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ACCESSION NBR: 8807130082 DOC. DATE: 88/07/05 NOTARIZED: NO DOCKET #
 FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
 AUTH. NAME AUTHOR AFFILIATION
 JOHNSON, J.R. Carolina Power & Light Co.
 WATSON, R.A. Carolina Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-013-00: on 880603, emergency diesel start due to undervoltage on 1A-SA emergency bus. W/8 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Application for permit renewal filed. 05000400

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Carolina Power & Light Company

HARRIS NUCLEAR PROJECT
P.O. Box 165
New Hill, NC 27562

JUL 5 1988

File Number: SHF/10-13510C
Letter Number: HO-880135 (O)

U.S. Nuclear Regulatory Commission
ATTN: NRC Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 88-013-00

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,

R. A. Watson
Vice President
Harris Nuclear Project

JRJ:acm

Enclosure

cc: Dr. J. Nelson Grace (NRC - RII)
Mr. B. Buckley (NRR)
Mr. G. Maxwell (NRC - SHNPP)

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MEM/LER-88-013/1/OS1

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1	DOCKET NUMBER (2) 0 5 0 0 0 4 b 1 0	PAGE (3) 1 OF 4
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TITLE (4)
EMERGENCY DIESEL START DUE TO UNDERVOLTAGE ON 1A-SA EMERGENCY BUS

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	6	03	8	8	013	0	7	05			0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																			
POWER LEVEL (10) 19.9	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(a)(1)(vi)	<input type="checkbox"/> 20.406(e)	<input type="checkbox"/> 50.38(e)(1)	<input type="checkbox"/> 50.38(e)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	OTHER (Specify in Abstract below and in Text, NRC Form 368A)	
	<input type="checkbox"/> 20.405(a)(1)(vii)	<input type="checkbox"/> 20.405(a)(1)(viii)	<input type="checkbox"/> 20.405(a)(1)(ix)	<input type="checkbox"/> 20.405(a)(1)(x)	<input type="checkbox"/> 20.405(a)(1)(xi)	<input type="checkbox"/> 20.405(a)(1)(xii)	<input type="checkbox"/> 20.405(a)(1)(xiii)	<input type="checkbox"/> 20.405(a)(1)(xiv)	<input type="checkbox"/> 20.405(a)(1)(xv)	<input type="checkbox"/> 20.405(a)(1)(xvi)	<input type="checkbox"/> 20.405(a)(1)(xvii)	<input type="checkbox"/> 20.405(a)(1)(xviii)	<input type="checkbox"/> 20.405(a)(1)(xix)	<input type="checkbox"/> 20.405(a)(1)(xx)	<input type="checkbox"/> 20.405(a)(1)(xxi)	<input type="checkbox"/> 20.405(a)(1)(xxii)	<input type="checkbox"/> 20.405(a)(1)(xxiii)	<input type="checkbox"/> 20.405(a)(1)(xxiv)		<input type="checkbox"/> 20.405(a)(1)(xxv)

LICENSEE CONTACT FOR THIS LER (12)

NAME JOSEPH R. JOHNSON SENIOR SPECIALIST - REGULATORY COMPLIANCE	TELEPHONE NUMBER AREA CODE: 919 NUMBER: 362-2083
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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) <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)

ABSTRACT:

On June 3, 1988, while conducting a monthly Operational Surveillance Test (OST-1124) on the 1A-SA 6.9kV Emergency Bus Undervoltage Trip Actuating Device, the 1A-SA Emergency Bus was deenergized resulting in an automatic start of Emergency Diesel Generator 1A-SA and the initiation of Emergency Load Sequencing. The diesel started and loaded, and plant operation was not affected. During the emergency load sequencing, the 1A-SA Emergency Service Water (ESW) Pump did not start as required, and the Reactor Auxiliary Building (RAB) Battery Room "A" ventilation recirculation damper (AC-D4SA-1) failed to operate as required upon a control room ventilation isolation signal.

