



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

ENERGY OPERATIONS, INC

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NO. 50-313

1.0 INTRODUCTION

10 CFR 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 referred as 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 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," and 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

On January 2, 1996, at the Arkansas Nuclear One, Unit 1 (ANO-1), members of the Entergy Operations, Inc. (hereafter referred as the licensee) discovered a pin-hole leak in the service water piping during routine operator rounds. Based on visual inspection, it was determined that the source of the leak was a pin-hole defect in the service water piping located approximately 1/4 inch upstream of service water supply valve CV-3850 on line HBD-4-6". The affected service water piping was a 6-inch diameter, Schedule 40, carbon steel pipe. The leak rate was initially estimated to be about 12 drops per minute and later measured to be 0.0005 gpm. By letter dated January 25, 1996, the licensee requested relief from the ASME Code, Section XI replacement requirements. The licensee based its request for relief on the results of a flaw evaluation (CALC-96-E-0001-01) 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 service water piping. Location of leak approximately 1/4 inch upstream of emergency feedwater (EFW) supply valve CV-3850 on line HBD-4-6".

### 3.2 Section XI Edition for ANO-1

1980 Edition of the ASME Code, Section XI through and including 1981 addenda.

### 3.3 ASME Section XI Code Requirement

The ASME Code Section XI requires that repairs or 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 the service water piping per the requirements of Article IWA-4000 or IWA-7000, respectively. Relief is being sought until the next maintenance outage IR13 for the ANO-1 which is scheduled for September 1996.

### 3.5 Basis for Relief

Request for relief has been submitted and alternatives to the Code requirements has been proposed by the licensee. The NRC staff reviewed the proposed alternatives for compliance with the provisions of 10 CFR 50.55a(a)(3)(i), which allow licensees to propose alternatives to Code requirements if the proposed alternative would provide an acceptable level of

quality and safety. The licensee has evaluated the flaw in accordance with the guidance provided in Generic Letter 90-05. Based upon the evaluation, it was established that the flaw satisfies the criteria for non-code repair as described in Generic Letter 90-05 and performing permanent repairs in accordance with the ASME Code would be impracticable during plant operation. To perform a Code qualified repair during power operation will not be possible since one of the EFW pumps would have to be declared inoperable. With one EFW pump and its flow path inoperable, the inoperable train is required to be restored within 72 hours or the unit must be placed in Hot Shutdown within 6 hours per Technical Specification 3.3.6. Based on the insignificance of the leak, it would be inappropriate to challenge the operation of the plant in this higher risk configuration during repair.

### 3.6 Licensee's Alternative Program

The licensee is planning to install a simple rubber patch attached to the pipe by band clamps to limit the leakage for housekeeping purposes. The patch will be maintained as a temporary repair and will not alter the structural integrity of the piping and will be reversible, if necessary. The licensee is planning to maintain this patch, or a similar configuration, as a temporary repair.

## 4.0 STAFF EVALUATION AND CONCLUSIONS

### 4.1 Operability Determination, Root Cause Analysis and Structural Integrity Evaluation

The licensee determined that the leak was located in the service water system. This system was constructed in accordance with ANSI B31.1, Power Piping Code, but is treated as ASME Class 3 for the purpose of meeting the inservice inspection requirements of ASME Code, Section XI. Upon discovery of the leak, the licensee performed an operability determination of the service water system in the "as found" condition and the system was determined to be operable. The licensee determined that the loss of flow to the service water system was about 12 drops per minute and was later measured to be 0.0005 gpm. The licensee also determined that the system leakage would not constitute a flooding concern in the location of the leaking component, nor would it adversely affect any other safety-related equipment in the surrounding area.

The licensee performed ultrasonic examination (UT) of the area around the leak as part of its root cause analyses. Based on the UT data, the flaw was determined to be highly localized through-wall pit and typical of corrosion degradation in service water piping. Previous evaluations of the large bore service water piping, performed as part of ANO's Service Water Integrity Program, has determined that similar pitted areas are most likely to be caused by microbiologically induced corrosion. The licensee also evaluated the structural integrity of the piping using the guidance of Generic Letter 90-05. Based upon the evaluation it was determined that the integrity of the piping would be maintained and that the flawed piping satisfy the "through-wall flaw" stability criteria of Generic Letter 90-05.

#### 4.2 Augmented Inspection

The leak was located approximately 1/4 inch upstream of service water supply valve CV-3850 on line HBD-4-6". The licensee selected six additional locations for augmented UT inspection that were representative of the environment seen by the defect. These locations included downstream of valve CV-3850, downstream of the similar Loop 2 service water valve CV-3851, and four additional upstream locations upstream of the leak. The data collected indicated negligible corrosion or pits in the examined areas. The examination results validated that the minimum required wall thickness exist everywhere except at the location of the pin hole.

#### 4.3 Proposed Temporary Non-code Repair and Monitoring Provisions

The licensee is planning to install a simple rubber patch attached to the pipe by band clamps to serve as a "stop gap" measure to limit leakage for housekeeping purposes. The licensee considers the rubber patch to be a temporary non-code repair. The patch is attached to the pipe by mechanical means and can be removed to perform subsequent non-destructive examinations (NDEs) if needed.

#### 4.4 Staff 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 licensees' structural integrity and operability assessments to be acceptable. The licensee has also installed a temporary rubber patch attached with pipe band clamps around the degraded piping area. The rubber patch temporary fix was found to be an acceptable temporary action since it is a reversible leak limiting device and provides temporary fix for the affected service water piping. The licensee's actions constitute an acceptable temporary alternative to the Code requirements.

Furthermore, the staff finds that performance of an immediate Code repair would constitute an undue burden (create undue hardship) upon the licensee. To perform a Code qualified repair during power operation will not be possible since one of the EFW pumps would have to be declared inoperable. With one EFW pump and its flow path inoperable, the inoperable train is required to be restored within 72 hours or the unit must be placed in Hot Shutdown within 6 hours per Technical Specification 3.3.6. Based on the insignificance of the leak, it would be inappropriate to challenge the operation of the plant in this higher risk configuration during repair. The staff, therefore, concludes that 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, 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(a)(3)(i) the alternative is authorized until the next scheduled outage exceeding 30 days, but no later than the next refueling outage. At that time a Code repair will be performed.

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Date: March 26, 1996