Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511
914 736.8001

New York Power Authority

Robert J. Barrett
Plant Manager

September 18, 1996
IPN-96-105

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

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License No. DPR-64
Request for Relief From ASME Code Section XI Per 10 CFR 50.55a

Dear Sir:

This letter requests relief from ASME Code Section XI requirements for corrective actions for flaws that exceed code acceptance limits for components that are in service. During an inspection by the NRC Resident Inspector on August 23, 1996, a leak was observed on the service water (SW) discharge piping in the SW zurn pit area. The leak existed on the discharge header of 33 SW Pump at a weld located just above a pipe clamp near the floor and the leak rate was approximately 0.3 gpm. The affected SW line number 1083 is a 14 inch ASTM A-53 carbon steel ANSI B 31.1 cement lined pipe. This pipe is within the safety related boundary of the SW system and is an Inservice Inspection Class 3 pipe.

The Authority conducted a teleconference with NRC staff members on August 24, 1996 to discuss the discovery of the flaw, the Authority's evaluation of the structural integrity of the affected pipe and to inform the NRC staff of the temporary measure we planned to take to control the leak, pending a formal submittal of the relief request in accordance with the guidance provided in NRC Generic Letter (GL) 90-05.

Ultrasonic Testing (UT) characterized the flaw as two pin holes with weld metal between them. The flaw area measured 1.25 inches in length. The Authority performed an evaluation using the "through-wall" approach for the pin holes and the "wall thinning" approach outside the pin hole area in accordance with the guidance provided in GL 90-05 and confirmed the structural integrity of the pipe for the service requirements of the system for approximately 20 years. Thus, the Authority has concluded that the affected SW pipe is structurally capable of performing its intended design function.

The Authority installed a 1/8 inch thick Viton patch to cover the area of the pin hole leak, as a temporary modification. The Viton patch was reinforced with a metal shim and held in place by two hose clamps. This temporary modification is intended to be used as a means of stopping or reducing the leakage for housekeeping concerns.

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The Authority plans to defer code repair/replacement of this pipe to the next refueling outage (RO 9 scheduled for Spring 1997). The Authority considers the code repair/replacement of this pipe during power operation impractical and requests relief in accordance with 10 CFR 50.55a(g) for a temporary non-code repair using the guidance described in GL 90-05.

The Authority's request for relief is in Attachment I. The evaluation for the structural integrity of the pipe is in Attachment II and the commitments made by the Authority are in Attachment III.

Should you have any questions regarding this matter, please contact Mr. K. Peters at (914) 736-8029.

Very truly yours,

Robert J. Barrett
Plant Manager

Attachments

cc: Mr. Hubert J. Miller
Regional Administrator
Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector's Office
Indian Point Unit 3
U.S. Nuclear Regulatory Commission
P.O. Box 337
Buchanan, NY 10511

Mr. George F. Wunder, Project Manager
Project Directorate I-1
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Mail Stop 14 B2
Washington, DC 20555

REQUEST FOR RELIEF FROM THE REQUIREMENTS OF ASME SECTION XI

Background

During an inspection by the NRC Resident Inspector on August 23, 1996, a leak was observed on the service water (SW) discharge piping in the SW zurn pit area. The leak existed on the discharge header of 33 SW Pump at a weld located just above a pipe clamp near the floor. The leak rate was approximately 0.3 gpm. The affected SW line number 1083 is a 14 inch ASTM A-53 carbon steel ANSI B 31.1 cement lined pipe. This pipe is within the safety related boundary of the SW system and is an Inservice Inspection Class 3 pipe.

Ultrasonic testing (UT) showed that there are 2 closely spaced pin holes over a length of 1.25 inches in the weld with the minimum remaining wall thickness of 0.105 inches (28 % of nominal wall thickness). Away from this area, the minimum wall thickness was measured to be 0.258 inches (69 % of nominal wall thickness). This value is greater than 0.113 inches which is based on the ASME Code Case N-480 minimum required pipe wall thickness, but less than 0.328 inches which is the 12.5% tolerance for ASTM piping products.

ASME Code Requirements From Which Relief is Requested

The request for relief applies to the requirements of ASME Code Section XI, 1983 Edition through the Summer 1983 Addenda, Articles IWA-4000, IWD-3000, IWB-3400, IWB-3500, and IWB-3600. The affected pipe is part of an ASME Code Section XI inservice inspection program. The Authority performed an evaluation using the "through-wall" approach for the pin hole area and the "wall thinning" approach outside the pin hole area in accordance with the guidance provided in GL 90-05. The structural integrity of the pipe for the service requirements of the system was confirmed for approximately 20 years. The UT measurements in the pin hole area showed a flaw length of 1.25 inches. The structural integrity evaluation performed by the Authority concluded that a flaw length of up to 2.75 inches was acceptable for this portion of the SW line. IWB-3122.4 allows "components" whose volumetric or surface examination reveal flaws that exceed the acceptance standards of IWB-2500-1, to be acceptable without removal, repair, or replacement, if an analytical evaluation, as described in IWB-3600 meets the acceptance criteria of IWB-3600. Therefore, relief is requested from the requirements of IWA-4000, IWD-3000, and various sections of IWB-3000 as described above, to allow continued operation with the flawed SW pipe.

