PROPRIETARY

Nuclear Operating Company

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

April 29, 2009
U7-C-STP-NRC-090038

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

References:

1. Letter, Mark McBurnett to Document Control Desk, "Response to Requests for Additional Information", dated February 19, 2009 (U7-C-STP-NRC-090010) (ML090540471)

2. Letter, Mark McBurnett to Document Control Desk, "Response to Requests for Additional Information", dated February 19, 2009 (U7-C-STP-NRC-090014) (Proprietary)

Attached are responses to NRC staff questions included in Request for Additional Information (RAI) letter numbers 76, 89, and 91 related to Combined License Application (COLA) Part 2, Tier 2, Section 6.2 and Appendix 6C. This response contains proprietary information.

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

RAI 06.02.02-1
RAI 06.02.01.01.C-2
RAI 06.02.01.01.C-8

The response to RAI 06.02.01.01.C-2 is a supplement to a previous response. The non-proprietary and proprietary versions of this previous response were provided in References 1 and 2.

Attachment 1 provides the response to RAI 06.02.02-1. This response contains no proprietary information. Attachment 2 contains the non-proprietary supplemental response to 06.02.01.01.C-2 and Attachment 3 contains the non-proprietary response to 06.02.01.01.C-8. The proprietary

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versions of the responses to 06.02.01.01.C-2 and 06.02.01.01.C-8 are provided in Attachments 4 and 5. Since Attachments 4 and 5 contain information considered to be proprietary to Westinghouse Electric Corporation, Attachment 6 provides Westinghouse Authorization Letter CAW-09-2563, accompanying affidavit, Proprietary Information Notice, and Copyright Notice. Since these attachments contain information proprietary to Westinghouse LLC, they are supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b) (4) of Section 2.390 of the Commission's regulations. Accordingly it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390 of the Commission's regulations. Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-09-2563 and should be addressed to B. F. Maurer, Manager, ABWR Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

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 4/29/09

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

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Attachments:

1. Question 06.02.02-1 (Non-Proprietary)
2. Question 06.02.01.01.C-2 (Non-Proprietary)
3. Question 06.02.01.01.C-8 (Non-Proprietary)
4. Question 06.02.01.01.C-2 (Proprietary)
5. Question 06.02.01.01.C-8 (Proprietary)
6. Affidavit for Withholding of Proprietary Data

cc: w/o attachment except*
(paper copy)

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RAI 06.02.02-1:

QUESTION:

Section 6C.1 of STP COLA Revision 2 (the application) states that the ABWR design has committed to following the guidance provided in Regulatory Guide 1.82; "Utility Resolution Guidance (URG) for ECCS Suction Strainer Blockage", NEDO-32686-A; and the additional guidance described in the application.

When reviewing STP ECCS suction strainer design, in addition to the above guidance, the staff plans to use the applicable portions of the detailed guidance provided in Draft Guidance for Review of Final Licensee Responses to Generic Letter 2004-02, dated September 27, 2007 (NRC Agencywide Documents Access and Management System (ADAMS) package Accession No. ML072600425). This guidance contains: (1) Draft Review Guidance for Strainer Head Loss and Vortexing, (2) Draft Review Guidance for Coatings; and, (3) Draft Review Guidance for Chemical Effects. Although the staff developed this guidance for PWRs, parts of this guidance are also applicable to BWRs (such as ABWR).

The staff identified and presented the "Differences in Treatment of Containment Strainer/Sump Clogging Technical Issues for Boiling Water and Pressurized Water Reactors," at a November 27, 2007, public meeting with the Boiling Water Reactor Owner's Group. A summary of this meeting is available in ADAMS under Accession No. ML080240235. The staff met with the Boiling Water Reactor Owner's Group in June 5 and September 10, 2008, public meetings. Summaries of these meetings are available in ADAMS under accession numbers, ML081620552 and ML083100271.

A. Provide a calculation report on sizing suppression pool recirculation suction debris strainers for the staff review to determine that they meet the guidance of Regulatory Guide 1.82, Revision 3.

B. Describe how you addressed or plan to address the Differences in Treatment of Containment Strainer/Sump Clogging Technical Issues for Boiling Water and Pressurized Water Reactors.

