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

May 27, 2010
U7-C-STP-NRC-100088

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
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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 responses to NRC staff questions included in Request for Additional Information (RAI) letter number 339 related to Combined License Application (COLA) Part 2, Tier 2 Section 6.2 and RAI letter number 344 related to COLA Part 2 Tier 2 Section 9.5.

Attachments 1 through 6 address the responses to the RAI questions listed below:

RAI 06.02.01.01.C-14	RAI 06.02.01.01.C-17
RAI 06.02.01.01.C-15	RAI 06.02.01.01.C-18
RAI 06.02.01.01.C-16	RAI 09.05.01-11

RAI Question 06.02.01.01.C-15 contained proprietary information but the response does not. The proprietary information in the question has been removed and is indicated by brackets.

Where COLA revisions are indicated, they will be made at the first routine COLA update following NRC acceptance of these responses.

There are no commitments in this letter.

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

D091
NRO

STI 32659100

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

Executed on 5/27/10

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

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Attachments:

1. RAI 06.02.01.01.C-14
2. RAI 06.02.01.01.C-15
3. RAI 06.02.01.01.C-16
4. RAI 06.02.01.01.C-17
5. RAI 06.02.01.01.C-18
6. RAI 09.05.01-11

cc: w/o attachment except*
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RAI 06.02.01.01.C-14

QUESTION:

The departure report indicates that the conservatism of the assumed mass flow and enthalpies for the feedwater system side break flow used in the FWLB simulation will be confirmed after detailed design of the condensate and feedwater are complete. Please clarify at what stage of the COL application the feedwater system side break flow used in the FWLB simulation will be provided?

RESPONSE:

The feedwater system side break flow used in the FWLB simulation will be confirmed as part of the analyses to be performed as required by ITAAC (Inspections, Tests, Analyses and Acceptance Criteria) Item No. 4 in ABWR DCD Tier 1, Table 2.14.1 titled "Primary Containment System". The design commitment for that ITAAC requires that the maximum calculated pressures and temperatures for the design basis accident be less than design conditions. As also stated in that ITAAC, the analyses of the design basis accident will be performed using as-built primary containment system (PCS) data. This data will reflect the final detailed design for this system and will include design parameters such as the as-built condensate and feedwater piping configuration, pipe lengths and pump characteristics.

As a result of this response, the STD DEP 6.2-2 description in STP 3 & 4 COLA Part 7, Section 2.2 will be revised as shown below. Changes from STP 3 & 4 COLA Revision 3 are shown with gray shading.

STD DEP 6.2-2, Containment Analysis

Description

For the containment analysis, the feedwater system side of the FWLB has been changed using a revised time variant feedwater mass flow rate and enthalpy directly to the drywell airspace. The time histories of the mass flow and enthalpy have been determined from the predicted characteristics of a typical feedwater system. The conservatism of the assumed mass flow and enthalpies will be confirmed based on the containment analyses to be performed for ITAAC Item No. 4 in Part 2, Tier 1, Table 2.14.1, which will reflect the as-built condensate and feedwater piping configuration, pipe lengths, and pump characteristics ~~after detailed condensate and feedwater designs are complete~~. In addition, to provide added assurance of acceptable results, safety related FWLB mitigation has been added to the STP 3 & 4 ABWR design which adds safety related instrumentation to sense and confirm a FWLB based on high differential pressure between feedwater lines coincident with high drywell pressure to trip the condensate pumps (Ref. STD DEP T1 2.4-2). This automated condensate pump trip is not credited in the containment analysis.

RAI 06.02.01.01.C-15

QUESTION:

The revised STP Units 3 and 4 containment analysis was performed using different values of the vent loss coefficients as compared to the values used in the DCD analysis. In the revised analysis, the effective vent loss coefficient was varied from [ ] depending on number of cleared horizontal vent rows. However, Table 6.2-1 of the COL FSAR (Rev. 3) indicates the vent loss coefficient range of 3.5 to 5.0. Please, revise the Table 6.2-1 of the COL FSAR (Rev. 3) accordingly.

RESPONSE:

STP 3 & 4 COLA Part 2, Tier 2, Table 6.2-1 will be revised to reflect the revised vent loss coefficients as shown in the markup below. Because this information is proprietary to Westinghouse Electric Corporation, the revised table will reference the appropriate section of WCAP-17058 where this information is located. Changes from STP 3 & 4 COLA Revision 3 are shown with gray shading.

