

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 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-8 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.

FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2	DOCKET NUMBER (2) 05000237	PAGE (3) 1 of 3
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TITLE (4)
Unit 2 Rod Block Monitor Inoperable due to Failed Diode

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 NAME	DOCKET NUMBER
03	20	99	99	003	00	04	19	99	N/A	N/A
									N/A	N/A

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10) 100		20.2203(a)(2)(i)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.405(a)(1)(ii)	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)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	X 50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME K. W. Robbins, System Engineer	TELEPHONE NUMBER (Include Area Code) (815) 942-2920 ext 2314
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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	IG	RECT	Unknown	N					

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

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

On March 20, 1999, during routine Control Rod Drive (CRD) exercising on Unit 2, it was observed that the four-rod display on panel 902-5 indicated an improper number of Local Power Range Monitor (LPRM) inputs to the Rod Block Monitor (RBM) for the rod selected. Troubleshooting revealed that a diode had shorted, preventing proper operation of the Count Circuit and providing an improper number of LPRM inputs when some rods were selected. The cause of the diode failure is unknown. The corrective action was to replace the diode. The safety consequences of this event are minimal. This report is submitted pursuant to 10 CFR 50.73(a)(2)(vii)(D).

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2	DOCKET (2) 05000237	LER NUMBER (6)			PAGE (3) 2 OF 3
		YEAR 99	SEQUENTIAL NUMBER 003	REVISION NUMBER 00	

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:

Unit 2 Rod Block Monitor Inoperable due to Failed Diode

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2	Event Date: 3/20/99	Event Time: 1757 CDT
Reactor Mode: 1	Mode Name: Run	Power Level: 100

Reactor Coolant System Pressure: 1000 psig

No systems or components were inoperable or out of service at the start of this event which contributed to the event.

B. DESCRIPTION OF EVENT:

This event was initially reported pursuant to 10 CFR 50.72(b)(1)(iii)(D) which requires four hour notification of any condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. Following a thorough review of this event and the Updated Final Safety Analysis Report (UFSAR), it has been determined that the Rod Block Monitor [IG] (RBM) is designed to mitigate the rod withdrawal error (RWE) transient. It has been shown analytically that even with a failure of the RBM, no fuel damage will result during the RWE. This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(vii)(D), which requires the reporting of any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to mitigate the consequences of an accident.

On March 20, 1999, as control rods were selected during a routine Unit 2 Control Rod Drive [AA] (CRD) exercise, it was observed that false Local Power Range Monitor [IG] (LPRM) indications were displayed on the Upper and Lower Right displays of the Four Rod Display section of panel 902-5 when any rod was selected that should have no LPRM indication displayed in the Upper and Lower Right displays.

On March 20, 1999, the Instrument Maintenance Department (IMD) completed troubleshooting, with support from an IMD Maintenance Specialist. The fault was isolated to a shorted diode.

Under normal conditions, when one of two specific two-string rods (06-27(A-7) or 06-31(A-8)) is selected, this diode provides input to the RBM Count circuit that a two-rod has been selected. This establishes the reference for the Count Circuit INOP trip. In addition, when a different two-string rod is selected, this diode prevents the K1 relay, which directs the LPRM inputs to the four-rod display, from picking up. With this diode short-circuited, the K1 relay would pick up any time a two-string rod was selected. This allowed LPRM 08-25 to always input to the lower right display and 08-33 to input to the upper right display when a two-string rod was selected.

C. CAUSE OF EVENT:

The cause of this event was a shorted diode (NRC Cause Code X). This failure is considered an isolated event and further analysis is not required.

D. SAFETY ANALYSIS

The RBM system is designed to prevent local fuel damage as a result of a single rod withdrawal error under the worst permitted RBM bypass conditions. Also, the RBM system provides a signal to permit operator evaluation of

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	YEAR 99	SEQUENTIAL NUMBER 003	REVISION NUMBER 00	3 OF 3

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

the change in the local relative power level in the vicinity of a rod that is being withdrawn.

A detailed analysis was made of the functional requirements of the RBM. The analysis revealed that the rod block monitor system performs no primary reactor protection function.

The analysis results from the latest reload licensing package indicate that the delta Critical Power Ratio (CPR) calculated for the RWE without RBM is bounded by the feedwater controller failure event. The calculated peak LHGR during the RWE is compared to the LHGR limit associated with one percent plastic strain in the cladding. The results of this comparison are such that fuel damage is not expected during the event. Therefore the safety consequences of this event are minimal.

E. CORRECTIVE ACTIONS:

The diode was replaced per work request 990029578-01. (Complete)

F. PREVIOUS OCCURRENCES:

A review of Dresden operating experience revealed one event related to rod block monitors. The result is as follows:

237-180-98-01500: Unit 2 Rod Block Monitor Inoperable due to Improper Setting of the Input LPRM Low Level Bypass Trip Reference due to Inadequate Design Documentation. This event occurred because of an improperly set reference voltage. The corrective actions were to obtain the correct reference voltage from the vendor and make appropriate system calibrations. These actions were not effective in preventing this event from occurring because they were not intended to prevent a component from failing. However, they were effective in ensuring the proper operation of the input monitoring circuit, averaging circuit and count circuit.

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model/ Part Number</u>
Unknown	AR6Z11CR2	1N914

The diode that failed was an original component on the card (GE part number 136B1351G1). The diode was replaced in lieu of card replacement due to operational time restrictions.