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 AUTH. NAME      AUTHOR AFFILIATION  
 RICHEY, R.B.      Carolina Power & Light Co.  
 RECIPIENT NAME      RECIPIENT AFFILIATION  
 EBNETER, S.D.      Region 2, Ofc of the Director

SUBJECT: Part 21 rept re potential failure of main steam PORVs.  
Initially reported on 890721.

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Carolina Power & Light Company

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

JUL 26 1989

File Number: SHF/10-13510  
Letter Number: HO-8900780

NRC-674

S. D. Ebnetter  
United States Nuclear Regulatory Commission  
Region II  
101 Marietta Street, Northwest (Suite 2900)  
Atlanta, Georgia 30323

SHEARON HARRIS  
DOCKET NO. 50-400/LICENSE NO. NPF-63  
10CFR PART 21 NOTIFICATION  
MAIN STEAM PORVs

Dear Mr. Ebnetter:

Attached is our report on the subject item which was deemed reportable per the provisions of 10CFR21, on July 19, 1989. Carolina Power & Light Company considers that the actions taken/planned are adequate for resolution of this item.

If you should have any questions regarding this matter, please contact Mr. Dean Tibbitts at (919)-362-2718.

Very truly yours,

*R. B. Richey*  
R. B. Richey  
Manager  
Harris Nuclear Project

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MGW:djs

Enclosure

cc: Messrs. R. A. Becker (NRR)  
W. H. Bradford (NRC-SHNPP)

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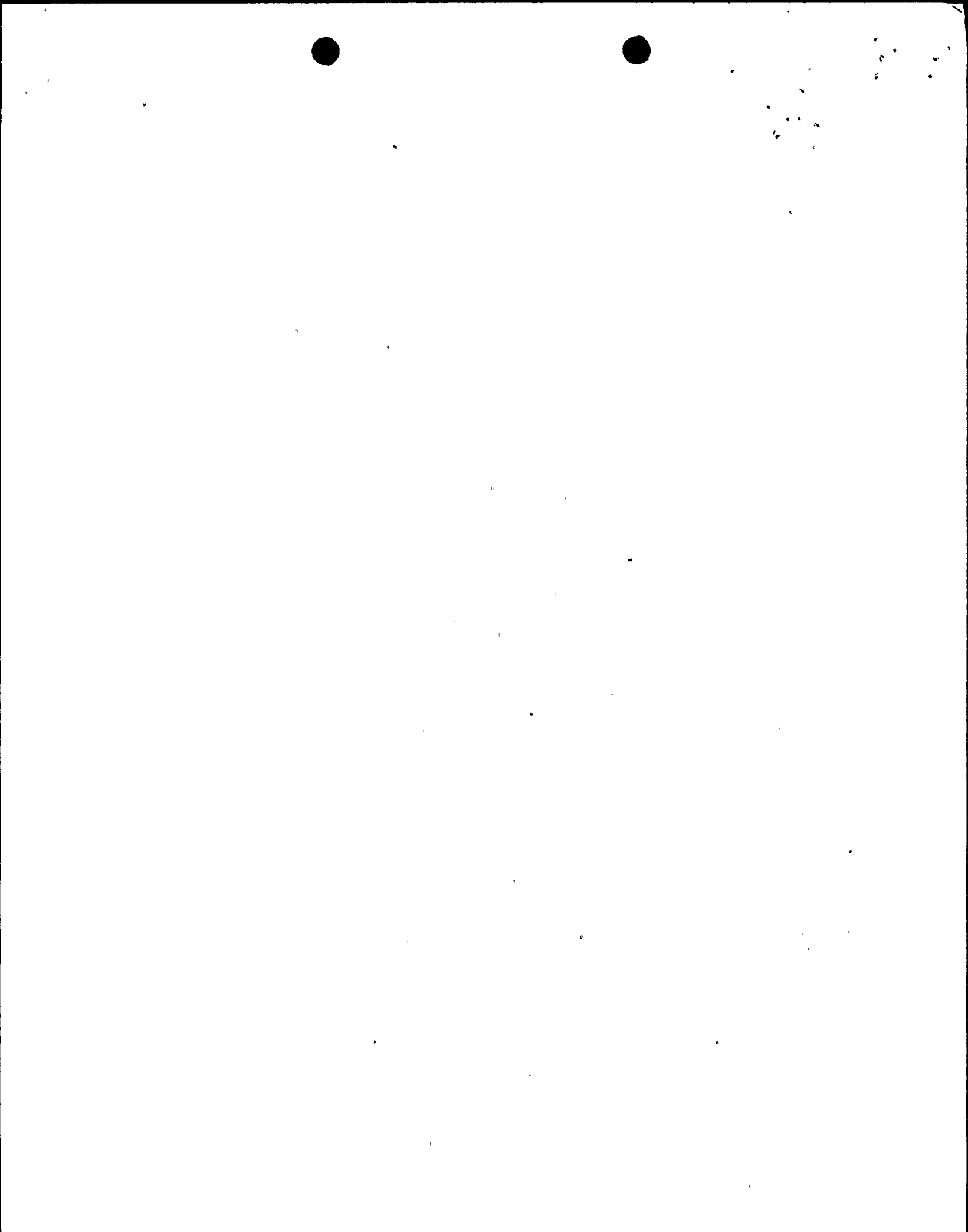
CAROLINA POWER & LIGHT COMPANY  
SHEARON HARRIS NUCLEAR POWER PLANT