RESPONSE:

A. Toshiba is preparing a summary report of the analyses they prepared for the replacement of Emergency Core Cooling System (ECCS) suction strainers at a Japanese ABWR. This report includes debris generation evaluation, debris transport, strainer head loss analyses, and confirmatory testing of the Control Component Inc. (CCI) suction strainers used for the Japanese ABWR. The same cassette-type CCI suction strainers will be used for STP 3 & 4, so this document will provide the basis for analyses that will be performed for the STP 3 & 4 ECCS strainers during detailed design. The methodology is consistent with the Boiling Water Reactor Owners Group (BWROG) Utility Resolution Guideline (URG) NEDO-32686-A, as required by RG 1.82, Revision 3. The STP 3&4 approach for evaluating the additional issues identified in

RG 1.82, Revision 3 (i.e., chemical effects and downstream effects) are discussed in Part B, below.

The Toshiba summary report of the Japanese ABWR ECCS suction strainer analyses will be available for NRC audit by May 31, 2009.

B. Toshiba has reviewed the 12 issues the NRC has been discussing with the BWROG in public meetings. Additionally, the Toshiba Engineering Procurement Construction Team has been involved with U.S. PWRs in resolutions of GSI-191. The approach for addressing these issues is described in the table below.

STP 3 & 4 Project Plans to Address NRC Concerns for BWR ECCS Strainers

No	Item	Assessment/Approach	Schedule
1	Downstream Effects – Components	Toshiba has considered downstream equipment effects in the selection of strainer mesh size used for Japanese ABWR replacement ECCS suction strainers. The type and size of debris predicted to pass through the strainer is identified in a report on CCI strainer testing performed for PWRs. Toshiba will confirm that this report can be shown to the NRC, if they have not already seen it. Consistent with the BWROG commitment, Toshiba will select and evaluate downstream components consistent with the methodology in WCAP-16406, "Evaluation of Downstream Sump Debris Effects in Support of GSI 191," including evaluation of the effects of abrasive wear during equipment mission time.	Confirm that the CCI report on debris predicted to pass through strainer can be made available for NRC audit by May 31, 2009. Downstream Effects on Components will be evaluated during Detailed Design, i.e., after specific components are selected.
2	Downstream Effects – Fuel	STPNOC has not taken any departure from the fuel specified in the DCD. When the fuel is changed in a license amendment, a downstream effects evaluation will be performed by the fuel supplier.	When the license amendment for fuel is submitted, an evaluation of downstream effects on fuel will be included.

No	Item	Assessment/Approach	Schedule
3	Debris Bed Head Loss Prediction	Toshiba has confirmed the head loss characteristic parameter for the insulation in the Japanese Hamaoka 5 ABWR design, which includes some Calcium Silicate (Cal-Sil) insulation. The head loss in the CCI strainer testing performed for Hamaoka 5 met all acceptance criteria using the current ABWR insulation design. The Hamaoka 5 evaluation will be available for NRC audit. The Equipment Requirement Specification for STP 3 & 4 Insulation Design allows only stainless steel reflective metal insulation (RMI) on large bore piping (> 80 mm) and equipment, and nuclear-grade fiberglass insulation on small bore piping in the STP 3 & 4 drywell. Therefore, the head loss tests conducted for Hamaoka 5 bound STP 3 & 4. When the STP 3 & 4 insulation design is finalized, it will be evaluated to confirm that the existing Hamaoka 5 head loss tests are bounding.	The Hamaoka 5 evaluation will be available for NRC audit by May 31, 2009. Final evaluation of STP 3 & 4 insulation design will be performed during Detailed Design, i.e., after specific piping and component insulation is finalized.

