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

April 14, 2009
U7-C-STP-NRC-090030

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
Responses to Request for Additional Information

Attached are responses to NRC staff questions included in Request for Additional Information (RAI) letter number 84, related to Combined License Application (COLA) Part 2, Tier 2, Section 2.3S.2, "Local Meteorology." Attachments 1 and 2 and the Enclosure comprise a complete response to RAI letter number 84, and include responses to the following RAI questions:

02.03.02-7 02.03.02-8

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.

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

Executed on 4/14/09

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

rhb

Attachments:
1. Question 02.03.02-7
2. Question 02.03.02-8

Enclosure: DVD: South Texas Project Units 3 & 4, RAI 02.03.02-8, "Seasonal/Annual Cooling Tower Impact (SACTI) Input and Output Files"

D091
NRO

STI 32452874

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

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Texas Department of Health Services
Division for Regulatory Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspections Unit Manager
Texas Department of Health Services
P. O. Box 149347
Austin, Texas 78714-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington D.C. 20004

*George F. Wunder
*Tekia Govan
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George Wunder
*Tekia Govan
Loren R. Plisco
U. S. Nuclear Regulatory Commission

Steve Winn
Eddy Daniels
Joseph Kiwak
Nuclear Innovation North America

Jon C. Wood, Esquire
Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

RAI 02.03.02-7

QUESTION:

This question is related to the applicant's response to RAI 02.03.02-1. Update the information presented in the response to RAI 02.03.02-1 to reflect the ultimate heat sink design modification presented in Revision 2 of the COL application and incorporate the entire revised RAI response into the FSAR.

RESPONSE:

The ultimate heat sink (UHS) design, as described in Revision 1 of the STP Unit 3 & 4 COLA, which was used in response to RAI 02.03.02-1, has been modified. The following RAI response applies to the UHS design as currently described in COLA Revision 2. No update to discussions regarding the MCR in RAI 02.03.02-1 is necessary, since no design change to the MCR has been made. However, the proposed changes to the STP Unit 3 & 4 COLA, included at the end of this response, do incorporate the discussions regarding the MCR presented in RAI 02.03.02-1.

Reactor Service Water System

The effects of added salt and moisture from the RSW system were determined using the Seasonal/Annual Cooling Tower Impact (SACTI) model. The inputs for this analysis are described in the response to RAI 02.03.02-8.

Salt Deposition:

The Unit 4 transformers are located approximately 380 meters north northwest of the Ultimate Heat Sink (UHS). Maximum salt deposition rates at this location are predicted by SACTI to be between 4165 Kg/ (Km^2-Mo.) (at 300 meters) and 1139 Kg/ (Km^2-Mo.) (at 400 meters). Based on the location, STP 3 & 4 represents a medium to heavy contamination environment according to IEEE Standard C57.19.100-1995 (Reference 1). Since the model assumes that the RSW system will be running at full capacity, when in reality it is expected to run closer to half capacity, actual salt deposition rates are expected to be lower. Natural wash off from rain, which SACTI does not consider, is expected to further decrease these values. The Unit 4 transformers are considered bounding for electrical equipment and transmission lines because, based on their location, they receive the greatest amount of salt deposition, as predicted by the SACTI model. The design of the transformers considers the effect of salt deposition of the nature discussed in this response.

Moisture:

The SACTI model predicts a maximum of zero hours of fogging annually in any location and zero hours seasonally.

Temperature:

As discussed in Section 9.4 of the ABWR DCD, safety-related HVAC systems are designed for an outdoor summer temperature of 115°F. The temperature of the exhaust plume from the UHS will not exceed the RSW return water temperature of 109.4°F, which is below the 115°F outdoor summer temperature. Therefore, added heat from the UHS will not have adverse effects on the HVAC systems.

References:

1. IEEE Standard C57.19.100-1995, IEEE Guide for Application of Power Apparatus Bushings, Reaffirmed December 9, 2003.

The fifth paragraph of COLA FSAR Section 2.3S.2.4 will be revised as follows. Information related to the MCR provided in the following COLA markup is taken from the response to RAI 02.03.02-1.

> These effects and other potential, related environmental impacts (e.g., solids deposition, visible plume formation, transport, and extent) are addressed below and ~~in detail~~ in ER Subsections 5.3.3.1 and 5.3.3.2.
>
> **Reactor Service Water System**
>
> The effects of added salt and moisture from the RSW system were determined using the Seasonal/Annual Cooling Tower Impact (SACTI) model.
>
> The STP Unit 3 & 4 reactor service water (RSW) system was modeled as two towers with a maximum drift rate of 0.005%. Site-specific meteorological data acquired from the STP 1 & 2 meteorological tower for 1997, 1999 and 2000 was used as input for the code. The site-specific data included the wind speed, wind direction, and dry bulb temperature. Additional meteorological data required for the SACTI analysis was acquired from the National Weather Service for the Palacios Municipal Airport Weather Station, also for the years 1997, 1999, and 2000. This data included the total sky clearness value, the dew point temperature, and the ceiling height. The site dry bulb temperature and the Palacios Municipal Airport dew point temperature were used to calculate the wet bulb temperature and the relative humidity.
>
> For the SACTI model, the towers were assumed to be operating during emergency reactor shutdown where the towers are running at full capacity. Under normal operating conditions the RSW system will operate at only half capacity. Sodium concentration of the makeup water is discussed in COLA Part 3 Environmental Report (ER) Section 2.3.1 and it was assumed that all sodium would be associated with chloride for a corresponding NaCl concentration.

