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Dresden Nuclear Power Station
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July 08, 1993

GFSLTR 93-0009

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

Licensee Event Report 93-005-01, Docket 050237. This revised report is being submitted to provide an update on progress regarding this event.

Gary F. Spedl
Station Manager
Dresden Station

GFS/slb

Enclosure

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

(p:\plntmgr\gfs93\0009.93)

IE22 1/1

DAP FORM 02-08C
SUPPLEMENTAL REPORT TO LER

LER NO.					SYSTEM AFFECTED
	STA	UNIT	YEAR	NO.	1500
D	12	2	93	005	

PART 1 TITLE OF EVENT

Postulated LPCI Swing Bus Loss Resulting From an Original Construction Design Deficiency

OCCURRED

DATE	TIME
03/05/93	09:00

REASON FOR SUPPLEMENTAL REPORT

Provide final decision not to implement a modification based upon the results of an engineering study, which was commissioned to review the original design deficiency.

PART 2

ACCEPTANCE BY STATION REVIEW — 7/1/93

DATE — 7-1-93

SUPPLEMENTAL REPORT APPROVED AND AUTHORIZED FOR DISTRIBUTION

STATION MANAGER — DATE 7-1-93

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
Dresden Nuclear Power Station, Unit 2 (3)	0 5 0 0 0 2 3 7	1 of 0 4

Title (4)

Postulated LPCI Swing Bus Loss Resulting From an Original Construction 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 Names	Docket Number(s)
0 3	0 5	9 3	9 3	--- 0 0 5	--- 0 1	0 3	2 6	9 3	Dresden 3	0 5 0 0 0 2 4 9
									N/A	

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIRMENTS OF 10CFR (Check one or more of the following) (11)								
POWER LEVEL (10)	0 0 0		20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
			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)	X	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)			

LICENSE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
John Smentek Ext. 2872	AREA CODE 8 1 5 9 4 2 - 2 9 2 0

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

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

On March 5, 1993, Dresden Station determined there exists a potential design deficiency concerning the LPCI Swing Bus during degraded voltage conditions. Specifically, the potential exists that during a LOCA condition concurrent with degraded voltage that there are single component failures that result in the failure of the LPCI Swing Bus and the associated 4 KV Safety Bus to transfer to their respective alternate supplies, resulting in sustained degraded voltage. Sustained degraded voltage on the LPCI Swing Bus and associated 4 KV Safety Bus results in the failure of both LPCI and Division II Core Spray Systems, resulting in an Emergency Core Cooling response that is more limiting than the current licensing basis.

Based on the review of this issue, Dresden Station has concluded that this event is not within the current licensing basis, and due to the extremely low probability of occurrence and availability of core cooling systems, is of minimal safety significance. Therefore this event was deemed not reportable. However, because of the nature of this issue, Dresden Station has elected to provide this voluntary report.

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:

Postulated LPCI Swing Bus Loss Resulting From an Original Construction Design Deficiency.

A. CONDITIONS PRIOR TO EVENT:

Unit: 2 (3) Event Date: March 5, 1993 Event Time: 0900

Reactor Mode: N (N) Mode Name: Refuel (Shutdown) Power Level: 0 (0)

Reactor Coolant System (RCS) Pressure: 0 (0) psig

B. DESCRIPTION OF EVENT:

On March 5, 1993 with Unit 2 in a Refuel outage and Unit 3 in a forced outage, it was determined that during a Loss Of Coolant Accident concurrent with a degraded voltage condition, that a single breaker failure, (the main feed breaker to the 4 KV Safety Bus, device 152-2411), could render the Low Pressure Coolant Injection (LPCI) System 480 volt swing bus Motor Control Center, (MCC) 29-7/28-7(39-7/38-7) and the Division II Core Spray Systems incapable of performing their intended functions. Failure of both LPCI and Division II Core Spray Systems results in an Emergency Core Cooling response that is more limiting than the current licensing basis.

Under the current licensing basis, the LPCI Swing Bus is designed to operate as described below. The event assumes a LOCA concurrent with a LOOP on Unit 2. (Refer to Sketch 1, attached, for a simplified one line of Unit 2, showing the relevant buses and breakers.) At the LPCI Swing Bus (MCC 29-7/28-7), the normal feed contactor (Device 2972) drops out (opens) on a loss of power. However, this alone does not cause a transfer of the Swing Bus due to the presence of a time-delay-on-drop-out relay (TDOD). The undervoltage relays (IAV27B relays), sensing a loss of voltage time out and trip the Bus 24-1 feed breaker (2411). Bus 24-1 feed breaker (2430) is interlocked (slaved) with breaker (2411), therefore it trips and initiates an auto start signal to the Unit 2 diesel generator (which has already received an autostart signal from the LOCA signal). The output breaker of the Unit 2 diesel generator (2422) will close when the Bus 24-1 feed breaker (2411) is open and the Unit 2 diesel generator is producing adequate voltage at rated frequency. Closing the Unit 2 diesel generator output breaker will restore voltage to 480 V Bus 29, picking up (closing) the contactor (2972) and preventing a transfer. If the Unit 2 diesel generator fails to start, or one of the breakers fails to operate, the time delay relay associated with the contactor (2972) will initiate a transfer after a period of 20 seconds. This affords the Unit 2 diesel generator an opportunity to restore the normal feed to the Swing Bus.

