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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

CODE REQUIREMENT

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-317

1.0 INTRODUCTION

The Technical Specifications for Calvert Cliffs Nuclear Power Plant, Unit No. 1 states that the inservice inspection and testing of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first ten-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) on the date twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The 1983 Edition, Summer 1983 Addenda of Section XI is the applicable edition of the ASME Code for the Calvert Cliffs Unit 1 second 10-year inservice inspection (ISI) interval. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Enclosure

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law; will not endanger life, property, or the common defense and security; and are, otherwise, in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

In December 1996, Baltimore Gas & Electric (BGE), the licensee, found a leak near a piping support attachment weld on the ASME Code Case 2 safety injection recirculation piping in Unit 1 component cooling pump room. In a letter dated December 19, 1996, BGE proposed an alternative examination to the requirements of the ASME Code, Section XI. The licensee requested temporary relief from repairing the leak until the next refueling outage in the spring of 1998.

2.0 DISCUSSION

2.1 Code Requirement for which Relief is Requested:

The licensee requested relief from the ASME Code (1983 edition), Section XI, paragraph IWA-5250, which requires that repairs or replacement of components be performed in accordance with IWA-4000 or IWA-7000, respectively, when leaks are detected as discussed above.

2.2 Basis for Relief Request:

The licensee is requesting relief based on 10 CFR 50.55a(a)(3). The licensee states:

> The proposed alternative actions provide an acceptable level of quality and safety. In addition, compliance with this Code requirement would require the shutdown of Unit 1 to repair the piping. This results in hardship without compensatory quality or safety improvement.

2.3 Licensee's Proposed Alternative:

The licensee proposes to perform weekly visual examinations and trending to ensure that the leakage does not significantly increase. It will also perform quarterly non-destructive examinations of the defect to ensure that the weld and piping near the defect does not degrade.

The licensee stated the following:

> The affected pipe was determined to be operable based on the rate of leakage from the weld being immeasurably small, low stress levels at this location, probable flaw characteristics, and the

location of the leak. The lack of significant leakage provides reasonable assurance that the weld is not substantially degraded. Further degradation of this pipe segment will not prevent the safety injection pumps and containment spray pumps from accomplishing their design safety functions under post-accident conditions. Additionally, the affected pipe segment is isolated during containment sump recirculation.

The flaw was examined by liquid penetrant and ultrasonic testing and determined to be a pin-hole weld defect. Liquid coming from the leak appears to evaporate faster than a single droplet can form... Our evaluation followed the guidelines and recommendations contained in Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping." Based on the results of non-destructive examination and engineering analysis, we have determined that the defect is unlikely to grow under any circumstances. Therefore, it is concluded that the pin-hole size defect will have no effect on the ability of the pipe pressure boundary to fulfill its safety function. We intend to further evaluate this defect once the affected pipe segment is removed.

The licensee discussed the safety significance of the leak:

The operability of the safety injection pump minimum flow recirculation piping ensures the high pressure safety injection, low pressure safety injection and containment spray pumps have a minimum flow path to remove excessive pump heat. The pin hole in the affected pipe segment is currently leaking at an immeasurably small rate. Thus, flooding, spray, or loss of safety injection pump recirculation flow are not current concerns. Additionally, the pipe segment is restrained above the defect by the pipe anchor and three inches below the defect by the floor grouping. This provides restraint against pipe movement resulting in a stable configuration should degradation of weld or pipe occur.

The piping at the location of the defect remains structurally sound and the calculated stresses at this location are low. Additionally, we have concluded that there are no mechanisms which indicate the possibility for significant degradation of the weld. The pipe segment is restrained such that substantial cracking of the pipe would not result in pipe separation. Therefore, catastrophic failure of this line is not credible.

Even though failure of this line is not credible, the impact of such a failure has been reviewed. If this pipe were to catastrophically fail, the maximum expected flow out of the break is approximately 400 gpm. This flooding rate is well within the currently evaluated rate for this room (2852 gpm). A break at this location would result in some loss of inventory from the

Refueling Water Tank (capacity 400,000 gallons), however, at this flooding rate, this loss does not appear excessive.

In conclusion, the Safety Injection System remains capable of performing its design safety functions. Delaying the repair of this minor leak until as late as the next Unit 1 refueling outage has no safety significance.

The repair of the weld requires that the safety injection pump recirculation line be isolated and drained. Therefore, Unit 1 would have to be shut down into Mode 5 while the repair is made. Currently, we expect the repair to require removal of the pipe segment and possible relocation of the pipe support.

The licensee performed a flaw evaluation using area reinforcement rules from the original construction Code. It stated that it used these rules because it determined that the flaw is similar to an unreinforced circular opening; that inspection results showed no sign of linear or planar type indication; that the indication is too small to represent a volumetric defect at this time; that the stainless steel is not susceptible to degradation from corrosion at this location that would cause the opening to enlarge. The evaluation showed that the defect had no effect on structural integrity.

The licensee will perform ultrasonic and liquid penetrant testing quarterly and visual examination weekly to ensure no further degradation occurs. The boric acid buildup will also be measured, cleaned, and trended weekly. In the event of an increasing trend, the non-destructive examination frequency will be increased, and the operability of the pipe segment will be re-evaluated.

3.0 EVALUATION

The staff's review of the licensee's proposed alternative finds that the evaluation of the flaw ensures that structural integrity will be maintained and the safety injection system will remain capable of performing its design safety function. The flaw is minor and not expected to grow. The system was determined by the licensee to be degraded but operable. Moreover, the licensee's continuing monitoring of the leak by walkdowns and nondestructive examination will ensure that any further degradation will be promptly identified. The licensee's relief request followed the guidance for Class 3 piping in Generic Letter 90-05. Although this guidance does not apply in this case because the piping is ASME Code Class 2, the staff based its evaluation on this guidance to ensure that all the relevant points regarding safety are adequately addressed in the relief request.

4. CONCLUSION

The NRC staff evaluated the information provided by the licensee in support of its proposed alternative to ASME Code,Section XI requirements. Based on the information submitted, the alternative to repairing the leak in ASME Code Class 2 safety injection recirculation piping contained in the licensee's proposal is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). Compliance with

the requirements of the ASME Code, Section XI, Article IWA-5250, to perform Code repairs on the flawed weld would result in hardship without a compensating increase in the level of quality and safety. The proposed alternative is authorized until the next refueling outage scheduled for spring 1998.

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