August 15, 2001

Mr. William T. Cottle
President and Chief Executive Officer
STP Nuclear Operating Company
South Texas Project Electric
Generating Station
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT, UNIT 1 - RELIEF REQUESTS RR-ENG-2-24 AND RR-ENG-2-25 (TAC NOS. MB1405 AND MB1404)

Dear Mr. Cottle:

By two letters dated March 5, 2001, STP Nuclear Operating Company (STPNOC) submitted two requests for relief from the ASME Code, Section XI requirements, to defer Code repairs of flaws identified in the Essential Cooling Water System piping at the South Texas Project, Unit 1. The Nuclear Regulatory Commission (NRC) staff has reviewed the requests as discussed in the enclosed Safety Evaluation.

The NRC staff finds that the performance of immediate Code repairs would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff, therefore, concludes that STPNOC's proposed alternatives to the Code requirements are authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the next outage of sufficient duration to perform the repair.

Sincerely,

/RA/

Robert A. Gramm, Chief, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-498

Enclosure: As stated

cc: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF FROM ASME CODE REPAIR REQUIREMENTS

FOR ASME CODE CLASS 3 PIPING

STP NUCLEAR OPERATING COMPANY

SOUTH TEXAS PROJECT, UNIT 1

DOCKET NO. 50-498

1.0 INTRODUCTION

Section 10 CFR 50.55a(g) of Title 10 of the *Code of Federal Regulations* (10 CFR) 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 to 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 Commission 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 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 that could result if the requirements were imposed on the facility.

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 NRC staff in evaluating relief requests submitted by licensees for temporary non-Code repairs of Code Class 3 piping. For the purpose of this letter, impracticality is defined to exist if the flaw

detected during plant operation is in a section of Class 3 piping that cannot be isolated for completing 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 a Code repair necessitates a plant shutdown.

2.0 BACKGROUND

During plant operation, the licensee discovered areas with recurring discolorations on a 3-inch flange at the flange-to-pipe weld and on 30-inch by 30-inch by 14-inch pipe tee on the Unit 1 essential cooling water system (ECWS) at the South Texas Project. The ECWS is a low pressure system with normal operating pressures of approximately 50 psig and the design pressure is 120 psig. The 3-inch flange and the 30-inch by 30-inch by 14-inch pipe tee material was identified to be aluminum-bronze. Discoloration of aluminum-bronze indicates a dealloyed through-wall defect. However, the small size of the discolored areas indicated that the dealloying is relatively minor. There is currently no leakage or surface accumulation of moisture at the locations of discoloration. By letters dated March 5, 2001, the licensee requested relief from the ASME Code, Section XI repair or replacement requirements under the provisions of 10 CFR 50.55a(g). The licensee based its requests 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 REQUESTS

3.1 Components for Which Relief is Requested

ASME Code Class 3 essential cooling water system piping (one 3-inch flange at the flange-to-pipe weld and one 30-inch by 30-inch by 14-inch pipe tee).

3.2 Section XI Edition for South Texas Project, Unit 1

ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition, no 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 the Code. The Code 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

Reliefs are requested from the requirements of IWA-5250(a)(3) of ASME Section XI so that Code repairs of the through-wall flaws in essential cooling water piping may be deferred until the next Unit 1 outage of sufficient duration. Reliefs are sought from performing a repair or replacement of one 3-inch flange at the flange-to-pipe weld and one 30-inch by 30-inch by 14-inch pipe tee at one location (Unit 1, train B, essential cooling water screen wash booster pump flow orifice, weld FW2068, Spool EW-1003-B and Unit 1, train 1A, essential chiller

supply, Spool EW-1102-AP, line EW1102WT3). Relief is being sought until the next Unit 1 outage which was scheduled to take place on October 3, 2001.

3.5 Basis for Relief

Requests for relief have been submitted and alternatives to the Code requirements have been proposed by the licensee. The NRC staff reviewed the proposed alternative for compliance with the provisions of 10 CFR 50.55a(a)(3)(ii). The licensee has evaluated the flaws in accordance with the guidance provided in GL 90-05. Based upon the evaluation, it was established that the discovered flaws satisfies the criteria for non-code repair as described in GL 90-05 and performing permanent repairs in accordance with the ASME Code would result in hardship or unusual difficulty upon the licensee since the repairs may not be completed within the time period permitted by the limiting condition for operation. Further, the licensee has also determined that the dealloying degradation of the piping is a slow process and rapid or catastrophic failure is not a consideration. In addition the ECWS is a low pressure system with normal operating pressure of approximately 50 psig and, therefore, severe failure consequences associated with high energy lines are not applicable for the ECWS. Also, because there is no leak there was no adverse effect on any safety-related equipment in the surrounding area.

3.6 Licensee's Alternative Program

1. Monthly monitoring for qualitative assessment of leakage (quantitative if measurable leaks are observed). Currently there is no measurable leakage.

