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

February 19, 2009
U7-C-STP-NRC-090010

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
Response to Requests for Additional Information

Attached are responses to NRC staff questions included in Request for Additional Information (RAI) letter number 76 related to Combined License Application (COLA) Part 2, Tier 2, Section 6.2 and Appendix 3B. This RAI response is the non-proprietary version. The proprietary version of this RAI response is provided in STP letter U7-C-STP-NRC-090014.

Attachments 1 through 5 address the responses to the RAI questions listed below.

RAI 06.02.01.01.C-1
RAI 06.02.01.01.C-2
RAI 06.02.01.01.C-4
RAI 06.02.01.01.C-7

Attachment 6 identifies the RAI questions that require extensions and includes the reasons for extension and the date by which each response is expected to be submitted to the NRC staff.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact me at (361) 972-7206, or Bill Mookhoek at (361) 972-7274.

D091
NRO

STI 32416933

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

Executed on 2/19/09

M A McBurnett

Mark A. McBurnett
Vice President, Oversight and Regulatory Affairs
South Texas Project Units 3 & 4

jet

Attachments:

1. Question 06.02.01.01.C-1
2. Question 06.02.01.01.C-1, Table 1
3. Question 06.02.01.01.C-2
4. Question 06.02.01.01.C-4
5. Question 06.02.01.01.C-7
6. Response Date Extensions for RAI Questions

cc: w/o attachment 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
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
*Stacy Joseph
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George Wunder
*Stacy Joseph
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 06.02.01.01.C-1:

QUESTION:

Section 6.2.1.1.3: The staff found the containment analyses in support of the certified ABWR design to be acceptable based on the use of the GESSAR methodology and confirmatory calculations by the staff. It is the staff's understanding that the applicant plans to replace GESSAR with the GOTHIC computer program. It is also the staff's understanding that the GOTHIC code was adapted to employ models and assumptions outlined in the NEDO-20533 reports. Please, provide:

- GOTHIC input deck/description for the STP ABWR DBA containment analyses,
- detailed description of how the models and assumptions presented in the NEDO-20533 reports were incorporated into the GOTHIC model, and
- reference for qualification and/or benchmarking of GOTHIC to be used as an acceptable tool for performing the STP ABWR DBA containment analysis..

RESPONSE:

In response to the request of the first bullet in this RAI question, the input parameters for the GOTHIC pressure/temperature containment model are provided in Table 1, Containment Model Input Parameters.

The response to the requests in the second and third bullets of this RAI will be provided no later than April 6, 2009.

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

Table 1
Containment Model Input Parameters

Geometry	**Values**	
Upper Drywell Volume	[	m^3]^{a,c}
Upper Drywell Height	[	m]^{a,c}
Lower Drywell Volume	[	m^3]^{a,c}
Lower Drywell Height	19.6	m
Drywell Inside Diameter	29	m
Number of Vertical Drywell Interconnecting Vents	10	
Flow Area of Each Vertical Drywell Interconnecting Vent	1.822	m^2
Height of Vertical Drywell Interconnecting Vent	[	m]^{a,c}
Total Vertical Drywell Interconnecting Vent Volume	[	m^3]^{a,c}
Hydraulic Diameter of Vertical Drywell Interconnecting Vent	[	m]^{a,c}
Number of Horizontal Lower Drywell Vent Connections	[ ]^{a,c}	
Flow Area of Each Horizontal Lower Drywell Vent Connection	[	m^2]^{a,c}
Height of Horizontal Lower Drywell Vent Connection	[	m]^{a,c}
Hydraulic Diameter of Horizontal Lower Drywell Vent Connection	[	m]^{a,c}
Number of Vertical Vent Pipes	10	
Total Vertical Vent Pipe Volume	[	m^3]^{a,c}
Flow Area of Each Vertical Vent Pipe	1.13	m^2
Height of Vertical Vent Pipe	11.7	m
Hydraulic Diameter of Vertical Vent Pipe	1.2	m
Number of Horizontal Drywell Overflow Pipes	[ ]^{a,c}	
Height of Bottom of Drywell Overflow Pipe	[	m]^{a,c}
Diameter of Drywell Overflow Pipe	[	m]^{a,c}
Area of Drywell Overflow Pipe	[	m^2]^{a,c}
Number of Horizontal Vents per Vertical Vent Pipe	3	
Centerline Height of Top Horizontal Vent	3.5	m
Centerline Height of Middle Horizontal Vent	2.13	m
Centerline Height of Bottom Horizontal Vent	0.76	m
Diameter of Each Horizontal Vent	0.7	m
Flow Area of Each Horizontal Vent	0.385	m^2
Total Loss Coefficient for Each Horizontal Vent		
Top	[ ]^{a,c}	
Middle	[ ]^{a,c}	
Bottom	[ ]^{a,c}	

Table 1 (contin.)
Containment Model Input Parameters

Geometry	**Value**	
Equivalent Loss Coeff. (Applied at Vertical Vent Pipe Entrance)	[ ][a,c]	
Wetwell Airspace Free Volume		
HWL	5958	m^3
LWL	N/A	
Suppression Pool Water Volume		
HWL	3625	m^3
LWL	3455	m^3
Suppression Pool Depth		
HWL	7.1	m
LWL	6.9	m
Wetwell Height	18.77	m
Wetwell Interfacial Heat/Mass Transfer Area	DEFAULT	
Initial Conditions		
Drywell Pressure	5.2	kPaG
Drywell Temperature	57	C
Drywell Humidity	20	%
Wetwell Pressure	5.2	kPaG
Wetwell Airspace Temperature	35	C
Wetwell Humidity	100	%
Suppression Pool Temperature	35	C

a) The information reveals the distinguishing aspects of a process (or component, structure tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

