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10 CFR 50.73

June 23, 2004

SVPLTR: #04-0038

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

Dresden Nuclear Power Station, Unit 2
Facility Operating License No. DRP-19
NRC Docket No. 50-237

Subject: Licensee Event Report 2004-002-00, "Unit 2 SCRAM Due to Main Steam Isolation Valve Closure and Subsequent Inoperability of the Isolation Condenser"

Enclosed is Licensee Event Report 2004-002-00, "Unit 2 SCRAM Due to Main Steam Isolation Valve Closure and Subsequent Inoperability of the Isolation Condenser," 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)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications."

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

Respectfully,

David B. Wozniak for/

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

bcc: Officer of Nuclear Facility Safety – IEMA - DNS
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Dresden Regulatory Assurance, Subject File
SVP Numerical File – SVPLTR: #04-0038

E-MAIL: LER Completed
File electronic in L:\8360\8301\237\180\2004\2004-002-00

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 2 SCRAM Due To Main Steam Isolation Valve Closure and Subsequent Inoperability Of The Isolation Condenser

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 N/A	DOCKET NUMBER N/A
04	24	2004	2004	– 002 –	00	06	23	2004	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	1
10. POWER LEVEL	020

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)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	X	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 April 24, 2004, at 0603 hours (CDT), with Unit 2 at approximately 20 percent power in Mode 1 and the Main Turbine Generator off-line in preparation for a scheduled maintenance outage, an automatic scram occurred due to closure of the Main Steam Isolation Valves. During the event, Main Steam Isolation Valve 2-203-2B closed slower than allowed by Technical Specifications. There were no Electromatic or Safety Relief valve actuations and no Emergency Core Cooling System initiations. Primary Containment Isolation System Group 2 and 3 isolations occurred as expected. All other systems responded to the automatic scram as expected. The Isolation Condenser System was used for primary system pressure control and operated as expected for approximately 5 hours.

On April 24, 2004, at 1050 hours (CDT), with Unit 2 at zero percent power in Mode 3, the Isolation Condenser System was declared inoperable when valve 2-1301-3 could not be fully opened. The Reactor Water Cleanup System and Gland Seal System were subsequently used for pressure control.

The root cause of the Main Steam Isolation Valve closure and resulting scram was attributed to inadequate drainage of the Main Steam Lead Drain System. The corrective action to prevent reoccurrence is to inspect for foreign material in the Main Steam Lead Drain System and clean as necessary. The root cause of the failure of Isolation Condenser valve 2-1301-3 to open was attributed to procedural inadequacy associated with setting the valve's Open Torque Switch Bypass. The corrective action to prevent reoccurrence was to revise the procedure for setting the valve's Open Torque Switch Bypass.

Dresden Nuclear Power Station Unit 2 is a General Electric Company Boiling Water Reactor 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: 02 Event Date: 4-24-2004 Event Time: 0603 CDT
Reactor Mode: 1 Mode Name: Power Operation Power Level: 20 percent
Reactor Coolant System Pressure: 1000 psig

B. Description of Event:

On April 24, 2004, at 0603 hours (CDT), with Unit 2 at approximately 20 percent power in Mode 1 and the Main Turbine Generator [TA] [TB] off-line in preparation for a scheduled maintenance outage, an automatic scram occurred due to closure of the Main Steam Isolation Valves (MSIVs) [V]. One MSIV, 2-203-2B [V]], closed slower than allowed by Technical Specifications (TS). There were no Electromatic or Safety Relief valve [V] actuations and no Emergency Core Cooling System initiations. Primary Containment Isolation System Group 2 and 3 isolations occurred as expected. All other systems responded to the automatic scram as expected. The Isolation Condenser System (IC) [BL] was used for primary system pressure control and operated as expected for approximately 5 hours.

An ENS call was made on April 24, 2004, at 0800 hours (CDT) for the above-described scram event. The assigned ENS event number was 40702.