No	Item	Assessment/Approach	Schedule
4	Chemical Effects	As noted in Item 3 above, the Equipment Requirement Specification (ERS) for STP 3&4 Insulation Design allows only stainless steel reflective metal insulation (RMI) on large bore piping (> 80 mm) and equipment, and nuclear-grade fiberglass insulation on small bore piping in the STP 3&4 drywell. Additionally, the Insulation Design ERS and Prohibited Materials specification (invoked by the Coatings specification) state that reactive materials such as aluminum and zinc shall not be used in the STP 3&4 primary containment. Toshiba has performed a preliminary evaluation of ABWR chemical effects. The preliminary evaluation concluded that no significant dissolution or precipitation of materials inside primary containment are predicted for post-LOCA suppression pool chemistry without actuation of the Standby Liquid Control (SLC) system. For post-LOCA suppression pool chemistry with SLC actuation, additional bench-top testing is planned to confirm that containment materials will not be affected by the pH levels predicted in the suppression pool following SLC actuation. Given that the STP 3&4 primary containment will not contain aluminum or phosphates (which resulted in calcium phosphate precipitates in PWRs), it is not likely that tests using post-LOCA, SLC-actuation water chemistry will result in significant precipitates. If additional SLC-actuation water chemistry testing concludes that precipitates might affect strainer performance, small scale strainer testing would be performed.	Additional evaluation of containment materials in post-LOCA, SLC-actuation water chemistry will be completed by July 31, 2009 and available for audit. If small scale strainer testing is required, it will be performed in the 3rd quarter 2009.

No	Item	Assessment/Approach	Schedule
5	Assessment of Coatings	Coatings are included in the existing CCI head loss tests performed for Hamaoka 5, which bound STP 3&4. As noted in Item 3, the Hamaoka 5 evaluation will be available for NRC audit by May 31, 2009. Additionally, when the detailed design is completed for STP 3&4, Toshiba will conduct confirmatory small-scale tests with the predicted mix of debris, including coatings.	See Item 3. Additionally, confirmatory tests will be performed following completion of insulation Detailed Design.
6	Latent Debris	The SPCU (Suppression Pool Clean Up System) will minimize the amount of corrosion products which could accumulate on the bottom of the suppression pool. Other debris will be minimized by the adoption of INPO and EPRI guidance for cleanliness and Foreign Materials Exclusion (FME). Therefore, the latent debris defined in the URG (which was used for the Hamaoka 5 testing) is considered bounding for STP 3&4.	Complete
7	Zone of Influence (ZOI) adjustment for air jet testing	The current debris generation evaluation uses the URG methodology, and there is no indication in GSI-191 guidance documents (e.g., NEI 04-07) that this methodology is unconservative, other than for Cal-Sil, which will not be used at STP 3&4 (see Item 3 above).	Complete
8	ZOI for Protective Coatings	See discussion on Items 5 and 7 above. There is no indication that the quantity of coatings assumed for the Hamaoka 5 strainer testing (which is based on URG guidance) is unconservative.	Complete
9	Debris Transport – Erosion	The Hamaoka 5 debris transport evaluation uses the URG transport factors for Mark III and Mark I containments. The URG transport factors were based on testing.	Complete
10	Debris Characteristics – Calcium Silicate Insulation	See Item 3 above, "Debris Bed Head Loss" (Cal-Sil will not be used in the primary containment at STP 3&4.)	Complete

No	Item	Assessment/Approach	Schedule
11	Near Field Effect/ Scaling	The summary report of the CCI strainer testing performed for Hamaoka 5 will be available for NRC audit by May 31, 2009. Additionally, Toshiba will confirm that the CCI strainer testing ensured adequate mixing of all debris such that test results are valid by conducting confirmatory small-scale testing of detailed design debris loading (see Item 5, above).	A summary report of CCI strainer testing for Hamaoka 5 will be available for NRC audit by May 31, 2009. Also see Item 5.
12	Spherical ZOI Approach	The current debris generation calculation for Hamaoka 5 considers breaks representing adverse combinations of insulation and other materials of concern.	Complete

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

RAI 06.02.01.01.C-2 Supplement

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 (supplemental):

The requested input parameter information (bullets 1-6) was provided to NRC in STP Letter U7-C-STP-NRC-090014 dated February 19, 2009.

STP also stated in the February 19 letter that the requested figures (bullets 7-15) will be provided after the corresponding calculations have been completed, which was planned to be no later than

RAI 06.02.01.01C-2 Supplement

April 30, 2009. However, the schedule for these calculations has been extended, with completion now planned for June 15, 2009. Therefore, the response for the requested figures (bullets 7-15) from 0.0 to 5 hours will be provided no later than June 30, 2009. In order to provide information that will facilitate the NRC review in advance of the final 0.0 to 5 hour information, the following is provided.

