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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM ASME CODE REQUIREMENTS

TEMPORARY REPAIR OF ASME CODE CLASS 3 PIPING

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-317

1.0 INTRODUCTION

Section 50.55a, "Codes and Standards," of 10 CFR Part 50 requires, in part, that safety-related components meet the requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (code). Technical Specification 4.0.5 for the Calvert Cliffs Nuclear Power Plant, Unit 1 states that the inservice inspection programs shall be performed in accordance with Section XI of the code 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). Section XI of the code specifies the requirements for repair, replacement, and modification of Class 1, 2, and 3 components of operating nuclear power plants. However, repair, replacement, or modification to code requirements may be impractical.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with a requirement of Section XI of the 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 code requirements. 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 or 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.

The licensee's letter dated April 25, 1991, provided the details of a leak in the Unit 1 Saltwater System header and requested relief from ASME Code, 1983 Edition with the Summer 1983 Addenda, Section XI, IWA-4130(1) and (2). The licensee had determined that repair of a small through-wall flaw in the weld attaching a 6-inch weld-o-let inspection port to the 30-inch Saltwater System header just downstream of No. 12 Service Water/Saltwater heat exchanger was impractical. The licensee stated that the valve to isolate the flawed section of the piping system was leaking. If the Saltwater System was completely taken out-of-service, the plant would have to be shut down and the core would have to be off-loaded. The licensee requested approval of its proposed alternative under 10 CFR 50.55a(a)(3) with the construction of a "replacement" pressure boundary surrounding the leak at the inspection port.

2.0 EVALUATION

Code Requirement

Section XI, Subparagraph IWA-5250(a)(2), "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:

(1) . . .

(2) repairs or replacements of components shall be performed in accordance with IWA-4000 or IWA-7000, respectively."

Code Relief Request

The licensee requested relief from the ASME code, Section XI, 1983 Edition, including the Summer 1983 Addenda, Section XI, IWA-4130(1) and (2). The staff considers that the applicable code requirement for which relief is requested is subparagraph IWA-5250(a)(2). The basis for this determination is discussed below.

Basis for Relief

A repair or replacement as specified by the ASME Code, Section XI, cannot be performed with the unit operating. To accomplish a repair/replacement the entire Saltwater System would have to be secured. This can only be accomplished with the plant not operating and the fuel removed from the core. Although there are isolation valves on the system, isolation of the affected portion could not be accomplished because of valve leakage.

Proposed Alternative

The licensee proposes to mitigate the leak using a "branch connection" to provide a pressure boundary replacement around the leak. The "branch connection" was designed in accordance with the original construction code, ANSI B31.1-1967. The licensee performed calculations to support the design. The "branch" was evaluated for deadweight, pressure, thermal expansion, and seismic stresses. A conservative corrosion rate was incorporated into the analysis. The stress analysis demonstrated that the branch connection stresses are well below the code allowable values.

Code Considerations

In order to clarify terminology, definitions in the 1989 Edition, Section XI, IWA-9000, have been used. An item is "a material, part, appurtenance, piping subassembly, component, or component support." Repair is defined as "the process of restoring a nonconforming item by welding, brazing, or metal removal such that existing design requirements are met." The staff considers the actions performed by the licensee on the item constitute a temporary repair which does not meet code requirements. If the licensee's action is considered a repair, the NRC staff concludes that the code requirements to describe and characterize the flaw, and to remove the flaw were not fully satisfied. The staff does not not consider that and adequate evaluation of the cause(s) of

of failure was made to ensure that the repair procedure is suitable for the long term. The time frame for the suitability of the repair was not specified. The staff considers that it is certainly less than the remaining life of the plant.

Even when the licensee's actions are described as a replacement, the rules for repair (IWA-4000) would apply because the replacement was welded, and IWA-4600 would be applicable. In addition, the staff considers that a "replacement" requires removal of the defective item and its substitution with a conforming item or an addition to a component which conforms to the code. The licensee has not satisfied this code requirement.

Technical Considerations

The cause of the leak is described by the licensee as corrosion. The 30-inch pipe to which the weld-o-let was welded is coated with concrete for corrosion protection. When coating systems are used to provide protection in corrosive environments, under certain conditions where there are breaks in the coating, corrosion is accelerated. The weldment attaching the weld-o-let inspection port to the 30-inch concrete line pipe appears to have been a location where the protective coating was either missing or damaged.

The welding of the saddle reinforcement plate with full thickness fillet welds to the exterior pipe wall will probably cause local cracking or spalling of the concrete coating on the interior surface of the 30-inch pipe. Welding produces high temperatures with attendant expansion in local areas because of the highly concentrated heat inputs of welding. Any breaks or holidays in the coating in this section of piping could be possible sites for local areas with high corrosion rates.

4.0 Conclusions

Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee determined that conformance with certain code requirements is impractical for its facility and submitted supporting information. The staff has reviewed the licensee's submittal and has concluded that the corrective measures by the licensee are acceptable for continued service until the next refueling outage. The repair is structurally adequate and presently stops the leak. However, the licensee has not adequately addressed the effects of corrosion. The staff considers that the 30-inch pipe will be subject to accelerated corrosion in the areas under the welds attaching the saddle to the pipe. The current configuration of the item is such that corrosion/local corrosion and/or pitting can take place in a manner similar to that which contributed to the original failure. Although a corrosion rate allowance was used in analyzing the branch connection, the 30-inch pipe with the concrete coating was not evaluated for corrosion failure where the concrete may have cracked or spalled from the pipe under the new welds. Therefore, the staff considers it necessary that monthly visual inspections of this component be performed to assure detection of any small leaks that might occur.

Pursuant to 10 CFR 50.55a(g)(6)(i), the staff concludes that completely satisfying the requirements IWA-5250(a)(2) of the 1983 Edition with the Summer 1983 Addenda are impractical because the affected system cannot be isolated, it would require plant shutdown and removal of fuel from the core and, thus would burden the licensee. Therefore, relief is granted until the next refueling outage. At that time, repair or replacement to the code requirements shall be made. Such relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest. This relief has been granted giving due consideration to the burden upon the licensee that could result if the requirement were imposed upon the facility.

Principal Contributors:
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Date: May 17, 1991

This completes our action related to the above referenced TAC number.

Sincerely,
ORIGINAL SIGNED BY:
Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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