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10 CFR 50.73



November 18, 1999

JMHLTR: #99-0121

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

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

Subject: Licensee Event Report 1999-005-00, "Unanticipated loss of Level in Reactor Cavity/Fuel Pool during Refueling Activities due to Open Electromatic Relief Valve"

The enclosed Licensee Event Report, which is an interim report, describes the Unanticipated loss of Level in Reactor Cavity/Fuel Pool during Refueling Activities due to Open Electromatic Relief Valve. This condition is being reported pursuant to 10CFR50.73(a)(2)(iv), which requires the reporting of "any event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

The following immediate actions were taken:

The "E" ERV pilot assembly was replaced. The station has quarantined the removed component for performance of a component failure analysis.

This correspondence contains the following commitments:

A supplemental LER will be submitted including a review of the Post Maintenance Testing (PMT) process, system readiness and work request package control, incorporating any additional corrective actions.

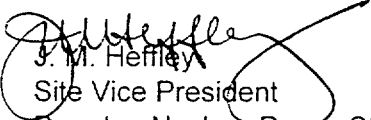
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Should you have any questions, please contact D. F. Ambler, Dresden Regulatory Assurance Manager at (815) 942-2920 extension, 3800.

Respectfully,


J. M. Henley
Site Vice President
Dresden Nuclear Power Station

Enclosure

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

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory information collection request: 50 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-6 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. If an 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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05000237

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TITLE (4)
Unanticipated Loss of Level in Reactor Cavity/Fuel Pool during Refueling Activities due to Open Electromatic Relief Valve

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	19	1999	1999	005	00	11	18	1999	N/A	N/A
									N/A	N/A

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)								
POWER LEVEL (10)	00	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)		
		20.2203(a)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)		
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
		20.2203(a)(2)(ii)		20.2203(a)(4)	X	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)		50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)
 NAME: **Ralph M. Fenili, Staff Analyst NGG**
 TELEPHONE NUMBER (Include Area Code): **(815) 942-2920 ext 2917**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES	If yes, complete EXPECTED SUBMISSION DATE)			NO	02	27

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

On October 19, 1999, at approximately 1715 hours, following removal of the Main Steam Line (MSL) "B" plug by Reactor Services, an inadvertent draindown of the Unit 2 Reactor Cavity commenced. Operations personnel immediately recognized the event in progress, and took appropriate actions to terminate the event. After notifying the Outage Control Center (OCC), Control Room personnel manually started the 2B Core Spray Pump and established an initial injection rate of 2600 gallons per minute to restore and control cavity water level. In parallel, Reactor Services was directed to reinstall the MSL plugs that had been removed. At approximately 1750 hours, personnel entered the Unit 2 Drywell and identified that water was flowing through the "E" Electromatic Relief Valve (ERV). The "E" ERV closed following mechanical agitation of its associated pilot valve assembly, terminating the event.

The Prompt Investigation concluded that the event was due to the failure of the "E" ERV Pilot Valve to re-seat following a post maintenance test. The most probable cause of the failure to re-seat appears to be either mechanical or the presence of foreign material in the pilot valve assembly. Immediate corrective measures included removal / replacement of the pilot valve assembly. A Supplemental LER will be submitted following pilot assembly disassembly, inspection and cause determination. The Nuclear Safety Significance of this event was determined to be minimal.

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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:

Unanticipated Loss of Level in Reactor Cavity/Fuel Pool during Refueling Activities due to Open Electromatic Relief Valve.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2	Event Date: 10-19-99	Event Time: 1715
Reactor Mode: 5	Mode Name: Refuel	Power Level: 00
Reactor Coolant System Pressure: 0 psig		

Unit 2 was in Operational Mode 5, day 18 of Refueling Outage D2R16. Main Steam Line plugs were being removed to support upcoming vessel draindown activities. The Fuel Pool Gates were open.

B. DESCRIPTION OF EVENT:

This LER is being submitted pursuant to 10 CFR 50.73 (a)(2)(iv), which states the licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF).

Prior to October 15, 1999, maintenance activities were performed on the Main Steam [SB] ERVs. This included removal and replacement of 2 ERVs (one of which is the "E" ERV), and removal / bench testing of all four ERV pilot solenoids. During the installation, a mechanical blocking device (referred to as a "gag") was installed just below the local manual actuator arm to prevent accidental actuation by bumping the actuator arm.

On October 19, 1999 at approximately 0300 hours, Electrical Maintenance workers (with Operations support) successfully cycled all four ERVs from the MCR to verify operability of the open/close limit switches. At approximately 1535 hours, Reactor Services relaxed the mechanical seal on the "B" MSL plug. Initial cavity water level indicated about 465 inches.

At approximately 1715 hours, just after Reactor services pulled the plug in the "B" MSL, the Non-Licensed Operator (NLO) on the refuel floor reported that the Fuel Pool Cooling (FPC) [DA] System Skimmer Tank level was dropping steadily. In parallel with the NLO's observation, Control Room Operators received the FPC Skimmer Below Normal Level alarm. The Control Room notified the OCC of the event in progress.