The IC was initiated for primary pressure control at 0616 hours (CDT) and IC valve 2-1301-3 [V], "IC Reactor Inlet Isolation Valve," opened satisfactorily. At 0953 hours (CDT), IC valve 2-1301-3 was closed. At 1048 hours (CDT), operations personnel in the control room were unable to fully open the valve and the valve was closed. On April 24, 2004, at 1050 hours (CDT), with Unit 2 at zero percent power in Mode 3, IC was declared inoperable. The Reactor Water Cleanup System and Gland Seal System were used for pressure control.

This event is 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 reactor protection system is listed in 10 CFR 50.73(a)(2)(iv)(B).

- 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications." TS 3.5.3, "IC System," requires that an inoperable IC be restored to operable status within 14 days. The Unit 2 IC was inoperable from October 8, 1999, to April 24, 2004, which exceeded the 14-day allowed outage time.

C. Cause of Event:

The root cause of the MSIV closure was attributed to inadequate drainage of the Main Steam Lead Drain System [SB].

Plant operation at a low steam flow rate provides the potential for an extremely low flow rate in at least one of the four main steam lines. The low steam flow rate can lead to moisture formation and water buildup in the main

steam lines. The Main Steam Lead Drain System is designed to drain water from the portion of the main steam lines between the steam chest and the Main Turbine high-pressure inlets.

On April 24, 2004, a maintenance outage was planned which required the removal of the Main Turbine Generator from service. The reactor was to remain critical during the outage with main steam being directed to the condenser by way of the Turbine Bypass Valves [V]. Five of the nine Turbine Bypass Valves were open prior to the planned turbine trip. As expected after the turbine trip, the bypass valves opened further, however approximately 12 seconds later a hydraulic pressure transient was experienced that induced actuation of the main steam low-pressure switches, MSIV closure and reactor scram.

An evaluation of the event has concluded that upon the turbine trip and subsequent turbine control valve closure, a volume of steam was trapped between the turbine control valve and a main steam line water slug. The steam bubble collapsed, which resulted in a rapid transport of the water slug towards the turbine control valves. The passage of the water slug through a turbine control valve caused Main Turbine steam chest pressurization. The hydraulic transient also created a reverse flow through the turbine stop valves and introduced a pressure load in the turbine stop valve upstream piping. The pressure loading in the turbine stop valve upstream piping was sufficient to induce actuation of the main steam low-pressure switches.

Dresden Engineering evaluated the Main Steam Lead Drain System's capabilities for moisture removal and determined that the system is adequately designed to remove the calculated moisture buildup provided all components operated as designed. The evaluation concluded that the main steam line water slug was caused by blockage within the Main Steam Lead Drain System at the inline strainer, orifice or within the system's piping due to foreign material.

Immediate corrective actions included the revision of Dresden procedure DGP 02-02, "Unit Shutdown," to require the opening of additional main steam line drain valves prior to reducing Main Turbine Generator load below 140 megawatts electric (Mwe). The corrective action to prevent reoccurrence is to inspect for foreign material in the Main Steam Lead Drain System and clean the system as necessary.

The root cause of the failure of IC valve 2-1301-3 to open was attributed to procedural inadequacy associated with setting the valve's Open Torque Switch Bypass.

Valve 2-1301-3 is a 12" gate valve that is used to throttle steam to the IC. The valve's stroke is limited by design to 1.625 inches rather than the full 12-inch stroke that is available to keep from choking the IC natural circulation heat exchanger and is accomplished by setting the Open Limit contact to open at 1.625 inches. This is considered the open electrical stroke. The valve's Open Torque Switch Bypass is to be set outside the open electrical stroke.

Investigation into the failure of IC valve 2-1301-3 discovered that the Open Torque Switch Bypass was set at approximately 60 percent of the open electrical stroke, which equates to approximately 0.975 inches of valve stroke. The incorrect setting of the Open Torque Switch Bypass in the open electrical stroke did not effect the initial operation of the valve. However, the addition of the thermal effects from the valve being in operation and then closed for approximately one hour caused the valve's opening torque to exceed the Open Torque Switch Bypass set point during the opening stroke and prevented the valve from opening to 1.625 inches.

