



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

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION UNIT NO. 3

DOCKET NO. 50-362

1.0 BACKGROUND

Temporary Non-Code Repairs

Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(g) requires nuclear power facility piping and components to meet the applicable requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (hereafter called the Code). Section XI of the Code specifies Code-acceptable repair methods for flaws that exceed Code acceptance limits in piping that is in service. A Code repair is required to restore the structural integrity of flawed Code piping, independent of the operational mode of the plant when the flaw is detected. Those repairs not in compliance with Section XI of the Code are non-Code repairs. However, the required Code repair may be impractical for a flaw detected during plant operation unless the facility is shut down. Pursuant to 10 CFR 50.55a(g)(6)(i), the Commission will evaluate determinations of impracticality and may grant relief and may impose alternative requirements.

Generic Letter (GL) 90-05, entitled "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2 and 3 Piping," dated June 15, 1990, provides guidance for the staff in evaluating relief requests submitted by licensees for temporary non-Code repairs of Code class 3 piping. The Commission may grant relief based on a staff evaluation considering the guidance in GL 90-05.

2.0 DISCUSSION

By letter dated July 13, 1995, Southern California Edison Company (SCE or the licensee) requested relief from Code repair requirements for a pin hole leak in a moderate energy Class 3 pipe at San Onofre Nuclear Generating Station, Unit No. 3. On June 19, 1995, plant engineering personnel observed leakage from the boric acid make-up (BAMU) line S31218ML031. A single through-wall crack at a solid anchor attachment weld was identified. The crack was a 9/16-inch long linear indication.

The through-wall leak was discovered in a line connecting the boric acid makeup pumps to the charging pump suction. The pipe material was ASME SA376 Gr. T304, seamless austenitic stainless steel 3-inch nominal pipe size (NPS), schedule 10S. The design pressure of the system was 150 psig. The operating pressure of the system was 100 psig when the boric acid pump was operating and under normal conditions approximately 50 psig. The operating temperature of the system was ambient.

Visual, dye penetrant, dye penetrant developer "blot testing," and radiographic imaging were used to characterize and evaluate the flaw. Ultrasonic examination was used to determine wall thickness. There were no eroded areas around the flaw as determined by ultrasonic examination. No other indications were observed in a four-inch wide band around the pipe encompassing the flaw.

A Code repair would involve the replacement of a section of schedule 10 stainless steel pipe which is attached to an anchored pipe support and runs through both the pipe support and a 2-foot thick wall. Completion of the repair during operation was not feasible due to the inadequate access for the line replacement and associated freeze seal. The licensee evaluated the flaw according to the methods of Generic Letter 90-05 and determined it to be acceptable. The licensee requested deferral of the code repair until the refueling outage scheduled for July 22, 1995, 33 days from the discovery of the leak.

The root cause of the crack has not been determined. Intergranular stress corrosion cracking (IGSCC) could have been a primary candidate cause. Previously the licensee experienced a similar failure. The root cause was sensitization in the heat affected zone (HAZ). The failure mechanism was IGSCC as determined by metallurgical examination. The root cause of the present crack will be determined after metallurgical examination following the pipe replacement.

A structural assessment was performed in accordance with the guidance of the generic letter. Linear elastic fracture mechanics analysis was performed. The licensee concluded that the flaw location retains adequate structural integrity for continued service until the next refueling outage.

The licensee determined there was no safety significance associated with the crack. A catastrophic failure was not considered likely to occur based on fracture mechanics. In addition, the refueling water storage tanks and the gravity feed lines from the boric acid tanks are available to provide borated water to the reactor core via the charging pumps if needed for safe shutdown.

Since the structural analysis had shown compliance with the guidance of the generic letter, the licensee planned to leave the leak as-is. The crack was not projected to grow to where a significant boric acid leak would occur. The leakage rate was not expected to increase past the current magnitude of

seepage/dripping. The issue of spray is not a concern since the crack is located in a valve room enclosed on the three sides that contains no electrical components. The open side of the valve alley faces a concrete wall where there are no electrical components. Code repair would occur at the next refueling outage, scheduled for July 1995.

For monitoring purposes, the licensee has committed to the guidance of the generic letter as follows:

- Visual inspections will occur once per shift.
- Qualified NDE examinations daily, to monitor size and leakage.
- Other examinations will be performed as deemed necessary until the refueling outage in July 1995.
- The pipe will be replaced by a thicker pipe per disposition of NCR 95060074 during the July 1995 refueling outage.

An augmented inspection of other similar areas of the system revealed no degradation or leakage.

3.0 EVALUATION

The staff has determined that temporary non-Code repair of Class 3 piping that cannot be isolated without a plant shutdown is justified in some cases. Adherence to the guidance provided in Generic Letter 90-05 provides reasonable assurance of piping structural integrity and that public health and safety will be maintained.

The staff concludes that the licensee has complied with all the criteria identified in Enclosure 1 of Generic Letter 90-05. The staff agrees that the flaw evaluation performed by SCE adequately demonstrates that the structural integrity of the line will be maintained until the start of the Cycle 8 refueling outage. The augmented inspection committed to by the licensee meets the guidance contained in the generic letter and provides additional assurance that significant degradation of the crack will not occur. The staff finds acceptable the licensee's decision to leave the piping as-is based on the fracture mechanics analysis results.

The staff agrees that it would be impractical to perform the Code-required repairs to this line. Impracticality is defined by GL 90-05 to exist if the flaw detected during plant operation is in a section of Class 3 piping that cannot be isolated for completing a Code repair within the time period permitted by the limiting condition for operation of the affected system as specified in the plant Technical Specifications. Performing a Code repair on the pin hole leak in the BAMU line meets this definition of impracticality and compliance with the code would involve redesign or replacement of the piping in order to meet plant TSs.

4.0 CONCLUSION

The licensee has committed to the guidance provided in GL 90-05 and has satisfied the safety guidance of the generic letter. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), the staff concludes that granting relief where Code requirements are impractical is authorized by law and will not endanger life or property or the common defense and security and is 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) and consistent with the guidance in GL 90-05, relief is granted until the next scheduled outage exceeding 30 days, but no later than the next refueling outage. The staff's conclusion was provided verbally to Southern California Edison Company on June 27, 1995. The Code repair was performed during the Cycle 8 refueling outage, which began on July 22, 1995.

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