Immediate investigation has not revealed the cause for loss of power to the 1A-SA Emergency Bus or failure of the 1A-SA ESW Pump to start. The failure of the RAB Battery Room ventilation damper was traced to a sticking limit switch in the hydraulic drive unit of the damper.

Investigation into the cause of the Emergency Bus deenergization and the failure of the ESW Pump to start is continuing.

8807130082 880705
PDR ADOCK 05000400
S. PNU

Handwritten initials/signature

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1	DOCKET NUMBER (2) 0 5 0 0 0 4 0 0	LER NUMBER (6)			PAGE (3)	
		YEAR 8 8	SEQUENTIAL NUMBER — 0 1 3	REVISION NUMBER — 0 0	0 2	OF 0 4

TEXT (If more space is required, use additional NRC Form 305A's) (17)

DESCRIPTION:

On June 3, 1988, the plant was operating in Mode 1 at 99% power. The 1A-SA Emergency Service Water (ESW) Pump was operating supplying flow to the 1A-SA Emergency Service Water Header. An Operational Surveillance Test, OST-1124, 6.9kV Emergency Bus Undervoltage Trip Actuating Device Operational Test, was in progress on the 1A-SA Emergency Bus (EIIS:EK). This is a monthly Operational Surveillance Test which had been conducted without incident approximately 20 times in the past.

At 0717 the operator proceeded to test the undervoltage device and depressed the "red" pushbutton PB-SA on cubicle 10 of Bus 1A-SA as required by Step 7.1.7 of OST-1124. The test button actuates the test relay (86T) in order to block undervoltage trips during the test and allows the undervoltage relay (86UV) to actuate without causing a bus trip. The operator observed that the plant response was normal and, as required by Step 7.1.10, released the "red" pushbutton. The operator observed that both relays 86UV and 86T reset automatically as expected; however, at this point in time (0719) circuit breaker 105, which supplied power to the 1A-SA Emergency Bus, tripped on bus undervoltage. This resulted in an automatic start of Emergency Diesel Generator (EDG) 1A-SA and the subsequent initiation of Emergency Load Sequencing.

The diesel started and loaded normally and plant operation was not affected. Load sequencing proceeded as designed except that the 1A-SA Emergency Service Water Pump did not restart in load block 3 as required, therefore, the operator manually started the pump at 0720.

Loss of the 1A-SA Emergency Bus caused voltage fluctuations in the power supply to the Control Room Ventilation outside air intake radiation monitors, which resulted in spurious Containment and Control Room ventilation isolation signals. The Reactor Auxiliary Building (RAB) Battery Room "A" ventilation recirculation damper (AC-D4SA-1) failed to operate as required upon initiation of the Control Room isolation signal.

CAUSE:

An immediate investigation of the event did not reveal any obvious cause for the undervoltage trip on the 1A-SA Emergency Bus or the failure of the 1A-SA ESW Pump to start. Control fuses were checked and no deficiencies were found. Procedure steps were verified, and it was established that personnel properly followed the procedure. The ERFIS data base and operating logs were reviewed for possible indications of abnormal conditions or events. No abnormal conditions were found. Since a direct cause for the bus loss was not apparent and no abnormal conditions could be found, normal power was restored to the 1A-SA Emergency Bus at 1137, and the EDG was secured at 1139.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		8 8	- 0 1 3	- 0 0	0 3	OF 0 4

TEXT (If more space is required, use additional NRC Form 368A's) (17)

CAUSE: (continued)

Since the ESW Pump did not automatically start, it was declared inoperable. Investigation into possible load sequencer related causes for the failure to start did not reveal any probable cause. A generic trip free condition in which the circuit breaker trip coil remained energized through the indicating light circuits was experienced in the past. This problem was corrected during the startup test program by FCR-SI-70(R2) and could not have been the cause because the breaker closed on the manual signal. A special test procedure (EPT-110T) was prepared to checkout and exercise the automatic start features of the ESW Pump through the Emergency Load Sequencer. During the test, the pump started properly on a manual signal, therefore, the failure to start automatically is probably related to the automatic start circuitry. Two successful automatic starts of the ESW Pump using the Emergency Load Sequencer circuitry were accomplished on June 3, 1988, and the 1A-SA ESW Pump was declared fully operational at 2030 on June 3, 1988.

