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

November 12, 2008

Mr. Edward D. Halpin
Chief Nuclear Officer
STP Nuclear Operating Company
South Texas Project
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT (STP), UNITS 1 AND 2 - AUTHORIZATION OF RELIEF REQUEST NO. RR-ENG-2-51 ON SYSTEM PRESSURE TEST OF CLASS 1, 2, AND 3 SYSTEMS (TAC NOS. MD8951 AND MD8952)

Dear Mr. Halpin:

By letter dated June 2, 2008 (NOC-AE-08002308), STP Nuclear Operating Company (the licensee) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Case N-498-4, "Alternative Requirements for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1." This is Relief Request (RR) No. RR-ENG-2-51 for the second 10-year inservice inspection (ISI) interval for STP, Units 1 and 2. The RR pertains to the boundary subject to test pressurization during performance of a system leakage test conducted at or near the end of the ISI interval.

Based on the information provided in the above letter, the Nuclear Regulatory Commission staff concludes in the enclosed safety evaluation that the licensee's compliance to the ISI Code of record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the proposed alternative provides reasonable assurance of structural integrity. Therefore, pursuant to paragraph 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations*, the staff authorizes the proposed alternative in RR No. RR-ENG-2-51 for the second 10-year ISI interval of STP, Units 1 and 2. All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

Sincerely,

Markley T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
Safety Evaluation

cc w/encl: See next page

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UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO INSERVICE INSPECTION PROGRAM REQUIREMENTS AND

RELIEF REQUEST NO. RR-ENG-2-51

STP NUCLEAR OPERATING COMPANY, ET AL.

SOUTH TEXAS PROJECT, UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

By the application dated June 2, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081620109), STP Nuclear Operating Company (the licensee) submitted Relief Request (RR) No. RR-ENG-2-51 on system pressure testing applicable to South Texas Project (STP), Units 1 and 2, for the second 10-year inservice inspection (ISI) interval. The licensee request relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI. Section XI requires system hydrostatic testing of Class 1 pressure retaining piping and valves once per 10-year interval.

The licensee has adopted the U.S. Nuclear Regulatory Commission (NRC)-approved ASME Code Case N-498-4, "Alternative Requirement for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1," which allows a system leakage test in lieu of the system hydrostatic test at or near the end of each inspection interval. However, the ASME Code case requires that the boundary subject to test pressurization during the system leakage test extend to all Class 1 pressure-retaining components within the system boundary.

In Relief Request (RR) No. RR-ENG-2-51, the licensee has proposed an alternative to pressurize up to the inboard isolation valve which would exclude a small segment of the Class 1 piping between the inboard and outboard isolation valves in some systems from attaining the required test pressure. Nevertheless, in accordance with the ASME Code case, the visual examination during pressurization would include all components within the system boundary.

The NRC staff has evaluated the licensee's request for relief pursuant to paragraph 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations* (10 CFR) that compliance to the requirement of the ASME Code of record and Code Case N-498-4 would result in hardship without a compensating increase in the level of quality and safety.

2.0 REGULATORY REQUIREMENTS

Paragraph 55a(g) of 10 CFR Part 50 requires that the ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation in 10 CFR 50.55a(a)(3) allows the NRC staff to authorize alternatives to the ISI requirements of Paragraph 50.55a(g) if the applicant demonstrates that either (1) the proposed alternatives would provide an acceptable level of quality and safety, or (2) compliance with the specified requirement would result in hardship or unusual difficulty 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 (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 ISI 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 (or the optional ASME Code cases listed in NRC Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Applicability, ASME Section XI, Division I," through Revision 15 (dated October 2007), that are incorporated by reference in 10 CFR 50.55a(b)(5). ASME Code Case N-498-4 has been accepted by NRC; however, the code case is listed in Table 2 of RG 1.147 as a conditionally NRC accepted Section XI code case and subject to specified limitations and conditions.

In its application, the licensee stated that the ISI Code of Record for the second 10-year ISI interval of STP, Units 1 and 2, is the 1989 Edition of the ASME Code, Section XI. The licensee also stated that it has adopted ASME Code Case N-498-4 as an alternative requirement for the 10-year system hydrostatic testing for Class 1, 2, and 3 systems.

