Commonwealth Edison Company
Dresden Generating Station
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ComEd

November 16, 1995

PGHLTR 95-0032

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

Licensee Event Report 95-019, Docket 50-237 is being submitted pursuant to 10CFR50.73(a)(2)(v) any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition.

This LER includes the following commitments:

1. The SDV RPS logic and cable routing will be corrected prior to the re-loading of Unit 2's fuel. (237-180-95-01901)

2. The root cause and any additional corrective actions will be provided in a subsequent supplement. (237-180-95-01900S1)

3. The Unit 3 SDV RPS cable routing will be reviewed and any lack of RPS cable separation issues will be provided in a subsequent supplement. (237-180-95-01900S1A)

Sincerely,

Peter D. Holland

Peter G. Holland
Regulatory Assurance Supervisor

PGH/PG:pt

Enclosure

cc: H. Miller, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	1 OF 4

TITLE (4)
The Control Rod Drive Scram Discharge Volume's Reactor Protection System Control Logic Fails To Meet the Single Failure Criteria Due to Design Deficiency

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 NAME	DOCKET NUMBER
10	20	95	95	-- 019 --	00	11	16	95	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	000		20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)
			20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71(c)
			20.2203(a)(2)(i)		20.2203(a)(4)	X	50.73(a)(2)(v)	X	OTHER
			20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
			20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
			20.2203(a)(2)(iv)		50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
			20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Paul K. Garrett, Plant Engineering Ext. 2713	(815) 942-2920

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

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		02	28	96

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

On October 20, 1995, at approximately 1100, while Unit 2 was in refuel with all fuel removed from the Reactor Vessel, it was determined that the Control Rod Drive Scram Discharge Volume's (SDV) control logic did not meet the single failure criterion. The SDV was declared inoperable and an ENS phone call was made. The root cause of the failure has not yet been determined and will be supplied in a subsequent supplement, along with any additional corrective actions.

EVENT IDENTIFICATION:

The Control Rod Drive Scram Discharge Volume's Reactor Protection System Control Logic Fails To Meet the Single Failure Criteria Due to Design Deficiency

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 10/20/95 Event Time: 1100

Reactor Mode: N Mode Name: Refuel Power Level: 0%

Reactor Coolant System Pressure: 0 psig

B. DESCRIPTION OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(1), reportable events, and 50.73(a)(2)(v)(A), any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to shutdown the reactor and maintain it in a safe shutdown condition.

On October 19, 1995, at approximately 1700, while, performing Dresden Instrument Surveillance (DIS) 0500-05, Unit 2 Scram Discharge Volume (SDV) Level Sensor Calibration and Functional Test, a discrepancy in the procedure was identified by the Technicians performing the surveillance. The Process Computer Data points' nomenclature did not match the corresponding section on the surveillance's test summary sheet. The surveillance was stopped. The Process Computer nomenclature was revised in 1988 and no corresponding revision was made to DIS 0500-05. Thus, when the surveillance was being performed, the discrepancy became apparent to the Technicians and a review initiated.

It was determined that the series level switches which actuate the Unit 2 Reactor Protection System (RPS) [JC] Channels A1, A2 and B1, B2 should have been wired differently. Each of the 4 RPS channels should have one actuation signal from the West SDV level switch and one from the East SDV level switch. However, the configuration installed by a plant modification in 1983 had both actuation signals to the individual SDV RPS channels from the same side, i.e., both East or both West. A specific example is that the RPS A1 logic relay (590-100A) which is actuated by two SDV level switches in series, which are both located on the West SDV. The result is that if relay 590-100A failed to actuate (single failure), with a high level in the West SDV, a RPS Channel A half scram would NOT occur, resulting in a failure of the full scram. A Performance Improvement Form (PIF) was written to document the discrepancy.

On October 20, 1995, at approximately 1100, while Unit 2 was in refuel with all fuel removed from the Reactor Vessel, it was determined that the Control Rod Drive Scram Discharge Volume's (SDV) RPS control logic did not meet the single failure criterion. The SDV was declared inoperable. At 1500 (ET) an ENS phone call was made pursuant to 10CFR50.72(b)(2)(iii)(A).

