REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8806140464 DOC. DATE: 88/06/10 NOTARIZED: NO DOCKET #
FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH. NAME AUTHOR AFFILIATION
HOWE, A. J. Carolina Power & Light Co.
WATSON, R. A. Carolina Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 88-011-00: on 880511, Westinghouse notified plant of unanalyzed condition re inadvertent actuation of low temp overpressure protection sys. Automatic actuation function disabled & permanent mod under consideration. W/880610 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Application for permit renewal filed. 05000400

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
SHEARON HARRIS NUCLEAR POWER PLANT - UNIT ONE	0 5 0 0 0 4 0 0	1 OF 0 5

TITLE (4) UNANALYZED CONDITION PERTAINING TO INADVERTENT ACTUATION OF LOW TEMPERATURE OVERPRESSURE PROTECTION SYSTEM

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 5 0 0 0
0 5	1 1	8 8	8 8	— 0 1 1	— 0 0	0 6	1 0	8 8		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
1 0 0		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		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)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Andrew J. Howe - Sr. Engineer	AREA CODE 9 1 9 — 3 6 2 — 2 7 1 9

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)

ABSTRACT:

On May 11, 1988, the plant was verbally notified by Westinghouse Electric Corporation of an unanalyzed condition regarding the inadvertent actuation of the Low Temperature Overpressure Protection (LTOP) System during either a main steamline break accident or recovery from a steam generator tube rupture. During these accident scenarios, the temperature of the Reactor Coolant System (RCS) in the affected loop can decrease to below the automatic arming and actuation temperature setpoints of LTOPS, and if a single random failure is assumed in a second temperature sensor, an actuation signal is generated. LTOPS would open two RCS Power Operated Relief Valves (PORV), and the resulting RCS depressurization may change the analyzed consequences of the two accident scenarios.

Upon receiving this information, the control switches for the two LTOPS PORVs were placed in "SHUT" position, which inhibits any automatic open signal, thus removing the potential safety concern. The PORVs remained operable for modes 1 through 3 since their required safety function in these modes is to provide a manual RCS depressurization capability for safe shutdown. Two days later, on May 13, LTOPS was electrically disabled by disconnecting the Process Instrumentation Cabinet cards, and the PORV control switches were returned to "AUTO" position.

Administrative controls are in place to return LTOPS to operable status when the plant enters mode 4 during shutdowns by reinstalling and testing the disconnected cards. A permanent modification to provide for manual arming of LTOPS is planned.

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

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

INITIAL CONDITION:

The plant operated in mode 1 at 100% power, at nominal operating temperature and pressure.

DESIGN INFORMATION:

Refer to Attachment A, FSAR Figure 7.6.1-7, RCS Pressure Control Logic Diagram.

The Low Temperature Overpressure Protection (LTOP) System uses two Reactor Coolant System (RCS) power operated relief valves (PORV) (EIIS:AB:PCV) to open and reduce RCS pressure if required at low temperatures. The system is required to be operable in mode 4 below 335°F, mode 5, and mode 6 when the Reactor Vessel Head is in place, to ensure protection of the RCS from pressure transients which could exceed the limits of 10CFR50 Appendix G.

The system is armed automatically when the RCS temperature is less than 355°F (allowing a 20°F margin to the Technical Specification requirement of 335°F). The two PORVs actuate at separate setpoints as specified in Technical Specification 3.4.9.4. The pressure setpoints are temperature dependent, with one setpoint calculated based on auctioneered low wide range hot leg RCS temperature and the other on auctioneered low wide range cold leg RCS temperature. (EIIS:AB:TT) The arming permissive is generated using these same sensors. To ensure no single failure of a temperature sensor can both arm and actuate a PORV, the cold leg sensors provide the arming permissive for one PORV and the actuation setpoint for the opposite PORV, with the hot leg sensors providing the complementary function. A PORV will open if the arming permissive is met and the actual RCS wide range pressure exceeds the calculated setpoint. Actuation capability is also designed to ensure capability to sustain a single failure without disabling both redundant PORVs.

DESCRIPTION:

On May 11, 1988,-at approximately 1530, the plant was notified verbally by Westinghouse Electric Corporation (WEC), of an unanalyzed condition regarding the potential for inadvertent actuation of LTOPS System during main steamline break (MSLB) accidents, and during recovery from steam generator tube ruptures (SGTR). A written follow-up notification was received on May 31, 1988, by letter CQL-88-570 dated May 23, 1988.

