UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 20, 1991

Docket No. 50-286

Mr. Ralph E. Beedle
Executive Vice President, Nuclear
Generation
Power Authority of the State of
New York
123 Main Street
White Plains, New York 10601

Dear Mr. Beedle:

SUBJECT: NRC BULLETIN 88-08, "THERMAL STRESSES IN PIPING CONNECTED TO REACTOR COOLANT SYSTEMS," INDIAN POINT NUCLEAR GENERATING UNIT NO. 3 (TAC NO. 69642)

Your letter dated October 12, 1988, responded to NRC Bulletin 88-08 for the Indian Point Nuclear Generating Unit No. 3. Your response stated that a review was performed of piping connected to the reactor coolant system (RCS) and that one unisolable section of piping connected to the RCS may have been subjected to the thermal stresses described in the bulletin. The response also included piping examinations that were planned for the upcoming 6/7 refueling outage. Your letter dated June 29, 1989, provided the details of the piping examinations and monitoring actually performed during the 6/7 refueling outage.

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

Although no response was required related to Supplement 3 of the bulletin, 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. The NRC staff may audit or inspect the implementation of Bulletin 88-08 and its supplements at a later date. The enclosure to this letter contains information that you may use to assess the adequacy of your program with respect to Action 3 of the bulletin and Supplement 3.

In summary, you meet the requirements of Bulletin 88-08. This completes our activity related to TAC Number 69642.

Sincerely,

N. F. Conicella

Nicola F. Conicella, Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Evaluation Criteria

cc w/enclosure:
See next page

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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 the reactor coolant system (RCS) will not be subjected to stratification and thermal cycling that cause fatigue failure of the piping.

2.0 PURPOSE

1. To provide guidelines for evaluation of licensee responses.

2. To provide acceptable procedures and criteria for preventing crack initiation in susceptible unisolable piping.

3.0 IDENTIFICATION OF POTENTIALLY SUSCEPTIBLE PIPING

A. Sections of injection piping systems, regardless of pipe size, which normally contain stagnant water and have the following characteristics:

1. The source pressure is normally higher than the reactor coolant loop (RCL) pressure.

2. The piping contains long horizontal runs.

3. The piping is isolated from the RCL by one or more check valves and a closed isolation valve in series.

4. For sections connected to the RCL:

   a. Water injection is from the top or side of the RCL piping.

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

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

B. Sections of other piping systems connected to the RCL, regardless of pipe size, which normally contain stagnant water and have the following characteristics:

1. The downstream pressure is normally lower than RCL pressure.

2. The piping is isolated from the RCL by a closed isolation valve or a check valve in series with a closed isolation valve.

3. 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 source upstream of the isolation valve below the RCL pressure during normal operation.

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

3. Installation of temperature monitoring instrumentation for valve leakage detection.

   A. Selection of locations.

      a. Temperature monitoring should be performed by installing resistance temperature detectors (RTDs).

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

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

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

      e. At each location an RTD should be positioned on top and bottom of the pipe cross-section.

   B. Determination of baseline temperature histories.

      After RTD installation, the temperature should be recorded during normal plant operation at every location over a period of 12 hours. The resulting temperature time-histories represent the baseline histories at these locations subject to the following conditions:

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

      b. Top and bottom temperature time-histories should be in-phase and not fluctuate by more than ±30°f.

c. If top-to-bottom temperatures becomes out-of-phase, the bottom temperature should not fluctuate by more than 50°F.

C. Section of monitoring time intervals.

a. Monitoring should be performed at the following times:

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

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

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

c. Temperature histories should correspond to the initially recorded baseline histories.

4. Installation of pressure monitoring instrumentation for leakage detection.

A. Selection of locations.

a. Pressure monitoring should be performed by installing pressure transducers.

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

B. Selection of monitoring time intervals.

a. Monitoring should be performed at the following times:

1. At the beginning of Mode 1 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. Pressure fluctuation criteria.

No limits on pressure fluctuations are specified. The only requirement is that the downstream pressure (RCL pressure) should be greater than the upstream pressure at all times.

NOTES:

1. Pressure transducers could also be installed across the first closed isolation valve of injection piping in which case the downstream pressure (the pressure in the pipe segment between the isolation valve and the check valve) should be lower than the upstream pressure. An equalization of pressure indicates leakage through the valve seat and eventual check valve cycling.

2. Pressure monitoring is not recommended, since pressure measurements may not provide an accurate indication of events in the unisolable pipe sections.

5.0 CORRECTIVE ACTIONS

Corrective actions must be taken if the following conditions arise:

a. Top-to-bottom temperature differences exceed 50°F.

b. Top and bottom temperature time-histories become significantly out of phase.

c. Bottom temperature oscillations exceed 50°F peak-to-peak.

d. External leakage is detected in closed isolation valves.

In summary, you meet the requirements of Bulletin 88-08. This completes our activity related to TAC Number 69642.

Sincerely,

Original signed by:

Nicola F. Conicella, Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Evaluation Criteria

cc w/enclosure:
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