3.0 TECHNICAL EVALUATION

3.1 System/Component(s) for Which Relief is Requested

In its letter dated June 2, 2008, the licensee identified the specific ASME Code Class 1 components in the system pressure boundary between isolation valves in the Addendum to RR No. RR-ENG-2-51.

3.2 ASME Code Requirements

Table IWB-2500-1, "Examination Category B-P," Note 2, requires hydrostatic testing of Class 1 pressure retaining piping once per 10-year interval. Code Case N-498-4 approved by the NRC allows performance of a system leakage test in lieu of the 10-year hydrostatic test. Further, Note 2 of Table IWB-2500-1 and Paragraph (a)(2) of Code Case N-498-4 require that the test pressurization boundary extend to all Class 1 components.

Paragraph IWB-5221(a) states, "The system leakage test shall be conducted at a test pressure not less than the nominal operating pressure associated with 100 percent rated power."

3.3 Licensee's Request for Relief

In lieu of performing the 10-year system hydrostatic test, the licensee plans to perform a system leakage test in accordance with ASME Code Case N-498-4, and proposes alternative visual examination of the segment of Class 1 piping between an inboard and an outboard isolation valve including the valves in the system boundary for the residual heat removal (RHR) system, the safety injection (SI) system, and the reactor coolant system (RCS). The licensee requests relief from the Code requirement to apply a system leakage test to Class 1 components at full RCS pressure for those components that are normally isolated from RCS pressure.

3.4 Licensee's Basis for Requesting Relief

Normal RCS pressure at 100 percent rated power is approximately 2235 pounds per square inch gauge (psig). The components and piping connected to the RCS, such as vents, drains, and instrument connections, the SI system and RHR system, for which relief is requested, are the portion of piping between an inboard and an outboard isolation valve including the valves. This segment of piping will not be pressurized to the required test pressure of 2235 psig during the system leakage test as required by ASME Code Case N-498-4.

The licensee stated that compliance with the requirement of the ASME Code or the ASME Code case in pressurizing to RCS pressure beyond the inboard isolation valve during performance of a system leakage test would result in hardship without a compensating increase in the level of quality and safety due to the following reasons listed by the licensee in its application:

1. Special valve lineup is required for the test would add an unnecessary challenge to the system configuration and there are no test connections between the isolation valves. Consequently, a system pressure test would require opening the first manual isolation valve to test the second isolation valve,

2. The affected components are located inside containment and the tests performed inside the radiologically restricted area would increase the total exposure to plant personnel while modifying and restoring system lineups and result in contamination of test equipment,

3. The use of single valve isolation from systems with lower design pressures than the RCS pressure could possible result in the over-pressurization of these systems and damage to permanent plant equipment,

4. The use of single valve isolation is a significant personnel safety hazard,

5. There are no test connections in the RHR system for testing the piping between check valves in the system, and

6. Any leakage past isolation valves into the RCS during the special tests could affect the RCS boron concentration and thus complicate the task of maintaining a homogenous boron concentration throughout the RCS.

3.5 Licensee's Proposed Alternative

The licensee has proposed, in lieu of the required 10-year system hydrostatic test, a system leakage test shall be conducted at or near the end of each inspection interval, prior to reactor startup. The segment of Class 1 piping between an inboard and an outboard isolation valve including the valves in the system boundary for the RHR system, SI system, and RCS will be visually examined for evidence of past leakage and/or leakage during the system leakage test conducted with the isolation valves in the position required for normal reactor startup.

4.0 NRC STAFF EVALUATION

The ASME Code of record for STP, Units 1 and 2 is the 1989 Edition ASME Code, Section XI. Table IWB-2500-1, Category B-P, Item B15.51 requires hydrostatic testing of Class 1 pressure retaining piping once per 10-year interval. The licensee has adopted the NRC-approved Code Case N-498-4 in their 10-year ISI program which allows a system leakage test in lieu of the Code-required system hydrostatic test conducted at or near the end of each inspection interval, prior to reactor startup. The system leakage test is required to be performed at a test pressure not less than the nominal operating pressure of the RCS corresponding to 100 percent rated reactor power and shall include all Class 1 components within the RCS boundary.