The failure of the battery room ventilation damper was traced to a sticking limit switch in the hydraulic drive unit of the damper. This was lubricated and the damper was returned to service on June 3, 1988. A failure analysis request has been initiated since at least one similar failure has occurred.

ANALYSIS OF EVENT:

The loss of the 1A-SA Emergency Bus due to an apparent spurious undervoltage signal is a challenge to an engineered safety feature and is being further investigated in order to preclude unnecessary challenges to the safety system. The direct cause of the undervoltage trip has not been established. The portion of OST-1124 related to the 1B-SB Emergency Bus was successfully conducted on the 1B-SB Bus at 1305 on June 6, 1988, three days after the undervoltage trip on the 1A-SA Emergency Bus. The cause of the bus trip is probably related to the operation of relays 86T and 86UV. These relays are eight stack rotary relays which consists of 8 independent switch wafers on a common operating shaft. During the reset process, circuit design requires that relay 86UV operate before 86T (86UV resets before the trip circuit is "unblocked" by the actuation of 86T). Wafer 1 of each relay controls the trip and reset process, and wafer 7 of each relay controls the bus supply breaker and undervoltage trip functions. For all practical purposes, resetting relay 86UV instantaneously resets relay 86T. Play or "slop" in the relay could allow the operation of wafer 7 to lag the operation of wafer 1 and result in improper sequencing of relay contacts. This condition has been observed in similar relays and could account for the bus trip. A special test will be developed and conducted to confirm or deny this relay condition.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1	DOCKET NUMBER (2) 0 5 0 0 0 4 0 0	LER NUMBER (6)			PAGE (3)	
		YEAR 8 8	SEQUENTIAL NUMBER - 0 1 3	REVISION NUMBER - 0 0	0 4	OF 0 4

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

ANALYSIS OF EVENT: (continued)

The failure of the 1A-SA ESW Pump to start under a valid safety signal is a safety concern. Although EPT-110T successfully demonstrated the proper functioning of the pump to start from a safety signal on two occasions, further investigation is intended in an attempt to establish a more definitive root cause. Additional testing will be conducted in a manner that duplicates the conditions of this event to the maximum extent practicable including de-energizing the emergency bus. This test will be performed just prior to the July 1988 refueling outage.

This event was reportable in accordance with 10CFR50.73(a)(2)(iv) due to the actuation of an Engineered Safety Feature. There were no safety consequences as a result of this event. Plant operators took appropriate actions in accordance with AOP-025, "Loss of One Emergency AC Bus (6.9kV) or One Emergency DC (125V) Bus." This procedure requires operators to ensure specific equipment is operating after losing an Emergency Bus. The operator quickly noticed that 1A-SA ESW Pump had failed to restart and manually started the pump. Without operator action, the 1A-SA Diesel would have eventually failed without cooling water from the 1A-SA Emergency Service Water Header. This would not have created a significant safety consequence to the reactor since the plant is designed to withstand a single failure of one Emergency Bus. The 1B-SB Diesel and 1B-SB Emergency Bus were still available for operation.

There have been no similar events.

CORRECTIVE ACTIONS:

1. Investigation into the cause of the 1A-SA Emergency Bus undervoltage trip is continuing. Tests will be prepared and conducted as necessary to establish the root cause of the undervoltage trip and accomplish appropriate corrective action.
2. Investigation into the cause of the failure of the 1A-SA ESW Pump to start is continuing. Tests will be prepared and conducted as necessary to establish the root cause of the failure and accomplish appropriate corrective actions.
3. The RAB Battery Room "A" recirculation damper AC-D4SA-1 was repaired on June 3, 1988, and because a previous failure had been identified, a detailed failure analysis will be conducted.