




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

October 9, 1991

EDE LTR #91-619

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

Licensee Event Report #91-031, Docket #050237 is being submitted
Voluntarily in accordance with Technical Specification 6.6 and NUREG 1022.


E. D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/dwh

Enclosure

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

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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 5 10 10 10 12 13 17 Page (3) 1 of 0 6

Title (4) Control Rod Drive R-10 Failure to Latch Due to Collet Piston Binding

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	2	1	9	1	9	1	0	3	1	0	0	1	0	0	8	9	1	N/A	
																			N/A	

OPERATING MODE (9) N

POWER LEVEL (10) 0 8 5

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

<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 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 checked="" type="checkbox"/> Other (Specify in Abstract below and in Text) Voluntary
<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"/> 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"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

Name: Walter Ravelo, Technical Staff System Engineer, Ext. 2997

TELEPHONE NUMBER: AREA CODE 8 1 5 9 4 2 2 - 2 9 2 10

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
X	A	A	D R I V G	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15) 0 5 0 1 9 2

X Yes (If yes, complete EXPECTED SUBMISSION DATE) NO

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

At 0327 hours on September 21, 1991 with Unit 2 at 85% power, Control Rod Drive (CRD) Exercising was being conducted on CRD R-10 per Dresden Operating Surveillance (DOS) 300-1, Daily/Weekly Control Rod Drive Exercise. While attempting to exercise CRD R-10 from position "48" (full out) to position "46", the CRD failed to latch at positions "46" and "44". With Qualified Nuclear Engineer (QNE) permission, an attempt to latch at position "42" was also made and failure to latch again occurred. The CRD was inserted and maintained at position "00" by continuously applying an Emergency-In signal. At 0535 hours, CRD R-10 began to drift out; the CRD was scrambled to position "00" (full in) and held in position by charging water pressure.

Tests were conducted per Special Procedure (SP) 91-9-114 to relatch CRD R-10 and flush the CRD collet piston. During testing, CRD R-10 was successfully relatched. Testing indicated that there is no leakage in the directional control valves. The CRD collet housing was determined to be intact and latching failure was determined to be a result of collet piston binding. Upon completion of flushing, latching failure again occurred and CRD R-10 was scrambled to position "00" where it successfully latched. This event had minimal safety significance because shutdown margin was not violated with this rod and the highest worth rod postulated to fail and all other rods postulated at position "02". A previous rod drift due to unrelated causes was reported by LER 91-22/050237.

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

While maintaining the rod at position "00" with the Emergency-In/Notch Override Switch, the Assistant Superintendent of Operations (ASO), the Production Superintendent, the Station Manager, the QNE, and the On-Site General Electric (GE) Representative were contacted to discuss a contingency plan should rod drift occur again.

At 0535 hours, CRD R-10 began to drift out from position "00" with the Emergency-In Notch/Override Switch still engaged and with 5 gpm of drive water flow indicated on the control room drive water flow meter (Panel 902-5). CRD R-10 was then individually scrammed from position "42" via toggle switch on the CRD scram test panel per the agreed contingency plan. The Reactor Protection System [JE] (RPS) Channel A and Channel B Scram Fuses for CRD R-10 were removed to prevent valves 2-305-126 (Scram Inlet Valve) and 2-305-127 (Scram Outlet Valve) from closing. Valve 2-305-112 was closed to eliminate a continuous flow of water to the Scram Discharge Volume (SDV). CRD R-10 was maintained in the full-in position via water pressure from the CRD Charging Water Header.

By 1430 hours, the Fuel Vendor had completed calculations concerning this event's affect on shutdown margin. Two scenarios were addressed:

1. Calculations were conducted with the strongest rod in the core and CRD R-10 assumed at position "48" with all other rods at position "00";
2. Calculations were conducted with the strongest rod in the core and CRD R-10 assumed at position "48" with all other rods at position "02".

In both cases, shutdown margin requirements were determined to be met.

At 2140 hours, testing was conducted to determine the operability of the CRD collet piston, assess any potential leakage past the Directional Control Valves, and flush the collet piston per Special Procedure (SP) 91-9-114.

Testing demonstrated CRD collet piston operability by attempting to latch CRD R-10 in position "00" or position "02". While testing for CRD collet piston operability, charging water was removed by closing valve 2-305-113, Charging Water Isolation Valve. Upon closing valve 2-305-113, CRD R-10 successfully settled and latched from the "Overtravel-in" position into position "00".

