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

COMMONWEALTH EDISON COMPANY

BRAIDWOOD STATION, UNIT 1

DOCKET NO. STN 50-456

1.0 INTRODUCTION

According to 10 CFR 50.55a(g), nuclear power facility piping and components are required to meet the applicable requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (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 implementation of required Code (weld) repairs to ASME Code Class 1, 2 or 3 systems is often impractical for nuclear licensees since the repairs normally require an isolation of the system requiring the repair, and often a shutdown of the nuclear power plant.

Alternatives to Code requirements may be used by nuclear licensees when authorized by the Director of the Office of Nuclear Reactor Regulation if the proposed alternatives to the requirements are such that they are shown to provide an acceptable level of quality and safety in lieu of the Code requirements [10 CFR 50.55a(a)(3)(i)], or if compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety [10 CFR 50.55a(a)(3)(ii)].

A licensee may also submit requests for relief from certain Code requirements when a licensee has determined that conformance with certain Code requirements is impractical for its facility [10 CFR 50.55a(g)(5)(iii)]. 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 as it determines is authorized by law.

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 staff uses the guidance in GL 90-05 as its criteria for making its safety evaluation of relief requests for temporary non-Code repairs of Code Class 3 piping.

2.0 BACKGROUND

In December of 1996, Commonwealth Edison Company (ComEd, the licensee) identified a leak on a drain line of Train A of the essential service water system (SX) at Braidwood Station, Unit 1. The leak was located on a 6-inch by 8-inch reducer located on line 1SX93AA-8" downstream from the 1A SX System Strainer. The licensee's operability assessment and its bases were provided to the staff by letter dated December 31, 1996. By letter dated January 9, 1997, the licensee requested relief from the ASME Code, Section XI, repair or replacement requirements under impracticality provisions of 10 CFR 50.55(a)(g). The licensee based its request for relief on the results of a flaw evaluation that was performed by the licensee in accordance with the guidelines and acceptance criteria contained in GL 90-05.

3.0 LICENSEE'S RELIEF REQUEST

3.1 Components for Which Relief is Requested

ASME Code Class 3 essential service water system , 6-inch by 8-inch reducer located on line 1SX93AA-8" downstream from the 1A SX System Strainer.

3.2 Section XI Edition for Braidwood Station, Unit 1

1983 Edition of the ASME Code, Section XI, inclusive of the 1983 summer Addenda.

3.3 ASME, Section XI, Code Requirement

The ASME Code, Section XI, requires that repairs and replacements of ASME Code Class components be performed in accordance with rules found in Articles IWA-4000 or IWA-7000, respectively. The intent of these rules serve to provide an acceptable means of restoring the structural integrity of a degraded Code Class system back to the original design requirements.

3.4 Content of the Relief Request

Relief is sought from performing a repair or replacement of 6-inch by 8-inch reducer per the requirements of Article IWA-4000 or IWA-7000, respectively. Relief was sought until the next Braidwood Station, Unit 1, scheduled outage which began on March 29, 1997.

3.5 Basis for Relief

Request for relief has been submitted under the impracticality provisions of 10 CFR 50.55a(g). The licensee has stated that the reducer was structurally capable of meeting its intended function based upon flaw evaluation using the "Through-Wall Flaw" approach of GL 90-05. This evaluation demonstrated that the flaw stability and structural integrity would be ensured until permanent Code repair was performed. The licensee attempted to perform a Code repair or replacement during the week of January 6, 1997, without success. Successful completion of the Code repair or replacement depended on the isolation of this piping from the cooling lake. Complications in isolating this portion of the

SX pipe from the cooling lake using the upstream butterfly valve were encountered. The butterfly valve failed to provide isolation to perform Code repair or replacement without shutting the unit down and, thus, the Code repair or replacement was impractical. Replacement was completed during the refueling outage which began on March 29, 1997.