INITIAL WRITTEN REPORT

POTENTIAL FAILURE OF  
MAIN STEAM POWER OPERATED  
RELIEF VALVES (PORVs)

July 21, 1989

REPORTABLE UNDER 10CFR21



SUBJECT:

Shearon Harris Nuclear Power Plant, 10CFR21 reportable deficiency. Potential failure of Main Steam Power Operated Relief Valves (PORVs).

ITEM:

Deficiency in the Main Steam PORVs (IMS-58, IMS-60, IMS-62). Model No.OXG9-X8-X8BW-10BW-31MS51.

SUPPLIED BY:

Control Components Inc. (CCI), Rancho Santa Margarita, CA

NATURE OF DEFICIENCY:

A single PORV is provided in each of the three main steamlines, upstream of the main steam isolation valve. The PORVs, are ASME III, Class 2, Seismic Category I valves. The PORVs are electrohydraulically operated, fail shut valves. They are automatically controlled by steamline pressure during normal plant operation with the capability of remote manual adjustment of the pressure set point from the Control Room for use during plant cooldown operations.

Notification has been received from the Main Steam PORV manufacturer, Control Components Inc. (CCI), that these valves may randomly fail to open on demand. The cause of the potential failure is that the piston ring may fail to seal, thus allowing excess steam leakage past the piston ring and into the bonnet cavity. If the leakage past the piston ring is larger than the ability of the pilot plug to vent the bonnet, an excessive pressure remains in the bonnet. If this pressure is too high, then the actuator cannot overcome the forces holding the main plug on the seat.

According to CCI, the cause of the failure is not known. The failure occurs randomly and cannot be made to occur on demand. CCI speculates that the cause may be dirt or corrosion particles that get into the piston ring cavity and prevent the ring from sealing. Excessive bonnet pressure caused by abnormally high leakage past the main valve plug piston ring is suspected to have contributed to recent valve failures at the Palo Verde Nuclear Plant in which several of their Atmospheric Dump Valves failed to open.

DATE PROBLEM WAS CONFIRMED TO EXIST:

CP&L was made aware of the potential deficiency via CCI letter dated June 28, 1989. Subsequent review and evaluation by CP&L engineers and the Harris Plant Nuclear Safety Committee determined this item to be reportable per 10CFR21 on July 19, 1989.

PROBLEM  
REPORTED:

D. L. Tibbitts notified the NRC (Mr. D. M. Verrelli), that this item was reportable under 10CFR21 on July 21, 1989.

SCOPE OF  
PROBLEM:

The deficiency involves the operability of the main steam PORVs and the capability to remove heat from the Nuclear Steam Supply System during periods when the main steam isolation valves are closed.

SAFETY  
IMPLICATIONS:

The most limiting failure of the main steam PORVs with respect to safe shutdown and accident mitigation is the Steam Generator Tube Rupture, (SGTR) Coincident With Loss of Off-Site Power scenario.

One of the major concerns with a SGTR is the possibility of steam generator overfill since this could potentially result in a significant increase in the off-site radiological consequences. The most limiting single failure in the analysis, relative to overfill, is the failure of a PORV to open on an intact steam generator for Reactor Coolant System cooldown. This reduces the steam release capability to the capacity of one Steam Generator PORV. With this defect, the potential exists for the PORV on each of the two intact steam generators to fail to actuate. With both PORVs failed on the intact steam generators, overfill of the ruptured steam generator would occur; which could result in a significant increase in offsite radiological consequences.

CORRECTIVE  
ACTION:

A plant change request (PCR-4596) has been initiated to modify the PORV trim and increase actuator load capability in accordance with CCI's recommendations. Per discussion with CCI, the necessary parts will be available by mid-September 1989. It is currently planned to implement this change during the 1989 Fall Refueling outage. The Harris PNSC has reviewed and approved a JCO regarding these valves. The JCO concludes that continued operation is acceptable based on the current maintenance history for the valves which does not show any failure that could be contributed to the potential defect identified by CCI, random nature of the potential failure, and recent valve post maintenance tests.