With the operability of the CRD collet piston demonstrated, leakage past the Directional Control Valves was assessed. Valves 2-305-101, Drive Water Riser Isolation Valve, 2-305-102, Withdraw Riser Isolation Valve, 2-305-126, Scram Inlet Valve, and 2-305-127, Scram Outlet Valve, were isolated. The NSO initiated a sustained Insert signal and monitored for an increase in drive water flow. No increase in flow was found indicating no leakage past valves 2-305-120 or 2-305-122. Leakage past valves 2-305-121 and 2-305-123 was assessed by repeating the process with a sustained withdraw signal. Again, no leakage was found.

The final portion of the testing involved flushing of the collet piston. CRD R-10 was withdrawn from position "00" to position "48". The CRD was latched at positions "4", "10", "12", "24", "36", and "48" to further demonstrate collet piston operability. It should be noted that a drive pressure of 400 psi over reactor pressure was needed to move CRD R-10; however, failure of the collet housing would prevent any movement of the CRD. Since CRD movement was possible, it is concluded that the collet housing has not failed. At position "48", with normal valve line up, the CRD collet piston was flushed by increasing the drive water pressure to approximately 450 psi over reactor pressure and initiating a series of two minute withdrawal signals. Collet piston operability was then verified by inserting the CRD to position "46" and then withdrawing to position "48". After flushing the CRD 20 times, CRD R-10 again failed to latch.

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CRD R-10 was scrambled to the "Overtravel-in" position where it settled and latched at position "00". CRD R-10 is currently at position "00", electrically disarmed and Out of Service.

Further actions on CRD R-10 will be conducted upon approval of On Site Review (OSR) 91-027. At that time the disposition of CRD R-10 will be determined.

C. APPARENT CAUSE OF EVENT:

This report is submitted voluntarily due to Nuclear Regulatory Commission (NRC) interest and generic applicability.

The root cause of this event is unknown; however, failure to latch has been determined to be due to binding of the CRD collet piston. It should be noted that the CRD collet housing has been determined to be intact. CRD R-10 will be removed from Unit 2 and replaced either during next refueling outage (D2R13) currently scheduled for September, 1992, or, if time permits, during an upcoming short outage.

The cause of the rod drift with the Emergency-In/Rod Out Notch Override Switch engaged is unclear since no leakage was found in the directional control valves; however, inadequate ball check valve seating could have been a contributing factor. CRD R-10 has been installed since February, 1975. While CRD R-10 has exceeded Station administrative guidance concerning replacement at intervals not to exceed ten years, it should be noted that failure to latch has not been a previous adverse trend.

D. SAFETY ANALYSIS OF EVENT:

Calculations from the fuel vendor indicate that with both the strongest control rod (C-11) and control rod R-10 at position 48 and all other control rods at position "02", shutdown margin is still within Technical Specification requirements for this case up to a cycle exposure of 5000 MWD/MTU, or approximately three further months of full power operation. The QNE conducted evaluations that indicated that should CRD R-10 unlatch from position "00" and drift out to position "48", the reactivity addition would be minor at any power level, including full power, and would not result in fuel damage since the CRD is located on the core periphery.

Since the QNE was present during all testing to assure that no nuclear limits were exceeded and shutdown margin was found to be within parameters, the safety significance of this event is considered minimal.

OSR 91-27 will be written to address any further actions and considerations that result from allowing CRD R-10 to remain in the core for the remainder of Cycle 13.

E. CORRECTIVE ACTIONS:

1. Immediate corrective actions were to demonstrate CRD collet piston operability in accordance with Technical Specification 3.3.2, assess the leakage past the directional control valves, and attempt flushing of the CRD collet piston per SP 91-9-114.
2. Since latching was achieved, the CRD was taken Out of Service at position "00" and electrically disarmed.
3. The QNE has conducted further evaluations that indicated that should CRD R-10 unlatch from position "00" and drift out to position "48", the reactivity addition at any power level, including full power, would not result in fuel damage.
4. OSR 91-27 is being written to address any safety concerns and special actions that result from allowing CRD R-10 to remain in the core for the remainder of Cycle 13. (237-200-91-17101)

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5. CRD R-10 has been placed on the D2R13 CRD (upcoming refuel outage) rebuild list. The CRD will then be disassembled under work request 04125 to determine the cause of the collet piston binding, and a supplemental report will be submitted (237-200-91-17102).
6. All originally installed CRDs have now been removed from Unit 3. Efforts are continuing to rebuild CRDs that have been installed longer than 10 years on both Unit 2 and 3 as recommended by General Electric. Only four CRDs remain in Unit 2 which have not been replaced since original startup.

F. PREVIOUS EVENTS:

LER/Docket Numbers Title

91-022/050237 Control Rod Drift Due to Pilot Solenoid Failure

During Electro Hydraulic Control (EHC) low pressure switch calibration per Dresden Instrument Surveillance (DIS) 500-8, EHC Low Oil Pressure Switch Calibration, CRD F-3 suddenly inserted from position "48" to position "34" on a Channel B 1/2 scram signal. Testing indicated that the rod drift was a result of leakage of pilot air past the Channel A scram pilot solenoid valves. Corrective actions were to replace the scram pilot solenoids.

