NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	1 OF 6

TITLE (4)
Undetected Thermal Limit Violation Due to Personnel Error

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: None	DOCKET NUMBER
09	12	93	93	-- 020 --	02	11	16	95	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9): N
POWER LEVEL (10): 062

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71(c)
	20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)		OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
	20.2203(a)(2)(iv)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
	20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
C. de la Hoz, Plant Engineering Ext. 2997	(815) 942-2920

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

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 15 single-spaced typewritten lines) (16)

On September 12, 1993 the Fuel Design Limiting Ratio for Centerline Melt (FDLRC) thermal limit was violated during a xenon transient which resulted from an earlier load drop and subsequent recovery. The violation went unnoticed at the time and as a result appropriate actions as specified by the Technical Specifications were not taken. The violation condition existed for a period of nearly two and one half hours during the evening of September 12. The maximum value of the FDLRC thermal limit was exceeded by 0.4%. Discovery of the event did not occur until the following morning during routine review of computer output by the Nuclear Engineers. After review of events described in LER 95-005-00 (Docket Number 0500249), it was determined that the true root cause of this event was the informal control of planned reactivity changes. The previous root cause has been changed to a contributing cause: failure of the Qualified Nuclear Engineer (QNE) responsible for monitoring the unit to periodically review core conditions. New corrective actions include formalizing planned reactivity changes, briefing/ training of on-coming shift personnel and nuclear engineers on the event, reassigning the Unit QNEs' System responsibilities. No previous events were found involving failure to follow technical specification required actions after a thermal limit violation.

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:

Undetected Thermal Limit Violation Due to Personnel Error

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 09/12/93 Event Time: 1952 hours

Reactor Mode: N Mode Name: Run Power Level: 62%

Reactor Coolant System Pressure: 949 psig

B. DESCRIPTION OF EVENT:

On September 12, 1993 at approximately 1533 hours, control rod [AA] maneuvers were completed on Unit 2. The control rod maneuvers were required to return the unit to a full power target rod pattern following a unit load reduction on the previous shift to facilitate Main Steam Isolation Valve [JM] timing. The Qualified Nuclear Engineer (QNE) involved in the maneuvers left the site at approximately 1553 hours on the same day. At 1952 hours, with Unit 2 maintaining steady load at approximately 62 percent of rated core thermal power, the Fuel Design Limiting Ratio for Centerline Melt (FDLRC) exceeded its limit of 1.0 specified in Technical Specification 3.5.K. This violation was the result of a local xenon transient which was initiated by the rod maneuvers that had been completed several hours earlier. FDLRC returned to a value less than the Technical Specification limit at 2218 hours on September 12, 1993 as the xenon transient continued. The value of FDLRC went unnoticed throughout the time period in which it exceeded 1.0.

Technical Specification 3.5.K requires that FDLRC be checked daily during reactor power operation at greater than or equal to 25 percent rated core thermal power. This requirement is met through Appendix A, Unit 2(3) Operator's Daily Surveillance Log, which requires that thermal hydraulic limits be checked once each day in accordance with DOS 500-15, Operator's Surveillance of Thermal-Hydraulic Limits on Power Distribution, when the unit is in the Run mode. This surveillance is performed as part of the Shift 2 (day shift) daily surveillances. When the surveillance was performed on September 12 on Shift 2 all limits were within required specifications. There was no requirement for shift personnel to check the FDLRC thermal limit value during Shift 3 on September 12, which was when the violation occurred. Since the FDLRC violation was not discovered until after the fact, the actions specified in Technical Specification 3.5.K were not taken.

The maximum value of FDLRC during the event was 1.004. The violation was discovered at 0950 hours on September 13, 1993 by the Unit Nuclear Engineer during routine review of the Unit 2 PRIME computer [ID] output. At the time of discovery FDLRC was within specifications, so no immediate actions were required to reduce the value of the thermal limit. Immediate corrective actions consisted of initiation of a Problem Identification Form (PIF).

C. CAUSE OF EVENT:

This event is being reported in accordance with Title 10 of the Code of Federal Regulations (CFR) Part 50 Section 73(a)(2)(i)(B), which states that any operation or condition prohibited by the plant's Technical Specifications must be reported.

An investigation into the event was conducted by the System Engineering Nuclear Group. The thermal limit violation resulted from a local xenon transient following rod maneuvers on September 12, 1993. The fact that this violation was never noticed and therefore never acted upon is a result of two factors.

During the review of a similar event on March 22, 1995, documented in LER 95-005-00, Docket Number 0500249, the root cause of this event was determined to be incorrect. This LER (93-020-01, Docket 0500237) is being supplied to enter the correct root cause and new corrective actions. The root cause of this event is the informal control of planned reactivity changes. The process for making reactivity changes did not provide a formal means for preparation and review of the evolution prior to its occurrence, nor did it provide for proper monitoring of thermal limits by Operations personnel. Rather, the station relied upon the informal monitoring of the unit by a single individual.

A contributing cause of the unnoticed thermal limit violation was personnel error. The station QNEs are expected to monitor thermal limits and provide advice concerning appropriate actions to maintain these values below their limits. DGP 3-1, Routine Power Changes, Attachment A, provides general guidance for QNE coverage and responsibilities during various plant evolutions. This guidance includes a requirement to monitor transient conditions to ensure adherence to thermal limits and preconditioning guidelines. This responsibility was not adequately fulfilled during this event. At the time the QNE involved in the rod pulls exited the site, the maximum value of FDLRC was 0.836. The QNE anticipated a local xenon transient following the rod maneuvers, but did not expect the magnitude of the transient to be sufficient to cause FDLRC to approach or exceed its Technical Specification limit. However the QNE intended to log in to the station's PRIME computer from a home terminal later in the evening, as permitted by DGP 3-1 Attachment A, to verify that all thermal limits and preconditioning guidelines were adhered to. The QNE unintentionally failed to perform this verification from home and as a result was unaware that the value of FDLRC was approaching its Technical Specification limit.