3.6 Licensee's Alternative Program

1. Performing of temporary non-code repair of the leaking area using gasket material mechanically attached to the pipe. The temporary non-code repair was to remain in place until a Code repair or replacement is completed during the next refueling outage.

2. Monitoring of the degraded area by plant operators.

3. Code repair or replacement of 6-inch by 8-inch reducer during the next refueling outage (scheduled to begin on March 29, 1997).

4.0 STAFF EVALUATION

4.1 Operability Determination, Root Cause Analysis and Structural Integrity Evaluation

The licensee determined that the 6-inch by 8-inch reducer is located on the drain line of Braidwood Station, Unit 1, Train A, essential service water strainer. The reducer is made from ferritic carbon steel material (SA234 Grade WPB) and is located on an ASME Code, Class 3 system. The reducer was visually and ultrasonically examined to identify the physical characteristics of the flaw and the extent of degradation. The flaw was characterized as a through-wall hole with diameter of approximately 1/8-inches. Ultrasonic examination was performed in order to obtain thickness measurements. The results of the thickness measurements revealed that the wall thickness surrounding the flaw ranged from 0.335 inches to 0.422 inches. The required piping minimum wall designed thickness is 0.036 inches. The licensee performed an evaluation of the reducer using the guidance provided in GL 90-05 and found that the reducer is structurally capable of performing its intended function until the next scheduled refueling outage. The licensee also performed a root cause analysis of the degraded reducer. Based upon results of visual and ultrasonic examination, the licensee concluded that the degradation of the reducer was due to localized corrosion. In addition, augmented inspections of five additional locations were performed. The augmented inspections utilized ultrasonic and radiographic examination techniques in accordance with the guidance provided in GL 90-05. Three of these five locations are sister components in both Units 1 and 2. All areas inspected had no localized wall thinning flaws below the applicable Code required minimum design wall thickness.

4.2 Augmented Inspection

The leak was located on a 6-inch by 8-inch carbon steel reducer located on the essential service water piping. The reducer was visually and ultrasonically examined to assess the severity of wall degradation. The reducer was

determined to be structurally capable of performing its intended function until a Code repair or replacement was accomplished. An augmented inspection using ultrasonic and radiographic examination was performed on five other similar locations (three of those five locations were sister components in both Units 1 and 2) in accordance with the guidance provided in GL 90-05. The examination results revealed that all locations met the minimum required wall thickness and, thus, the piping is acceptable for service.

4.3 Proposed Temporary Non-Code Repair and Monitoring Provisions

At the time of its submittal, the licensee performed a temporary non-Code repair of the leaking area using gasket material mechanically attached to the pipe. The licensee intended that the temporary non-code repair remain in place until a Code repair or replacement was completed during the next refueling outage. The degraded area was monitored by plant operators. The degraded section of pipe was replaced during the refueling outage that began on March 29, 1997.

5.0 CONCLUSIONS

The staff has determined that the licensee's flaw evaluation has been consistent with the guidelines and acceptance criteria of GL 90-05. The staff, therefore, finds the licensee's structural integrity and operability assessments to be acceptable. The licensee has performed a non-code repair of the leaking reducer using gasket material mechanically attached to the pipe. The temporary non-code repair remained in place until replacement was completed during the next refueling outage. While the non-Code repair was in place, the degraded area was monitored by plant operators.

Furthermore, the staff finds that performance of an immediate Code repair would constitute an undue burden (create undue hardship) upon the licensee since it would require an isolation of the affected essential service water system (ESWS) piping. Such an isolation would have resulted in shutting the unit down. Shutting the unit down was not in the best interest of plant safety, given the magnitude of the flaw and the licensee's alternative program. The staff, therefore, concludes that authorization of the licensee's alternative program would provide an acceptable level of quality or safety, is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest, giving 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) the alternative is authorized until the next scheduled outage. As noted previously, replacement of the leaking section of piping was completed during the refueling outage which began on March 29, 1997.

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