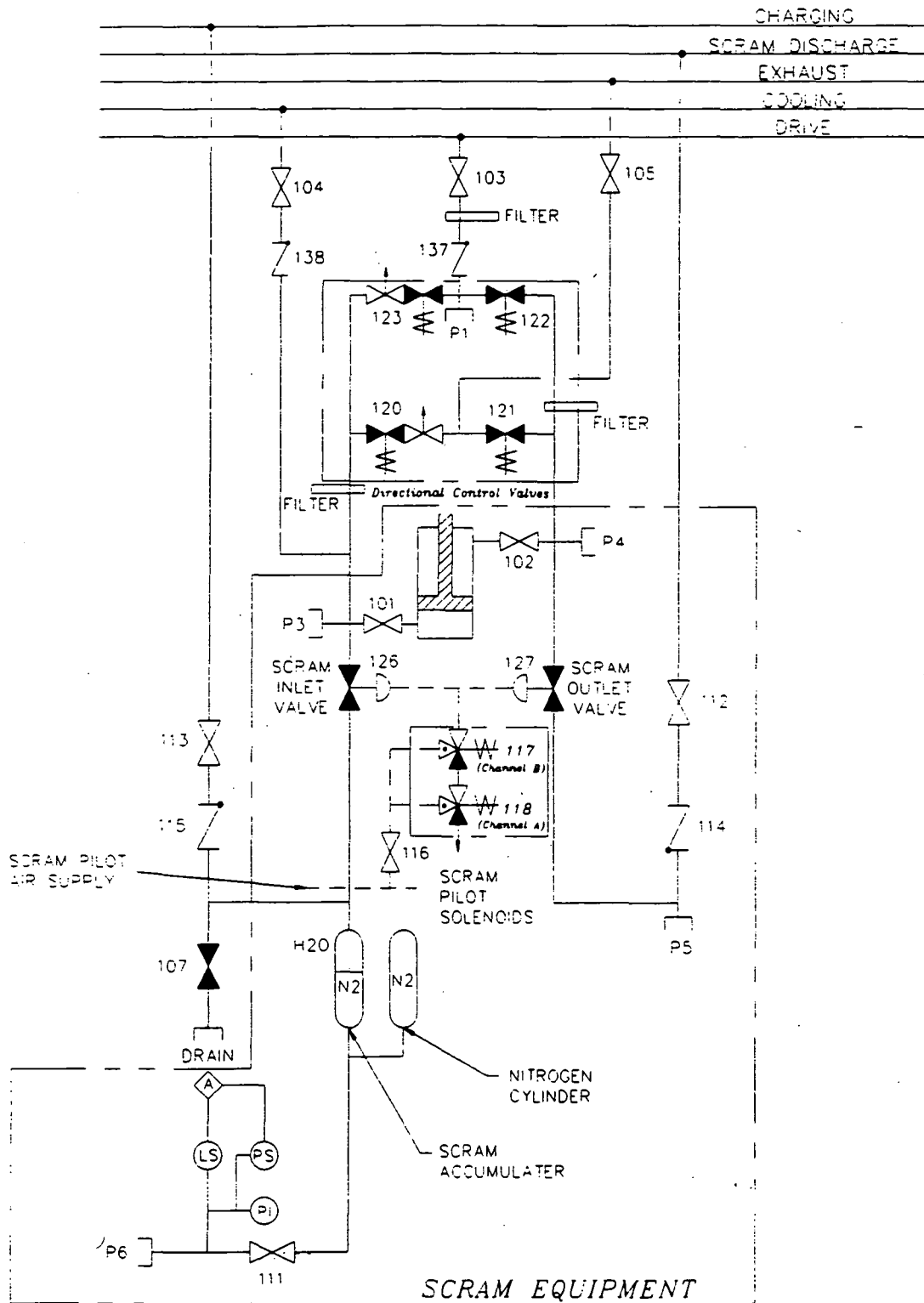
G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
General Electric	Control Rod Drive	7RDB144B	N/A

An industry wide Nuclear Plant Reliability Data System (NPRDS) data base search revealed 19 events dealing with Control Rod Drive latching mechanisms, collet pistons, or rod drifts. 18 of the events resulted from failures in the scram inlet or outlet valves or failures in the scram pilot solenoids. One of the 19 events involved excessive leakage past the collet piston due to a distorted collet piston. This failure was discovered during CRD leak testing before installation into the reactor core. Corrective actions were to replace the collet piston.

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STABLE
 CRD Hydraulic Control Unit (piping diagram)
 Figure 1