April 30, 2010

Mr. Mark McBurnett, Vice President
Regulatory Affairs
South Texas Project Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REGULATORY SUMMARY OF JULY 7, 2009 AND AUGUST 18, 2009 FOLLOW-UP AUDIT SOUTH TEXAS PROJECT, UNITS 3 AND 4 COMBINED LICENSE APPLICATION CONTAINMENT AND POOL SWELL METHODOLOGY CALCULATIONS

Dear Mr. McBurnett:

By letter dated September 24, 2008, South Texas Project Nuclear Operating Company (STPNOC) submitted South Texas Project (STP) Units 3 and 4 Combined License Application (COLA), Revision 2. To support the review of STP Units 3 and 4 COLA, the U. S. Nuclear Regulatory Commission (NRC) staff participated in an on-site audit of the supporting calculation documents used to develop the containment and hydrodynamic load methodology topical reports to be submitted in support of their COLA. The audit occurred at the Westinghouse Offices in Rockville, Maryland on July 7, 2009 and August 18, 2009. The subject audit is a follow-up audit to the March 3-4, 2009 audit that is documented in Agencywide Document Management System (ADAMS). The ADAMS Accession No. is ML090980270. The detailed results of the audit are provided in the attached Enclosure.

Should you have any questions, please contact Stacy Joseph, Project Manager for the STP COLA at (301) 415-2849 or Stacy.Joseph@nrc.gov.

Sincerely,

/RA/

Mark Tonacci, Chief
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-012 and 52-013

April 30, 2010

Mr. Mark McBurnett, Vice President
Regulatory Affairs
South Texas Project Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REGULATORY SUMMARY OF JULY 7, 2009 AND AUGUST 18, 2009 FOLLOW-UP AUDIT SOUTH TEXAS PROJECT, UNITS 3 AND 4 COMBINED LICENSE APPLICATION CONTAINMENT AND POOL SWELL METHODOLOGY CALCULATIONS

Dear Mr. McBurnett:

By letter dated September 24, 2008, South Texas Project Nuclear Operating Company (STPNOC) submitted South Texas Project (STP) Units 3 and 4 Combined License Application (COLA), Revision 2. To support the review of STP Units 3 and 4 COLA, the U. S. Nuclear Regulatory Commission (NRC) staff participated in an on-site audit of the supporting calculation documents used to develop the containment and hydrodynamic load methodology topical reports to be submitted in support of their COLA. The audit occurred at the Westinghouse Offices in Rockville, Maryland on July 7, 2009 and August 18, 2009. The subject audit is a follow-up audit to the March 3-4, 2009 audit that is documented in Agencywide Document Management System (ADAMS). The ADAMS Accession No. is ML090980270. The detailed results of the audit are provided in the attached Enclosure.

Should you have any questions, please contact Stacy Joseph, Project Manager for the STP COLA at (301) 415-2849 or Stacy.Joseph@nrc.gov.

Sincerely,
/RA/
Mark Tonacci, Chief
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-012 and 52-013

Distribution:
Public
RidsNroDnrlNge2
ADrozd, NRO
JMcKirgan, NRO
RidsNroDsraSbcv
SKirkwood, OGC
RidsOgcMailCenter
SJoseph, NRO
BAbeywickrama, NRO
MTonacci, NRO
Gwunder, NRO
RidsNroDnrl
RidsRgnMailCenter

ACCESSION NO. ML092790335 **NRO-002**

OFFICE	DNRL/PM	DNRL/LA	SBCV/TR	SBCV/BC	DNRL/BC
NAME	SJoseph	BAbeywickrama	ADrozd	JMcKirgan	MTonacci (GWunder for)
DATE	10/06/09	10/06/09	10/13/09	10/14/09	4/30/10

OFFICIAL RECORD COPY

STP UNITS 3 AND 4 COLA REVISION 2

CONTAINMENT AND POOL SWELL METHODOLOGY CALCULATION

FOLLOW-UP AUDIT SUMMARY

1. Background

The staff performed an audit of the South Texas Project (STP) Units 3 and 4 Combined License Application (COLA) and the supporting Westinghouse calculations used in development of the Technical Reports (TRs) for Containment Design Methodology and Pool Swell Methodology. These TRs are being developed in support of COLA Chapters 3B and 6.2. The purpose of the audit was to review the Westinghouse calculation packages in order to understand the model being utilized by STP (GOTHIC) and to determine the input parameters for these models so that the U. S. Nuclear Regulatory Commission (NRC) staff and contractors can complete their confirmatory model. The audit was held at the Westinghouse Offices in Rockville, Maryland on July 7 and August 18, 2009. The audit team consisted of the NRC staff members and Contractors identified in Table I. The applicant staff that participated in various audit discussions over the course of the two days at Westinghouse is identified in Table II.

