



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

May 19, 2005
NOC-AE-05001886

U. S. Nuclear Regulatory Commission
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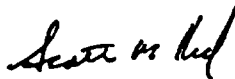
South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Additional Information Regarding Welded Attachments on Piping Systems
from which Arbitrary Intermediate Breaks were Previously Eliminated
(TAC Nos. MC5191 and MC5192)

Reference: Letter, S. E. Thomas to NRC, "Addition of Welded Attachments to Piping Systems from which Arbitrary Intermediate Breaks were Previously Eliminated," dated November 18, 2004 (NOC-AE-04001823)

The referenced letter reported two locations in each unit where welded attachments were added to piping systems from which arbitrary intermediate breaks were previously eliminated. The NRC review of the referenced letter resulted in an informal request for additional information. The attachment to this letter provides the response to that request.

There are no commitments in this letter.

If there are any questions regarding this submittal, please contact John Conly at (361) 972-7336 or me at (361) 972-7136.


Scott M. Head
Manager, Licensing

jtc

Attachment: Response to Request for Additional Information

STI: 31882289

A001

cc:

(paper copy)

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Response to Request for Additional Information

1. In your request letter (Reference 1), you indicated that the enveloping assessment was performed using Bechtel standard computer program ME-916. The current evaluation for the addition of welded attachment was performed using ME101. Confirm whether ME101 computer code uses the same methodology as used in ME916 for the design basis enveloping assessment.

Response:

The feedwater piping is analyzed using ME101 to determine the primary and secondary stresses and the support loads. The methodology used (ASME Section III, Code Class 2) for design stress limits and support loading combinations is the same for both the original and the modified feedwater piping.

The ME916 program calculates piping stresses at the integral attachments. The methodology used (ASME Code cases N-122, N-391) is the same for both the original attachments and the new attachments. Reference 2 details the methods of analysis used.

STP Nuclear Operating Company (STPNOC) used ME101 for piping analysis and ME916 to qualify integral welded attachments. As seen in DCN 9704761 on pages 121-133 of 151, STPNOC also used the evaluation procedure added in Code case N-122-2.

2. Subsection NC-3645(a) of ASME Section III, requires that attachments be designed to minimize stress concentrations in applications where the number of stress cycles, due either to pressure or thermal effect, is relatively large for the expected life of the equipment. Confirm whether the stress concentration has been adequately accounted for in your calculation using either ME916 or ME101 computer code.

Response:

The stress concentration has been adequately accounted for in the calculation. STPNOC used the stress indices for the feedwater piping analysis (ME101) for ASME Section III, Code Class 2 piping. The stress indices for the pipe and attachments (ME916) are enveloped stress indices per ASME Code Case N-391 (circular welded attachment for FW-9012-HL5010). The stress indices for the bounding case support (FW-9012-HL5010) are summarized in Table 1.

3. In the request letter, you indicated that the evaluation of the additional welded attachments in the rerouted feedwater piping following the steam generator replacement (SGR) indicated that the existing enveloping assessment performed previously in 1987 (Reference 2) remains bounding for the feedwater piping welded attachments and conform with the stress criteria for the elimination of AIBs discussed in UFSAR Section

3.6.2.1.1. Provide summary evaluation results for the primary stress intensity, the primary plus secondary stress and the cumulative factors for the additional welded attachments on the rerouted feedwater piping due to SGR.

Response:

The specific support primary stress intensity, primary plus secondary stress, and the cumulative usage factor for the new added integral welded attachments (IWAs) were not calculated. However, the new IWAs are qualified by comparison with welded IWAs for supports having a higher range of thermal/OBE loads and stresses. Refer to Table 2 for details.

References

1. STP Nuclear Operating Company letter to NRC, "Addition of Welded Attachments to Piping Systems from Which Arbitrary Intermediate Breaks (AIBS) Were Previously Eliminated," November 18, 2004, NOC-AE-04001823.
2. STP Houston Lighting & Power Company letter to NRC, "Elimination of Arbitrary Intermediate Breaks," ST-HL-AE-2290, dated July 8, 1987.

