



**Commonwealth Edison**  
Dresden Nuclear Power Station  
R.R. #1  
Morris, Illinois 60450  
Telephone 815/942-2920

September 29, 1991

EDE LTR #91-580

U.S. Nuclear Regulatory Commission  
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Licensee Event Report #91-028-0, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(i)(B).

E. D. Eenigenburg  
Station Manager  
Dresden Nuclear Power Station

EDE/ade

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III  
NRC Resident Inspector's Office  
File/NRC  
File/Numerical

(ZDVR/322)

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*Handwritten initials/signature*

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Dresden Nuclear Power Station, Unit 2	Docket Number (2) 0   5   0   0   0   2   3   7	Page (3) 1   of   0   6
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Title (4) Violation of Technical Specification Limit on Torus Water Bulk Temperature 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 Names	Docket Number(s)									
0	9	0	1	9	1	---	0	2	8	---	0	1	0	0	1	9	1		

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																						
POWER LEVEL (10)	0	4	7	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	Other (Specify in Abstract below and in Text)

LICENSEE CONTACT FOR THIS LER (12)															
Name R. H. Johnson, Operating Experience Group Leader								Ext. 2674				TELEPHONE NUMBER AREA CODE 8   1   5   9   4   2   -   2   9   2   10			

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
X	B   J	L   S	M   0   4   0	Y							

SUPPLEMENTAL REPORT EXPECTED (14)								Expected Submission Date (15)			
Yes (If yes, complete EXPECTED SUBMISSION DATE)								X   NO			

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

At 1959 hours on 9/1/91, with Unit 2 operating at 47% rated core thermal power, torus water bulk temperature exceeded 95 degrees F (without testing in progress) in violation of Technical Specification 3.7.A.1.c.(1). This requires entry into Technical Specification 3.0.A which requires that the unit be in hot shutdown within 12 hours. Shift supervision was aware of the rising torus water bulk temperature and was preparing to initiate torus cooling. Shift Supervision failed to identify and secure the source of heat addition to the torus until after the temperature reached a maximum value of approximately 97 degrees F. The root cause was personnel error by Shift Supervision in failing to initially recognize 95 degrees F as a Technical Specification limit, with contributing factors of procedural deficiency and miscommunication. This event was of minimal safety significance because of the low reactor power levels since startup earlier that day. Torus water bulk temperature was reduced below 95 degrees F at 0157 on 9/2/91, and the Limiting Condition for Operation (LCO) was terminated 0230 on 9/2/91 when the torus water bulk temperature was reduced to 92 degrees F. Corrective action initiated to prevent recurrence of this type of event included counseling the appropriate Shift Supervisors, continuing training of licensed operators on expectations for communications and on Technical Specifications and their interpretation, procedure revisions, and requesting a Technical Specification amendment to add an action statement to section 3.7.A.1.c.(1). A previous event in which the torus water bulk temperature exceeded 95 degrees F was reported by LER 90-006/050237.

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TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]

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:

Violation of Technical Specification Limit on Torus Water Bulk Temperature Due to Personnel Error

A. CONDITIONS PRIOR TO EVENT:

Unit: 2                                      Event Date: September 1, 1991                                      Event Time: 1959 Hours  
 Reactor Mode: N                                      Mode Name: Run                                      Power Level(S): 47%  
 Reactor Coolant System (RCS) Pressure: 970 psig

B. DESCRIPTION OF EVENT:

Unit startup was in progress during Shift 1 on September 1, 1991. The reactor [AC] was taken critical at 0000 hours. The High Pressure Coolant Injection (HPCI) [BJ] drain pot bypass valve, A02-2301-31, was cycled in an attempt to clear alarm 902-3 B-11 for HPCI turbine inlet drain pot high level. Dresden Annunciator Procedure (DAN) 902(3)-3 B-11 for the HPCI turbine inlet drain pot high level alarm specifies that if cycling the A02-2301-31, steam trap bypass valve, fails to clear the alarm, then drain the drain pot to the torus. After cycling valve A02-2301-31 failed to clear the alarm, valve A02-2301-28 was opened at approximately 0500 hours to establish the drain path from the drain pot to the torus. Because the alarm was due to a stuck level switch (not determined until Shift 3 later that day), the alarm did not clear and steam from the HPCI steam line flowed to the torus and began heating the torus water.