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

DESCRIPTION: (continued)

During these two accident scenarios, the RCS temperature is reduced due to depressurization of the faulted steam generator during an MSLB, and due to operator action for mitigating an SGTR. The RCS wide range cold leg temperature in one RCS loop can drop below the arming permissive temperature of 355°F, and the RCS pressure is greater than the setpoint calculated based on the cold leg temperature. If a single failure is then postulated in an RCS wide range hot leg temperature sensor, LTOPS will actuate and open the two PORVs, reducing RCS pressure to below the calculated setpoint. This pressure reduction was not considered in the analysis of MSLB or SGTR accident scenarios.

Upon receipt of this information, as an interim measure, at 1640, the control switches for the two PORVs were taken out of "AUTO" and placed in "SHUT" position, which inhibits the PORV from responding to an automatic open signal, and thus eliminating the potential for the unanalyzed condition to occur. The two PORVs remained operable for modes 1 through 3, since their safety related function is to provide a manual RCS depressurization capability for safe shutdown. The automatic pressure control function of the PORVs, i.e., opening if RCS pressure increases to 2335 psig, is a non-safety control function as per Final Safety Analysis Report (FSAR) 7.7.1, and does not, therefore, represent an operability requirement of the PORVs. This is further justified in the FSAR by section 5.4.13.1, which classifies the PORVs as inactive valves not requiring provisions to ensure activation. The third PORV does not receive LTOPS signals, and so it remained available for automatic actuation on high RCS pressure.

On May 13, at 2105, the LTOPS was electrically disabled by disconnecting the Process Instrumentation Cabinet (PIC) cards, and the PORV control switches were returned to "AUTO" position. Administrative controls to ensure LTOPS is operable when the plant is taken to mode 4 below 335°F have been in place, and will ensure the system is returned to service as required by Technical Specification 3.4.9.4.

A permanent modification is being evaluated so that LTOPS will be manually armed instead of the current automatic feature. This design is currently used by most plants which have this system.

SAFETY SIGNIFICANCE:

No formal safety analysis has been conducted to analytically calculate the consequences of inadvertent RCS depressurization due to actuation of the LTOPS PORVs during MSLB accidents or SGTR accident recovery, and since the potential for these scenarios to occur has been eliminated, no such analyses are planned. However, WEC has provided their engineering judgement as to the safety significance of these scenarios.

