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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BOILER AND PRESSURE VESSEL CODE REQUIREMENT

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-317

1.0 BACKGROUND

By letters dated March 23, 1995, as supplemented on August 8 and September 11, 1995, Baltimore Gas and Electric Company (BGE) requested relief from the American Society of Mechanical Engineers (ASME) Code, Section XI repair requirements under 10 CFR 50.55a(a)(5)(iii). BGE's request is to delay the required Code repair or replacement of a leak in a half-coupling on the bottom of the common saltwater discharge header in the Unit 1 service water pump room until no later than the next Unit No. 1 refueling outage (spring 1996).

BGE states that relief is necessary because performing Code requirements at this time would be impossible without an unscheduled unit shutdown. A licensee may propose an alternative under 10 CFR 50.55a(a)(3)(ii) if conformance to the Code would be impractical and result in undue hardship without a compensating increase in the level of quality and safety.

2.0 EVALUATION OF RELIEF REQUEST

2.1 Discussion

The 1983 edition of ASME Section XI, with Summer 1985 addenda, which is used at Calvert Cliffs, requires in IWA-5250 that (a) the sources of leakages detected during the conduct of a system pressure test shall be located and evaluated by the owner for corrective measures as follows: ...(2) repairs or replacements of components shall be performed in accordance with IWA-4000 or IWA-7000, respectively.

BGE indicated that the repair of the half-coupling on the saltwater pipe requires that the affected section of the pipe be drained and opened. To drain the pipe and gain access to the weld requires that the Unit be brought to Mode 5 and the saltwater system discharged to the bay by an alternate path. BGE estimates that the replacement of the half-coupling could be accomplished

Enclosure

within approximately 5 days and would require a unit shutdown which would result in a hardship without a compensating increase in the level of quality or safety.

BGE found a leak in a 1-inch nominal pipe size (NPS) half-coupling located at the bottom of the 30-inch NPS common saltwater discharge header in the Calvert Cliffs Nuclear Power Plant, Unit No. 1, service water pump room. The pipe is carbon steel, American Society for Testing and Materials (ASTM) A-234, grade WPB, with an organic lining of neoprene rubber. The coupling is forged carbon steel (ASTM A-234, grade WPB) with coal tar lining the coupling threads.

The saltwater system provides the cooling medium for the component cooling and service water heat exchangers, and emergency core cooling system pump room air coolers. The half-coupling is located in piping downstream of the saltwater/service water heat exchangers.

BGE found evidence of seepage from the half-coupling during a routine monthly system walkdown on March 14, 1995. The evidence consisted of a brown stain on the freshly painted saltwater piping in the area of the half-coupling. Drops of water were leaking from a pin-hole sized flaw on the half coupling at a rate of approximately 2 drops per minute and an ultrasonic (UT) examination of the header around the half-coupling was performed.

The piping examined was found to significantly exceed the required minimum wall thickness. The leak appeared to have initiated at or adjacent to the half-coupling. Past experience indicates the leak may be due to corrosion at a point where the coal tar coating was insufficient. UT examination of the adjacent pipe base material revealed no other degradation; thus, supporting the observation that the flaw was local and most likely initiated at a lining defect. BGE will determine the root cause of the leak when removing the half-coupling for repair or replacement at the next outage of sufficient duration.

2.2 Safety Significance

BGE performed an operability assessment for the common saltwater discharge header, evaluating the leakage from the saltwater system if the half-coupling should shear off. The affected half-coupling is located in piping downstream of the service water heat exchangers, and does not affect their cooling ability. In addition, the evaluation showed that there is adequate margin in the capacity of the saltwater system so that the postulated leak would not affect the ability of the saltwater system to perform its safety function.

Due to the location of the flaw, BGE could not perform a structural assessment for the half-coupling using the guidance provided in Generic Letter 90-05. Consequently, it performed a bounding calculation to assess the structural integrity of the header using the methodology for an un-reinforced branch connection per American National Standards Institute (ANSI) B31.1. This evaluation showed that sufficient reinforcement is provided by the excess

material in the header wall. Based on the minimum reading of .523 inches, the calculated number of months until the unreinforced opening no longer meets the Code requirements is 13 months. Stress analyses showed that the weld for the half coupling is loaded to less than 5% of the allowable stresses, thus, catastrophic failure is unlikely.

BGE also evaluated the effects of flooding and determined that, at the observed leak rate, the effects of flooding and spraying on other equipment are insignificant. The calculated flow resulting from a complete separation of the half-coupling would be less than the pump room drain capacity. Thus, flooding under worst-case conditions would not occur.

The common saltwater discharge header has been evaluated and the structural integrity of the saltwater pipe is unaffected by the leakage through the half-coupling. Additionally, the structural integrity of the saltwater pipe is also unaffected by the complete loss of the half-coupling and the saltwater system will maintain its ability to perform its safety-related function. Therefore, BGE has determined that deferring the repair is an appropriate course of action from a safety perspective.

2.3 Proposed alternatives

BGE proposes the following alternative actions:

Perform daily visual examinations of the leak during operator rounds.

Perform UT examinations of the piping immediately adjacent to the leak every 3 months.

2.4 Temporary Repair

In its letter of September 11, 1995, BGE reported additional degradation indicating that the half-coupling has a visible through wall hole at the flaw. The flow of water from the hole has not changed substantially because as the flaw has continued to degrade, the resultant hole has become clogged with biological growth. BGE plans to install a rubber lined pipe clamp around the flawed area if the leakage significantly increases. The clamp will have no effect on the structural integrity of the pipe and is a reversible leakage limiting device; thus, the use of the clamp will not affect the results of analyses discussed above. BGE further indicates that five other half-coupling at locations that could be susceptible to the same degradation will be selected and will be visually examined if the pipe clamp is installed. In addition, BGE is currently performing periodic walkdowns of the saltwater system which would identify any serious degradation in similar locations. These actions are consistent with the guidance in Generic Letter 90-05.

2.5 Summary

The NRC staff finds BGE's structural integrity and operability assessments to be acceptable. BGE determined that consequences of failure would be increased leakage, but that catastrophic failure is unlikely. In addition, should complete separation of the half-coupling occur, the saltwater system could still perform its safety-related function. Any increased leakage would be detected by the daily monitoring and the periodic inspection program will monitor flaw growth to ensure continued operability. BGE also intends to apply a clamp if necessary. This is acceptable since the clamp is a reversible leak limiting device and not detrimental to structural integrity. These actions constitute an acceptable alternative to the Code requirements. Compliance with the Code required repair or replacement can only be accomplished with the unit in Mode 5 and the affected portion of the pipe drained. Requiring the unit to shutdown for a duration long enough to perform the Code repair or replacement would result in hardship and unusual difficulties without a compensating increase in the level of quality and safety.

3.0 CONCLUSION

The NRC staff finds, as detailed above, that the performance of an immediate Code repair or replacement would constitute an undue burden upon the licensee and that the requirements are impractical. Therefore, in accordance with 10 CFR 50.55a(a)(3)(ii), we have determined that the proposed alternative is acceptable and, pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted until the next scheduled outage exceeding 30 days, but no later than the next refueling outage for performing the Code repair or the replacement of the half-coupling.

Accordingly, we have determined that the 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. This relief has been granted given due consideration to the burden upon the licensee and facility that could result if the Code requirements were imposed on the facility.

Principal Contributor: D. McDonald

Date: October 02, 1995