The main generator was placed on-line at 1057 hours. Generator load was increased (with brief holds at 95, 180, 250, and 300 MWe) until the unit reached approximately 350 MWe at 1510 hours.

Intermittent Torus Water Bulk Temperature Hi annunciator alarms began on Shift 2. The annunciator windows 902-4 A-18 and C-18 read "DIV 1 TORUS WTR BULK TEMP HI" and "DIV 2 TORUS WTR BULK TEMP HI." In response to the first annunciator alarm, the Unit Nuclear Station Operator (NSO) had checked the front and back panel temperature recorders and found the temperature to be between 90 and 92 degrees Fahrenheit (F). The Shift Engineer also checked the torus temperature and observed it to be near 90 degrees F. The annunciator alarms are calibrated for 93 +/- 2 degrees F (although the annunciator procedures state that the setpoint is 95 degrees F). The Unit NSO continued to monitor the torus water bulk temperature during the remainder of Shift 2.

At the time of the turnover from Shift 2 to Shift 3 (approximately 1500 hours), one of the high torus water bulk temperature annunciator alarms was up continuously and the second annunciator alarm was intermittent. The Shift 3 Unit NSO observed that the HPCI Drain Pot high level alarm was up and that a drain path was open to the torus in addition to the normal drain path to the main condenser [SG].

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TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

The Shift 3 Shift Engineer began corrective actions for the torus temperature in response to the annunciator alarms. Under direction of the Shift Engineer, the Station Control Room Engineer (SCRE) requested that Chemistry take Low Pressure Coolant Injection (LPCI) [B0] system water samples in preparation for running LPCI and the Containment Cooling Service Water (CCSW) [BI] system. Dresden Operating Procedure (DOP) 1500-2, Torus Water Cooling Mode of Low Pressure Coolant Injection System, includes a prerequisite to complete Dresden Operating Surveillance (DOS) 1500-8 (which requires analysis results for the samples) "if time permits prior to starting CCSW Pumps on either heat exchanger." Chemistry Dept. records indicate that the A loop sample was taken at approximately 1635 hours and the B loop sample was taken at approximately 1645 hours. Radiochemical analysis of the samples was completed at approximately 2056 hours.

Early in Shift 3, the Shift Engineer was informed by the unit NSO that valve A02-2301-28 was open to the torus in an attempt to clear the HPCI Drain Pot Hi Level alarm, and the Shift Engineer observed that the torus water bulk temperature recorder reading was near 90 degrees F, slightly above the Unit 3 torus water bulk temperature reading of 87 degrees F. The SCRE and Unit Shift Supervisor were also aware of the HPCI drain pot and torus temperature alarms. Later, the unit NSO logged a torus water bulk temperature of 92 degrees F on Unit Operator's Daily Surveillance Log. The Unit Operator's Daily Surveillance Log includes a note that the action level for this value is 93 degrees F and also includes a reference to 95 degrees F as a Technical Specification value.

Computer point history data indicates that the torus bulk water temperature reached 93 degrees F at approximately 1700 hours, shortly after the LPCI samples had been taken.

The unit NSO logged reaching a torus water temperature of 95 degrees F at 1959 hours and notified the SCRE. The SCRE acknowledged the 95 degrees F value and informed the NSO that LPCI samples had already been requested in preparation for torus cooling. When the LPCI sample analysis results were received from Chemistry, the Shift Engineer and SCRE performed the activity release calculations using DOS 1500-8. Shortly before 2200 hours, the Shift Engineer noted the Unit NSO's log entry of the 95 degrees F torus temperature and, in response, checked the back panel indications for Main Steam [SB] relief valve tailpipe temperatures, but found no indication of relief valve leakage. The Shift Engineer and SCRE failed to recognize that 95 degrees F was a Technical Specification limit.