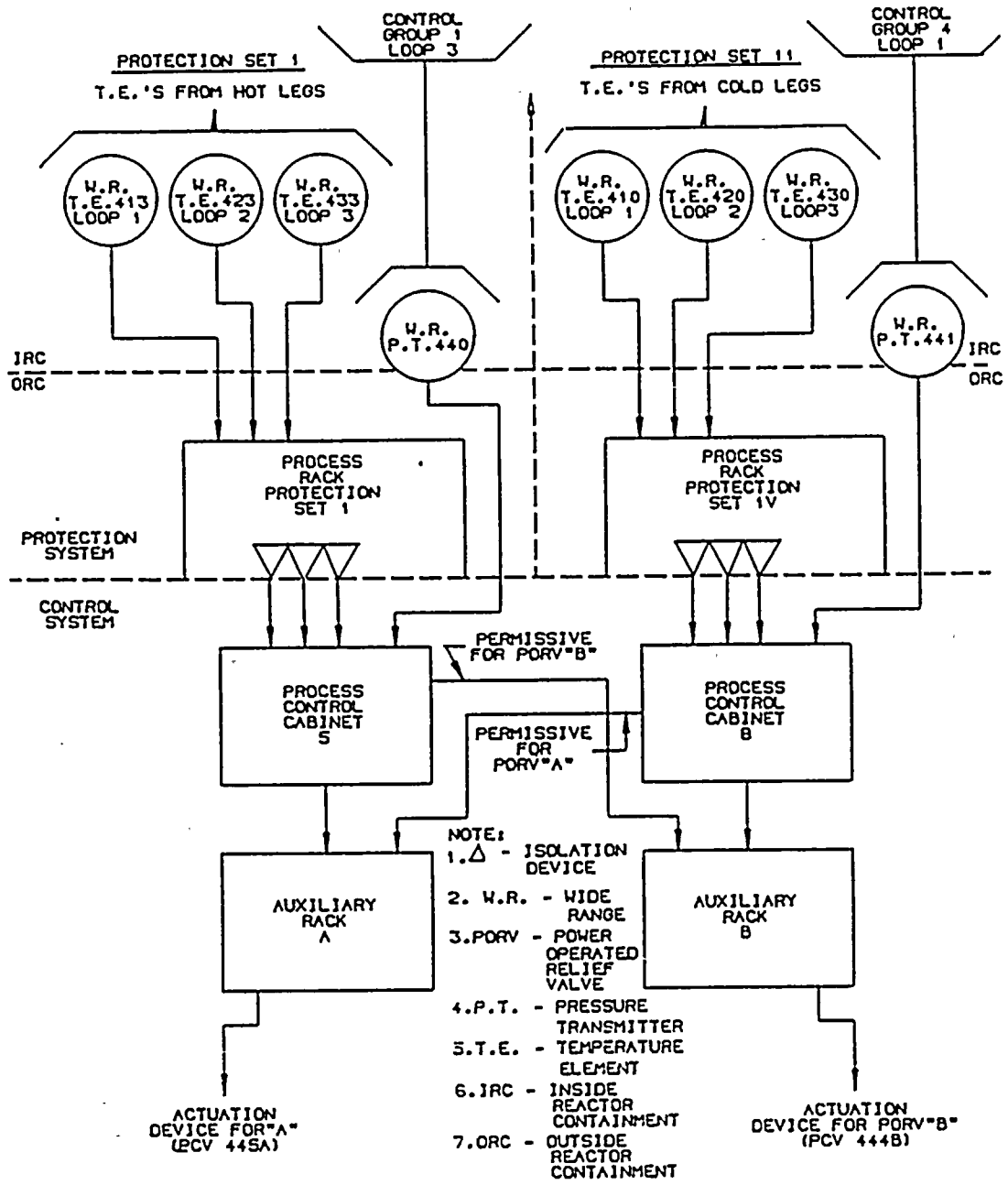
For the MSLB accident scenario, the margin from a Departure from Nucleate Boiling (DNB) in the core is reduced due to decreased RCS pressure from the existing analysis. However, since both safety trains of equipment would be available with the single failure as the inadvertent LTOPS actuation, the increased borated water flow from both safety injection system trains will tend to reduce the core power increase resulting from the steamline break, and offset the decrease in DNB margin resulting from the RCS depressurization. The DNB margin existing appears to accommodate the unanalyzed condition, and an analysis of this scenario would likely produce acceptable results.

For the SGTR recovery scenario, the inadvertent LTOPS actuation occurs only if the Reactor Coolant Pumps had been stopped. The depressurization of the RCS when the PORVs open may delay recovery actions, which could potentially increase the total primary to secondary coolant loss and thus increase offsite doses, reducing the margin to the 10CFR100 dose limits. However, RCS depressurization tends to reduce the rate of primary coolant loss to the ruptured steam generator, offsetting the time delay in recovery actions. Further, a single failure of a failed open Steam Generator PORV on the ruptured steam generator need not be postulated coincident with the single failure of the inadvertent LTOPS actuation, and this also tends to reduce the offsite release. Based on this mitigating effect, and on the fact that RCS depressurization reduces the primary to secondary loss of coolant, an analysis of this scenario is expected to yield acceptable results.

CORRECTIVE ACTION:

1. As stated above, the automatic actuation function of LTOPS has been disabled to ensure the unanalyzed condition cannot occur. This was achieved by placing the PORV control switches in the "SHUT" position until the PIC cards could be disconnected to electrically disable the LTOP System.

2. A permanent modification is under consideration to make the arming permissive a manual action, instead of automatic.



Amendment No. 22

SHEARON HARRIS NUCLEAR POWER PLANT Carolina Power & Light Company FINAL SAFETY ANALYSIS REPORT	RCS PRESSURE CONTROL LOGIC DIAGRAM	FIGURE 7.6.1-7

CP&L
Carolina Power & Light Company

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

JUN 10 1988

File Number: SHF/10-13510C
Letter Number: HO-880120 (O)

U.S. Nuclear Regulatory Commission
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SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 88-011-00

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 by direction
Vice President
Harris Nuclear Project

AJH:dj

Enclosure

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

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