Table I: NRC Staff and Contractors	
NAME	**AFFILIATION**
Andrzej Drozd	NRC Audit Team Lead
Michael Snodderly	NRC Technical Branch Chief
Eric Miller	NRC Technical Reviewer
Stacy Joseph	NRC Licensing
Mohsen Khatib-Rahbar	Energy Research, Inc (ERI)
Michael Zavisca	ERI
Pravin Sawant	ERI
Fred Moody	Consultant to ERI

Table II: Applicant's Staff			
NAME	**AFFILIATION**	**NAME**	**AFFILIATION**
Jim Tomkins	STPNOC	Bob Quinn	Westinghouse
Scott Head	STPNOC	Nirmil Jain	Westinghouse
Aaron Heinrich	STPNOC	Tom George	NAI
Brad Maurer	Westinghouse	Hirohide Oikawa	Toshiba
Jason Douglass	Westinghouse	Koichi Kondo	Toshiba/TANE
Rick Ofstun	Westinghouse		

2. Objective

The objective of the audit was for the staff to gain a better understanding of the detailed calculations and methodologies in support of STP's licensing basis for containment and pool swell. The calculations reviewed support the Containment Design Methodology Technical Report WCAP-17058-P (submitted to the NRC on June 30, 2009) and Pool Swell Technical Report, to be submitted for NRC review and approval by September 30, 2009.

3. Regulatory Basis

This audit supports the NRC staff review of the analytical methods used by STP for calculating drywell pressure and temperature (P/T) response as specified by Standard Review Plan (SRP) (NUREG-0800) Section 6.2.1.1.C-10, since the analytical method used by STP (GOTHIC) is other than the General Electric (GEH) model approved for Advanced Boiling Water Reactor. In addition, the information gathering performed during this audit supports the confirmatory analyses to be performed by the staff as specified by SRP Section 6.2.1.1.C-9. The pool swell calculations will be reviewed using NUREG -0978: "Mark III LOCA-Related Hydrodynamic Load Definition," August, 1984.

4. Audit Activities

The P/T portion of the containment audit began on July 7, 2009, with a proprietary presentation by Westinghouse (ML092320099 - public and ML092320100 - nonpublic). The presentation provided a summary of the ABWR Primary Containment Analysis using GOTHIC. The model uses NEDO-20533, as modified by the Design Certification Document (DCD), as the basis for the GOTHIC modeling methodology. In order to benchmark the methodology, Westinghouse compared the short term GOTHIC results and the DCD results. Finally, the model created by Westinghouse corrects the errors in the DCD previously identified by General Electric (GE) in NEDO-33372 (the aforementioned errors will be addressed separately for the DCD by GE). Westinghouse provided further detail on the model and the results obtained using that model.

Following the presentation, the NRC staff and contractors reviewed the Westinghouse Calculation package CN-CRA-09-27 "ABWR Primary Containment Analysis with GOTHIC". This calculation package supports the TR for the Containment Design Methodology WCAP-17058-P submitted to the NRC on June 30, 2009. From this calculation package, the staff obtained the input parameters needed to complete the confirmatory model, with the exception of a few outstanding items. The staff requested that STP/Westinghouse supplement WCAP-17058-P and provide the following:

- Total reactor power (i.e., fission plus decay heat) in tabular form as a function of time between 0 and 600 seconds as used by GOBLIN in calculating the input boundary conditions for the GOTHIC feedwater line break (FWLB) and main steamline break (MSLB) short-term containment analyses. Please include the maximum amount of time resolution in the period between 0 and 10 seconds.

- Values of each component of the loss coefficients for the drywell connecting vents, vertical vent pipes, and horizontal vents, as well as the supporting calculations and technical bases for these values

- Values of the discharge coefficients and the loss coefficients used to model the break flow rate in the FWLB and the MSLB scenarios. In the case of the MSLB, please provide this information for both sides of the double-sided break, if different.

