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August 1, 1991

EDE LTR #91-473

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Licensee Event Report #91-015, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(i)(A).

E. D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/dwh

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
File/NRC
File/Numerical

(ZDVR/272)

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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Dresden Nuclear Power Station, Unit 2 Docket Number (2) 0 15 10 10 10 12 13 17 Page (3) 1 of 0 6

Title (4) Orderly Unit Shutdown Due to Leakage Through Primary Containment Isolation Valves A0 2-220-44 and A0 2-220-45

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	7	0	9	9	1	0	15	0	0	18	0	1	9	1	N/A	
															N/A	

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)									
POWER LEVEL (10)		20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)			
0 5 1		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)			
		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		Other (Specify in Abstract below and in Text)			
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)					
		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)					
		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)					

LICENSEE CONTACT FOR THIS LER (12)

Name: Ronald R. Skoglund, Technical Staff System Engineer Ext. 2543
 TELEPHONE NUMBER: AREA CODE 8 1 5 9 4 12 -2 9 12 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	A	D	I S V B 3 1 4	Y							
X	A	D	I S V B 3 1 4	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 approximately 1330 hours on July 9, 1991, with Unit 2 at 51% power, a water leak was discovered at a piping penetration from the "A" Reactor Water Clean-Up Heat Exchanger Room. Air operated Reactor Recirculation sample line Primary Containment isolation valves A0 2-220-44 and A0 2-220-45 were closed in an attempt to isolate the leak. However, the leakage was not secured. At 1700 hours the A0 2-220-44 and A0 2-220-45 valves were declared inoperable as a conservative measure pending further investigation. An entry was then made into the "A" Reactor Water Clean-Up Heat Exchanger Room to close manual valve 2-1299-15 to stop the leakage; the leakage source was identified as a non-safety related tubing fitting. A 24 hour Limiting Condition for Operation was entered per Technical Specification 3.7.D.3 because integrity of the A0 2-220-44 and A0 2-220-45 valves was in question. A primary containment drywell entry was made at 40 percent power to close manual valve 2-220-102 to assure primary containment integrity. Cold shutdown was reached at 2000 hours on July 10, 1991. The safety significance of this event was minimal because testing confirmed that the leakage did not exceed Technical Specification limits. Corrective actions included the machining of the valve seating surfaces and valve maintenance procedure improvement; further actions that are being investigated include a different valve design for this application and extending the safety related boundary to a downstream valve. A previous event involving these valves was reported by LER 91-05/050237.

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TEXT Energy Industry Identification System (EIIS) 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:

Orderly Unit Shutdown Due to Leakage Through Primary Containment Isolation [JM] Valves AO 2-220-44 and AO 2-220-45.

A. CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: July 9, 1991 Event Time: 1700 Hours

Reactor Mode: N Mode Name: Run Power Level: 51%

Reactor Coolant System (RCS) Pressure: 938 psig

B. DESCRIPTION OF EVENT:

At approximately 1330 hours on July 9, 1991, with Unit 2 at 51% power while performing a Reactor Water Clean-Up (RWCU) [CE] modification walkdown, a water leak was found at the penetration between the "A" RWCU Heat Exchanger Room and the Reactor Building [NG]. The leakage was identified by an engineer performing design work, and was brought to the attention of Operations Shift Supervision. Upon investigation, this leak was determined to be a minor fitting leak on non-safety related tubing downstream of the air operated (AO) Reactor Recirculation [AD] sample line Primary Containment air operated isolation valves AO 2-220-44 and AO 2-220-45. A Nuclear Station Operator (NSO) was then asked to close the AO 2-220-44 and AO 2-220-45 valves; however, continued inspection of the area by Operations personnel found that the leakage did not stop. A Shift Supervisor then entered the "A" RWCU Heat Exchanger Room and closed manual valve 2-1299-15 located downstream of the AO 2-220-45 valve and the leak stopped, indicating that both containment isolation valves were leaking through. Acting in a conservative manner, the AO 2-220-44 and AO 2-220-45 valves were then declared inoperable at 1700 hours pending further investigation, resulting in an entry into a 24 hour Limiting Condition for Operation (LCO) per Technical Specification 3.7.D.3. An orderly Unit 2 shutdown was begun at 2040 hours. The Four Hour Notification concerning the Primary Containment isolation valves and the One Hour Notification for beginning the Unit shutdown were both made at 2038 hours. A Primary Containment Drywell entry was made at 40% power to close upstream manual valve 2-220-102 at 1430 hours on July 10, 1991, assuring primary containment integrity and the 24 hour LCO was terminated. An orderly shutdown of the Unit was completed at 2000 hours on July 10, 1991.

