



Commonwealth Edison

Dresden Nuclear Power Station

R.R. #1

Morris, Illinois 60450

Telephone 815/942-2920

September 4, 1991

EDE LTR #91-545

U.S. Nuclear Regulatory Commission
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Licensee Event Report #91-023-0, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(v).

E. D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/ade

Enclosure

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

(ZDVR/299)

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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 5

Title (4) 2A Recirculation Pump Discharge Motor-Operated Valve Failure to Close

Due to Torque Switch Setting Problem

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	8	0	17	9	1	9	1	1	N/A	
0	8	0	17	9	1	9	1	1	N/A	

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	3	7	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
				<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> in Abstract
				<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> below and in	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> Text)

LICENSEE CONTACT FOR THIS LER (12)

Name	Diego Estrella, Technical Staff System Engineer						Ext.	2354	TELEPHONE NUMBER	AREA CODE								
									8	1	5	9	4	12	-12	19	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	2	0	Y				

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> Yes (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	Expected Submission Date (15)	Month	Day	Year
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On August 7, 1991 at 0215 hours, with Unit 2 at 37% power, while attempting to start the 2A Recirculation pump, the pump discharge motor-operated valve (MOV) 2-0202-5A would not close. Troubleshooting revealed that the closing power contactor for the motor was dropping out shortly after close signal initiation. The Low Pressure Coolant Injection (LPCI) System was declared inoperable because this MOV is included in LPCI initiation logic. The Electrical Maintenance Department analyzed strip chart recorder motor current traces of the MOV and determined that the close torque switch was causing the MOV to trip early. Maintenance personnel made a primary containment entry to temporarily bypass the open-to-close torque switch for 77% of valve closing stroke by installing jumpers at the limit switch assembly. Analysis by the Nuclear Engineering Department (NED) revealed an incorrect torque switch setting for MOV 2-0202-5A. This problem was attributed to an erroneous determination of the force-axis zero coordinate during an earlier valve diagnostic test. On August 10, 1991, the torque switch bypass limit switch was returned to normal and the torque switch setting was raised per NED instructions. The safety significance for this event was mitigated by the availability of the Core Spray Subsystems. Review of system records indicated no previous adverse trend concerning diagnostic test interpretation problems. Corrective actions included implementation of an improved version of diagnostic computer software and enhancements concerning the diagnostic testing review process.

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

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with 10CFR50.73(a)(2)(v)(D), which requires the reporting of any event or 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.

During the previous Unit 2 refuel outage, D2R12, a VOTES test was performed on both M02-0202-5 valves. The VOTES trace for M02-0202-5A, though, had indicated possible stem and yoke abnormalities. The Station MOV Coordinator had contacted NED for guidance in marking M02-0202-5A force versus time referenced VOTES trace events. Review of the diagnostic testing data with NED had concluded that disassembly of the MOV was not required, and that the test data had been appropriately interpreted.

Re-evaluation of the previous VOTES testing data for this MOV after the failure indicates that an interpretation problem had occurred concerning establishment of a zero reference point on a force-versus-time VOTES trace. The most important item to note concerns the stem nut tension to compression transition area. This point is also known as the VOTES trace ZERO due to the zero forces between the stem and stem nut. All other valve events have their force co-ordinates referenced to this ZERO. VOTES computer software version 1.1 was used during D2R12 to perform VOTES analyses. All VOTES diagnostic testing at the Station is overseen by the Station MOV Coordinator in accordance with DEP 0040-10, VOTES Diagnostic MOV Testing. The Station MOV Coordinator, who has received specialized training in this type of testing, ensures that appropriate torque switch settings are established to comply with closing thrust windows provided by NED. In this particular case, NED had assisted with evaluation of the original test data and it had been concurred that appropriate intrepation of the VOTES trace had occurred. However, it should be noted that difficulty had occurred in establishing the zero reference point in this case because of the unusual characteristics of this trace. It should be noted that enhancements to the computer software used for this testing are in progress. The enhanced version 2.1 of the VOTES software provides enhanced resolution as well as other features to enhance zeroing and other analytical interpretations. On August 9, 1991, NED re-analyzed the D2R12 VOTES traces for both M02-0202-5's using the new VOTES software. NED then discovered that M02-0202-5A had its previous ZERO offset by 30,000 pound-force from the new ZERO. NED also reviewed the valve's spring pack curve and inertial loading concerns. As a result, NED then recommended that a higher torque switch setting be used for M02-0202-5A.

Although a search of the Total Job Management (TJM) database indicated previous instances involving MOV torque switch setting problems, subsequent development and implementation of a comprehensive MOV testing and preventative maintenance improvement program has resulted in excellent MOV performance overall. This is the first event involving misinterpretation of diagnostic valve testing data resulting in an inappropriate torque switch setting. The Station MOV Coordinator maintains control of MOV torque switch settings. Through diagnostic valve testing, MOV torque switch settings are verified to meet actuator thrust requirements established by NED. Improved diagnostic testing technology and MOV trending will better aid the Station MOV Coordinator in maintaining proper torque switch settings.