- Boundary conditions (i.e., mass and energy releases to containment during the time period between 0 and 5×10^4 seconds) in tabular form for the long-term MSLB analysis. Also, please provide in tabular form the feed water flow rate for the same MSLB analysis.

- Data in electronic tabular form for all of the time-dependent plots presented in the report.

Any further requests for additional information (RAI) will be handled through the standard RAI process.

The staff also received an informal presentation (no presentation materials provided) on the methodology to be used for the Pool Swell TR as a pre-cursor to the audit to be performed on August 18, 2009. The NRC staff requested that, in addition to the formal presentation to be presented, that STP/Westinghouse have available and be prepared to discuss information on the following items during the pool swell portion of the containment audit on August 19, 2009:

- Scaled drawings showing the locations of various equipments inside the wetwell gas space that may need to be protected from potential level swell and hydrodynamic loads.

- An explanation of how the pool swell loads that are calculated in the Westinghouse analysis will be utilized by Sargent and Lundy.

- An assessment of the effects of uncertainties on the calculated pool swell level surge.

- An explanation of similarities and differences between the three GOTHIC input models used for the short-term, long-term, and pool level swell analyses.

To conclude the day and the P/T portion of the containment follow-up audit, Toshiba and Westinghouse presented a brief update on the status of the Phase I P/T Analysis (COL), the Phase II P/T analysis (Post-COL), Pool Swell analysis and hydrodynamics load evaluation. The presentation can be found in ADAMS as ML092190395.

The audit resumed on August 18, 2009. Westinghouse and Toshiba provided a proprietary presentation (ML092390335 - public and ML092390337 - nonpublic) to describe the methodology used to prepare the Pool Swell Analysis for the STP COLA. The presentation covered the following subjects:

- Comparison of GOTHIC vs. the DCD Model
- Pool Swell Test Data
- Comparison with Test Data and DCD Results
- ABWR Analysis and Sensitivity Studies
- Pool Swell Load Application
- Contents of the Pool Swell TR
- Responses to the Informal Questions raised during the July 7, 2009 P/T portion of the Containment Audit

Following the presentation, the staff reviewed the following calculation packages which support the development of the Pool Swell TR to be submitted to the NRC on September 30, 2009.

- LTR-CRA-09-110 (modified the short term analysis in CN-CRA-09-27 for Pool Swell Input)

- NAI-1397-002 “Validation of Suppression Pool Swell Load Modeling for Westinghouse – ABWR”

- NAI-1397-001-R1 “Suppression Pool Swell Load Parameters for Westinghouse – ABWR”

The referenced reports are also placed in STP’s electronic reading room for continued use by the NRC staff. These calculation reports will be used to build the confirmatory model.

Following the presentation and calculation review, the staff requested that Westinghouse elaborate on the following topics when submitting the Pool Swell TR:

- Elaborate on the characterization of the Nitrogen flow. Provide a description of the parameters in GOTHIC that cannot change (and why those parameters are appropriate for the model) or perform sensitivity studies.

- Describe load definition on submerged structures in the wetwell (WW) pool based on local values of liquid velocity and hydrodynamic (or “virtual”) mass M_H.

The NRC staff pointed out that the Condensation Oscillation, Chugging and safety relief valve (SRV) loads were described during the presentation or in the calculation packages reviewed. STP and Westinghouse stated that the COLA will reference an approved methodology for determining the subject loads and that Toshiba will be preparing a derivative document of that methodology to provide to Westinghouse for use. The staff noted that an audit of this derivative document will need to be performed once it is completed.

To conclude the audit, the NRC staff and STP identified a number of actions items to be completed that are detailed in the next section of this report.

5. Action Items

The following action items were identified at the conclusion of the audit. All actions items have since been completed.

a. STP to provide supplemental information to WCAP-17058-P via CD (excel files) to the NRC Document Control Desk (complete).

b. STP/Westinghouse to provide discussion in Pool Swell Report on characterization of N_2 flow. (Report submitted. Follow-up questions to be via RAI).

c. STP/Westinghouse to provide discussion in Pool Swell Report on M_H derivation. (Report submitted. Follow-up questions to be via RAI).

d. STP to provide the calculation reports and Pool Swell Test Facility comparison data in the electronic reading room (complete).