At 1721 hours, the Unit 2 FPC pump tripped on low-level in the FPC skimmer surge tank. Control Room operators identified that the reactor cavity level was beginning to decreasing slowly.

At 1724 hours, the 2"C" Shutdown Cooling Pump (SDC) [BO] tripped on low suction pressure. (Note: During refueling activities, the 2"C" SDC pump is aligned to the Fuel Pool System for decay heat removal. As reactor cavity and pool levels decrease, water flow into the skimmer surge tank through an installed weir plate stops. Without a source of makeup into the tank from the pool, suction is lost to these FPC and SDC pumps.)

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At 1725 hours, Operations began to add water to the primary system using the 2"A" Core Spray ECCS Keep Fill system [BM]. Also, Operations closed AO 2-1901-57, FPC system reject to 2/3"A" CST, per DOP 1900-03. Cavity indicated level was 460 inches.

At 1730 hours, the Operations Outage Manager (OOM) directed Reactor Services to reinstall the MSL plugs, starting with the "B" MSL first. (Up to this point, three plugs had been removed). MCR personnel started 2"B" Core Spray pump and established a 2600 gpm injection rate. The cavity water level stopped decreasing and began slowly rising. Wide Range Torus level indication had increased from 11.2 feet to 11.7 feet.

At 1750 hours, the Outage Manager, Drywell Coordinator and the Reactor Services Manager entered the U2 Drywell and identified that water was flowing through the open "E" ERV. The Outage Manager mechanically agitated the pilot valve by hand, heard a pop as the pilot stem moved to the full up position, and flow through the ERV ceased. The MCR was notified and subsequent monitoring of cavity level confirmed level was no longer decreasing. The Outage Manager then noted that the gag device was still on the "E" ERV pilot valve, though noted to be in a lower position than normal. He obtained the appropriate tools and repositioned the gagging device correctly prior to leaving the ERV.

At 1800 hours, the "B" MSL plug installation was complete. Cavity level was stable with no Core Spray makeup. The order to install the other two MSL plugs was rescinded.

At 1821 hours, an ENS call was made regarding ECCS injection into the reactor cavity due to the open ERV. The Shift Manager requested a Prompt Investigation. No other systems, components or structures were identified which contributed to the isolation event.

C. CAUSE OF EVENT:

Based upon review of the maintenance work packages, the investigation concluded that the gagging device was in place when the "E" ERV was cycled. When cycled, the downward force of the solenoid plunger against the actuator arm was sufficient to force the gag downward (into its final resting position as found by the Outage Manager on October 19, 1999). This repositioning of the gagging device was sufficient to permit the actuator arm to contact the pilot stem, and permit successful completion of the position indication limit switch checks. When personnel entered the Drywell for troubleshooting during the draindown event, the "E" ERV was found to be open, and the ERV was subsequently closed. The Outage Manager did not reposition the gagging-device until after the "E" ERV was closed. This confirmed his visual observation that the gagging device was not hindering the movement of the pilot stem through contact with the pilot spring cover (see attached drawing).

Based on the sequence of events and the investigation above, the event sequence was determined to be as follows:

Before the MSL "B" plug was pulled on October 19, 1999 at 1525 hours, MSL plugs "C" and "D" were pulled. Even though the MSLs are cross-tied just upstream of the inboard MSIVs, the crosstie-piping diameter is small and would preclude a rapid filling of the other MSLs. Once the MSL "B" plug was removed, the approximate 70 feet of cavity water head pressure seen at the ERV established an approximate 30 psi differential pressure across the ERV permitting the main seat to open. Agitation of the pilot valve permitted repositioning of the stem and allowed ERV closure.

The inadvertent opening of the ERV was caused by failure of the ERV pilot valve to reseal after being cycled for a post maintenance testing. The probable cause for the "E" ERV Pilot valve's failure to close appears to be either a mechanical defect or the intrusion of foreign material during pilot valve assembly. Following performance of a component failure analysis, a supplemental LER will be issued, incorporating any additional corrective actions.

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D. SAFETY ANALYSIS

Assuming no operator intervention, the flowpath established during the event sequence would have resulted in self-termination once cavity level reached the Main Steam Lines, with core submergence maintained. Additionally, with the fuel pool gates removed, the pool level decrease also self-terminates upon reaching the bottom of the transfer canal, assuring spent fuel submergence. As demonstrated during this event, adequate ECCS systems remained available during refueling activities to assure long-term core submergence through their ability to provide makeup into the reactor vessel.

