Dresden Operating Procedure DOP 5100-04 "Turbine Oil Cooler Operation." The procedure directs the operator to stop filling the oncoming Main Turbine lube oil cooler prior to swapping. This caused air to be induced into the oncoming lube oil cooler from the hot lube oil volume being cooled by cold service water, and resulted in the Main Turbine trip from low lube oil pressure. This procedural guidance had been in place since 1991 and had been used approximately seven times since 1999. However, system realignment had only occurred once in the month of January.

The root cause of the HPCI inoperability was low margin in the FWLCS to accommodate changes to the post-scram vessel level response. The FWLCS is designed to respond to a scram by adjusting the vessel level set point from +30 inches to +5 inches and then after approximately 2 seconds, to lock the FRVs in place for approximately 15 seconds. After 15 seconds, the valve demand signal positions the FRVs at 30% of their previous position. At that time, the FWLCS reverts to controlling in the normal mode where the FRVs are positioned based on the rate of change in vessel level and the difference between the vessel level and the FWLCS set point.

Following the reactor scram on January 30, 2004, the following occurred.

- The position of the FRVs immediately increased from 56% open to 63% open during the approximately 2 seconds it takes for the FWLCS to lock the FRVs in place for 15 seconds. During this period, the increase in the position of the FRVs, combined with decreasing reactor pressure, caused an increase in total feedwater flow that led to the trip of the "B" RFP on low suction pressure. A RFP had not tripped on previous similar scrams, as the similar scrams occurred prior to the need to operate with 3 RFPs at full power.

- The FRVs began to close from 63% open at approximately 16 seconds after the scram signal due to the pulse down signal from the FWLCS to reposition the FRVs to 30% of their previous position. The FRVs never reached 30% of the previous position because at 24 seconds after the scram, FWLCS signaled the valves to reopen. At approximately 30 seconds after the scram signal the FWLCS signaled the FRVs to close. However, the rate at which the FRVs closed was not fast enough to prevent overfilling the vessel, tripping the "A" and "C" RFPs on high water level, and putting water into the HPCI steam supply line.

The FWLCS operated as designed during this event. The condition that the FWLCS had low margin to accommodate changes to the post-scram vessel level response was not known prior to this event because no analytical model capable of predicting the dynamic interaction between the FWLCS and other factors affecting vessel level was available. This resulted in the failure to adequately evaluate or test the post-scram response of the FWLCS prior to implementation of 3 RFP operation.

The immediate corrective actions for Units 2 and 3 were to lower the FWLCS post-scram vessel level set point from +5 inches to –10 inches. These set point changes provide reasonable assurance that a vessel overfill event will not recur.

The corrective action to prevent reoccurrence is to re-design the FWLCS post-scram response. Exelon Engineering will develop a dynamic model capable of accurately predicting the response of the FWLCS. This model will be benchmarked against the two most recent scrams and used to optimize the re-design. The modifications to install the improved FWLCS design will be implemented if necessary, during the next refueling outage of each unit or outage of sufficient duration after the development of the analytical model to predict the interaction of the FWLCS and post scram vessel level response.

D. Safety Analysis:

The safety significance of the scram event was minimal. All control rods fully inserted and other than the feedwater response, all systems responded as expected to the automatic scram.

The safety significance of the HPCI inoperability event was minimal. For Dresden Units 2 and 3, 2 transients and 2 design basis accidents have the potential for water carryover into the HPCI steam line and assume the availability of the HPCI for redundant long term inventory make-up. For these events, a conservative analysis has been performed using Automatic Depressurization System and low pressure Emergency Core Cooling Systems as an alternate core cooling sequence that demonstrates there is a substantial margin to predicted cladding perforation.

Therefore, the consequences of these events had minimal impact on the health and safety of the public and reactor safety.

E. Corrective Actions:

Procedure DOP 5100-04 has been revised.

The immediate corrective actions for Units 2 and 3 were to lower the FWLCS post-scram level set point from +5 inches to –10 inches.

Exelon will develop an analytical model to predict the interaction of the FWLCS and post scram vessel level response and if necessary, the FWLCS post-scram response will be modified.

F. Previous Occurrences:

A review of Dresden Nuclear Power Station Licensee Event Reports (LERs) and operating experience over the previous five years did not find any similar occurrences associated with the Main Turbine Lube Oil Coolers.

A review of Dresden Nuclear Power Station LERs identified that the most recent LER associated with the FWLCS and a reactor vessel high water level was LER 98-003-00, "Reactor Scram Results from MSIV Closure Caused by a Spurious Group 1 Isolation Signal due to Inadequate Preventive Maintenance." Following the scram, a feedwater transient occurred which resulted in water entering the HPCI steam supply line. The LER corrective actions included modifications to the FWLCS. The actions were successful in preventing water from entering the HPCI steam supply line during subsequent similar scram events when the plant was operated with 2 RFPs.

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

G. Component Failure Data:

NA