



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

March 6, 2012

Mr. Mark J. Ajluni
Manager, Nuclear Licensing
Southern Nuclear Operating Company, Inc
40 Inverness Center Parkway
Birmingham, Alabama 35201

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT 1, SAFETY EVALUATION OF RELIEF REQUEST HNP-ISI-ALT-14, VERSION 2, FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL, TEMPORARY NON-CODE REPAIR OF SERVICE WATER PIPING (TAC NO. ME7366)

Dear Mr. Ajluni:

By letter to the U.S. Nuclear Regulatory Commission (NRC), dated October 24, 2011, as supplemented October 27, 2011 (References 1 and 2, respectively), Southern Nuclear Operating Company, Inc. (SNC, the licensee) submitted request for an alternate HNP-ISI-ALT-14 from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at the Edwin I. Hatch Nuclear Plant, Unit 1 (Hatch-1). Specifically, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), the licensee proposed a temporary non-code repair to a leak occurring in the Hatch-1 Plant Service Water (PSW) System.

Based on the review of the information the licensee provided, the NRC staff concludes that the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety and the alternatives provide reasonable assurance of structural integrity. Therefore, the licensee's proposed temporary non-code repair is authorized in accordance with 10 CFR 10 50.55a(a)(3)(ii) until an ASME Section XI Code repair/replacement is performed during the Hatch-1 1R25 refueling outage or until the next cold shutdown of sufficient time to perform the repair/replacement, whichever comes first. The Hatch-1 1R25 refueling outage is currently scheduled for early spring 2012. All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third-party review by the Authorized Nuclear In-service Inspector.

Sincerely,

A handwritten signature in cursive script that reads "Nancy Salgado".

Nancy Salgado, Branch Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-321

Enclosure: Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST HNP-ISI-ALT-14 VERSION 2.0

REGARDING TEMPORARY NON-CODE REPAIR OF

PLANT SERVICE WATER PIPING

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

EDWIN I. HATCH NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-321

1.0 INTRODUCTION

By letters dated October 24, 2011 (Reference 1) and October 27, 2011 (Reference 2), Southern Nuclear Operating Company (the licensee), requested approval of an alternative pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(a)(3)(ii) to the requirements of Article IWA-4412 of Section XI of the 2001 Edition of the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* (ASME Code) through the 2003 Addenda for the Edwin I. Hatch Nuclear Plant, Unit 1 (HNP-1). The purpose of the licensee's request is to perform a temporary non-code repair of plant service water piping. The licensee proposes that completing code compliant repairs would create a hardship without a compensating increase in quality. The licensee proposes that the non-code repair remain in place until the next refueling outage (scheduled for February 2012) or until the next cold shutdown of sufficient duration to perform the repair/replacement activity; whichever comes first.

On October 27, 2011, the staff verbally authorized the licensee's proposed alternative (Reference 3). This safety evaluation provides the basis for the staff's prior finding that the licensee's proposed alternative meets the requirements of 10 CFR 50.55a(a)(3)(ii) and the staff's authorization of the licensee's proposed alternative until the next refueling outage (scheduled for February 2012) or until the next cold shutdown of sufficient duration to perform the repair/replacement activity, whichever comes first.

Enclosure

2.0 REGULATORY EVALUATION

In this relief request the licensee requests authorization of an alternative to the requirements Article IWA-4412 of Section XI of the ASME Code pursuant to 10 CFR 50.55a(a)(3)(ii).

Title 10 CFR, Section 50.55a(g)(4) specifies that ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for In-service Inspection (ISI) 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 in-service examination of components and system pressure tests conducted during the first 10-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), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

Title 10 CFR, Section 50.55a(a)(3) states, in part, that alternatives to the requirements of paragraph (g) of 10 CFR 50.55a may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if the licensee demonstrates (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 difficulty without a compensating increase in the level of quality and safety.

3.0 TECHNICAL EVALUATION

3.1 Applicable Code Edition and Addenda

HNP-1 is in its fourth 10-year inservice inspection interval. This interval ends December 31, 2015. The Code of Record for the fourth 10-year inservice inspection interval is the 2001 edition through 2003 addenda of Section XI of the ASME Boiler and Pressure Vessel Code.