Table 6.2-2 Containment Parameters

	Drywell	Wetwell
A. Drywell and Wetwell		
1. Internal Design Pressure (kPaG)	*309.9*	~~*309.96*~~**309.9**
3. Design Temperature (°C)	*171.1*	~~*103.9*~~**104**
B. Vent System		
5. Vent Loss Coefficient (Varies with number of vents open) ‡		~~*2.5 3.5*~~**3.5 5.0**

‡ Provided in Section 6.1 of Reference 6.2-5.

RAI 06.02.01.01.C-16

QUESTION:

The maximum drywell-to-wetwell differential pressure reported in the ABWR DCD is 109.8 kPaD (occurs in short-term FWLB). The maximum drywell-to-wetwell differential pressure calculated in the STP Units 3 and 4 containment analysis is 146 KPaD (occurs in short-term MSLB). Even though the revised analysis value for the differential pressure is different from the ABWR DCD value, the applicant has retained (incorporated by reference) the ABWR DCD value in the COL FSAR (Rev. 3) (see Table 6.2-1). Please, update the maximum differential pressure value reported in Table 6.2.1 of the COL FSAR (Rev. 3) accordingly.

RESPONSE:

The maximum drywell-to-wetwell pressure in the positive direction (drywell pressure greater than wetwell pressure) for the STP 3 & 4 containment analysis is +148.3 kPaD. STP 3 & 4 COLA Revision 3, Part 2, Tier 2, Table 6.2-1 will be revised to reflect this value as shown in the markup with gray shading highlighting the changes.

The STP 3 & 4 calculation for the drywell-to-wetwell pressure in the negative direction (drywell pressure less than wetwell pressure) is currently on-going. It is expected to be complete by July 31, 2010. If the results of that calculation show that the DCD value of -10.7 kPaG, as currently shown in Table 6.2-1, is not bounding, a COLA change will be made to reflect this calculated value.

Table 6.2-1 Containment Parameters

Design Parameter	Design Value	Calculated Value[1]
5. *Drywell-to-wetwell differential pressure*	*+172.6 kPaD*	~~*+109.8 kPaG*~~ +148.3 kPaD
	-13.7 kPaD	*-10.7 kPaG*

RAI 06.02.01.01.C-17

QUESTION:

In COL License Information Item 6.5, the applicant has proposed that a vacuum breaker shield (consisting of a solid "V" shaped plate) will be provided below each vacuum breaker to protect the valves against loads due to pool swell under LOCA conditions. However, the actual design of the shield has not provided in the COL FSAR (Rev. 3). Provide detailed design of the vacuum breaker shield discussing/showing it's protective design characteristics.

RESPONSE:

As noted in STP 3 & 4 COLA Part 2, Tier 2 Subsection 6.2.7.4, a vacuum breaker shield, consisting of a solid "V" shaped plate, is provided below each wetwell to drywell vacuum breaker to protect the valve from LOCA-generated pool swell loads. A sketch of the vacuum breaker design is provided in Attachment 6.2.1.1.C-17-1 to this response. All dimensions on this sketch are preliminary and subject to change based on the results of the pool swell loads analysis.