2. Continuation of ECWS large bore piping periodic walkdowns. This walkdown is regularly scheduled VT-2 examination.

4.0 STAFF EVALUATION AND CONCLUSIONS

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

The licensee determined that the flaws were located in the ECWS which is classified as ASME Code Class 3 system. The flaws were located in Unit 1 on one 3-inch flange at the flange-to-pipe weld and on one 30-inch by 30-inch by 14-inch pipe tee. The flawed 3-inch flange material and 30-inch by 30-inch by 14-inch pipe tee material were identified to be aluminum-bronze which is inherently ductile material. The licensee has analyzed through-wall flaws in essential cooling water piping and found that degradation progresses slowly. Rapid or catastrophic failure due to dealloying defects is not a concern. Dealloying produces detectable leakage before flaws reach a limiting size that would affect the operability of the ECWS. The flaws are monitored and inspected to ensure detection of leakage. Compensatory actions taken following discovery of this condition provide assurance that changes in the condition will be monitored and analyzed for further action as needed. An evaluation of the flaws using the guidance provided in GL 90-05 was performed and found that the flaws satisfy the through-wall criteria prescribed in GL 90-05 and that the flaws meets the criteria for a temporary non-Code repair. The licensee determined that the operability of the system will not be impaired because there was no leak. Also, because there was no leak, no adverse effect on any other safety-related equipment in the surrounding area was found.

The licensee performed a root cause analysis of the flaws and determined that the degradation resulted from dealloying. The root cause of dealloying flaws 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 the case of the 3-inch flange at the flange-to-pipe weld is believed to be the result of an existing crevice and susceptible material, while in the case of the 30-inch by 30-inch by 14-inch pipe tee, the cause of dealloying was believed to be the result of susceptible material associated with a weld repair of an extruded tee. Presence of flaws is indicated by areas of recurring discoloration that have been found on the 3-inch flange at the flange-to-pipe weld and the 30-inch by 30-inch by 14-inch pipe tee. Discoloration of aluminum-bronze indicates a dealloyed through-wall defect. However, the small size of the discolored area indicates that the dealloying is relatively minor. There is currently no leakage or surface accumulation of moisture at this location. The problem of dealloying of castings has also been described in previous communications with the NRC.

4.2 Augmented Inspection

The flaws were located in one 3-inch flange at the flange-to-pipe weld and one 30-inch by 30-inch by 14-inch pipe tee. The flaws were identified on January 17, 2001, and July 24, 2000, during normal Unit 1 plant operations. The subject flaws were discovered during periodic examination of essential cooling water large bore piping. Augmented monthly inspections have been implemented to detect any changes in the size of the discolored area or leakage. Significant change in the size of flaws will require additional engineering attention to confirm that the technical justification of these relief requests remains valid.

4.3 Temporary Non-Code Repair and Monitoring Provisions

The licensee had monitored the flawed areas monthly. If a measurable leak was identified, a quantitative assessment of the leak would have been performed. The flaw will be repaired during the next scheduled outage (October 3, 2001).

4.4 Staff Conclusions

The NRC staff has determined that the licensee's flaw evaluation has been consistent with the guidelines and acceptance criteria of GL 90-05. The NRC staff, therefore, finds the licensee's structural integrity and operability assessments to be acceptable. The licensee had established a periodic inspection program to monitor flaw growth and ensure continued operability. The licensee had also monitored the condition of the flaws by visual inspection every month to ascertain that no measurable leak is observed. The licensee’s actions constituted an acceptable temporary alternative to the Code requirements. Furthermore, the NRC staff finds that performance of an immediate Code repair would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety since the repair may not have been completed within the time period permitted by the limiting condition for operation, and thus an isolation of the affected ECWS piping would have been required. Such an isolation is not in the best interest of plant safety, given the magnitude of the flaw and the licensee's alternative program. In addition, any leakage can be detected before the flaw reaches a limiting size that would affect ECWS operability.

The NRC staff, therefore, concludes that the licensee's proposed alternatives to the Code requirements are authorized pursuant to 10 CFR 50.55a(a)(3)(ii) until the next outage of sufficient duration to perform the repair.

Principal Contributor: G. Georgiev

Date: August 15, 2001

South Texas, Units 1 & 2

cc:

Mr. Cornelius F. O'Keefe
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77414

A. Ramirez/C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

Mr. M. T. Hardt
Mr. W. C. Gunst
City Public Service Board
P. O. Box 1771
San Antonio, TX 78296

Mr. C. A. Johnson/R. P. Powers
AEP - Central Power and Light Company
P. O. Box 289
Mail Code: N5022
Wadsworth, TX 77483

INPO
Records Center
700 Galleria Parkway
Atlanta, GA 30339-3064

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

D. G. Tees/R. L. Balcom
Houston Lighting & Power Co.
P. O. Box 1700
Houston, TX 77251

Judge, Matagorda County
Matagorda County Courthouse
1700 Seventh Street
Bay City, TX 77414

A. H. Gutterman, Esq.
Morgan, Lewis & Bockius
1800 M Street, N.W.
Washington, DC 20036-5869

Mr. J. J. Sheppard, Vice President
Engineering & Technical Services
STP Nuclear Operating Company
P. O. Box 289
Wadsworth, TX 77483

S. M. Head, Manager, Licensing
Nuclear Quality & Licensing Department
STP Nuclear Operating Company
P. O. Box 289, Mail Code: N5014
Wadsworth, TX 77483

Office of the Governor
ATTN: John Howard, Director
Environmental and Natural
Resources Policy
P. O. Box 12428
Austin, TX 78711

Jon C. Wood
Matthews & Branscomb
112 East Pecan, Suite 1100
San Antonio, TX 78205

Arthur C. Tate, Director
Division of Compliance & Inspection
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756

Jim Calloway
Public Utility Commission of Texas
Electric Industry Analysis
P. O. Box 13326
Austin, TX 78711-3326