Immediately after the tailpipe temperatures were checked, a call was received from the Unit Shift Supervisor who reported hearing steam flow in the line from the HPCI drain pot and suspecting that level switch LSH2-2365 was stuck. Tapping the level switch cleared the alarm, and the NSO closed valves A02-2301-28 and A02-2301-31 at 2200 hours, thus stopping the heat addition to the torus. Computer point history data indicates that the maximum torus water temperature during this event was approximately 97 degrees F.

Immediately following the call from the Unit Shift Supervisor, the Shift Engineer answered questions from a non-licensed operator assigned to perform the LPCI system venting in preparation for initiating torus cooling. Dresden Operating Procedure (DOP) 1500-2 includes a prerequisite that "In other than emergency conditions, ensure that the LPCI System is vented for a minimum of five minutes prior to starting LPCI Pumps."

The non-licensed operator left to perform the venting. Approximately 10 minutes later, however, prior to completion of the venting checklist, Operations personnel received an emergency call that the non-licensed operator's wife had begun labor. The Shift Engineer released the non-licensed operator from work and initiated a call for a relief; in addition, another non-licensed operator was held over from Shift 3 to Shift 1. (The venting procedure requires that one operator perform the venting and a second operator perform a verification.)

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The turnover from Shift 3 to Shift 1 included the calculations for the LPCI samples and the incomplete venting checklist. Shift Supervision for Shift 1 decided to conservatively repeat the entire venting because of the incomplete checklist from Shift 3. CCSW pumps were started at 0130 hours, and the NSO logged venting completed as of 0145 hours. Torus cooling began at approximately 0148 hours (based on computer point history data) and the NSO logged maximum torus cooling at 0152 hours. By approximately 0157 hours (based on computer point history data) torus temperature had dropped below 95 degrees F.

At approximately 0100 to 0130 hours, the Shift 1 SCRE raised a concern that Technical Specifications applied to the 95 degrees F torus temperature value. At approximately 0200 hours, the review of Technical Specifications by the Shift Engineer and SCRE determined that 95 degrees F was a Technical Specification Limiting Condition for Operation (LCO) with no specific remedial action requirements and, consequently, that LCO 3.0.A required that the unit be in hot shutdown within 12 hours unless the condition were corrected. Operations Department Technical Specification Interpretation Memo #02 requires that unit shutdown begin immediately upon entering LCO 3.0.A., but this requirement was recognized by the Shift Engineer too late to initiate a shutdown prior to exiting the LCO. At 0230 hours, torus bulk water temperature had been reduced to 92 degrees F and termination of the 95 degrees F LCO was logged. A Regulatory Assurance investigation team was assembled by station management to determine causes behind the event and to initiate appropriate corrective actions.

C. APPARENT CAUSE OF EVENT:

This event is reported in accordance with 10CFR50.73(a)(2)(i)(B) which requires the reporting of any event or condition prohibited by Technical Specifications.

The root cause of this event is attributed to personnel error by the Shift 3 Shift Engineer and SCRE in failing to recognize a torus water bulk temperature of 95 degrees F (without testing in progress) as a Technical Specification limit. Consequently, they did not give a high work priority to correcting the problem with the HPCI drain pot. Had the HPCI drain pot alarm been investigated and corrected promptly, the Technical Specification limit would not have been exceeded.

Failure of Shift 2 personnel to investigate the HPCI drain pot alarm was a contributing factor in this event. The alarm had been discussed in the turnover from the Shift 1 NSO to the Shift 2 NSO. The torus temperature alarm occurred late in Shift 2 and the Shift Engineer and NSO checked the torus water bulk temperature, the Shift Engineer stated, however, that because the torus temperature was near 90 degrees F and near ambient, he did not feel compelled to take action. Had the HPCI drain pot alarm been investigated and corrected by Shift 2 personnel, the Technical Specification limit would not have been exceeded.

Procedure deficiency was a contributing factor in this event. DAN 902-3 B-11 failed to identify a stuck level switch as one of the probable causes of the alarm, and no time limit is given for the action of attempting to clear the alarm by establishing a drain path to the torus. Dresden Operating Abnormal Procedure (DOA) 902-4 A-18 and C-18 failed to reference the Technical Specification limits on torus water bulk temperature. Technical Specification references are required as part of the annunciator procedure upgrade currently in progress, but DOA 902(3)-4 A-18 and C-18 have not been upgraded.

