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

November 30, 2009
U7-C-STP-NRC-090206

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

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

References:
1. Letter, Scott Head to Document Control Desk, "Responses to Requests for Additional Information" for the South Texas Combined License Application dated September 21, 2009, U7-C-STP-NRC-090146 (ML092710096).

2. Letter, Scott Head to Document Control Desk, "Commitments FSAR COM 2.5S-1 and Resolution of Docketing Issues Commitment #6" for the South Texas Combined License Application dated December 15, 2008, U7-C-STP-NRC-08070 (ML083540456).

Reference 1 provided responses to NRC staff questions included in Request for Additional Information (RAI) letter number 202, related to COLA Part 2, Tier 2, Section 2.4S.12, "Groundwater." The response to RAI 02.04.12-33, submitted in reference 1, proposed refinements to the STP 3 & 4 numerical groundwater model which was originally submitted in Reference 2. Attachment 1 to this letter, RAI 02.04.12-33, Supplement 1, provides additional details about the refinements to the STP 3 & 4 numerical groundwater model. This supplemental information completes the response to RAI 02.04.12-33. Attachment 2 to this letter provides the updated STP 3 & 4 numerical groundwater model, "Groundwater Model Development and Analysis for STP Units 3 & 4," Bechtel Power Corporation, December 2008, Revised November 2009."

When a change to the COLA is indicated, the change will be incorporated into the next routine revision of the COLA following NRC approval of the response.

There are no commitments in this letter.

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

STI 32575915

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NRO

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

Executed on 11/30/09

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

rhb

Attachments: 1. RAI 02.04.12-33, Supplement 1.

2. "Groundwater Model Development and Analysis for STP Units 3 & 4," Bechtel Power Corporation, December 2008, Revised November 2009."

cc: w/o attachments and enclosure except*
(paper copy)

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RAI 02.04.12-33, Supplement 1:

QUESTION:

In the review of the document "Groundwater Model Development and Analysis for STP Units 3&4" provided as part of applicant's response to RAI 02.04.12.20, the staff noted that while the purpose of a groundwater flow model for a site goes beyond just calibration, one of the primary bases for determining a model's reliability to predict post-construction conditions is documenting its ability to reproduce existing field observation. The staff conclude from the review (of the FSAR Rev 2 Sections 2.4S.12 and 2.4S.13, and RAI responses including 2008 data and interpretations) that among the critical observed field conditions not reproduced by the existing model one must include (1) a groundwater divide in the Upper Shallow Aquifer in the immediate vicinity of the proposed location for STP Units 3&4, (2) a groundwater divide (that cannot be excluded) in the Lower Shallow Aquifer in the immediate vicinity of the proposed location for STP Units 3&4, and (3) an exposure pathway in the vicinity of Kelly Lake where there is an upward gradient from the Lower to the Upper Shallow Aquifer and the Upper Shallow Aquifer is hydraulically connected to Kelly Lake. Provide either 1) a revised conceptual model to better represent the current observed field conditions, a revised numerical model, its revised results and conclusions, and proposed changes to the FSAR Sections 2.4.12 and 2.4.13, or 2) a justification of why these inconsistencies between observations and model predictions do not make the model unreliable for these assessments.

Reference: "Groundwater Model Development and Analysis for STP Units 3&4," South Texas Project, U7-C-STP-NRC-080070, Attachment 2, by Bechtel Power, December 2008.

SUPPLEMENTAL RESPONSE:

As discussed in the response to Item 1 in RAI 02.04.12-33 (STPNOC Letter U7-C-STP-NRC-090146, dated September 21, 2009 (ML092710096)), refinements to the numerical groundwater model were proposed to improve the simulation of observed heads in the Upper Shallow Aquifer at the proposed STP Units 3 & 4 power block. Preliminary runs of the numerical model indicated the following should be considered for inclusion in the numerical model:

- The addition of local groundwater sources along the north site boundary and groundwater sinks around the Main Cooling Reservoir (MCR),
- The adjustment of general head boundaries (GHB) along the northern perimeter of the model,
- The inclusion of STP Units 1 & 2 building foundations,
- The use of one-foot contour intervals, and
- Inhomogeneous and anisotropic conditions at the power block based on slug tests.

The revised numerical model in Attachment 1 incorporated the addition of a seventh layer to separate stratum A/B into two model layers to represent the effects of the various building foundation depths at STP Units 1 & 2 on groundwater flow using inactive cells. The revised numerical model includes additional river boundary cells to model the levee-bound irrigation

channels located to the north and west of the MCR as potential groundwater sources, and lines of drain cells to represent the entire length of Little Robbins Slough and selected plant area drainage ditches as potential groundwater sinks. The numerical model revision also includes use of lines of drain cells instead of individual drain cells to model the relief wells and sand drains around the MCR and use of automated parameter estimation software to aid in recalibration.

A copy of the updated STP 3 & 4 numerical groundwater model, "Groundwater Model Development and Analysis for STP Units 3 & 4," Bechtel Power Corporation, December 2008, Revised November 2009, is being provided in conjunction with this supplemental response.