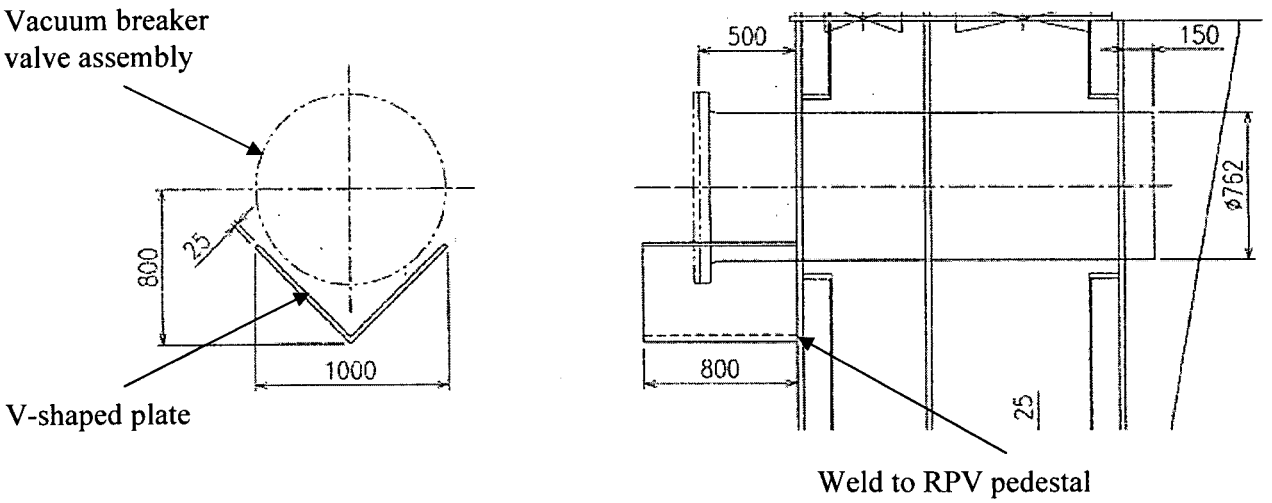
The "V" shaped plate is a Seismic Category I structure that is attached to and a part of the Reactor Pressure Vessel (RPV) Pedestal outer wall plate. The V-shaped plate is not in contact with the vacuum breakers. The plate will be made of coated carbon steel.

The "V" shape of the plate acts to divert water from the pool swell away from the vacuum breaker valve to avoid pool swell water impingement on the vacuum breaker. The "V" shape of the plate will minimize the pool swell loads on the plate as opposed to a flat plate design.

As noted above, the final dimensions of this protective plate have yet to be determined. The dimensions will be finalized after completion of the pool swell loads structural evaluation later this summer.

There are no COLA changes required as a result of this response.

Attachment 6.2.1.1.C-17-1*



* All dimensions on this Figure (shown in mm) are PRELIMINARY and will be finalized after completion of loads analysis.

RAI 06.02.01.01.C-18

QUESTION:

The maximum wetwell pressure reported in the COL FSAR (Rev. 3) (see Table 6.2-1) is 219.3 kPaG. However, the STP Units 3 and 4 containment analysis presented in WCAP-17058 indicates that the maximum wetwell pressure is 210.3 kPaG (occurs in long-term MSLB).

Explain the apparent discrepancy between the maximum wetwell pressure value reported in the COL FSAR (Rev. 3) and that based on the revised STP Units 3 and 4 containment analyses.

RESPONSE:

The STP 3 & 4 containment analysis documented in WCAP-17058 does not provide an explicit value for the peak wetwell pressure. Consequently, the maximum pressure value of 210.3 kPaG as noted in the question is not presented in that document, and it also does not reflect the peak containment pressure for the STP 3 & 4 containment analysis.

The maximum calculated containment pressure for the STP 3 & 4 containment analysis is 217.2 kPaG. STP 3 & 4 COLA Revision 3, Part 2, Tier 2 was incorrectly changed to a value of 219.3 kPaG as noted in the question. The STP 3 & 4 COLA Part 2, Tier 2, Table 6.2-1 will be revised to reflect the correct value for wetwell pressure and also to correct the calculated value for peak suppression pool temperature as noted below. The changes from STP 3 & 4 COLA Revision 3 are highlighted with gray shading.

6.2.1.1.2.2 Wetwell

STD DEP 6.2-2

*The wetwell chamber design pressure is 309.9 kPaG and design temperature is ~~103.9°C~~*104°C.

Under normal plant operating conditions, the maximum suppression pool water and wetwell airspace temperature is 35°C or less. ~~Under blowdown conditions following an isolation event or LOCA, the initial pool water temperature may rise to a maximum of 76.7°C.~~The continued release of decay heat after the initial blowdown following an isolation event or LOCA *may result in suppression pool temperatures as high as ~~97.2~~ ~~99.5°C~~99.6°C. The Residual Heat Removal (RHR) System is available in the Suppression Pool Cooling mode to control the pool temperature. Heat is removed via the RHR heat exchanger(s) to the Reactor Building Cooling Water (RCW) System and finally to the Reactor Service Water (RSW) System. The RHR System is described in Subsection 5.4.7.*

6.2.1.1.3.3.1.4 Long-Term Accident Responses

STD DEP 6.2-2

In order to assess the adequacy of the containment system following the initial blowdown transient, an analysis was made of the long-term temperature and pressure response following the accident. The analysis assumptions are those discussed in Subsection 6.2.1.1.3.3.1.2.

