Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

September 6, 2007
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File No.: G25
10CFR50.55a

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2746

South Texas Project
Unit 2
Docket No. STN 50-499
Request for Relief from ASME Boiler and Pressure Vessel Code,
Section XI Requirements for the Essential Cooling Water System
(Relief Request RR-ENG-2-49)

In accordance with the provisions of 10 CFR 50.55a(g)(5)(iii), the South Texas Project requests relief from IWA-5250 of Section XI of the ASME Boiler and Pressure Vessel Code. Approval will allow deferral of code repair of a flaw identified in the Unit 2 Essential Cooling Water (ECW) Class 3 piping. Repair of the flaw with a code repair at this time is impractical. In accordance with the guidance provided in NRC Generic Letter 90-05 and subject to Nuclear Regulatory Commission approval, code repairs will be implemented no later than the next scheduled Unit 2 refueling outage.

An indication of through-wall dealloying was identified on Standby Diesel Generator #23 cast aluminum-bronze ECW return flow balance throttle valve 2-EW-0204. The dealloying indication is a spot with residue buildup on the seat retainer. Evaluation of the flaw using fracture mechanics methodology provided by Generic Letter 90-05 determined that the structural integrity of the ECW piping is not adversely affected.

The attached relief request addresses the present condition of the valve, and implementation of compensatory and corrective actions in accordance with the guidelines provided in Generic Letter 90-05. Operability and functionality of the system have been maintained, and deferring repair of the flaw will not affect the health and safety of the public.

A list of commitments in the request is attached.

If there are any questions, please contact either Mr. P. L. Walker at (361) 972-8392 or me at (361) 972-7867.

David W. Rencurrel
Vice President, Engineering
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PLW

Attachments: 1) Request for Relief from ASME Boiler and Pressure Vessel Code, Section XI Requirements for the Essential Cooling Water System (Relief Request RR-ENG-2-49)

2) List of Commitments

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NRR

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SOUTH TEXAS PROJECT
UNIT 2
REQUEST FOR RELIEF FROM ASME BOILER AND PRESSURE VESSEL CODE, SECTION XI REQUIREMENTS FOR THE ESSENTIAL COOLING WATER SYSTEM (RELIEF REQUEST RR-ENG-2-49)

1. Component for Which Relief is Requested

   (a) Description:

   Aluminum-bronze Essential Cooling Water (ECW) return flow balance throttle valve (2-EW-0204) for Standby Diesel Generator (SBDG) #23 engine cooling.

   (b) Function:

   The ECW System is designed to supply cooling water to various safety-related systems for normal plant operation, normal shutdown, and during and after postulated design-basis accidents.

   (c) Class:

   ASME Code Class 3

   (d) Description of the flaw:

   An indication of through-wall dealloying was identified on SBDG #23 cast aluminum-bronze ECW return flow balance throttle valve 2-EW-0204. The dealloying indication is a spot with residue buildup on the seat retainer. The area of deposit appears to be less than 3/4-inch in diameter and composed of porous, dealloyed pipe material. There is no active dripping.

2. Applicable Code Edition and Addenda:

   ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition

3. Applicable Code Requirement:

   ASME Section XI, IWA-5250(a)(3) requires that the source of leakage be evaluated for repair or replacement in accordance with IWA-4000 or IWA-7000. Relief from the requirements of IWA-5250(a)(3) is requested so that code repair of the through-wall flaw at this location may be deferred until the next outage of sufficient duration but not later than the next refueling outage provided the conditions of Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2 and 3 Piping," are met.

4. Flaw Detection

   The flaw was identified on June 6, 2007, during the periodic examination of ECW large bore piping. Unit 2 was in Mode 1 at 100% power.

5. Impracticality Determination

   As stated in Generic Letter 90-05, an ASME Code repair is required for Code Class 1, 2, and 3 piping unless specific written relief is granted by the NRC. Relief is appropriate when performing the repair at the time of discovery is determined to be impractical.

   A repair is considered to be impractical if:

- The flaw detected during plant operation is in a section of Class 3 piping that cannot be isolated to complete a code repair within the time period permitted by the limiting condition for operation of the affected system as specified in the plant Technical Specifications, and
- Performance of code repair necessitates a plant shutdown.

Performance of code repairs within the allowed outage time for the ECW system, as permitted by the limiting condition for operation, is not practical due to the amount of time required to implement the repair, and the potential for fit-up problems during repair. A plant shutdown may be necessary to complete the repair. Therefore, relief is requested on the basis of impracticality.

6. Proposed Alternative and Basis for Use

6.1 Proposed Alternative

Repair of the defect will be deferred until adequate time is available for the repair, but no later than the next Unit 2 refueling outage. The next Unit 2 refueling outage is currently scheduled to begin in October 2008. Compensatory action has been implemented to detect changes in the condition of the flaw until a repair can be implemented.

6.2 Basis for Use

6.2.1 Scope

An indication of through-wall dealloying was identified on SBDG #23 cast aluminum-bronze ECW return flow balance throttle valve 2-EW-0204. The dealloying indication is a spot with residue buildup on the seat retainer. The area of deposit appears to be less than 3/4-inch in diameter and composed of porous, dealloyed pipe material. There is no active dripping.