Changes to FSAR 2.4S.12:

The second and third paragraphs of FSAR Subsection 2.4S.12.3.4 will be revised as follows:

As described in Reference 2.4S.12-23, the groundwater model uses seven ~~six~~ layers to explicitly simulate three-dimensional flow in the Upper Shallow Aquifer (Stratum C), Lower Shallow Aquifer (Strata E and H), and intervening confining clay units (Strata A/B, D and F). The Stratum A/B constitutes two model layers (one and two) to reproduce the various building foundation depths at STP Units 1 & 2 using inactive (no-flow) cells. The numerical code MODFLOW 2000 developed by the U.S. Geological Survey was used to build, execute, and calibrate the model as implemented in the user-interface software Visual MODFLOW developed by Waterloo Hydrogeologic, Inc. (now owned by Schlumberger Water Services). The model was developed using available historic data and data collected during the 2006 to 2008 subsurface investigations, and by using various boundary conditions to simulate local streams, surface water bodies, and recharge. The calibrated model was used to simulate post-construction conditions that account for the presence of backfill material and slurry walls in the area of the new STP 3 & 4 structures. Within Visual MODFLOW, three-dimensional particle tracking flow paths were generated from the model output using MODPATH to simulate particle travel ~~time~~ and groundwater pathways of potential liquid effluent releases from the power block area.

Results of the pre-construction particle tracking simulations shown in Figures 76 ~~72~~ through 81 ~~77~~ in Reference 2.4S.12-23 indicate that the postulated effluent release to groundwater of the Lower Shallow Aquifer (Strata E and H) within the power block area of STP 3 & 4 would move eastward through the Lower Shallow Aquifer and discharge to the Colorado River (Stratum E) or move southeastward through the Lower Shallow Aquifer towards the Colorado River (Stratum H). These results also indicate that a release to the Upper Shallow Aquifer (Stratum C) within the Power Block of STP 3 & 4, in pre-construction conditions, would flow to Units 1 & 2 and then down through the backfill at Units 1 & 2 to the Lower Shallow Aquifer (Stratum E) and discharge to the Colorado River.

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Figures 84 ~~83~~ through 89 ~~88~~ and 93 through 98 in Reference 2.4S.12-23 illustrate two post-construction scenarios, one without and one with slurry walls around the excavation, respectively. Particle tracking results for both scenarios indicate that a release to the Upper Shallow Aquifer would migrate downward through the backfill at

Units 3 & 4 to the Lower Shallow Aquifer and discharge to the Colorado River. Both post-construction scenario results are similar for the Lower Shallow Aquifer to the pre-construction results.

Reference 2.4S.12-23 in FSAR Subsection 2.4S.12.6 will be revised as follows:

2.4S.12-23 "Groundwater Model Development and Analysis for STP Units 3 & 4," ~~STP Letter U7-C-STP-NRC-080070, dated December 15, 2008.~~ Bechtel Power Corporation, December 2008, Revised November 2009.

Changes to Environmental Report 2.3.1.2

Add a new ER Subsection 2.3.1.2.5.3 as follows:

2.3.1.2.5.3 Three-Dimensional Numerical Modeling

A three-dimensional, steady-state, numerical groundwater flow model was developed to better understand groundwater flow conditions at the north end of the site during pre-construction and post-construction of Units 3 & 4. This model is described in detail in Reference 2.3.1-XX. As described in Reference 2.3.1-XX, the groundwater model uses seven layers to explicitly simulate three-dimensional flow in the Upper Shallow Aquifer (Stratum C), Lower Shallow Aquifer (Strata E and H), and intervening confining clay units (Strata A/B, D and F). The Stratum A/B constitutes two model layers (one and two) to reproduce the various building foundation depths at STP Units 1 & 2 using inactive (no-flow) cells. The numerical code MODFLOW 2000 developed by the U.S. Geological Survey was used to build, execute, and calibrate the model as implemented in the user-interface software Visual MODFLOW developed by Waterloo Hydrogeologic, Inc. (now owned by Schlumberger Water Services).

To assist in the modeling effort, 26 new observation wells were installed in pairs at 13 well clusters during July and August 2008, with one set within the Upper Shallow Aquifer and the other set within the Lower Shallow Aquifer. Locations of the 26 new wells (OW-950U/L through OW-962U/L) are illustrated by Figure 10 in Reference 2.3.1-XX. Water levels were measured in the new and existing observation wells in September and December 2008. The numerical model was calibrated to the data collected in September 2008.

Using the calibrated model results, particle tracking was performed using MODPATH incorporated within Visual MODFLOW. The pre-construction particle tracking simulations shown in Figures 76 through 81 in Reference 2.3.1-XX indicate that the postulated effluent release to groundwater of the Lower Shallow Aquifer (Strata E and H) within the power block area of STP 3 & 4 would move eastward through the Lower Shallow Aquifer and discharge to the Colorado River (Stratum E) or move southeastward towards the Colorado River (Stratum H). These results also indicate that a release to the Upper Shallow Aquifer (Stratum C) within the Power Block of STP 3 & 4 would flow to Units 1 & 2 and then down through the backfill at Units 1 and 2 to the Lower Shallow Aquifer (Stratum E) and discharge at the Colorado River.

Figures 84 through 89 and 93 through 98 in Reference 2.3.1-XX illustrate two post-construction scenarios, one without and one with slurry walls around the excavation, respectively. Particle tracking results for both scenarios indicate that a release to the Upper Shallow Aquifer would migrate downward through the backfill at Units 3 & 4 to the Lower Shallow Aquifer and discharge to the Colorado River. Both post-construction scenario results are similar for the Lower Shallow Aquifer to the pre-construction results.

The following reference will be added to ER Subsection 2.3.1.3:

2.3.1-XX "Groundwater Model Development and Analysis for STP Units 3 & 4," Bechtel Power Corporation, December 2008, Revised November 2009.