C. APPARENT CAUSE OF EVENT:

This event is submitted in accordance with 10CFR50.73 (a)(2)(i)(A), which requires the reporting of the completion of any shutdown required by the Technical Specifications. However, it should be noted that the LCO requirement to achieve cold shutdown within 24 hours was exited after 21.5 hours when the inboard manual isolation valve was closed; also, investigation and testing concluded that Technical Specification leakage limits were not violated.

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A maintenance history review was performed on the Reactor Recirculation sample line Primary Containment isolation valves on both Dresden Units 2 and 3. The physical differences between Unit 2 and Unit 3 such as valve location and line flow were discounted as contributors to valve leakage. The maintenance history records revealed that previous maintenance on the Unit 3 valves included replacing the air operator diaphragm and the valve packing. No work was performed that could affect the seating surface of the valves. The A0 2-220-44 valve internals were re-machined in August 1990, after it would not isolate a packing leak on the A0 2-220-45 valve. In March 1991, the valve internals on A0 2-220-44 and A0 2-220-45 valves were re-machined after the downstream line was discovered leaking. Galling was noted in both valves at this time.

Upon disassembly of the A0 2-220-44 valve on July 11, 1991, no wire draw marks were present; therefore, steam cutting or erosion were discounted. The plug's seating surface contained a 3/4 inch long galling mark on the seating surface. Subsequent machining revealed that the galling mark was approximately 10 thousandths of an inch deep. A similar galling mark was on the seating surface of the seat. The galling has been determined to be the cause of the excessive leakage. The galling is believed to have occurred during maintenance activities while setting stem travel or adjusting the valve to reduce its leakage in March 1991. An underlying root cause involved Dresden Maintenance Procedure (DMP) 0040-06, Copes-Vulcan Valve and Reverse Acting (Air to Open) Operator Maintenance, which failed to mention that damage could be done to the seating surface by rotating the plug in place.

D. SAFETY ANALYSIS OF EVENT:

A0 2-220-44 and A0 2-220-45 are Primary Containment Group I [JM] isolation valves and will close when one of the following conditions is met:

- Reactor low-low water level
- Main steam line high flow
- Main steam line high radiation
- Main steam line tunnel high temperature
- Main steam line low pressure

The purpose of isolating the reactor recirculation sample line is to prevent the release of radioactive material in accordance with 10CFR100. The Copes Vulcan, Model D-100-60 valves that are currently being utilized as Reactor Recirculation sample line Primary Containment isolation valves exert a seating force of approximately 500 pounds per linear inch of seating circumference. A value between 300 and 600 pounds per linear inch is acceptable per ANSI B16.104. This force is adequate to allow the valves to close when necessary. Prior to any maintenance activities, an as found local leak rate test (LLRT) was performed to measure the as found leakage rate. The total as found leak rate for the A0 2-220-44/A0 2-220-45 test volume was 43.7 standard cubic feet per hour (SCFH). This leakage, when added to existing containment leakage data, was well below the allowable limits for total leakage of Primary Containment. It should also be noted that the majority of this leakage (41.5 SCFH) was attributed to the A0 2-220-44 valve; as such, through leakage from this volume was minimal. However, the valves were declared inoperable and an orderly Unit shutdown was initiated as a conservative operating practice upon identification of the leak because it could not be quantified and due to concern that the valves had exhibited leakage previously. The LCO requiring achievement of cold shutdown within 24 hours was terminated within 21.5 hours when the inboard manual valve 2-220-102 was closed. Therefore, the safety significance of this event was minimal.

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E. CORRECTIVE ACTIONS:

The immediate corrective actions included machining the seating surfaces on the A0 2-220-44 valve. During the as-found LLRT, 41.5 SCFH of the 43.7 SCFH leakage was determined to be leaking through the A0 2-220-44 valve. After all valve work was completed, Dresden Operating Surveillance (DOS) 1600-1, Quarterly Valve Timing, was performed. The leaking sample line was also repaired.

After completion of all maintenance activities and backflushing, an as-left LLRT showed a leakage of 4.1 SCFH, which verified satisfactory integrity of the valves. An On-Site review of this event and the corrective actions implemented was also completed prior to startup.

Because valves A0 2-220-44 and A0 2-220-45 have had several occasions where corrective maintenance work has been required, several further corrective actions are being considered to improve the performance of these valves:

1. Potential design changes are being evaluated by the Nuclear Engineering Department. This evaluation will include a modification to replace these valves on both Units (237-200-91-11401).
2. An engineering study is being performed to extend the safety related boundary out to the 2-1299-28 valve so that credit may be taken for the 2-1299-28 valve as a safety related isolation valve as a contingency measure in the case that a similar event occurs in the future. (237-200-91-11402).
3. The Mechanical Maintenance Department will revise DMP 0040-06, Copes-Vulcan Valve and Reverse Acting (Air to Open) Operator Maintenance, to include a caution against rotating the valve plug while it is in contact with the seat (237-200-91-11403).