3.2 Components for Which Relief is Requested

Component: 10-inch nominal pipe size carbon steel service water pipe, nominal wall thickness 0.365 inches

Code Class: Built to ANSI B31.1, Power Piping Code; Treated as ASME Code Class 3 for purposes of the ASME Code, Section XI

3.3 Reason for Request

In October 2011, a leak of tritiated water was detected at HNP-1. In an effort to resolve this leak, plant personnel excavated a section of demineralized water transfer piping adjacent to the HPN-1 reactor building. This original leak is not part of this request or safety evaluation. In the course of excavating the demineralized water transfer piping, plant personnel exposed a section of service water piping. Plant personnel proactively inspected this piping for any evidence of degradation. Weeping due to internal corrosion was detected in two closely spaced locations. These leaks, individually or in combination, were not of sufficient size to affect system operability due to either structural or flow rate considerations.

In the absence of this request, despite the fact that the leaks detected in the service water piping did not currently adversely affect system operability, a code compliant repair of the leakage is required. In its request, the licensee stated that for the necessary repair to be code compliant, Article IWA 4412 of Section XI of the Boiler and Pressure Vessel Code requires that the defect leading to the need for the repair be removed in accordance with IWA 4420. The licensee also stated that, due to the increase in leakage rate associated with removal of the defect, the piping would need to be removed from service in order to complete a code compliant repair. The licensee further stated that Technical Specification (TS) 3.7.2 Condition E requires that the plant be shut down if this piping is out of service for greater than 72 hours. The licensee additionally stated that the process of isolating and draining the necessary service water piping would require most of the available 72 hours, making it essentially impossible to complete the repair within the allotted time. The licensee finally stated that it believed that making a code compliant repair would necessitate a plant shutdown and that, in the context of 10 CFR 50.55a(3)(ii), it viewed a plant shutdown as a hardship.

In addition to the hardship described above, the licensee's request stated an urgent need to receive authorization from the NRC to implement its proposed alternative to the stated Code requirements. This urgency was based on the need to preheat the piping prior to welding if the temperature of the water in the pipe dropped below 60°F [degrees Fahrenheit]. At the time of the licensee's request the river temperature was 66°F and decreasing.

3.4 Proposed Alternative

The licensee's proposed alternative is based on Code Case N-513-3. Detailed drawings of the proposed repair and calculations to support the strength of the repair are provided in the request and are not repeated here.

Based on ultrasonic thickness measurements of the area surrounding the leaks, the licensee proposes welding plates/pipe sections of sufficient dimensions to ensure that leakage is contained and strength is provided for the period of the temporary repair. These plates/pipe sections will be formed to correspond to the curvature of the existing pipe and will be fillet welded in place. Once the repair has been made, it will be visual test examined per B31.1 and pressure tested in accordance with Section XI, IWA 4540. A liquid penetrant examination will be conducted no less than 48 hours after welding to detect delayed cracking. The excavation site will be left open so that the piping repair can be visually observed on a daily basis and ultrasonically inspected on a monthly (30 days) basis. The open excavation will be marked so as not to present a personnel hazard and protected from missile hazards and small vehicles by metal grating and barriers. This excavation will be closed following the completion of permanent repairs to the piping.

3.5 Licensee's Technical Basis

The licensee's technical basis for demonstrating the adequacy of the proposed alternative is based on:

- a. calculations demonstrating the structural adequacy of the welded repair

- b. general projections that corrosion which may have taken 36 years to corrode through 0.365 inches of steel pipe will not corrode through the applied plate in roughly 3.5 months
- c. inspections of the welded repair made at the time of the repair and shortly thereafter
- d. follow on visual and ultrasonic inspections

3.6 NRC Staff's Evaluation

The staff will evaluate the technical aspects of this request against the criteria contained in 10 CFR 50.55a(3)(ii), the existence of a hardship or unusual difficulty without a compensating increase in quality or safety. The staff finds the first criterion, hardship, or unusual difficulty, to be self explanatory. The staff finds that the second criterion can be met if the proposed alternative provides reasonable assurance of structural integrity or leak tightness of the subject components.

The staff has reviewed the bases provided by the licensee in support of its proposal as indicated in items a – d in Section 3.5. The staff finds items a, c, and d to be consistent with principles of ASME Code Case N-513-3 and, therefore acceptable support for the proposal.

The prediction of a corrosion rate, as is set forth in item b, based on the installed thickness and a single wall thickness measurement taken many years later is often imprecise. However, in the present case, the required life span of the temporary non code repair is extremely short, a few months, and amount of material contained in the temporary repair which must be removed by corrosion in order to cause the repair to fail is significant. The staff is unaware of any corrosion mechanism which is likely to occur in a raw water environment which would occur at a rate approaching the rate required to cause a failure of the repair within its projected life. The staff, therefore, finds the licensee's proposal to be acceptable and that failure of the repair due to corrosion is unlikely.