Miscommunication was a contributing factor in this event. The NSO stated that he recognized that 95 degrees F was a Technical Specification limit. The NSO informed the SCRE when that temperature was reached, but assumed that the SCRE would recognize that a Technical Specification LCO had been entered. The NSO believed incorrectly that Technical Specifications allowed 24 hours to correct the problem, and the SCRE had responded to the NSO that preparation for torus cooling was underway.

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D. SAFETY ANALYSIS OF EVENT:

The safety significance of reaching a maximum torus water bulk temperature of 97 degrees F during this event is minimal. Technical Specification Bases Section 3.7 and Updated Final Safety Analysis Report Section 5.2.3.1 discuss the torus water inventory as based on limiting the torus bulk water temperature to 145 degrees following a loss of coolant accident (LOCA). A 50 degree F temperature rise in torus bulk water temperature due to the LOCA is used in the analysis. The Technical Specification Bases discuss this as being well below the 170 degrees F temperature "that is conservatively taken to be the limit for complete condensation of the reactor coolant, although condensation would occur for temperatures above 170.

The reduction in margin with a torus water bulk temperature of 97 degrees F is minimal, and is less than the reduction in margin allowed by Technical Specification 3.7.A.c.(2) during testing which adds heat to the torus. During such testing, torus water bulk temperatures of up to 105 degrees F are permitted for up to 24 hours. Technical Specification 3.7.A.c.(3) requires that the reactor shall be scrammed from any operating condition if the torus water bulk temperature reaches 110 degrees F.

In addition, because the reactor had operated at low power levels since unit startup earlier on 9/1/91, the core had a decay heat inventory lower than that which is present during extended full-power operation.

E. CORRECTIVE ACTIONS:

The following corrective actions were initiated to prevent recurrence of this type of event:

1. The Assistant Superintendent of Operations counseled three Shift Engineers, a SCRE, and a Unit Shift Supervisor involved in this event on the need for awareness of Technical Specification requirements, on the need for closer attention to annunciator alarms for safety systems, and on the station policy with respect to Technical Specification 3.0.A.
2. Licensed Operator continuing training will review Technical Specification 3.0.A., Technical Specifications Section 3.7, and Technical Specification Interpretation memos (237-200-91-15601).
3. DAN 902(3)-3 B-11 will be revised by the Operations Department to add a stuck level switch as one of the probable causes of the alarm and to account for this cause in the required Operator Actions (237-200-91-15602).
4. DOA 902(3)-4 A-18 and C-18 will be revised by the Operations Department to clarify the alarm setpoint and to add the proper Technical Specification references (237-200-91-15603).
5. DOS 1500-8 will be revised by the Operations Department to clarify when LPCI water sampling/analysis is required prior to initiating torus cooling (237-200-91-15604).
6. Both licensed and non-licensed operators will be trained on Operations Department expectations for communications, including the following (237-200-91-15605):
  - a. Referencing relevant Technical Specifications and procedures.
  - b. Repeating back critical information.

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- 7. HPCI Drain Pot Level Switch LSH2-2365 will be inspected, repaired, or replaced, as necessary, under Work Request 03796 (237-200-91-15606).
- 8. The Regulatory Assurance Department will initiate a request to amend Technical Specification 3.7.A.1.c.(1) to add remedial action requirements (237-200-91-15607).

F. PREVIOUS OCCURENCES:

LER/Docket Numbers    Title

90-006/050237    Target Rock Safety-Relief Valve Fails Open Due to a Steam Cut Pilot Valve Disc

The 2-203-3A Target Rock Safety-Relief Valve spuriously opened with reactor at 87% power. Attempts to close the valve using station procedures were unsuccessful, and the reactor was manually scrammed. The maximum torus water bulk temperature during the event was 122 degrees F.

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
Magnetrol Intl. Inc.	Level Switch	402	N/A

An industry wide Nuclear Plant Reliability Data System (NPRDS) data base search revealed that nine failures of this model had been reported by the industry, including four at Dresden 2. Only one of the nine failures appears to involve a stuck level switch.