As stated in the RAI, the requested information is needed for development of the MELCOR input file for NRC's independent confirmatory analysis. Also, as discussed in the containment audit by NRC of STP on March 3-4, STP is making the WEC containment pressure/temperature (P/T) calculation benchmark results and GOTHIC containment P/T benchmark input decks available for NRC review. To facilitate the development of NRC's MELCOR model, this response provides the time-dependent mass and energy releases used in the WEC benchmarking containment P/T analysis. Figures 1 through 5, attached to this response, provide the requested mass and energy curves as follows:

- Figure 1 provides the time-dependent flow rate of liquid and steam from the RPV side of the break and the flow rate of liquid from the feedwater (or pump) side of the break for the FWLB.
- Figure 2 provides the time-dependent enthalpy of the feedwater from the feedwater side of the break for the FWLB.
- Figure 3 provides the time-dependent liquid and vapor enthalpy of the feedwater from the RPV side of the break for the FWLB.
- Figure 4 provides the total time-dependent flow rate, which includes flow from the RPV and piping side of the break for the MSLB. (Note: the WEC benchmarking calculation did not distinguish between flow from either side of the break for the MSLB. As noted in Figure 5, the time-dependent enthalpy for the steam from either side of the break is the same).
- Figure 5 provides the time-dependent liquid and vapor enthalpy, which is applicable to both sides of the break for the MSLB.

The feedwater flow rate and enthalpy assumed for the MSLB accident were not factors for the benchmarking calculation because the controlling case was the loss-of-offsite-power. Therefore, feedwater flow is assumed to be unavailable. For the final plant-specific calculation to be provided on June 30, 2009, this data will be provided.

This information, along with the input information provided in the responses to RAI's 06.02.01.01.C-1, 06.02.01.01.C-8, and the previous response submittal to RAI 06.02.01.01.C-2, is adequate to complete development of the confirmatory MELCOR model and to initiate analyses that can be compared to the available containment P/T benchmark analysis results.

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

[a,c]

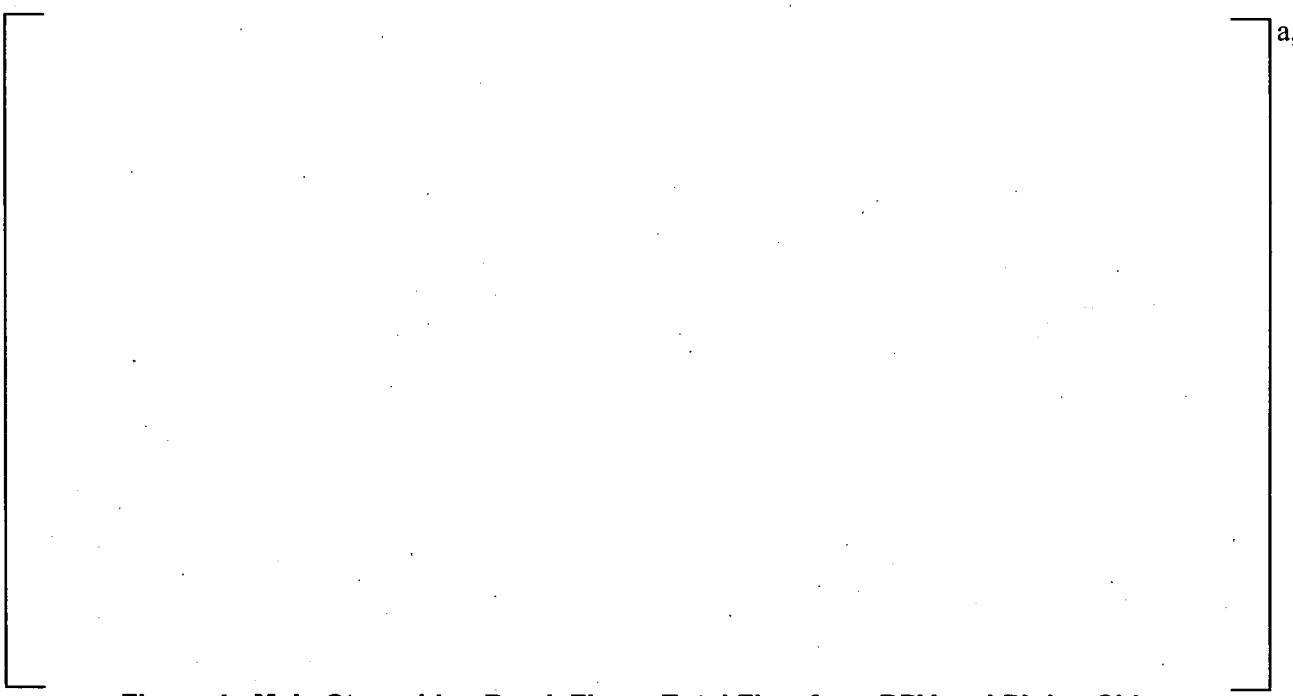
Figure 1 Feedwater Line Break Flow— RPV and Feedwater (Pump) System Side of Break