~~*The short-term pressure peak (268.7 kPaG) of Figure 6.2-6 is the peak pressure for the whole transient.*~~ *Figure 6.2-8 shows temperature time histories for the suppression pool, wetwell, and drywell temperatures. The peak pool temperature (*~~*96.9*~~ ~~99.5~~ 99.6*°C) is reached at* ~~*15,350*~~ 6600 *seconds (*~~*4.264*~~1.833 *hours).* This is less than the suppression pool temperature value of 100°C which is used in the net positive suction head available (NPSHA) calculations.~~*and remains below the 97.2°C limit.*~~

Table 6.2-1 Containment Parameters

Design Parameter	Design Value	Calculated Value[1]
1. *Drywell pressure*	*309.9 kPaG*	~~*268.7 kPaG*~~ 281.8 kPaG
2. *Drywell temperature*	*171.1°C*	~~*170°C*~~ 173.2°C[2]
3. *Wetwell pressure*	*309.9 kPaG*	~~*179.5*~~ ~~219.3~~ 217.2 kPaG
4. *Wetwell temperature*		
• *Gas Space*	~~*103.9 °C*~~104°C	~~*98.9*~~ 98.6°C
• *Suppression pool*	~~*97.2*~~ 100°C	~~*96.9*~~ 99.56°C

[1] Calculated values from Ref. 6.2-5

[2] Calculated drywell maximum temperature exceeds design temperature for only 2 seconds. See discussion in Section 6.2.1.1.2.1.

RAI 09.05.01-11

QUESTION:

In the applicant's response to RAI 09.05.01-9, the applicant confirmed the deletion of a statement referring to the development of a license condition for changes to the fire protection program. In addition, the staff had requested (in RAI 09.05.01-9) that the applicant provide the change process license condition in the FSAR Section 9E. However, the applicant did not include the change process description or a change process license condition in accordance with RG 1.189.

The staff is requesting that the applicant include within Section 9E of the FSAR the credited change process accompanied by a license condition for their self-approval change process of the fire protection program in accordance with RG 1.189.

RESPONSE:

Reference: Letter from Scott Head to NRC dated October 29, 2009, U7-C-STP-NRC-090187 (ML093430301)

RG 1.189 provides, in part, the following relevant discussion for changes to new plant fire protection programs (FPPs):

> **1.8 Fire Protection Program Changes/Code Deviations**
>
> **1.8.1 Change Evaluations**
>
> GL 86-10 (Ref. 15) recommended that licensees incorporate the FPP in the facility FSAR. Incorporation of the FPP and major commitments, including the fire hazards analysis, by reference in the FSAR for the facility places the FPP, including the systems, administrative and technical controls, organization, and other plant features associated with fire protection on a consistent status with other plant features described in the FSAR. GL 86-10 further recommended the adoption of the standard license condition (see Regulatory Position 1.8.1.2 of this guide), requiring licensees to comply with the provisions of the approved FPP as described in the FSAR and establishing when NRC approval is required for changes to the program.
>
> The standard fire protection license condition recommended by GL 86-10 (Ref. 15) is not applicable to the FPP for new reactors that are licensed in accordance with 10 CFR Part 52. Changes to new reactor FPPs that do not require exemption requests should be evaluated and processed in accordance with 10 CFR 50.59. The appendices to 10 CFR Part 52 include additional requirements for processing changes and exemptions for new reactors that are based on a certified design.

As a result of this RAI response, COLA Part 2, Tier 2, Appendix 9E, Section 9E.1.8 will be revised as follows (and supersedes the proposed markup provided in the response to

RAI 09.05.01-9 reference that previously made this section "N/A"):

9E.1.8 Fire Protection Program Changes/Code Deviations

~~This topic will be addressed in a License Condition to the STP 3 & 4 COL.~~Changes to the STP 3 & 4 FPP will be evaluated and processed in accordance with 10 CFR 52.98(c).