Salt Deposition:

The Unit 4 transformers are located approximately 380 meters north northwest of the Ultimate Heat Sink (UHS). Maximum salt deposition rates at this location are predicted by SACTI to be between 4165 Kg/ (Km2-Mo.) (at 300 meters) and 1139 Kg/ (Km2-Mo.) (at 400 meters). This represents medium to heavy contamination levels over the course of a month according to IEEE Standard C57.19.100-1995 (Reference 1). Since the model assumes that the RSW system will be running at full capacity, when in reality it is expected to run closer to half capacity, actual salt deposition rates are expected to be lower. Natural wash off from rain, which SACTI does not consider, is expected to further decrease these values. The Unit 4 transformers are considered bounding for electrical equipment and transmission lines because they are positioned to receive the greatest amount of salt deposition, as predicted by the SACTI model.

Moisture:

The SACTI model predicts a maximum of zero hours of fogging annually in any location and zero hours seasonally.

Temperature:

As discussed in Section 9.4 of the ABWR DCD, safety-related HVAC systems are designed for an outdoor summer temperature of 115°F. The temperature of the exhaust plume from the UHS will not exceed the RSW return water temperature of 109.4°F, which is below the 115°F outdoor summer temperature. Therefore, added heat from the UHS will not have adverse effects on the HVAC systems.

Main Cooling Reservoir

The SACTI model is used to analyze cooling towers; therefore, the code was not considered when addressing potential effects from the MCR.

Salt Deposition:

Any salt deposits on the HVAC systems and electrical equipment from the MCR will be a result of evaporation of the cooling water. Since there is no exit velocity from the evaporative process as in a cooling tower, most of the salt content will remain in the pond. Therefore, salt deposits on HVAC intakes, transmission lines and other electrical equipment as a result of evaporation from the MCR is not expected to affect these plant components.

Moisture:

The additional water flow from STP Units 3 & 4 to the MCR will increase ambient moisture as a result of raised pond temperatures and evaporation. Although additional

fogging may result from the UHS cooling tower plume, the MCR was designed for four units and the HVAC intakes, transmission lines and onsite electrical equipment are designed for outdoor operation, which include environmental conditions such as fog and rain. Thus, no adverse effects to these plant features are expected. Furthermore, HVAC systems are designed to regulate relative humidity which will further mitigate any potential effects.

Temperature:

As discussed above, safety-related HVAC systems are designed for an outdoor summer temperature of 115°F. The analysis described in COLA Part 3, Environmental Report (ER) Table 3.4-3 shows the maximum predicted monthly MCR temperature at the Circulating Water System (CWS) discharge for 4-unit operation from 2003-2005 is 112.3°F. As discussed in ER Section 3.4.2.4, the design MCR intake temperature for STP 3 & 4 is 100°F. Since both the intake design temperature and maximum monthly overall CWS discharge are lower than the outdoor HVAC design temperature, added heat from the MCR is not expected to adversely affect the HVAC systems. Furthermore, since the design basin temperatures for the UHS are lower than that of the MCR intake temperature values, combined temperature effects from the UHS and the MCR will be similar to those from the MCR.

RAI 02.03.02-8

QUESTION:

This question is related to the applicant's response to RAI 02.03.02-2. Describe the assumptions and provide a copy of the input files (e.g., prep.usr, mult.usr, table.usr, met data file) and resulting output files used to execute the Seasonal/Annual Cooling Tower Impact (SACTI) computer code for estimating the impacts from fogging, icing, and drift deposition from the operation of the reactor service water (RSW) system mechanical draft cooling towers. The response to this question should reflect the ultimate heat sink design modification presented in Revision 2 of the COL application.

RESPONSE:

The ultimate heat sink (UHS) design as described in Revision 1 of the STP 3 & 4 COLA, which was used in response to RAI 02.03.02-2, has been modified. The following RAI response applies to the UHS design as currently described in COLA Revision 2.

The SACTI input and output files are included on a DVD provided as an enclosure with this RAI Response.

The STP Unit 3 & 4 reactor service water (RSW) system was modeled as two towers with a maximum drift rate of 0.005%. Site-specific meteorological data acquired from the STP 1 & 2 meteorological tower for 1997, 1999 and 2000 was used as input for the code. The site-specific data included the wind speed, wind direction, and dry bulb temperature. Additional meteorological data required for the SACTI analysis was acquired from the National Weather Service for the Palacios Municipal Airport Weather Station, also for the years 1997, 1999, and 2000. This data included the total sky clearness value, the dew point temperature, and the ceiling height. The site dry bulb temperature and the Palacios Municipal Airport dew point temperature were used to calculate the wet bulb temperature and the relative humidity.

For the SACTI model, the towers were assumed to be operating during emergency reactor shutdown where the towers are running at full capacity. Under normal operating conditions the RSW system will operate at only half capacity. Sodium concentration of the makeup water is discussed in COLA Part 3 Environmental Report (ER) Section 2.3.1 and it was assumed that all sodium would be associated with chloride for a corresponding NaCl concentration.

No COLA revision is required as a result of this RAI response.