[a,c]

Figure 2 Feedwater Line Break Flow Enthalpy—Feedwater System Side of Break

a,c

Figure 3 Feedwater Line Break Flow Enthalpy—RPV Side of Break



a,c

Figure 4 Main Steam Line Break Flow—Total Flow from RPV and Piping Side

[ ] a,c

Figure 5 Main Steam Line Break Flow Enthalpy—RPV and Piping Side of Break

RAI 06.02.01.01C-8

QUESTION:

6.2.1.1.1 Design Basis - **Supplement to RAI 06.02.01.01.C-2 :** In support of performing independent confirmatory analysis, the following are requested additional information:

(a) Reactor Pressure Vessel
- Core channel flow rate during full power operation
- Core bypass flow rate during full power operation
- Loss coefficients for steam/water flow through the feedwater sparger and feedwater nozzle
- Approximate elevation of the Reactor Internal Pump (RIP) suction
- Design details of the core support plate (weight, thickness, diameter and distribution of holes in the core plate)
- Design details of the orificed and peripheral fuel supports (diameter of orifices and weight and height of the fuel supports)
- Length and inside diameter of control rod guide tubes
- Dimensions of the control rod (lengths of SS sheathed blades and absorber tubes, thickness of the blades, diameter of absorber tubes, and number of absorber tubes)
- Weights of SS and B4C in each control rod
- Weights of Zircaloy-4 and Zircaloy-2 in each fuel assembly
- Outside diameter of control rod housing
- Design details of the Top Guide (weight, thickness, diameter and distribution of holes in the core plate)
- Dimensions of the main steam line flow restricting nozzle
- Loss coefficient for steam/water flow through the main steam line flow restricting nozzle
- Discharge coefficient for steam/water flow through the main steam line flow restricting nozzle

(b) Fuel
- Weight of UO2 per assembly
- Pitch of the fuel assemblies (or spacing between the fuel assemblies)
- Length of the fuel channel (Zircaloy-4 canister)
- Fuel channel inside dimensions and wall thickness
- Bottom elevation of the fuel channel
- Length and material of the fuel assembly nose piece
- Length of the active fuel
- Elevation of the bottom of active fuel (BAF)
- Diametrical gap between fuel pellet and cladding
- Length of gas plenum
- Fuel rod cladding thickness
- Fuel rod outside diameter
- Pitch of the fuel rods
- Fuel pellet density
- Fuel pellet diameter

- Fuel pellet length
- Flow area of fully open Main Steam Isolation Valve (MSIV)
- Flow resistance of open MSIV
- Discharge coefficient of open MSIV

(c) Engineered Safety Features
- Flow area of fully open ADS valve
- Loss coefficient and discharge coefficient for the fully open ADS valve
- Setpoint value of the drywell pressure at which reactor trip occurs
- Setpoint value of the main steam line steam flow rate at which reactor trip occurs
- Setpoints for the closure of MSIV
- Elevations and radial positions of the HPCF, LPCF and RCIC systems suction strainer in SP
- Elevations and radial positions of the SRV line quenchers in the SP
- Elevation and radial position of the exit of RCIC turbine steam exhaust line the SP

(d) Feedwater Line Break (FWLB):
- A figure showing the containment pressure and temperature response (i.e., Figures 6.2-6 and 6.2-7 in [reference 2] STP COLA with the time axis varying from 0.0 to 30 min)
- A decay power curve in Fig. 6.3-11 of [reference 2] STP COLA is normalized with respect to which power; operating power or 102 % of the operating the operating power?

