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SUBJECT: Provides suppl info re relief request for temporary non-code repair of standby svc water piping,per GL 90-05.

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December 19, 1995
GO2-95-281

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: **WNP-2, OPERATING LICENSE NPF-21**
**RELIEF REQUEST FOR A TEMPORARY NON-CODE REPAIR OF STANDBY SERVICE WATER PIPING PER GENERIC LETTER 90-05 SUPPLEMENTAL INFORMATION**

Reference: Letter GO2-95-200, dated September 27, 1995, JV Parrish (SS) to NRC, "Relief Request for a Temporary Non-Code Repair per Generic Letter 90-05 of Standby Service Water Piping"

The purpose of this letter is to provide verbally requested supplemental information to the referenced relief request and submit copies of the operability assessment and end of cycle flaw evaluation calculation. Attachment 1 provides the supplemental information.

Should you have any questions or desire additional information regarding this matter, please call me or D.A. Swank at (509) 377-4563.

Sincerely,

for

J.V. Parrish (Mail Drop 1023)
Vice President, Nuclear Operations

DPR/lm
Attachment

cc: LJ Callan - NRC RIV
KE Perkins, Jr. - NRC RIV, Walnut Creek Field Office
NS Reynolds - Winston & Strawn
JW Clifford - NRC
DL Williams - BPA/399
NRC Sr. Resident Inspector - 927N



A001

ATTACHMENT 1
RELIEF REQUEST FOR A TEMPORARY NON-CODE REPAIR OF SSW PIPING
PER GL 90-05 - SUPPLEMENTAL INFORMATION

1. **Date and circumstances under which the flaw was found:**

The flaw was found on September 4, 1995 during a line-up inspection of the tower makeup water system to the service water spray ponds.

2. **Size of hole or crack:**

No greater than 1/4 inch diameter

3. **Eroded area:**

No evidence of pipe wall corrosion outside a 3/8 inch radius of the leak except for the two additional areas identified in #4 below.

4. **Number of flaws:**

Three areas of wall thinning were identified.

a. Area of through wall corrosion with wall thinning about 3/4 inch in diameter (leaking area).
b. Area about 1 inch in diameter 5 inches from through wall.
c. Area about 1 inch in diameter 6.5 inches from through wall and 3.5 inches from area 2.

5. **Adjacent wall thickness**

Adjacent wall thickness in all three wall thinning areas is 0.35 to 0.39 inches.

6. **Total area examined around flaw**

A 4 inch diameter area around the center of the leak and an area 12 inches downstream of the leak and an area 12 inches upstream of the leak.

7. **From the flaw evaluation calculations:**

a. **Input, material properties & stresses**

1. The following input and material properties were used in the calculation:

ISO SW-296-54.57 Rev. 14

a. **Material properties, input, & stresses (continued)**

Piping Material SA 106 Grade B
Room Temperature Yield 35 ksi

Pipe Diameter 18" Standard Schedule
Wall Thickness (nominal) = 0.375"
Code t min., inch = 0.264"
Design Pressure = 309 psi
Design Temperature = 150°F
Minimum Operating Temperature = 32°F
Code Allowable = 15,000 psi
Corrosion Allowance = 0.080"

Thinned Area Diameter = 1"
Wall Thickness (minimum measured) = 0.35"

Maximum Pipe Stress (used) = 13.36 ksi

The fracture toughness value was conservatively estimated to be 37.95 ksi$(in)^{0.5}$. This value was determined using ASME Code Appendix G $K_{IR}$ curve assuming an NDT temperature of 40°F. However, the Generic Letter 90-05 value of 35 ksi $(in)^{0.5}$ was used in determining the maximum allowable flaw size.

2. The stresses used were thermal, seismic, pressure, and deadweight. The stresses were the maximum in the piping system for the segment analyzed. The stresses were applied on the existing flaw and oriented perpendicular to the assumed through wall flaw. The flaw is oriented axially.

   The flaw size was conservatively based on the maximum diameter of the thinned area, regardless of wall thickness. This is a conservative assumption because the Generic Letter 90-05 through-wall approach defines the maximum length of the portion of the flaw as that which extends beyond the minimum wall.

   The calculated stress intensity was:

   25.247 ksi $(in)^{0.5}$, which is less than 35 ksi $(in)^{0.5}$ allowed by Generic Letter 90-05.

**b. Operability assessment calculation:**

**1. method used**

The Linear Elastic Plastic Mechanics (LEFM) method was used

**2. limiting flaw size**

Limiting flaw size, 1.4 inches

**3. period of time to reach limiting flaw**

Based solely on cracking, not on corrosion mechanisms, and assuming 26 start- ups and shut-downs per year, the period of time to reach the limiting flaw is in excess of 40 years.

**c. End of cycle flaw evaluation calculation:**

**1. method used**

Method used LEFM

**2. estimated growth rate of erosion, crack growth, or corrosion**

The flaw is judged to be a highly localized pipe wall defect. Extensive followup NDE revealed two additional partial-depth defects in the immediate vicinity of the existing leakage defect. No pitting corrosion or other reduction in the nominal pipe wall thickness was detected along a one foot longitudinal distance on either side of the defect.

The crack growth rate used was from the ASME Code for carbon steel materials in BWR water environments with conservative assumptions imposed. Specifically, the crack tip was not assumed to be blunted by corrosion, and a conservative environmental factor of 10 was imposed. The factor of 10 is assumed to bound potential statistical variations in fatigue crack growth due to environmental testing. With these assumptions, the limiting flaw size would not occur for approximately 11 years.

**3. projected flaw size**

The projected flaw size was 1 inch through wall.

4. **design loads used in calculations**

The design loads used were 1.44 ksi for dead weight ($K_{min}$.) with the pressure, thermal and seismic stresses superimposed for every cycle which equals a total stress of 13.36 ksi ($K_{max}$).