RAI 06.02.01.01.C-2:

QUESTION:

Section 6.2.1.1.3: The staff is preparing an STP ABWR MELCOR model in support of performing independent confirmatory analysis. The following information is needed for development of the MELCOR input file:
- reactor vessel: water flow loss coefficient for the following junctions: downcomer to lower plenum, lower plenum to core channel, lower plenum to core bypass, core channel to steam separator, steam separators to downcomer,
- reactor vessel: elevation of the main feed water spargers,
- setpoint value of the Condensate Storage Tank (CST) level at which High Pressure Core Flooder (HPCF) and Reactor core Isolation Cooling (RCIC) systems suction transfer from the CST to the Suppression Pool (SP),
- setpoint value of the SP level at which HPCF and RCIC systems suction transfer from the CST to the SP,
- setpoint value of the reactor vessel pressure at which the low pressure permissive signal is generated to open the Low Pressure Core Flooder (LPCF) injection valve,
- ADS valves opening sequence after receiving the ADS initiation signal,
- a figure showing the feedwater line break flow from the feedwater system side of break (i.e., Figure 6.2-3 in STP COLA, Rev. 2 with the time axis varying from 0.0 to 5 hrs),
- a figure showing the feedwater line break flow enthalpy from the feedwater system side of break (i.e., Figure 6.2-4 in STP COLA, Rev. 2 with time axis varying from 0.0 to 5 hrs),
- a figure showing the feedwater line break flow from the RPV side of break (i.e., Figure 6.2-23 in ABWR DCD with time axis varying from 0.0 to 5 hrs),
- a figure showing the feedwater line break flow enthalpy from the RPV side of break (i.e., Figure 6.2-23 in ABWR DCD with time axis varying from 0.0 to 5 hrs),
- a figure showing the main steam line break flow from the RPV side of break (i.e., Figure 6.2-24 in ABWR DCD with time axis varying from 0.0 to 5 hrs),
- a figure showing the main steam line break flow enthalpy from the RPV side of break (i.e., Figure 6.2-24 in ABWR DCD with time axis varying from 0.0 to 5 hrs),
- a figure showing the main steam line break flow from the piping side of break (0 to 5 hrs),
- a figure showing the main steam line break flow enthalpy from the piping side of break (0 to 5 hrs),
- a figure showing the feedwater flow rate and enthalpy assumed for the MSLB accident analysis as described in section 6.2.1 of STP COLA, Rev. 2.

RESPONSE:

The requested input parameter information (bullets 1-6) is provided below. The requested figures (bullets 7-15) will be provided after the corresponding calculations have been completed which is planned to be no later than April 30, 2009.

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

- Loss coefficient downcomer to lower plenum = [ ]^{a,c}
- Loss coefficient lower plenum to core channel = [ ]^{a,c}
- Loss coefficient lower plenum to core bypass = [ ]^{a,c}
- Loss coefficient core channel to steam separator = [ ]^{a,c}
- Loss coefficient steam separators to downcomer = [ ]^{a,c}
- Elevation of main feedwater spargers = [ ]^{a,c} (discharge port height)
- Setpoint for switch over from CST to suppression pool = [ ]^{a,c} as we do not credit suction from CST
- Low pressure permissive setpoint for LPCF injection valve = [ ]^{a,c}.
- ADS valve opening sequence =
  [ ]^{a,c} Hi DW
  Pressure assumed to be in place prior to LWL-1 signal (i.e, not explicitly modeled).

Where:

a) The information reveals the distinguishing aspects of a process (or component, structure tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

RAI 06.02.01.01.C-4:

QUESTION:

STP FSAR Tier 2 Chapter 3, App. 3B, p. 3B-2: 3B.3.3 (STD DEP Admin) – Figure 3B-8 shows a "typical" X-quencher pressure amplitudes. Provide a list of the similarities and differences between a "typical" X-quencher analyzed in reference 3B-5 and the Toshiba proposed quencher. Provide a pressure signature for the Toshiba proposed quencher if it is different from the "typical" X-quencher analyzed in reference 3B-5.

RESPONSE:

The STP DEP Admin referenced in the question above is an Administrative Departure to correct the text, including a missing "call out" to Figure 3B-8. There is no technical departure from the DCD relative to the X-quencher design as documented in STP 3&4 COLA Rev 2. The X-quencher design for STP 3&4 is incorporated by reference. The X-quencher design evaluated in the App. 3B references will be implemented for STP 3&4.

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

RAI 06.02.01.01.C-7:

QUESTION:

STP FSAR Tier 2, Chapter 3, App. 3B, p. 3B-2: 3B.4.2.1 (STD DEP 6.2-2) – a statement is made that the "load calculation methodology for defining such loads will be based on that approved for Mark III containment (NUREG-0978)." Provide the reference for these calculations including a description of the adaptation of the Mark III methodology to the Toshiba proposed ABWR design.

RESPONSE:

The statement referenced in the question above is reproduced verbatim from the DCD Tier 2 Subsection 3B.4.2.1, which was included in the STP 3&4 FSAR to identify the relative location of changes to other statements in that section as a result of STD DEP 6.2-2.

It should be noted that the load calculation methodology remains based on NUREG-0978, as described in the DCD, Subsection 3B.4.2.1. The load calculations for STP 3&4 are not yet completed. When completed, these calculations will be available for NRC review.

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

Response Date Extensions for RAI Questions

RAI Question	Reason for Extension	Extended Response Date
06.02.01.01.C-3	Additional time is needed to complete discussions with the NRC on March 3-6	April 6, 2009
06.02.01.01.C-5	Additional time is needed to complete discussions with the NRC on March 3-6	April 6, 2009
06.02.01.01.C-6	Additional time is needed to complete discussions with the NRC on March 3-6	April 6, 2009