D. SAFETY ANALYSIS OF EVENT:

At the time of this event the Operations Department was in the process of returning the 2A Recirculation pump to service after a Recirculation Pump Motor-Generator set trip. The 2A Recirculation Pump Discharge valve M02-0202-5A is closed prior to pump start-up and then opened following pump start-up. During a postulated 2B Recirculation Loop Loss Of Coolant Accident (LOCA), LPCI initiation logic will select the 2A Recirculation Loop as the injection loop and will require M02-0202-5A to close. LPCI can thus inject into the vessel quickly enough to assure fuel clad integrity.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

In order to permit power operation with the LPCI injection function inoperable, Technical Specification 3.5.A.5 requires that both Core Spray [BM] Subsystems, the Containment Cooling Subsystem (including two LPCI pumps) and the Unit 2 and 2/3 Diesel Generators [EK] be operable and establishes a seven day LCO. If any of the above-mentioned support equipment should subsequently become inoperable, further power operation beyond 24 hours is prohibited. Because investigation concluded that the degraded LPCI System condition had existed since startup from the previous refuel outage, a comprehensive review was performed concerning the operability status of the above-mentioned redundant safety and support equipment during this time period. This review concluded that during all periods of power operation, the required redundant safety and support equipment was operable except for an approximate 11 hour period during which the 2B Core Spray Subsystem was inoperable. Also, at least two low pressure emergency core cooling system pumps were operable (including appropriate emergency power supplies and suction piping, etc.) at all times while the Unit was in cold shutdown or refuel conditions as required by Technical Specification 3.5.F.2.

E. CORRECTIVE ACTIONS:

As immediate corrective action WR 02916 and a temporary alteration safety evaluation was issued to adjust the open-to-close torque switch bypass limit switch setting and to lower the open limit switch setting. The Station MOV Coordinator requested NED re-evaluation of the torque switch setting. NED re-analyzed the VOTES traces for both Recirculation pump discharge valves using VOTES software version 2.1. Consequently, a new ZERO coordinate was established for the force-axis of MO2-0202-5A's VOTES trace. This new ZERO marker allowed for a higher torque switch setting than previously analyzed. As a result, MO2-0202-5A's torque switch was raised under WR 02948. Due to primary containment conditions while at power, a post-maintenance VOTES test was not performed at this time. WR 02977 was issued to diagnostically test the valve at the next available opportunity (237-200-91-13401). The valve was then returned to service and the 7-day LCO was terminated.

As further corrective actions, NED used the new VOTES software version 2.1 to perform a reanalysis of the remaining 37 safety related MOV's which were diagnostically tested with VOTES software version 1.1. Seventeen diagnostic tests were re-ZEROED; however, no other MOV was found to have a torque switch setting which would allow an actuator thrust outside the permissible thrust window. Babcock and Wilcock Nuclear Services has recently trained Commonwealth Edison Station MOV Coordinators to use the new VOTES software. The Station MOV Coordinator will perform future static and operating system pressure diagnostic tests with VOTES 2.1. However, due to the importance of maintaining MOV torque switch settings, should any uncertainty in data interpretation exist, the Station MOV Coordinator will immediately contact NED for proper disposition. Furthermore, in order to provide further control over review of diagnostic test data, the Station MOV Coordinator will obtain independent review of all VOTES diagnostic analyses prior to startup from each refuel outage, beginning with the Unit 3 D3R12 outage scheduled to begin on September 8, 1991. This independent review will be documented in the startup On-Site Reviews performed prior to startup from each refuel outage. The Station MOV Coordinator will implement a surveillance tracking program item to control this requirement prior to startup from the D3R12 outage (237-200-91-13402) and will also revise appropriate Maintenance Procedures to include enhanced independent review requirements as a long-term corrective action (237-200-91-13403).

F. PREVIOUS OCCURENCES:

Review of maintenance and system history files for the past five years did not indicate similar occurrences of this type on the Recirculation System. However, the following are non-reportable station deviation reports (DVR's) involving torque switch setting problems.

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DVR Number Title

12-3-89-044 Core Spray Test Valve MO3-1402-4A Failure to Close Due to Incorrect Torque Switch Settings Caused by Personnel Error

While performing a monthly operating surveillance, Core Spray Test Return Valve MO3-1402-4A would not fully close under system pressure. Investigation revealed that the torque switch setting was incorrect. Safety significance was minimal because the valve was able to be manually positioned closed. Furthermore, MO3-1402-4A is not required to support Core Spray injection under LOCA conditions. The cause of this event was attributed to EMD personnel error due to improper adherence to work instructions. Under Work Request 85045, the EMD correctly set the torque switch. The EMD was required to review this event and stress the importance of properly set torque switches with its personnel.

12-2-87-075 Failure of MO2-1402-38B Due to Personnel Error

While performing a monthly operating surveillance, with Unit 2 in the Shutdown mode, the 2B Core Spray Loop Minimum Flow Valve, MO2-1402-38B, was observed to have abnormal valve indication. EMD investigation revealed that the valve actuator had become detached from the valve body. The root cause of this event was determined to be over-thrusting of the MOV due to EMD personnel error upon setting the torque switch. Safety significance for this event was considered minimal due to the availability of the redundant Core Spray Loop and the LPCI System. The EMD Foremen reviewed this event at a weekly staff meeting. This event was not a recurring problem, therefore no further corrective actions were deemed necessary.

Other corrective actions implemented to prevent torque switch adjustment problems included inclusion of an improved configuration diagram in the EMD MOV maintenance procedure, establishment of the Station MOV Coordinator to oversee all aspects of the MOV program, implementation of routine diagnostic testing to establish torque switch settings within NED-approved thrust windows, and establishment of an aggressive MOV preventative maintenance program.

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
Limitorque Corp.	Valve Operator	SMB-3-13	SMB-3-13

An industry wide NPRDS data base search under torque switch setting revealed 295 records. A similar searches under "VOTES" and "diagnostic testing" revealed no record of an event attributed to incorrect ZEROING of a diagnostic VOTES test.