Operations response to this event was prompt and limited the level decrease to approximately 5 inches. Task monitoring during MSL plug removal clearly demonstrated methodical implementation, clear communications and parameter monitoring (locally and in the Control Room) to high standards, resulting in prompt identification and correction. At all times a minimum water level of twenty-three feet was maintained above the fuel in the spent fuel pool and fifty feet of water was maintained above the reactor core. Evaluation of the event concluded that fuel integrity was never challenged and core submergence maintained. As a result, the Nuclear Safety Significance of the event was deemed minimal.

E. CORRECTIVE ACTIONS:

- The "E" ERV pilot assembly was replaced. The station has quarantined the removed component for performance of a component failure analysis. (Complete)
- Following performance of a formal component failure analysis, a supplemental LER will be submitted including a review of the Post Maintenance Testing (PMT) process, system readiness and work request package control, incorporating any additional corrective actions.
- (ATI# 18034)

F. PREVIOUS OCCURRENCES:

A review of station and industry events since 1995 failed to identify any similar events.

G. COMPONENT FAILURE DATA:

To be provided after component disassembly and cause determination in a supplemental document.

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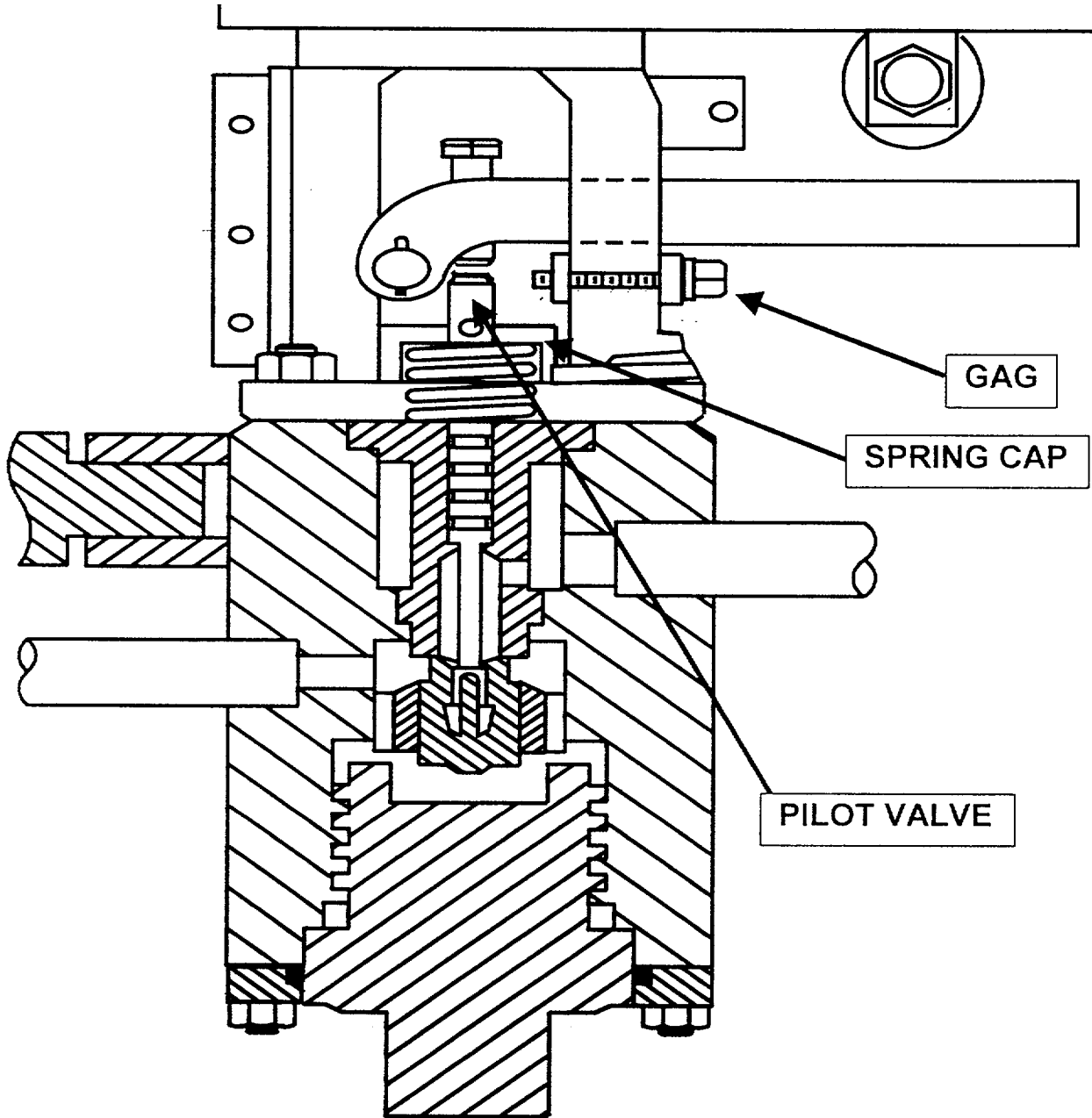


Figure 1
ERV Pilot Valve Diagram