In RR No. RR-ENG-2-51, the licensee, however, proposed an alternative to the boundary subject to test pressurization required under the Code of Record or Code Case N-498-4, for the RCS vents and drains, and the piping segments in SI and RHR systems between an inboard and an outboard isolation valve in the system boundary. The line configuration, as outlined, provides double-isolation of the RCS.

Under normal plant operating conditions, the subject pipe segments would see RCS temperature and pressure only if leakage through an inboard isolation valve occurs. As requested in RR No. RR-ENG-2-51, with the inboard isolation valve closed during the system leakage test, the segment of piping between an inboard and an outboard isolation valve would not get pressurized to the required test pressure during a system leakage test. In order to perform the ASME Code-required test, it would be necessary for the licensee to manually open each inboard isolation valve to pressurize the corresponding pipe segment. Pressurization by this method would, thus, preclude double valve isolation of the RCS and the licensee stated this single valve isolation is a significant personnel safety hazard to the personnel performing the visual (VT-2) examination for leaks in the isolated portion of the subject segments of piping. With the inboard isolation valve open and pressure applied to the space between the isolation valves, there will be pressure to lines being walked down as part of the VT-2 examination of the system pressure test. Alternatively, the line segments between the isolation valves could be separately pressurized to the required test pressure by a hydrostatic pump but there are no test connections between the isolation valves to attach a pump.

The subject inboard isolation valves are located inside the containment. The licensee stated that tests performed inside the radiologically restricted area inside containment increase the total exposure to plant personnel while modifying and restoring system lineups, as well as contamination of test equipment. This would include any manual actuation (i.e., opening and closing) of these inboard valves and would expose plant personnel to unnecessary radiation exposure during modification and restoration of system lineups. In accordance with 10 CFR 20.1003, radiation exposure is to be maintained as far below the dose limits in 10 CFR Part 20 as is practical consistent with the purpose for which the activity is undertaken. This is having the dose exposure for the required pressure system test as low as is reasonably achievable (ALARA).

Based on the above, the NRC staff concurs with the licensee's finding and concludes that compliance with the Code requirement would result in hardship without a compensating increase in the level of quality and safety. The licensee has proposed an alternative to visually examine (VT-2) for leaks in the isolated portion of the subject segments of piping with the inboard and outboard isolation valves in the normally closed position, which would indicate any evidence of past leakage during the operating cycle as well as any active leakage during the system leakage test if the inboard isolation valve leaks. Based on its review of the application, the NRC staff concludes that the licensee's proposed alternative will provide reasonable assurance of structural integrity for the RCS vents, drains, and the piping segments in SI and RHR systems between an inboard and an outboard isolation valve including the valves while also maintaining personnel radiation exposure to as low as reasonably achievable (ALARA) as required by 10 CFR Part 20 and minimizing the safety hazard to the personnel performing the visual (VT-2) examination.

5.0 CONCLUSION

Based on the above evaluation, the NRC staff concludes that test pressurization during system leakage test of the Class 1 pressure retaining components within the system boundary of RCS vents, drains, and piping segments in SI and RHR systems between an inboard and an outboard isolation valve including the valves as required under Code Case N-498-4 would result in hardship to the licensee without a compensating increase in the level of quality and safety. The NRC staff also concludes that the licensee's proposed alternative in RR-ENG-2-51 provides a reasonable assurance of structural integrity of the vents, drains, and piping of the subject systems in RR-ENG-2-51. Therefore, based on these conclusions and pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff further concludes that the proposed alternative in RR ENG-2-51 is authorized for the second 10-year ISI interval of STP, Units 1 and 2.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Prakash Patnaik

Date: November 12, 2008

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Mr. Edward D. Halpin
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Sincerely,
/RA/

Markley T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499
Enclosure:
Safety Evaluation
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* See memo dated 09/29/08
** See previous concurrence

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