The above scenario can now be reconsidered with the initiating event a LOCA with degraded voltage rather than a LOOP. The Unit 2 Diesel Generator would start (from the LOCA signal) and the output breaker (2422) would close after the second level undervoltage relay times out, identical to the actions

initiated by the undervoltage relay as discussed above. However, a single failure of the normal feed breaker (2411), prevents the Unit 2 Diesel Generator output breaker form closing. Thus, the diesel generator could not close in, and would continue to run unloaded. The offsite source of power, still in a "degraded" voltage condition, would not assure adequate voltage to re-align the LPCI injection valves. However, if the voltage level remained above the 'drop out' voltage of the contactor (2972), the Swing Bus transfer mechanism would not execute its transfer sequence. Note that the new "power monitoring" scheme installed for detecting problems with the diesel generator voltage regulator under modification M12-2(3)-89-053 would detect the degraded condition, but would take no action as the trip logic requires that the Unit 2 Diesel Generator output breaker (2422) must be closed for a transfer to occur.

Further analysis of this event has shown that other single failure modes can be postulated that will result in the same outcome. Since the degraded voltage relay logic is two out of two, failure of either relay will also prevent the isolation of the Safety Bus. Failure of 125 volt DC at the Safety Bus, since the degraded voltage relays are energize to actuate, will also prevent the isolation of the Safety Bus. Finally, failure of the HFA relay, which actuates upon degraded voltage and provides the trip signal to the Safety Bus main feed breaker, will also prevent the Safety Bus from isolating.

C. APPARENT CAUSE OF EVENT:

The root cause of this event is an original construction design weakness. The event is considered to be outside the current licensing basis. This sequence of events was not considered when the existing degraded voltage relay protection package was installed.

D. SAFETY ANALYSIS OF EVENT:

The sequence of events postulated is considered to be extremely low probability and outside the current licensing basis. First, a LOCA must occur that is sufficiently large to exceed the capacity of HPCI and Auto Depressurization System (ADS)/ Core Spray Systems. Concurrently, a degraded voltage condition must occur. Finally, a failure must occur that prevents the isolation of the Safety Bus.

Additionally, a previous safety evaluation was performed by Nuclear Fuel Services (developed as a historical safety assessment of the degraded voltage setpoint issue at Dresden identified during the Dresden EDSFI). This report evaluates the condition where only one Core Spray pump is available as a result of degraded voltage, and concludes that, utilizing generic realistic LOCA analysis, that sufficient systems are available to assure that Peak Clad Temperatures following the large break LOCA are maintained less than 2200 degrees F.

Based on the review of this issue, Dresden Station has concluded that this event is not within the current licensing basis and due to the extremely low probability of occurrence and availability of core cooling systems, is of minimal safety significance. Therefore, this event was deemed not reportable. However, because of the nature of this issue, Dresden Station has elected to provide this voluntary report.

E. CORRECTIVE ACTIONS:

No immediate actions were taken, as both units were in outages. Further analysis of the postulated scenario continues. No equipment was declared inoperable nor was there any actual component failure during this event. An engineering study continues to evaluate the design deficiency. Several different designs have been considered, however conceptual design work indicates that a change will require long lead time components (i.e. new Safety Bus potential transformers and voltage relays). Therefore, upon completion of the engineering study, a final decision will be made regarding the appropriate resolution of this issue. The engineering study will be completed and a supplemental report issued by 6/30/93 (NTS # 237-180-93-00501).

As an interim compensatory measure, procedural guidance will be provided to the Operators prior to Unit startup. This procedure will identify symptoms indicative of either the Safety Bus failing to isolate or MCCs 29-7/28-7 (39-7/38-7) failing to transfer on degraded voltage (NTS # 237-180-93-00502).

The results of the engineering study (Reference CHRON #0120896) indicate that the costs required to resolve this postulated scenario do not justify installation due to the extremely low probability of occurrence and availability of core cooling systems and the determination that this event is not within the current licensing basis. Therefore, no further corrective actions are required However, Dresden Procedure DOA 6500-9, "LOCA Concurrent with a Failure of Degraded Voltage Relay Protection" will continue to remain in place.

F. PREVIOUS OCCURRENCES:

This concern has not been identified previously at Dresden. However, a similar event concerning degraded voltage and the LPCI Swing Bus Transfer was previously addressed under modification 12-2(3)-89-053. This modification provided voltage and frequency protection at the LPCI Swing Bus to detect a failure of the diesel generator voltage regulator. As described previously, this protection is only available when the diesel generator output breaker is closed.

G. COMPONENT FAILURE DATA:

As this event did not involve actual component failure, this section is not applicable.