



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM ASME CODE REPAIR REQUIREMENTS

FOR ASME CODE CLASS 3 PIPING

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT 1

DOCKET NO. 50-245

1.0 BACKGROUND

By letter dated November 29, 1993, Northeast Nuclear Energy Company (NNECO) requested relief from the American Society of Mechanical Engineers (ASME) Code Section XI requirements regarding repair of ASME Class 1, 2, or 3 structures. NNECO proposed to perform a temporary non-Code repair to ensure the structural integrity and operability of a leaking service water (SW) system discharge pipe. The affected pipe is a discharge line that conveys sea water from the plant to Long Island Sound, and is a safety related Code Class 3 line. The pipe has a pin hole leak at the floor penetration area where the line descends through the basement floor elevation to connect to the underground SW discharge tunnel.

The subject pipe is 24" nominal pipe size (NPS), schedule 40, carbon steel (SA-53 gr. B), with an organic lining. Design conditions are for sea water at 150 psig and 150 degrees F. Operating conditions are: ambient temperature and very low pressure; flow is by gravity feed to the underground discharge tunnel.

Failure cause was attributed to a local lining failure resulting in a pin-hole leak where the pipe is encased in the concrete at the floor penetration. The actual leak was not visible or readily accessible. It had manifested itself as a slight seepage on the floor, a few drops per minute, coming from the pipe penetration through the concrete floor.

Because the affected line is a common discharge line for a number of plant safety systems, it cannot be removed from service or isolated to conduct a Code repair while the unit is on. As a result of this hardship, NNECO proposed several complementary actions patterned after the guidance of Generic Letter (GL) 90-05, and proposed a modification of a structural support. GL 90-05 did not apply in this case because a flaw evaluation and analysis was not feasible.

2.0 DISCUSSION

Upon discovery of the leak, NNECO performed an ultrasonic test (UT) survey of the pipe in the area adjacent to the floor penetration. No evidence of wall thinning was detected. In order to gauge the volume of the leak, exploratory holes were drilled through the floor slab near the shrinkage cracks that were exhibiting seepage. This revealed that the subgrade under the floor consisted of dry packed sand and, thus, the leakage was not larger than the observed few drops per minute indicated by the wetting of the floor.

To assess the structural integrity in the absence of a flaw evaluation, a worst case flaw was proposed. This consisted of assuming a guillotine break at the floor slab level. The effect of the jet reaction with design basis event loads was analyzed for its effect on the severed pipe and the nearby pipe supports. The analysis showed that the pipe and its supports were adequate for this postulated event. However, displacement of the pipe by up to 2 inches of misalignment with respect to the floor penetration could occur. To mitigate this effect and thus preclude the possibility of local flooding of the surrounding floor, an additional pipe restraint was designed and installed. This created an anchor support adjacent to the postulated guillotine break location. With this modification in place, no significant pipe movement could occur, thus, alignment would be maintained, and flooding would be insignificant.

The effect of flooding was analyzed and found to be inconsequential. The floor elevation at the subject pipe location is at ground level. If a leak induced flood were to occur, the water would run out of the building and on to the ground outside. No safety significant sump pumps would be challenged. Safety equipment in the area is mounted on pedestals. Additionally, due to the operating pressure in this part of the SW system, no significant spraying or flooding is likely to occur. The operating pressure is near zero psig, since flow at this point is by gravity feed to the underground discharge tunnel.

An augmented inspection was performed according to the guidance of GL 90-05. A UT survey of other areas potentially susceptible to lining degradation (such as elbows and tees) was performed. No degradation was found. This further supported NNECO's conclusion that the observed leak was due to a local failure in the pipe lining.

A flaw monitoring program was proposed based upon the guidance of GL 90-05. The area would be monitored once per shift for changes in the leakage rate. The subfloor sand bed would be examined for moisture on a biweekly basis. Follow-up nondestructive examination of the accessible area above the leak would be performed on a 2 week basis initially, and on a monthly basis after the first month.

NNECO proposed to continue operation with the mitigating actions discussed above until the next refueling outage, scheduled for January 1994.

3.0 CONCLUSION

The staff finds that NNECO has provided a comprehensive mitigation plan which would reasonably assure structural integrity and operability of the flawed pipe. NNECO has committed to the guidance provided in GL 90-05. NNECO has an effective program for identifying and evaluating SW system problems and has satisfied the safety guidance of the generic letter.

Because the leak cannot be isolated and compliance with the Code would require plant shutdown, the staff concludes that the Code requirements are impractical. Therefore, relief may be granted based upon NNECO's commitment to perform alternative modifications and monitoring consistent with GL 90-05. This relief is authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest, given due consideration to the burden upon the licensee and facility that could result if the Code requirements were imposed on the facility. Pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted until the next refueling outage. The temporary non-Code repair must then be replaced with a Code repair.

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Date: February 10, 1994