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Dresden Nuclear Power Station
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July 22, 1994

GFSLTR 94-0239

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

Licensee Event Report 94-015, Docket 50-237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10CFR50.73(a)(2)(vii).

Sincerely,

Gary F. Spedl
Station Manager
Dresden Station

GFS/cfq

Enclosure

cc: J. Martin, 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							
LICENSEE EVENT REPORT (LER)								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.				
FACILITY NAME (1) Dresden Nuclear Power Station, Unit 2					DOCKET NUMBER (2) 05000237			PAGE (3) 1 OF 6				
TITLE (4) Yarway Reactor Water Level Switch Failure												
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		
06	27	94	94	-- 015 --	00	07	22	94	None			
OPERATING MODE (9)		N		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)		099		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)		50.73(a)(2)(v)		OTHER		
				20.2203(a)(2)(ii)		50.36(c)(1)	X	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 George Milligan, System Engineer						TELEPHONE NUMBER (Include Area Code) Ext. 2920 (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		
B	JE	LS	Y005	Yes								
SUPPLEMENTAL REPORT EXPECTED (14)						EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR		
YES (If yes, complete EXPECTED SUBMISSION DATE).				X NO								

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

On June 27, 1994, at 1000 hours, with Unit 2 at 99% rated core thermal power, while performing Dresden Instrument Surveillance (DIS) 0500-03, Reactor Water Level ECCS Initiation Indicating Switch Calibration, level switch 2-263-72C contact 7-8 failed to trip. Level Indicating Switch (LIS) 2-263-72C contact 7-8 provides Core Spray initiations, ADS permissives, and an input to the Diesel Generator start logic on decreasing low low water level. The safety function of the instrument is to sense decreasing water level prior to or at -59" indicated which is 84" above the top of the active fuel. The switch was adjusted to an acceptable value of 153.8" WC. The necessary redundant switches were available during the event allowing these systems to remain operable. Previous events involving the failure of similar Yarway configurations are documented in 'Operability Assessment' of February 17, 1994, (Chron 0124505) written in response to LERS 93-031/050237 and 94-007/050249. Input to the Operability Assessment included two years of calibration data on the Yarway instruments. Additionally LER 94-008/050237 dated April 18, 1994 and LER 94-016/050237 dated June 16, 1994 documents similar events for the same instrument.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

EVENT IDENTIFICATION:

Yarway Reactor Water Level Switch Failure

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 06/27/94 Event Time: 1000 hrs
 Reactor Mode: N Mode Name: Run Power Level: 99%
 Reactor Coolant System Pressure: 1001 psig

B. DESCRIPTION OF EVENT:

On June 27, 1994, at 1000 hours, with Unit 2 at 99% rated core thermal power, while performing Dresden Instrument Surveillance (DIS) 0500-03, Reactor Water Level ECCS Initiation Indicating Switch Calibration, level switch 2-263-72C contact 7-8 failed to trip. Level Indicating Switch (LIS) 2-263-72C contact 7-8 provides Core Spray initiations, ADS permissives, and an input to the Diesel Generator start logic on decreasing low low water level. The safety function of the instrument is to sense decreasing water level prior to or at -59" indicated which is 84" above the top of the active fuel. The switch was adjusted to an acceptable value of 153.8" WC. The necessary redundant switches were available during the event allowing these systems to remain operable. Previous events involving the failure of similar Yarway configurations are documented in 'Operability Assessment' of February 17, 1994, (Chron 0124505) written in response to LERS 93-031/050237 and 94-007/050249. Input to the Operability Assessment included two years of calibration data on the Yarway instruments. Additionally LERS 94-008/050237 dated 04/18/94 and 94-0016/050237 dated 6/16/94 document similar events for the same instrument.

C. CAUSE OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(2)(vii) which requires the reporting of any event or condition that caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to mitigate the consequences of an accident. It has been determined that this failure is one point of an unfavorable trend history that has developed on these switches. A thorough review of the past two years of Yarway performance has been performed. Unit 2 Yarway contacts have been found at or "out of tolerance" 64 times out of a possible 336 calibrations.

