October 1, 1991

Docket No. 50-261

Mr. Lynn W. Eury
Executive Vice President
Power Supply
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Dear Mr. Eury:

SUBJECT: NRC BULLETIN 88-08, "THERMAL STRESSES IN PIPING CONNECTED TO REACTOR COOLANT SYSTEMS" - H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 (TAC NO. 69679)

By letter dated May 15, 1990, Carolina Power & Light Company responded to NRC Bulletin 88-08. Your response stated that a review was performed of piping connected to the reactor coolant system (RCS).

The NRC staff and its consultant, Brookhaven National Laboratories, have completed the review of your response to Bulletin 88-08 and its supplements. The staff has determined that your response is consistent with modification or monitoring alternatives stated in the Bulletin.

Although no response was required related to Supplement 3 of the Bulletin, some licensees have addressed Supplement 3 in response to the Bulletin. Those who have not will not be required to provide a specific response to Supplement 3. However, you are reminded that having been informed of the phenomenon identified in that supplement, you are responsible for adequate review of both its applicability to your plant and any considered actions. NRC staff may audit or inspect the implementation of Bulletin 88-08 and its supplements at a later date. Enclosure 1 contains information that you may use to assess the adequacy of your program with respect to Action 3 of the Bulletin, and Supplement 3.

Therefore, you meet the requirements of Bulletin 88-08 and no further action is required. This completes our activity on TAC number 69679.

Sincerely,
Orignal Signed By:
Brenda Mozafari for:

Ronnie H. Lo, Senior Project Manager
Project Directorate II-1
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: See next page

OFC	:LA:PD21:DRPE	:PM:PD21:DRPE	:D:PD21:DRPE	:	:
NAME	:PAnderson	:RLo:dt	:EAdensam	:	:
DATE	:9/25/91	:9/25/91	:9/26/91	:	:

OFFICIAL RECORD COPY
Document Name: LTR EURY 8808

020034

A01

D01

Mr. L. W. Eury
Carolina Power & Light Company

H. B. Robinson Steam Electric
Plant, Unit No. 2

cc:
Mr. H. Ray Starling
Manager - Legal Department
Carolina Power & Ligth Company
P. O. Box 1551
Raleigh, North Carolina 27602

Mr. H. A. Cole
Special Deputy Attorney General
State of North Carolina
P. O. Box 629
Raleigh, North Carolina 27602

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
H. B. Robinson Steam Electric Plant
Route 5, Box 413
Hartsville, South Carolina 29550

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street
Suite 2900
Atlanta, Georgia 30323

Mr. R. Morgan
General Manager
H. B. Robinson Steam Electric Plant
P. O. Box 790
Hartsville, South Carolina 29550

Mr. Dayne H. Brown, Director
Department of Environmental,
Health and Natural Resources
Division of Radiation Protection
P. O. Box 27687
Raleigh, North Carolina 27611-7687

Mr. Robert P. Gruber
Executive Director
Public Staff - NCUC
P. O. Box 29520
Raleigh, North Carolina 27626-0520

Mr. C. R. Dietz
Manager, Robinson Nuclear Project
Department
H. B. Robinson Steam Electric Plant
P. O. Box 790
Hartsville, South Carolina 29550

Mr. Heyward G. Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

DISTRIBUTION

Docket File
NRC PDR
Local PDR

S. Varga	14-E-4
G. Lainas	14-H-3
L. Reyes	RII
E. Adensam	14-B-20
P. Anderson	14-B-20
R. Lo	14-B-20
OGC	15-B-18
E. Jordan	MNBB-3701
ACRS (10)	P-315

PD-21 Reading File - Robinson
B. Mozafari

Enclosure

EVALUATION CRITERIA FOR RESPONSES TO NRC BULLETIN 88-08, ACTION 3 AND SUPPLEMENT 3

1.0 OBJECTIVE

To provide continuing assurance for the life of the plant that unisolable sections of piping connected to the reactor coolant system (RCS) will not be subjected to thermal stratification and thermal cycling that could cause fatigue failure of the piping.

2.0 PURPOSE

To provide guidelines for evaluation of licensee responses, including acceptable procedures and criteria to prevent crack initiation in susceptible unisolable piping.

3.0 IDENTIFICATION OF POTENTIALLY SUSCEPTIBLE PIPING

(1) Sections of injection piping systems, regardless of pipe size, which are normally stagnant and have the following characteristics:

A. The pressure is higher than the RCS pressure during reactor power operation.

B. The piping sections contain long horizontal runs.

C. The piping systems are isolated by one or more check valves and a closed isolation valve in series.

D. For sections connected to the RCS:

a. Water injection is top or side entry.

b. The first upstream check valve is located less than 25 pipe diameters from the RCS nozzle.