On October 22, 1995, during the design review for the modification to correct the SDV RPS control logic, four RPS cables were identified with a lack of sub-channel separation. These RPS cables were grouped with other sub-channel cables, while one Balance of Plant cable was routed in a common conduit with other RPS cables.

A review of the Unit 3 SDV RPS control logic indicates that Unit 3 does not have the same RPS logic configuration and is not susceptible to a single failure.

On October 30, 1995, a joint Corporate and Station (Dresden and Quad Cities - Dockets 50-254 and 50-265) root cause team was assembled for event investigation.

C. CAUSE OF EVENT:

Preliminary investigation results have identified a modification installed on Unit 2 in 1983 which provided an incorrect design for the SDV control logic and cable routing. Further review and analysis of the modification documentation, and personnel interviews are required. The root cause has not yet been determined and will be provided in a subsequent supplement.

D. SAFETY ANALYSIS:

The SDVs are to receive and contain the water exhausted from all of the CRDs during a Reactor scram. The SDV RPS control logic would have provided the necessary actuation and scram signals if the SDV level reached an unacceptable level as verified by the previous surveillance testing. The maintenance history for the initiation relays (590-100A, B, C and D) show that there have been no relay failures since the SDV RPS control logic was modified.

However, if a single failure of the initiation relay would have occurred along with a high level in one of the SDVs, a scram signal would not have been initiated. If, while in this condition, a RPS scram signal had occurred, only the CRDs controlled by the bank of HCUs unaffected by the single failure scenario would have fully inserted into the reactor core. During this scenario, upon reaching a predetermined reactor pressure or level set points, the recirculation pumps are automatically tripped and negative reactivity would be added. In addition, Manual Operator action would complete the reactor shutdown, which could include the use of the Stand By Liquid Control (SBLC) system or draining the SDV.

The ComEd Probabilistic Risk Assessment (PRA) Group performed a bounding quantitative analysis using the current Dresden Unit 2 PRA model with guidance on failure-to-scram quantification from the industry BWR IPE methodology. Further qualitative evaluation shows that the undetected filling of one of the SDVs without the expected full scram is highly unlikely because of the Dresden Unit 2 SDV modifications in the 1980's. The evaluation also shows that, during an ATWS scenario involving the single failure of concern, a power reduction would be expected from scramming the CRDs controlled by the bank of HCUs unaffected by the single failure scenario.

Based on the bounding quantitative analysis and the qualitative evaluation, the ComEd PRA Group concluded that the impact of the Dresden Unit 2 SDV level switch RPS logic failing to meet the single failure criterion is Non-Risk-Significant.

The Balance of Plant control cable routed in the RPS conduit does not have sufficient voltage to effect the other RPS control cables in the conduit.

The RPS sub-channel leads routed in the same conduit would not have prevented the SDV RPS control logic from initiating a scram. Any impact trauma to the conduit that could cause the wire to be damaged would result in a half scram signal.

Dresden considers this event to be a significant design problem, but the events' safety significance is minimal. There was no challenge to the system, no single failure occurred nor was there a history of single failure for the initiation relays, and there is a low probability of occurrence involving the single failure of concern.

E. CORRECTIVE ACTIONS:

Senior Station Management was notified of the incorrect logic.

Quad Cities and LaSalle Nuclear Power Stations were notified of the incorrect SDV RPS logic.

The SDV RPS logic and cable routing will be corrected prior to the re-loading of Unit 2's fuel. (237-180-95-01901)

The root cause and any additional corrective actions will be provided in a subsequent supplement. (237-180-95-01900S1)

The Unit 3 SDV RPS cable routing will be reviewed and any lack of RPS cable separation issues will be provided in a subsequent supplement. (237-180-95-01900S1A)

F. PREVIOUS OCCURRENCES:

LER/Docket Number Title

To be provided in the supplement.

G. COMPONENT FAILURE DATA:

None.