The Open Torque Switch Bypass was last adjusted for IC valve 2-1301-3 on October 8, 1999. The procedure used was DEP 0040-10, Rev. 13, "MOV VOTES TEST PROCEDURE." The testing portion of the procedure requires the use of the MOV Set Point Binder for information regarding limit switch set points. The MOV Set Point Binder, as it existed in October 1999, identified the valve's Open Torque Switch Bypass to be set 4 to 6 inches of

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the full 12-inch stroke. Under the posttest evaluation portion of the procedure, which was performed independently following the actual data acquisition, the procedure required the verification that the Open Torque Switch Bypass opens at 50% to 70% of the full open stroke. Thus, procedure DEP 0040-10 had inconsistent requirements for the setting of the Open Torque Switch Bypass for IC valve 2-1301-3. Procedure DEP 0040-10 has been replaced with procedure MA-AA-723-300, "Review and Evaluation of Motor Operated Valve Test Data," and the new procedure does not have the above-identified ambiguities.

The corrective action to prevent reoccurrence for the failure of IC valve 2-1301-3 to open was to revise the procedure for setting the valve's Open Torque Switch Bypass.

TS Surveillance Requirement 3.6.1.3.6 requires that the isolation time for each MSIV be greater-than-or-equal-to 3 seconds and less-than-or-equal-to 5 seconds. Main steam line B isolation is accomplished by the closure of either of its MSIVs, 2-203-1B or 2-203-2B. During the scram, MSIV 2-203-1B successfully closed within the TS allowable values. The valve manifold to MSIV 2-203-2B was replaced and the valve performed within TS allowable values. The completion of the inspection of the replaced MSIV 2-203-2B manifold is being tracked in the Dresden Corrective Action Program.

D. Safety Analysis:

The Dresden Updated Final Safety Analysis Report (UFSAR) Section 15.2.4.1, "Inadvertent MSIV Closure with Direct Scram," analyzed various initiating plant events that can lead to MSIV closure and a resulting scram. The UFSAR classified these events as moderate frequency events and the results of the analyses demonstrated that the plant transient response is within design limits. Additionally, the Technical Specifications Bases for the IC states that although the IC is an Engineered Safety Features System, no credit in taken in the accident analyses for IC operation. Main steam line B isolation is accomplished by the closure of either of its MSIVs and during the scram, MSIV 2-203-1B successfully closed within the TS allowable values. Therefore, the consequences of these events had minimal impact on the health and safety of the public and reactor safety.

E. Corrective Actions:

Dresden procedure DGP 02-02, "Unit Shutdown," was revised to require the opening of additional main steam line drain valves prior to reducing Main Turbine Generator load below 140 Mwe.

The Main Steam Lead Drain System will be inspected for foreign material and cleaned as necessary.

Procedure DEP 0040-10 has been replaced with procedure MA-AA-723-300 for the setting of a valve's Open Torque Switch Bypass.

MSIV 2-203-3B was repaired.

Main Steam low-pressure switch design will be reviewed for adequacy against vendor and industry experience.

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F. Previous Occurrences:

A review of Dresden Nuclear Power Station Licensee Event Reports (LERs) and operating experience over the previous six years identified the following Dresden LERs.

Dresden Unit 3 LER 1998-003, "Reactor Scram Results from MSIV Closure Caused By a Spurious Group 1 Isolation Signal Due to Inadequate Preventive Maintenance," described an event that occurred on April 9, 1998, in which a spurious signal resulted MSIV closure and a Unit 3 scram from approximately 99 percent power. The cause of the event was discovered to be dirty and oxidized contacts associated with a circuit relay.

Dresden LER 1999-005, Isolation Condenser Inoperable Due to Valve Actuator Motor Pinion Key Becoming Dislodged," described an event that occurred on July 10, 1999, in which it was discovered that an IC valve could not be electrically opened. The cause of the event was discovered to be a dislodged valve pinion key.

G. Component Failure Data:

NA