6.2.2 Specific Considerations

Consequences of potential system interactions, including flooding, spray on equipment, and loss of flow to the system, are addressed in Appendix 9A of the South Texas Project Updated Final Safety Analysis Report, "Assessment of the Potential Effects of Through-Wall Cracks in ECWS Piping". The assessment assumes the effects of spray from a moderate energy line (10-inch diameter). Safety-related equipment is either designed to operate in a spray environment, or protected if sensitive to spray. Flooding in a given area due to the ECW system is enveloped by worst case flow from an opening in a local pipe due to a "critical crack," with an area equivalent to a rectangle of length one-half the pipe diameter and a width equal to one-half the pipe wall thickness. This assessment is bounding for the condition under consideration.

Loss of operability of the affected SBDG will not prevent safe shutdown of the plant from being achieved.

The ECW system is a low-pressure system with normal operating pressures of approximately 50 psig and a design pressure of 120 psig. Normal temperature with the diesel in standby is 47 to 95 degrees and up to 115 degrees F with the diesel running. Temperature with the diesel running following a design-basis accident is not expected to exceed 123 degrees F. Therefore, the consequences associated with failure of high-energy lines are not applicable to this relief request.

The structural integrity is monitored by the following methods:

- Monthly monitoring for qualitative assessment of leakage (quantitative if measurable leaks are observed). There is no measurable leakage at this time.
- Continuation of large bore ECW piping periodic walkdowns. These walkdowns are regularly scheduled VT-2 examinations at six–month intervals. These inspections have proven to be an effective means of identifying dealloyed/cracked components prior to deterioration of structural integrity margins below ASME Section XI requirements.

Structural integrity and the monitoring frequency will be re-evaluated if significant changes in the condition of the dealloyed area are found during this monitoring.

6.2.3 Root Cause Determination

The root cause of dealloying is a combination of corrosion and stress. The dealloying process normally initiates from a crevice such as the area behind a backing ring, a fabrication-induced flaw, or a casting flaw. Dealloying in this case is believed to be similar to dealloying seen in other susceptible aluminum-bronze components. The process by which dealloying of aluminum-bronze occurs has been described in previous communications with the NRC (Reference 8.1).

6.2.4 Flaw Evaluation

In assessing the structural integrity of partially dealloyed aluminum-bronze piping components, a conservative evaluation has been performed to assure that adequate margins remain.

Pressure stress for the location is calculated at 640 psi, which is small relative to the allowable value of 7500 psi for dealloyed material. Combining the primary membrane stresses results in the following:

Pressure stress	= 640 psi
Membrane stress	= 4272 psi (due to bending loads)
Combined stresses	= 4912 psi

The combined stress remains below the 7500 psi allowed for dealloyed aluminum bronze. Under these combined stresses, the critical crack length for a 6-inch diameter schedule 40 pipe (0.28-inch wall thickness) is approximately 12 inches. This critical crack length is well above that of the dealloyed area (3/4-inch across).

The calculated safety margins are adequate for the various loading conditions.

6.2.5 Augmented Inspection

Augmented monthly inspections are performed to detect changes in the size of the discolored area or leakage. Inspections will look for: change from residue buildup to active dripping; new indication at a different area on the component; or, a substantial change (about 2x or more) in the area that appears to encompass the size of the original indication.

Structural integrity and the monitoring frequency will be re-evaluated if significant changes in the condition of the dealloyed area are found during this monitoring.

6.2.6 Conclusion

The South Texas Project has analyzed through-wall flaws in ECW piping and found that degradation progresses slowly. Dealloying produces detectable leakage before flaws reach a limiting size that would affect the operability of the Essential Cooling Water System. Rapid or catastrophic failure due to dealloying is not a concern. Flaws are monitored and inspected to ensure detection of leakage. Continued inspection provides assurance that changes in the condition of the flaws will be identified and assessed for further action as needed. Evaluation of the flaw using fracture mechanics methodology provided by NRC Generic Letter 90-05 concludes that the structural integrity of the ECW piping is not adversely affected. Operability and functionality of the system have been maintained, and deferring repair of the flaw will not affect the health and safety of the public.

7. Duration of Proposed Alternative

Repair of the defect will be deferred until adequate time is available for the repair, but no later than the next Unit 2 refueling outage, provided the condition continues to meet the acceptance criteria of Generic Letter 90-05. The next Unit 2 refueling outage is currently scheduled to begin in October 2008.

8. Reference:

8.1 Letter, Status of Corrective Actions in the ECW System, M. A. McBurnett to Document Control Desk, dated November 1, 1988 (ST-HL-AE-2748)

8.2 Letter, Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements (Dealloying) (Relief Request RR-ENG-35) (Supplement 2), T. J. Jordan to Document Control Desk, dated August 10, 2000 (NOC-AE-00000816) (ML003742174)

LIST OF COMMITMENTS

The following table identifies the actions in this document to which the STP Nuclear Operating Company has committed. Statements in this submittal with the exception of those in the table below are provided for information purposes and are not considered commitments. Please direct questions regarding these commitments to Philip Walker at (361) 972-8392.

Commitment	Expected Completion Date	CR Action No.
Rework of the defect will be deferred until adequate time is available for the repair, but no later than the next Unit 2 refueling outage, 2RE13.	11/26/2008	07-9166-3
Perform monthly walkdowns of dealloying location to detect changes in size of the discolored area or leakage until a code repair is performed. Structural integrity and the monitoring frequency will be re-evaluated if significant changes in the condition of the dealloyed area are found during this monitoring.	11/28/2008	07-9166-4