In considering the first condition of 10 CFR 50.55a(a)(3)(ii), hardship or unusual difficulty, the staff notes that the licensee proposes that removal of the defective portion of the pipe as required by IWA-4412 would increase the rate of leakage from the pipe to such an extent that repairs could not be made without removing the pipe from service. The staff finds the licensee's assessment that a permanent, code compliant repair could not be made without removing the affected piping from service to be reasonable. The staff also notes that the licensee proposes that a) plant technical specification TS 3.7.2 Condition E provides for continued plant operation for not longer than 72 hours with one train of service water out of service; b) that a substantial portion of the available 72 hour window would be consumed by isolating and draining the affected piping; and c) given the amount of time required to isolate and drain the piping, it is improbable that the necessary repairs could be completed within the allotted time. The staff finds the licensee's assessment that that permanent repairs could not be completed within the available time to be reasonable. The staff, therefore, concurs with the licensee's assessment that making code compliant repairs to the piping under consideration would require a plant shutdown and would therefore constitute a hardship.

In considering the second condition of 10 CFR 50.55a(a)(3)(ii), without a compensating increase in the level of quality and safety, the staff used guidance provided in NRC Generic Letter (GL) 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping" as well as ASME Boiler and Pressure Vessel Code, Code Cases N-513-3, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1." The NRC has accepted the use of ASME Code Case N-513-3, with the limitation that any repair or replacement activity temporarily deferred under the provisions of this Code Case shall be performed during the next scheduled outage. The staff finds that analyses which are conducted in accordance with an accepted Code Case, and are conducted to the satisfaction of the NRC, are sufficient to demonstrate reasonable assurance of structural integrity or leak tightness of the subject components. In its review of the licensee's proposal, the staff found that the licensee's proposal was consistent with each requirement contained in GL 90-05 and Code Case N513-3. Based on the consistency between the Code Case and GL requirements and the technical content of the licensee's proposal, the staff finds that, the licensee's proposal will provide reasonable assurance of structural integrity or leak tightness of the subject components and that requiring the licensee to make a code compliant repair, as opposed to utilizing the proposed alternative, will not result in a compensating increase in the level of quality and safety.

Based on the above, the staff finds that the licensee's proposal meets both technical criteria contained in 10 CFR 50.55a(a)(3)(ii) and provides reasonable assurance of structural integrity or leak tightness of the subject components.

4.0 CONCLUSION

As set forth above, the NRC staff determines that the proposed alternative provides reasonable assurance of structural integrity or leak tightness of the subject components and that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii). Therefore, the NRC staff authorizes the proposed alternative at Edwin I. Hatch Nuclear Plant Unit 1 until the next refueling outage (scheduled for February 2012) or until the next cold shutdown of sufficient duration to perform the repair/replacement activity, whichever comes first.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject request for relief remain applicable,, including the third party review by the Authorized Nuclear In-service Inspector.

5.0 REFERENCES

1. Southern Nuclear Operating Company letter 11-2155 to NRC dated October 24 2011, "Edwin I. Hatch Nuclear Plant, Unit 1, HNP-ISI-ALT-14 Version 1, Temporary Non-Code Repair of Plant Service Water Piping," Agencywide Documents Access and Management System (ADAMS) Accession No. ML112980122
2. Southern Nuclear Operating Company letter 11-2187 to NRC dated October 27 2011, "Edwin I. Hatch Nuclear Plant, Unit 1, HNP-ISI-ALT-14 Version 2.0, Temporary Non Code Repair of Plant Service Water Piping," ADAMS Accession No. ML12027A047.

3. Conversation Record dated October 27, 2011 documenting staff authorization of temporary non-code compliant repairs to service water piping at E. I. Hatch Nuclear Plant Unit 1, ADAMS Accession No. ML11304A198

Principal Contributor: D. Alley, NRR/DE

Date of issuance: March 6, 2012

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Mr. Mark J. Ajluni
Manager, Nuclear Licensing
Southern Nuclear Operating Company, Inc
40 Inverness Center Parkway
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Sincerely,

/RA/

Nancy Salgado, Branch Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-321

Enclosure: Safety Evaluation

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