D. SAFETY ANALYSIS:

FDLRC is a transient LHGR limit calculated for each fuel node (one six inch segment of one fuel bundle) which is designed to protect the fuel in the event of an overpower transient up to 120 percent of rated core thermal power. Operation with the maximum value of FDLRC less that its limit of 1.0 provides assurance that, in the event of an overpower transient, centerline melt of the fuel pellets in all nodes of the core will be avoided and 1 percent of plastic strain on the cladding will not be exceeded. During this event, unit power was maintained constant at approximately 62 percent of rated core thermal power.

Technical Specification 3.5.K requires one of two possible courses of action in the event that FDLRC is found to exceed its limit. The first is to adjust the Average Power Range Monitor (APRM) scram and rod block settings by a factor of 1/FDLRC. This is generally accomplished by increasing the APRM gains by a factor of FDLRC, which effectively produces the same result and is an option presented in the action statement. The second option is to adjust the core power distribution such that FDLRC no longer exceeds its limit. There is no time limit given for completion of either action. Since the violation during this event was unnoticed, neither of these actions was taken. However, the course of the xenon transient caused the core power distribution to change such that the maximum value of FDLRC was reduced to less than 1.0 by 2218 hours on September 12, 1993.

Only one fuel node exceeded the FDLRC limit during this event and the maximum value of FDLRC for this node was 1.004. All other nodes were within specifications at all times. In addition, no other thermal limits or preconditioning guidelines were violated at any time during the event and fuel integrity was not challenged.

For the reasons stated above, the safety significance of this event was minimal. However, had a transient occurred during this two hour time period which caused core thermal power to reach 120 percent of rated core thermal power, fuel integrity may have been challenged for the single node in violation.

E. CORRECTIVE ACTIONS:

At the time of discovery of this event, the maximum FDLRC value was within limits. Therefore the only immediate corrective action necessary was the initiation of a PIF.

The contributing cause of the unnoticed thermal limit violation was personnel error. The QNE involved with the rod maneuvers on September 12 failed to verify that the resulting xenon transient would not cause thermal limit or preconditioning guideline violations. The QNE has discussed the event with the Lead Nuclear Engineer (LNE) and the Reactor Engineer (RE) to ensure a full understanding of the expectations for QNEs while monitoring the units during transient conditions. In addition, the QNE prepared a writeup describing this event as well as lessons learned and presented the write up and discussed the event with all members of the System Engineering Nuclear Group. The write up was also included in the QNE required reading package.

New corrective actions, documented in LER 95-005-00, Docket Number 0500249 are:

1. Dresden Station created a Reactivity Maneuver Approval Form (RMA), which was generated for all planned reactivity changes. The purpose of the RMA is to:

   a. document and control the overall evolution and important plant conditions for the planned reactivity change including potential interactions among multiple procedures,

   b. communicate to Operations Personnel the information necessary to authorize, execute and monitor the planned change,

c. provide a consolidated list of activities in progress which affect reactivity,

d. require two QNEs to complete and review along with Unit Supervisor authorization.

2. A memorandum from the investigation team and signed by the Dresden Reactor Engineer, dated March 24, 1995, was sent to the Operating Shift Personnel. The memorandum describes the RMA and utilization of the RMA as a communication of critical technical information to assure that reactor and plant conditions will remain within the assumptions necessary to ensure conservative execution of the planned activity.

3. Dresden Station created a new interim procedure, IP 95-23, to formalize planning, execution and monitoring of reactivity changes utilizing the RMA. The interim procedure requires planned reactivity changes that are not specifically addressed by an approved site procedure be prepared by a QNE and reviewed by a second QNE prior to authorization by the Unit Supervisor. As evolution-specific procedures are enhanced to include reactivity management guidance and as experience is gained on the use of the RMA, the interim procedure will be revised to define which evolutions require this level of planning and review.

4. Following approval and prior to the implementation of the interim procedure, Operations personnel were trained on the interim procedure.

5. Dresden has developed an improved method for performing scram timing.

6. Provided Powerplex overview monitoring screen at NSO console.

7. Operators were trained on the event and conducted thermal limit review.

8. On March 27, 1995, the Nuclear Engineering Group was placed on probation until March 31, 1995, when the engineers had completed retraining on the appropriate core parameters to monitor during scram testing and major Xenon transients. Managements' expectations on notification requirements were communicated to the Nuclear Group.

9. Reiterated Managements' expectation that a QNEs' primary responsibility is reactivity management. The QNE involved in this event presented a review and analysis to emphasize this expectation to the NE Group.

10. System responsibilities currently assigned to the Unit QNEs were reassigned to a new Nuclear Group Engineer.

11. The Reactor Engineer has reiterated to the QNEs that they shall notify the Operations Shift immediately when reactivity management events occur.

F. PREVIOUS OCCURRENCES:

LER/Docket Numbers	Title
CDE 12-3-92-206	Procedural Discrepancy During DTS 300-2

During the Unit 3 Startup on December 30, 1992, a PIF was written due to exceeding the Technical Specification limit of 1.0 for FDLRC without prompt notification of the SCRE. The LNE provided training to all QNEs and Nuclear Engineers in Training on expectations for reporting suspected problems with reactor operations to the Shift Supervisor. A copy of the report was included in the QNE required reading book. This event was not reportable because the required actions specified in the Technical Specifications were taken at the time of the FDLRC violation.

G. COMPONENT FAILURE DATA:

This event did not involve component failure.