F. PREVIOUS OCCURENCES:

<u>LER/Docket Numbers</u>	<u>Title</u>
91-005/05000237	Orderly Unit Shutdown Due to Leakage Through Primary Containment Isolation Valves A0 2-220-44 and A0 2-220-45

A0 2-220-44 and A0 2-220-45 valves were identified to be leaking through after a fitting leak was discovered and could only be isolated with manual valves. Conservative actions were taken and the Unit was shutdown. Corrective actions included repacking, replacing the stem, machining the seating surfaces and investigating possible replacement of these valves.

<u>Non-Reportable Event No.</u>	<u>Title</u>
12-2-90-19/21	Failure of Primary Containment Isolation Valves A0 2-220-44 and A0 2-220-45 Due to Mechanical Binding

This event involved separate failures of valves A0 2-220-44 and 2-220-45. Corrective Actions included repacking, lubrication, further maintenance during the subsequent refuel outage, and implementation of preventative maintenance surveillances for packing replacement and diaphragm replacement.

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G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
Copes Vulcan (Division of Blaw Knox)	Diaphragm Operated Control Valve	D-100-60	N/A

An industry wide NPRDS data base search revealed 63 failures of similar valves. The root cause of these failures include packing leaks, leaking through due to normal wear, steam cutting, and unknown causes.

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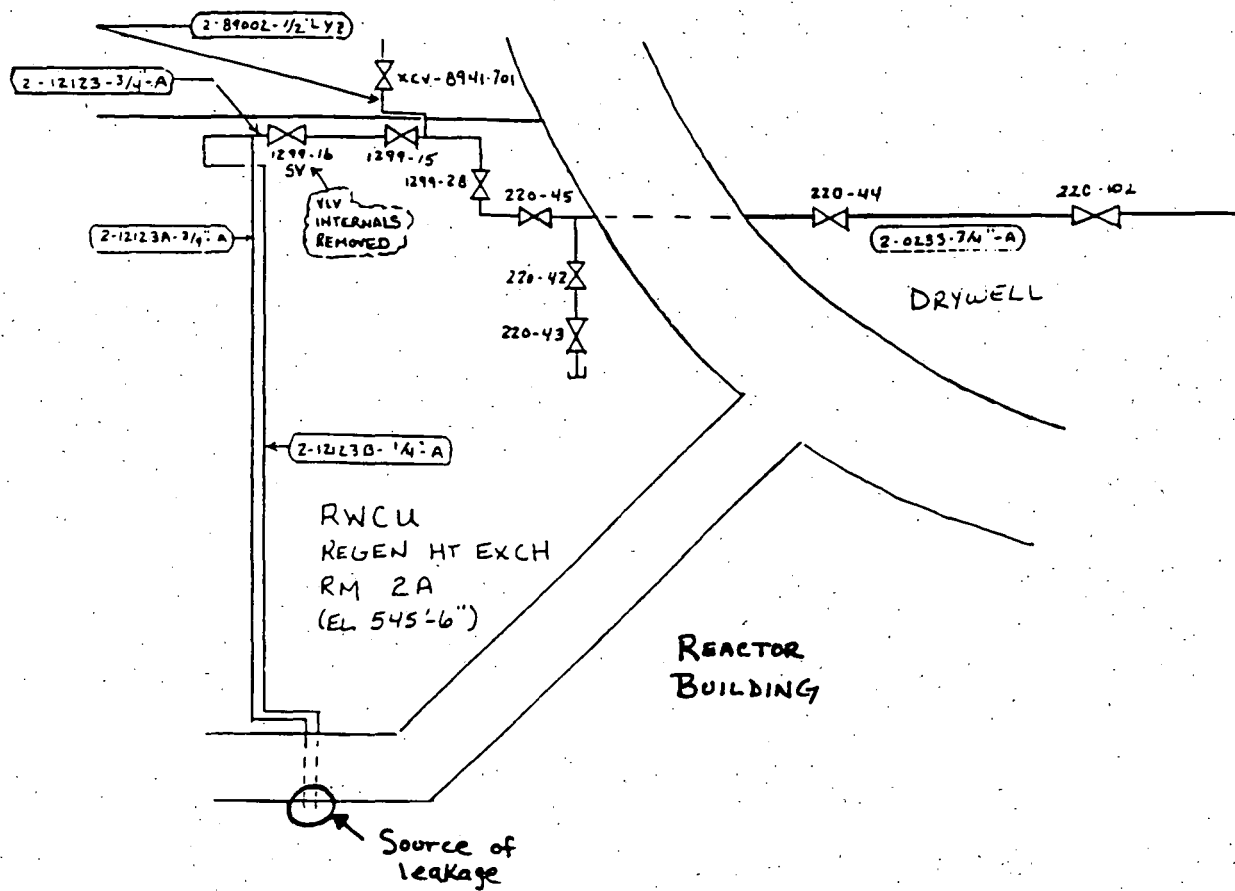


FIGURE 1