The Authority installed a 1/8 inch thick Viton patch to cover the area of the pin hole leak, as a temporary modification. The Viton patch was reinforced with a metal shim and held in place by two hose clamps. This temporary modification is intended to be used as a means of stopping or reducing the leakage for housekeeping concerns, reduce the leakage through the flaw so that any degradation due to flow induced erosion is reduced, and protect the surrounding plant equipment from potential water damage. The size of the patch also allows for monitoring of the flaw, such that should the leak rate increase and the flaw exceed the size of the patch, a UT can

The specific technical considerations applicable to the code repair/replacement of the affected SW pipe deferral are as follows: The pipe is unisolable and a code repair or replacement would require a plant shutdown. A temporary modification of installing a rubber patch over the pin hole leak area has been performed to reduce or stop the leakage. This temporary modification is fully reversible. The leak will be monitored weekly by visual inspection without removing the patch, and if there is an increase in the leak rate, a UT will be conducted. This area will also be monitored by UT every 3 months for any increase in the flaw length until the pipe is replaced or a code repair is performed.

Impracticality Determination

The leaks are in a portion of line number 1083 that is unisolable and a plant shutdown would be needed to perform code repair or replace the pin hole section of the weld. Application of a liquid nitrogen freeze seal to facilitate the repair of this area was investigated. However, given the age of the cement liner in the service water pipe to be repaired, it is probable that degradation of the cement liner may occur as a result of the freeze seal application. Furthermore, "through wall" and "wall thinning" calculations performed by the Authority indicate that there is adequate structural integrity of the pipe for service for approximately 20 years. Based on the above, and the fact that there is a temporary modification using a rubber patch that effectively stops the active leak, the Authority believes it would be imprudent to use the freeze seal method, and judges deferral of the code repair/replacement of the pipe to the next refueling outage (RO 9 scheduled for Spring 1997) to be the proper course of action.

Root Cause Determination and Flaw Characterization

The UT indications showed 2 pin holes in the weld with a flaw length of 1.25 inches and with the minimum remaining wall thickness of 0.105 inches. Away from this area, the minimum wall thickness was measured to be 0.258 inches. Based on similar pipes previously evaluated, the most likely cause of this flaw can be attributed to crevice corrosion where a corrosion mechanism is created in the gap in the cement lining that is often found between two welded sections of cement lined pipes. This preliminary assessment is based on UT results and flaw characterization. A thorough metallurgical evaluation of the weld will be required to confirm the corrosion mechanism. This evaluation will be performed when the pipe is removed from service and before the weld is repaired or the piping is replaced.

Operating System Assessment

As part of the Authority's Deviation Event Report (DER) procedure, a DER recorded the degraded pipe. Subsequently, the pipe was inspected by UT and an evaluation was performed to determine its structural integrity. An evaluation of the UT results and calculation of structural integrity in accordance with the guidance of GL 90-05 concluded that the flawed pipe is structurally adequate to perform its intended design function and the system was judged to be operable. Given the moderate energy of the SW piping system, leak before break methodology is assumed. It can be expected that such a leak will increase rather than the pipe experience a catastrophic failure. Given the location, any deterioration of the flaw would be discovered quickly

either by the plant operators who must access the area at least once per eight hour shift, or by system engineering personnel during the weekly inspection of the leak as required by GL 90-05.

Flaw Evaluation and Structural Integrity Assessment

A structural evaluation was performed which concludes that the pipe is structurally acceptable for an estimated 20 years of service and will not fail catastrophically under all design loading conditions, including the Design Basis Earthquake (DBE) and Operating Basis Earthquake (OBE). The potential for vibration induced fatigue failure is highly unlikely because the piping is a short run with local restraint and no identified source of vibration.

The probability of failure of the cement liner affecting the flow is limited because the line is 14 inches in diameter and the cement liner is 1/4 inch thick. Also, UT results indicate that the liner is intact. The potential for loss of flow to the system will be insignificant given the size of the leak (approximately 0.3 gpm) as compared to the output of any one of the SW pumps (2500-6000 gpm). Consequences of flooding and spraying of water on surrounding equipment are minimized with the installation of the rubber patch over the leak area and monitoring by visual inspection during plant operator's rounds once per shift.

Augmented Inspection

UT was performed on the pipe weld and adjacent area and the Non Destructive Examination (NDE) Report was reviewed by Engineering. An extent of condition (augmented) inspection using UT was performed on five (5) other similar welds considered most susceptible and accessible in accordance with the guidelines of GL 90-05. The extent of condition examination found that all five welds are acceptable.

Periodic augmented inspections (UT) will be conducted on line number 1083 pipe weld flaw every three months to ensure that the structural integrity of the pipe is maintained within the allowable flaw length for all design loading conditions. Qualitative (visual) assessment of the flawed pipe will be performed weekly during plant walkdowns to monitor for any change in the condition of the flaw.

Summary

The Authority believes that the affected pipe has sufficient structural stability and is capable of performing its intended function for approximately 20 years. Therefore, the Authority believes that relief from the requirements of ASME Code Section XI, 1983 Edition through the summer 1983 Addenda, Articles IWA-4000, IWD-3000, IWB-3400, IWB-3500 and IWB-3600 for the flaw on SW pipe line number 1083 should be granted.

Docket No. 50-286
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Attachment II

STRUCTURAL INTEGRITY EVALUATION FOR SERVICE WATER LINE NUMBER 1083

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64