In this event, the mercury switch which provides inputs to Core Spray initiations, ADS permissives, and the Diesel Generator logic failed to respond. The mercury switch is actuated by a magnet which rotates as a result of an increase or decrease in the reactor vessel water level. This switch was found not to reposition which prevented the trip function from occurring. After a slight adjustment of the switch the calibration was successfully performed in accordance with DIS 500-3. The switch was functionally tested 5 times to insure repeatability.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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The Yarway reactor water level instruments have a history of not being able to maintain setpoints within the Technical Specifications and administrative limits as documented in DIS 0500-3. A root cause analysis was performed which identified the following i) Technical Specifications and procedural limits were more restrictive than instrument capabilities, ii) sub-component failures (Mercoind switch), and iii) excessive drift. Probable causal factors attributed to excessive drift include Mercoind switch aging (spring force degradation), mounting of the Mercoind switch, alignment of switch to actuating magnets, and/or defective jewelled bearings. However, the average "drifts" experienced during the past two years have been within the statistical 2 sigma failure values (4.62" Reactor Water Level) documented in calculation NED-I-EIC-0100 Revisio.

Performance of this Yarway has been evaluated and is summarized below.

263-72C (5-6)	1993- TECH SPEC CHANGE	TECH SPEC CHANGE-PRESENT
FOUND "OUT OF TOLERANCE"/CALIBRATIONS	10/16 or 62.5%	3/4 or 75%
AVG DRIFT/CALIBRATIONS (% SPAN)	3.04%	7.18%
TECH SPEC VIOLATIONS	6	1

263-72C (7-8)	1993- TECH SPEC CHANGE	TECH SPEC CHANGE-PRESENT
FOUND "OUT OF TOLERANCE"/CALIBRATIONS	5/16 or 31.25%	1/4 or 25%
AVG DRIFT/CALIBRATIONS (% SPAN)	1.48%	13.85%
TECH SPEC VIOLATIONS	2	1

Instrument 2-263-72C (7-8) performance has improved since January 1994. In 1993, switch 72C (7-8) was found to be "out of tolerance" during 5 of 12 surveillances (i.e. 42%). Since December 22, 1993, the switch was found within tolerance for six consecutive months before the June 27 surveillance. The presence of the consecutive acceptable "as founds" represent an improvement in instrument operation. This improvement occurred prior to changing the setpoint to implement a technical specification change.

This is the first failure (out of tolerance) for this contact since the setpoint was changed to prevent out of tolerance conditions due to random drift. This was a failure rather than random drift. All actions are continuing per the Yarway administrative action plan.

D. SAFETY ANALYSIS:

The safety significance of this event is minimal. The failure occurred in the non-conservative direction and would have prevented the switch from tripping; however the ECCS system contains four level instruments with two switches each to sense "low-low" reactor water level and initiate ECCS equipment when one-out-of two twice logic was satisfied. The actuation logic was operable because only one switch was affected.

A review of the safety significance of non-conservative drifts was performed as part of the "Operability Assessment" of February 17, 1994, (Chron 0124505). A bounding PRA analysis, assuming one complete logic system failure with a

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duration of 10 days during the two year period resulted in a change to core damage frequency of approximately 1%.

E. CORRECTIVE ACTIONS:

The initial corrective action was to adjust the switch to within its tolerance limits. Subsequent to the calibration, engineering support personnel performed additional investigation into the cause of the failure utilizing a shop mock-up of the field installation. The investigation provided additional information pertaining to dimensions between internal moving parts of the instrument assembly. This information was applied to the next surveillance, which was performed on an accelerated (2 week) interval. Although the results of the surveillance were within technical specification limits, the distance between the magnet and switch was reduced.

The long term corrective actions that have been proposed and are in progress at this time are summarized in the following paragraphs. As documented in the "Operability Assessment" of February 17, 1994, the station has committed to numerous actions to improve Yarway operability. The following Nuclear Tracking System (NTS) items (partial listing) identify pertinent actions to be taken by the station to eliminate the continued performance deficiencies with the Yarway instruments:

Proposed "Corrective Actions" have been documented in the LER and Operability Assessment referenced above and are being tracked by NTS as the following items:

- 237-200-91-11901 Yarways are presently scheduled to be replaced during D2R14 and D3R14). Modification P12-3-94-224 is in progress during the current Unit 3 refueling outage. This mod will implement preliminary actions for the replacement of the Yarways.
- 237-180-93-03101 Develop action plan for the chronic failures of Yarway switches, (action in progress, Yarway Administrative Action Plan has been approved and will accomplish this task.)
- 237-180-93-03102 Provide feasibility assessment for Yarway replacement (action completed, Yarways are committed to be replaced during D2R14 and D3R14). Modification P12-3-94-224 is in progress during the current Unit 3 refueling outage. This mod will implement preliminary action for the replacement of the Yarways.
- 237-180-93-03103 Evaluate and provide appropriate revision to DIS 0500-03 (action in progress, Yarway Administrative Action Plan has been approved and will accomplish this task.)

