SOUTH TEXAS PROJECT UNITS 3 AND 4 COMBINED LICENSE APPLICATION,
Final Safety Evaluation Report 2.4 Hydrology –
Hurricane Storm Surge and Embankment Breach
AUDIT PLAN

A. Background

As a part of the South Texas Project (STP) Units 3 and 4 Combined Operating License Application, STP submitted to the U.S Nuclear Regulatory Commission (NRC) the response of Request for Additional Information(RAI) 2.4.5-10 in relation to estimating the design based flooding level caused by hurricane storm surge and embankment breach. NRC staff reviewed the RAI response and found deficiencies on the modeling, mainly on the establishing the probable maximum hurricane scenarios and the set up of storm surge and dam breach models. Because the RAI response omits details of the modeling, it is needed for the staff to have a site audit to resolve the outstanding modeling issues in an efficient and timely manner. The purpose of the audit is for the staff to review the STP's storm surge and dam breach models, supporting modeling documentations, and calculation packages. The audit is needed for the staff to better understand the modeling result in order to make accurate safety conclusions in relation to writing the safety evaluation report for Final Safety Analysis Report (FSAR) Sections 2.4.4 "Potential Dam Failure", 2.4.5 "Probable Maximum Surge and Seiche Flooding", and 2.4.10 "Flood Protection Requirements".

B. Goal

The goal of the audit is to clarify and resolve outstanding issues on the modeling of hurricane storm surge and MCR breach flood in support of reviewing STP FSAR Sections 2.4, Hydrology.

C. Regulatory Guide

The regulatory guidance for estimating the design based flood level is available from the following NRC documents:

- Standard Review Plan Sections 2.4.4, 2.4.5, and 2.4.10
- RG 1.59
- RG 1.206

D. Audit Scope

- The area of focus for the audit is the STP Units 3 and 4 hurricane storm surge and embankment breach Modeling. The specific topics to discuss during the site audit are listed in the attachment A.

E. Information and Other Materials Necessary for the Regulatory Audit

- The staff will review the set-up and simulation results of the applicant's storm surge and dam break models.
- Calculation Package, if any, for storm surge and dam break modeling.
- STP Nuclear Operating Company (STPNOC) responses to RAI 2.4.5-10

F. Audit Team

The following are the potential audit team members:

Tekia Govan, Project Manager
Hosung Ahn, NRC Hydrologist (Audit Team Lead)
Nebiyu Tiruneh, NRC Hydrologist
Henry Jones, NRC Hydrologist
Rajiv Prasad, PNNL Hydrologist
Lyle Hibler, PNNL Hydrologist

G. Logistics (tentative)

Date:	August 31, 2010	September 1, 2010
Time:	8:30 a.m. – 4:30 p.m.	8:30 a.m. – 11:30 p.m.
Location:	South Texas Project Office Bay City, Texas	

H. Deliverables

The audit team will issue a audit report within 90 days after completing the audit.

Attachment A. Specific Topics to Discuss during the Site Audit

A. FSAR 2.4.5, "Probable Maximum Surge and Seiche Flooding" : (Morning Session)

1) Provide a detailed description of the ADCIRC model including details of the Holland B model (or SWAN model) to generate hurricane wind distributions at the offshore. Provide a comparison of the wind models used in ADCIRC and SLOSH models. Provide a comparison of wind stresses produced by the wind models employed by ADCIRC and SLOSH.

2) Discuss the Probable Maximum Hurricane (PMH) scenarios and parameters used in both ADCIRC and SLOSH models. Provide ADCIRC and SLOSH input and discuss the set up of the model (e.g., model grids, surface structures, etc.) for all simulated PMH scenarios. Provide graphical comparison of model inputs, computational grids, PMH storm tracks, topographic features, simulated water surface elevations, and others modeling components of ADCIRC and SLOSH to facilitate staff's review.

3) Discuss topographic data used to simulate ADCIRC model and how the data are different from those used in the SLOSH grids. Provide illustrations to indicate topographic features resolved by the ADCIRC and SLOSH grids.

4) Discuss the results and interpretation of the ADCIRC and SLOSH simulations; Provide graphical comparison of the output from the two models to facilitate staff's review.

B. FSAR 2.4.4 "Potential Dam Failure" : (Afternoon Session)

5) Provide information on the current velocities of hurricane storm surges near the northern MCR levee and other geotechnical details that were used by the applicant in the RAI response to access the potential of MCR embankment erosion .

6) Discuss conservatisms in estimating MCR breach parameters (i.e., breach time and width) in FSAR Table 2.4S.4-5 (Rev. 3). Why storage-based equations (e.g., the Macdonald and Langridge-Monopolis equation: USBR, 1990 report) are not considered in estimating MCR breach widths? Discuss the adequacy of the estimated breach time of 1.7 hours on the table.

7) Discuss the validity of the extent of the model area and set up of boundary condition for the RMA2 model used to simulate MCR breach floods.

8) Elaborate the discussion of excluding the potential of the MCR breach caused by a probable maximum storm surge event. Explain why this combined scenario is infeasible in terms of the dam safety aspect. Do we have sufficient data to come up that conclusion?

9) The applicant set the value of a SED2D input variable, DEPLIMIT, to 50,000,000 even though the recommended SED2D default value is 0.25. The staff used the default value recommended by the SED2D model documentation, but the resulting simulation ended prematurely. Therefore, the SED2D model is sensitive to the value of this model input parameter. Provide a detailed description of the effect of the value of this parameter on

SED2D simulations. Provide a discussion of the effects of the value of this parameter on the simulated water surface elevation and sediment deposition in the vicinity of safety-related SSCs.

C. FSAR 2.4.10 "Flood Protection Requirements": (Afternoon Session)

10) Briefly describe how safety-related facilities (buildings and foundations) are designed to withstand the static and dynamic forces of MCR breach floods, hurricane storm surge, or a combination of two events.

11) Provide the design specific information on the proposed watertight doors and openings that should resist static and dynamic forces of the design basis floods without water penetrations, or provide design specifications and/or industry standard that are applicable to design and maintenance of watertight doors and openings.

12) The proposed flood protection is solely relied on the watertight doors and emergency operation procedures. Discuss the possibility of the failure or non-failure of the watertight system. Why not provide additional flood protections in a defense-in-depth concept other than just relying on the closure of watertight doors which could fail during severe flood events.

13) What is the expected duration of flooding caused by the postulated MCR breach? Discuss the alternative access to the buildings during the prolonged MCR breach flood event? What are the potential impacts of the prolonged inundation from the MCR breach on the maximum groundwater level established in FSAR Section 2.4.12?