Nuclear Operating Company

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

January 31, 2013
NOC-AE-12002956
File No.: G25
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Unit 2
Docket No. STN 50-499
Response to Request for Additional Information Regarding Relief Request RR-ENG-3-09
for the Essential Cooling Water System
(TAC No. ME9806)

References:

1. Letter, D. W. Rencurrel to NRC Document Control Desk, "Request for Relief from ASME Boiler and Pressure Vessel Code, Section XI Requirements for the Essential Cooling Water System (Relief Request RR-ENG-3-09)," NOC-AE-12002898, dated October 16, 2012 (ML12299A287)

2. Letter, D. W. Rencurrel to NRC Document Control Desk, "Supplement to Relief Request RR-ENG-3-09 for the Essential Cooling Water System (TAC No. ME9806)," NOC-AE-12002928, dated November 14, 2012 (ML12341A229)

3. E-Mail, B. K. Singal, NRC, to Jamie Paul, STPNOC, "South Texas Project, Unit 2 – Email, Request for Additional Information, Relief Request RR-ENG-3-09 from ASME Code Requirements; Deferral of Code Repair of Essential Cooling Water System Piping until April 2013 Refueling Outage (TAC No. ME9806), dated January 2, 2013 (ML13003A072)

By Reference 1, as supplemented by Reference 2, the STP Nuclear Operating Company (STPNOC) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) to defer repairs to a degraded flange in the Essential Cooling Water System (ECWS). By Reference 3, the NRC staff requested additional information regarding the review of RR-ENG-3-09. STPNOC's response to Reference 3 is provided in the attachment to this letter.

There are no commitments in this letter.

A047
NRR

STI: 33650093

If there are any questions, please contact Coley Chappell at 361-972-4745, or me at 361-972-7566.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 31, 2013

G. T. Powell
Vice President,
Generation

ccc

Attachment: Response to Request for Additional Information Regarding Relief Request RR-ENG-3-09 (TAC No. ME9806)

cc:
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Response to Request for Additional Information Regarding
Relief Request RR-ENG-3-09 (TAC No. ME9806)

By letter dated [October] 16, 2012 (Agencywide Document Access and Management System (ADAMS) Accession No. ML12299A287), as supplemented by letter dated November 14, 2012 (ADAMS Accession Number ML12341A229), STP Nuclear Operating Company (STPNOC, the licensee), requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) to defer repairs to a degraded flange in the essential cooling water system (ECWS). In order to complete its review, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following additional information.

REQUEST:

1. The NRC staff does not concur with the results of the analysis used in the relief request to demonstrate structural integrity of the piping under consideration. The NRC staff believes that the analysis uses "as received" material properties. Selective leaching, the degradation mechanism of interest in this request, is known to degrade material properties ahead of advancing cracks. At the time of the request, neither the degree to which the material properties are degraded nor the area over which this degradation occurs is known or can be determined without destructively examining the flange under consideration. Given that the appropriate material properties for use in the structural integrity evaluation are not known, the NRC staff's evaluation is based on a worst case scenario, i.e., that the strength of the material from which the flange is constructed is completely degraded, i.e., zero tensile strength.

   Given that zero tensile strength in the degraded material is assumed, the NRC believes that, in the event of an earthquake, a guillotine break is likely to occur at the degraded pipe location. Such a break would encompass the full 360 degree circumference of the flange and result in complete separation of the ECWS A train piping from the ECWS B train and cross-tie piping.

   While the NRC staff acknowledges that the piping system, as designed, i.e., piping from trains A and Band the cross-tie piping function as a single unit, are seismically qualified, based on the information provided, it is not clear that this piping system remains seismically qualified when severed at the degraded flange.

Please demonstrate that the Trains A and B and Cross-tie piping of the ECWS remain seismically qualified when severed by a guillotine break at the degraded location on the flange in the cross-tie piping.

RESPONSE:

In order to demonstrate that the South Texas Project (STP) Unit 2 ECWS Trains A and B and associated cross-tie piping remain seismically qualified, STPNOC pipe stress (ME 101) analytical model was modified to introduce a guillotine break (separation) at the location of the existing flaw and then re-analyzed using design basis approach and stress limits. The results of this evaluation show that this piping system meets the ASME Code requirements and therefore remains seismically qualified.

Additional Discussion:

A guillotine break is considered to occur at the location where the 10-inch pipe adjoins the de-alloyed flange before being bolted to valve EW0274, corresponding to the location of the flaw as shown in Figures S-1 and S-2 in the supplement to the relief request.

The ME101 analytical model was established to simulate a separation at the location as described above. As such, this flange element will not be able to sustain or transmit any mechanical forces and moments in the piping system analytical model. The ME101 piping analysis analyzes all of the defined load cases as outlined in the current design basis analysis.

Functional capability is assured as shown by Equation (Eqn.) 9D (Occasional Loads, Safe Shutdown Earthquake) for maximum computed stress 6385 psi being less than the allowable stress 25,500 psi ($1.2 \times S_h$) for Eqn. 9B (Occasional Loads, Operating Basis Earthquake), where "S_h" is the hot allowable stress for system operation in a prescribed thermal mode with elevated temperature, usually greater than an ambient temperature of 70°F.

Below is a summary of the maximum computed stresses with the guillotine break modeled, as documented in STPNOC Condition Report Engineering Evaluation (CREE) No. 12-22876-25, for Code Stress Equations 8, 9B, 9D, and 10.

Design Condition	Level	Maximum Computed Stress (psi)	Allowable Stress (psi)	Ratio
Eqn. 8, Sustained Loads	--	4930	21,250 (S_h)	0.232
Eqn. 9, Occasional Loads	B	5592	25,500 ($1.2 \times S_h$)	0.219
Eqn. 9, Occasional Loads	D	6385	51,000 ($2.4 \times S_h$)	0.125
Eqn. 10, Thermal Expansion	--	24,833	27,000 (S_a)	0.920