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- 237-201-94-30600 Provide Yarway operability assessment due to a high degree of drift (action completed February 17, 1994 Chron 0124505).
- 249-180-94-00301 Perform QE 40.1 Operability assessment for Yarways in response to LER 3-94-003 corrective action (action completed February 17, 1994, Chron 0124505).
- 237-225-94-R12-94018A Develop drift optimization actions and incorporate in DIS 0500-03 (action complete).
- 237-225-94-R12-94018B Trend as-found calibration data per Dresden Yarway Administrative Action Plan and perform corrective actions as identified in the plan (actions on going until replacement).
- 237-225-94-R12-94018C Obtain setpoint tolerance Technical Specification change approval from NRC (action completed)
- 249-225-94-R12-94018D Implement setpoint change on Unit 3 Yarways and revise Administrative Action Plan (action completed).
- 237-225-94-R12-94018E Implement setpoint change on Unit 2 Yarways (action completed).
- 237-225-94-R12-94019A Develop characterization program for Yarways. Perform characterization and input to the Administrative Action Plan (action completed).
- 237-225-94-R12-94019B Develop Yarway Administrative Action Plan with the objective of achieving Yarway contact failure rates of 1×10^{-5} per operating hour or better (action in progress, Yarway Administrative Action Plan has been approved and will accomplish this task.)
- 249-225-94-R12-94019C Develop and implement inspection plan and preventative maintenance program for the Unit 3 Yarways during D3R13 (action in progress).
- 237-225-94-R12-94019D Update 3/29/93 NFS assessment for non-conservative instrument setpoint drift to support the Administrative Action Plan. (action completed)
- 237-225-94-R12-94019E Evaluate the feasibility of installing switch contact arc suppressor (action completed).
- 237-225-94-R12-94019F Implement the requirements of the Inspection Plan on Unit 2 switches (actions ongoing).
- 237-225-94-R12-94019G Inspect and correct condition of Unit 2 Level indicating switch 2-263-72C during the next surveillance (action ongoing).

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237-225-94-R12-94019H Review available 1994 Surveillance data for additional information to potentially add further follow-up actions (action completed).

237-225-94-R12-94019I Communicate the need for the Operating Department to maintain a heightened awareness regarding the excessive non-conservative drift and failure history (action completed).

F. PREVIOUS OCCURRENCES:

Numerous occurrences of similar events have been documented. A detailed calibration history is contained in the "Operability Assessment" of February 17, 1994, which provides a chronology of all calibration during the past two years with indication of as-found and as-left setpoints. A partial listing of 'out of tolerances' and switch failures is as follows:

UNIT 2	LER 2-93-031-00	CDE 2-201-93-M337	LER 2-94-008-00
	CDE 2-201-93-M175	CDE 2-201-93-M62	LER 2-94-016-00
	LER 2-93-019	CDE 2-202-93-046	
	CDE 2-201-93-827	CDE 2-201-93-803	
	CDE 2-202-93-039	CDE 2-202-93-023	
	DVR 12-2-92-103	DVR 12-2-92-97	
	DVR 12-2-92-73	DVR 12-2-91-234	
	DVR 12-2-91-202	DVR 12-2-91-176	
	DVR 12-2-91-139	DVR 12-2-91-119	
	DVR 12-2-91-103	DVR 12-2-91-83	
	DVR 12-2-91-62	DVR 12-2-91-34	
	DVR 12-2-91-19	DVR 12-2-90-119	
	DVR 12-2-90-100	DVR 12-2-90-46	
	DVR 12-2-90-35	DVR 12-2-89-102	
	DVR 12-2-89-76	DVR 12-2-88-123	
	DVR 12-2-88-114	DVR 12-2-88-91	

UNIT 3	LER 3-94-007-00	LER 3-94-002-00
	CDE 3-202-93-018	LER 3-93-018
	CDE 3-202-93-015	CDE 3-202-93-013
	CDE 3-202-93-07	LER 3-93-001
	CDE 2-3-92-186	CDE 12-3-92-164
	PIR 3-92-116	DVR 12-3-92-98
	DVR 12-3-92-87	DVR 12-3-92-86
	DVR 12-3-92-80	DVR 12-3-92-46
	DVR 12-3-91-88	DVR 12-3-86-64
	DVA 12-3-86-55	DVR 12-3-86-54
	DVR 12-3-86-46	

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
Yarway	Level Switch	4418C	DS551