Examples of such sections in PWRs are the safety injection lines and charging lines between the reactor coolant loop and the first upstream check valve, and the auxiliary pressurizer spray line between the charging line and the main pressurizer spray line.

(2) Sections of other piping systems connected to the RCS, regardless of pipe size, which are normally stagnant and have the following characteristics:

A. The downstream pressure is lower than RCS pressure during reactor power operation.

B. The piping systems are isolated by a closed isolation valve, or a check valve in series with a closed isolation valve.

C. There is a potential for external leakage from the isolation valve.

Examples of piping containing such unisolable sections in PWRs are the residual heat removal (RHR) lines. Examples of such piping for BWRs are the RHR lines and the core spray injection lines.

4.0 ACCEPTABLE ACTIONS

The following actions are considered as acceptable responses to Bulletin 88-08, Action 3 and Supplement 3, as applicable, provided that the requirements of Bulletin 88-08, Action 2 have been satisfied.

(1) Revision of system operating conditions to reduce the pressure of the water upstream of the isolation valve below the RCS pressure during power operation.

(2) Relocation of the check valves closest to the RCS to be at a distance greater than 25 pipe diameters from the nozzle.

(3) Installation of temperature monitoring instrumentation for detection of piping thermal cycling due to valve leakage.

A. Type and location of sensors.

a. Temperature sensors should preferably be resistance temperature detectors (RTDs).

b. RTDs should be located between the first elbow (elbow closest to the RCS), and the first check valve (check valve closest to the RCS).

c. For the auxiliary pressurizer spray line, RTDs should be installed near the "tee" connection to the main pressurizer spray line or on the cold portion (ambient temperature) of the line.

d. RTDs should be located within six inches of the welds.

e. At each pipe cross section, one RTD should be positioned on the top of the pipe and another RTD on the bottom of the pipe.

B. Determination of baseline temperature histories.

After RTD installation, temperature should be recorded during normal plant operation at every location over a period of 24

hours. The resulting temperature versus time records represent the baseline temperature histories at these locations. Baseline temperature histories should meet the following criteria:

a. The maximum top-to-bottom temperature difference should not exceed 50°F.

b. Top and bottom temperature time histories should be in-phase.

c. Peak-to-peak temperature fluctuations should not exceed 60°F.

C. Monitoring time intervals.

a. Monitoring should be performed at the following times:

1. At the beginning of power operation, after startup from a refueling shutdown

2. At least at six-month intervals thereafter, between refueling outages

b. During each monitoring period, temperature readings should be recorded continuously for a 24-hour period.

D. Exceedance Criteria.

Actions should be taken to modify piping sections or to correct valve leakage if the following conditions occur:

a. The maximum temperature difference between the top and the bottom of the pipe exceeds 50°F.

b. Top and bottom temperature histories are in-phase but the peak-to-peak fluctuations of the top or bottom temperatures exceed 60°F.

c. Top and bottom temperature histories are out-of-phase and the bottom peak-to-peak temperature fluctuations exceed 50°F.

d. Temperature histories do not correspond to the initially recorded baseline histories.

(4) Installation of pressure monitoring instrumentation for leakage detection in injection lines.

(Pressure monitoring is not the preferred method since pressure measurements cannot provide a measurement of thermal cycling in the unisolable pipe sections.)

A. Type and location of sensors.

a. Pressure sensors should preferably be pressure transducers.

b. Pressure transducers should be installed upstream and downstream of the first check valve.

c. For systems having a pressure higher than the RCS pressure, pressure transducers may be installed upstream and downstream of the first closed isolation valve. (The downstream section is the pipe segment between the isolation valve and the check valve.)

B. Monitoring time intervals.

a. Monitoring should be performed at the following times:

1. At the beginning of power operation, after startup from a refueling shutdown

2. At least at six-month intervals thereafter, between refueling outages

b. Pressure readings should be recorded continuously for a 24-hour period.

C. Exceedance criteria.

Actions should be taken to modify piping sections or to correct valve leakage if the following conditions occur:

a. For pressure measurements across a check valve, the downstream pressure (RCS pressure) is equal to or less than the upstream pressure at any time during power operation.

b. For pressure measurements across a closed isolation valve, the downstream pressure is equal to or greater than the upstream pressure at any time during power operation.