



South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

August 12, 2009  
U7-C-STP-NRC-090100

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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Rockville MD 20852-2738

South Texas Project  
Units 3 and 4  
Docket Nos. 52-012 and 52-013  
Response to Request for Additional Information

Attached are the responses to the NRC staff questions included in Request for Additional Information (RAI) letter number 158 related to Combined License Application (COLA) Part 2, Tier 2, Section 3.9 (Standard Review Plan, Section 3.12). This submittal completes the response to this RAI letter.

The two (2) attachments address the responses to the RAI questions listed below:

RAI 03.12-1  
RAI 03.12-2

When a change to the COLA is indicated, it will be incorporated in the next routine revision of the COLA following the NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

STI 32518317

DO91  
NRO

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

Executed on 8/12/09



Scott Head  
Manager, Regulatory Affairs  
South Texas Project Units 3 & 4

jep

Attachments:

1. RAI 03.12-1
2. RAI 03.12-2

cc: w/o attachment except\*  
(paper copy)

(electronic copy)

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**RAI 03.12-1****QUESTION:**

ABWR DCD Section 3.8.5.4 states that settlement of the foundations, and differential settlement between foundations for the site-specific foundations medium, will be calculated, and safety-related systems (i.e., piping, conduit, etc.) will be designed for the calculated settlement of the foundations.

The staff is requesting the applicant to provide descriptions of designing safety related piping systems for the calculated site-specific settlement of the foundations. The descriptions should be updated in the FSAR to address pipe stress design criteria, pipe support load combination for site-specific settlements in piping systems.

**RESPONSE:**

For safety-related systems, piping stresses due to differential foundation (building) settlement shall be evaluated as shown below:

## a) ASME Code Class 2 and 3 piping:

Piping stresses due to building settlement shall be evaluated in accordance with ASME Subsection NC-3600, Paragraph NC-3653.2(b), which states that the effects of any single nonrepeated anchor movement shall meet the requirements of the following equation (10a):

$(i \times M_d) / Z \leq 3 \times S_c$ , where:

- $i$  = stress intensification factor
- $M_d$  = resultant moment due to any single nonrepeated anchor movement (e.g., predicted building settlement), in-lbs
- $Z$  = section modulus of pipe, in<sup>3</sup>
- $S_c$  = material allowable stress at cold (room) temperature

## b) ASME Code Class 1 piping:

ASME Subsection NB does not specify the evaluation method to evaluate pipe stresses due to building settlement.

Using an approach similar to the approach for ASME Code Class 2 and 3 piping, piping stresses due to building settlement shall be evaluated using the following equation:

$(C_2 \times D_o \times M_d) / (2 \times I) \leq 6 \times S_m$ , where:

- $C_2$  = stress index
- $M_d$  = resultant moment due to any single nonrepeated anchor movement (e.g., predicted building settlement), in-lbs
- $D_o$  = outside pipe diameter, in
- $I$  = moment of inertia, in<sup>4</sup>
- $S_m$  = material allowable stress at cold (room) temperature

Note that  $6 \times S_m$  allowable is consistent with Note 7(a) to Table 3.9-2 in ABWR DCD/Tier 2.

For safety-related systems, pipe support loads due to foundation (building) settlement shall be considered normal loads and shall be included in all Service Level load combinations.

As the result of this response, the COLA will be revised to incorporate Note 13 into Table 3.9-2 as follows:

**Table 3.9-2 Load Combinations and Acceptance Criteria for Safety-Related, ASME Code Class 1, 2 and 3 Components, Component Supports, and Class CS Structures**

<i>Plant Event</i>	<i>Service Loading Combination</i>	<i>ASME Service Level</i>
1. Normal Operation (NO)	N	A <sup>13</sup>

13 For ASME Code Class 1, 2 and 3 piping, piping stresses due to differential foundation (building) settlement shall be evaluated to meet the following stress limits:

a) ASME Code Class 1 piping:

$$S_{SETTLEMENT} = (C_2 \times D_O \times M_d) / (2 \times I) \leq 6 \times S_m$$

where:  $S_{SETTLEMENT}$  is the nominal value of stress due to differential settlement

$M_d$  is the resultant moment due to predicted differential settlement

$C_2$ ,  $D_O$  and  $I$  are defined in ASME Code Subsection NB-3600

$S_m$  is material allowable stress at cold (room) temperature

$S_{SETTLEMENT}$  shall not be included in ASME Code Subsection NB-3600 Equations (10) and (11).

b) ASME Code Class 2 and 3 piping:

$$S_{SETTLEMENT} = (i \times M_d) / Z \leq 3 \times S_c$$

where:  $S_{SETTLEMENT}$  is the nominal value of stress due to differential settlement

$M_d$  is the resultant moment due to predicted differential settlement

$i$  and  $Z$  are defined in ASME Code Subsections NC/ND-3600

$S_c$  is material allowable stress at cold (room) temperature

$S_{SETTLEMENT}$  shall not be included in ASME Code Subsections NC/ND-3600 Equations (9), (10) and (11).

**RAI 03.12-2****QUESTION:**

In STP COL FSAR Section 3.9.7.4, Audit of Design Specification and Design Reports, the applicant stated that the design specification and design reports required by ASME Code for vessels, pumps, valves, and piping systems for the purpose of audit will be made available for NRC review (COL License Information Item 3.30). In particular, for piping systems, ITAAC Item No. 1 in the reference ABWR DCD Tier 1 Section 3.3 indicated that an ASME Code Certified Stress Report exists for the piping system and concludes that the design complies with the requirements of ASME Code, Section III. The staff recognizes that piping DAC was used in the ABWR design. According to RG 1.206, Section C.III.5.1, the applicant should supply the NRC with a schedule for completion of detailed engineering, procurement, fabrication, and installation information in a manner to support timely NRC inspection of DAC information. The current COL FSAR information as described above does not make it clear when the applicant will have the design reports available for NRC review. If the information cannot be provided prior the issuance of the license, the applicant needs to meet RG 1.206, Section C.III.5.1 and provide a description pertaining to the closure schedule of the piping design that will allow the coordination of activities with the NRC construction inspection program following issuance of the COL.

The applicant is requested to address the review schedule for piping DAC.

**RESPONSE:**

Development of design reports for ASME Code Class 1, 2, and 3 piping systems is the subject of a Design Acceptance Criteria (DAC) in the ABWR ITAAC # 3.3.1. That DAC is incorporated by reference in the STP COLA. It is anticipated that the primary purpose of an audit would be to support the eventual closure of the DAC.

The current schedule shows that design reports for all ASME Code Class 1, 2, and 3 piping systems will be completed by the end of the second quarter of 2012. This date represents the current design report completion date for various systems from the integrated project schedule and is subject to potential future adjustment. As part of our periodic issuance of the project schedule and ITAAC schedule to the NRC, the NRC will be informed of any changes.

Note that schedule dates for Design Specifications and Design Reports for other ASME components (e.g.: vessels, pumps, valves) are provided in other RAIs (e.g.: RAI 03.09.03-3).

No COLA change is required for this response.