Table 1

Summary of Stress Indices for Support 18"FW-9012-HL5010

Stress Indices	Pipe per ASME Section III (ME101)	Attachment to the Pipe per ASME Code Case N-391 (ME916)		
		Pipe	Attachment	Enveloped
B ₁	0.5	-	-	-
C ₁	1.0	-	-	-
K ₁	1.0	-	-	-
B ₂	1.0	-	-	-
C ₂	1.0	-	-	-
K ₂	1.0	-	-	-
C ₃	1.0	-	-	-
K ₃	1.0	-	-	-
B _T or B _W	-	-	-	4.618
B _L	-	-	-	1.1
B _C or B _N	-	-	-	2.528
C _W	-	6.6396	9.236	9.236
C _L	-	2.1062	2.2	2.2
C _C or C _N	-	4.2809	5.056	5.056
B _T	-	Not required for this support		
C _T	-	Not required for this support		
K _T , K _I	-	3.6	3.6	3.6 (Partial penetration as weld)

Table 2
Stress Summary for Added Attachments

Support No.	Primary Stress Intensity						Primary plus Secondary Stress and Usage factors				
	Design Condition (NB-3652)		Emergency Condition (NB-3655.2)		Faulted Condition (NB-3656)		Normal and Upset Condition (NB-3653)				Cumulative Usage Factor (CUF)
	EQ. 9 psi	Allowable Psi $1.5S_m$	EQ. 9 psi	Allowable psi	EQ. 9 psi	Allowable psi	EQ. 10 S_n Max psi	EQ. 12 S_e Max psi	EQ. 13 Max psi	Allowable $3S_m$	
FW-9012- HL5010	7706	25950	-	-	34910	51900	49635	-	-	51900	0.7835
FW-1012- HL5001 (loop A)	7200	25950	-	-	28500	51900	27497	-	-	51900	< 0.635 ^(2,4)
FW-1012- HL5006 (loop A)	8200	25950	-	-	29100	51900	66783 ⁽⁵⁾	8840 ⁽⁵⁾	6047 ⁽⁵⁾	51900	< 0.635 ^(3,4)
FW-1018- HL5014 (loop D)	7500	25950	-	-	14800	51900	Note (1)	-	-	51900	< 0.635 ⁽⁴⁾
FW-1014- HL5015 (loop B)	15300	25950	-	-	19100	51900	Note (1)	-	-	51900	< 0.635 ⁽⁴⁾
FW-2018- HL5014 (loop D)	Unit 2 is qualified by comparison with Unit 1 analysis.										
FW-2014- HL5015 (loop B)	Unit 2 is qualified by comparison with Unit 1 analysis.										

Notes:

- (1) The evaluation was to assess the fatigue effects on new and existing integral welded attachments (IWAs) for all four loops of main feedwater lines. The fatigue effects on piping systems are evaluated with EQ. 10 and EQ. 11 of ASME Section III, Paragraph NB3600 based on thermal range and OBE range loads. Based on a review of all the supports with IWAs and comparisons of thermal/OBE loads and stresses between:
 - a. the existing analysis (before steam generator replacement, i.e., pre-SGR)
 - b. the new analysis (post-SGR)
 - c. the loads for feedwater support FW-9012-HL5010 selected previously for fatigue evaluation.

The two supports on Loop A, HL5001 and HL5006, were subsequently selected for detailed fatigue evaluations as bounding cases to qualify new IWAs added to the supports listed in table above. Thus the stresses and cumulative usage factors for the new IWAs are determined to be lower when compared to bounding case supports analyzed (HL5001 and HL5006).
- (2) Alternating stresses S_{alt} = 23828 psi for support HL5001
- (3) Alternating stress S_{alt} = 24899 psi for support HL5006
- (4) CUF = 0.635 calculated for alternating stress S_{alt} = 30809 psi
- (5) Equations 12, 13 and thermal stress ratchet check of NB-3653.7 were satisfied.