(e) Main Steam Line Break (MSLB):
- A figure showing the containment pressure and temperature response (i.e., Figures 6.2-12 and 6.2-13 in [reference 2] STP COLA with the time axis varying from 0.0 to 30 min)

RESPONSE:

(a) The requested reactor pressure vessel information used in the GOTHIC modeling is provided in Table 1. Table 1 includes references to the GOBLIN noding, which is included in Figure 1. (Note: Node (6,4) is located between identified nodes (6.3) and (6,6).

(b) Information in response to the requested fuel and control rod data is provided in Table 1. Note that the fuel and control rod data provided is based on a modern design, with comparable or bounding data as compared to the design used in the DCD analysis.

(c) The requested engineered safety features information is provided in Table 1.

(d) The requested FWLB figures and curve will be provided no later than June 30, 2009.

(e) The requested MSLB figures will be provided no later than June 30, 2009.

There are no revisions to the COLA required as a result of this response.

Table 1 – Assumptions and Input Parameters for GOTHIC Analysis

Request	Response
(a) Reactor Pressure Vessel	
Core channel flow rate during full power operation	Rated core flow (100%) 14500 kg/s Notes: 1. Corresponds to the flow upward out of node 3,3 shown in Figure 1. 2. 111% flow assumed for mass & energy calculations
Core bypass flow rate during full power operation	Total bypass flow, including leakage from in-channel to bypass at rated conditions 1467.5 kg/s Note: Corresponds to the flow upward out of node 6,4 shown in Figure 1. Lower plenum to bypass direct leakage flow 359.0 kg/s Note: Corresponds to Flow path 3,4 shown in Figure 1.
Loss coefficients for steam / water flow through the feedwater sparger and feedwater nozzle	Feedwater flow and enthalpy are boundary conditions in GOBLIN
Approximate elevation of the Reactor Internal Pump (RIP) suction	RIP suction elevation* 1.8445 m *elevation is relative to bottom of vessel (inside)
Design details of the core support plate (weight, thickness, diameter and distribution of holes in the core plate)	Wall thickness of support plate 0.0508 m Diameter of core support plate 5.436 m Total length of beams 28.439 m Hole diameter 0.276 m Number of holes (CRDs) 205 Number of holes (In-core guide tubes) 62 Support ring height 0.419 m Weight unknown
Design details of the orificed and peripheral fuel supports (diameter of orifices and weight and height of the fuel supports)	Orifice diameters: Center (x 780) 57.4 mm Peripheral (Bottom x 52) 32.4 mm Peripheral (Lateral x 40) 38.3 mm Estimated surface area 85.375 m^2 Estimated thickness 0.0178 m Weight unknown
Length and inside diameter of control rod guide tubes	CRD guide tube length 3.7402 m CRD guide tube OD 0.273 m CRD guide tube thickness 0.0064 m Number of CRD 205
Dimensions of the control rod (lengths of SS sheathed blades and absorber tubes, thickness of the blades, diameter of absorber tubes, and number of absorber tubes)	Length of SS blades 4293 mm Length of absorber 3630.1 mm Blade thickness 9.7 mm Diameter of absorber tubes not modeled Number of absorber tubes not modeled
Weights of SS and B4C in each control rod	Weight of B4C [ ]^{a,c} Total Weight [ ]^{a,c} (Weights are not used in calculation)

Table 1 – Assumptions and Input Parameters for GOTHIC Analysis

Request	Response
Weights of Zircaloy-4 and Zircaloy-2 in each fuel assembly	Weight of fuel assembly (including UO2) [ ]^{a,c} Z4 / Z2 breakdown not readily available
Outside diameter of control rod housing	OD 0.15215 m ID 0.12349 m
Design details of the Top Guide (weight, thickness, diameter and distribution of holes in the core plate)	Weight 15059 kg Thickness 0.01524 m Hole Diameter 294.1 mm Hole Distribution (center to center) 309.9 mm
Dimensions of the main steam line flow restricting nozzle	ID 354 mm Flow Area 984.8 cm^2
Loss coefficient for steam/water flow through the main steam line flow restricting nozzle	Loss coefficient 0.50 Note: Corresponds to flow path 9,1 and 13,1 in Figure 1 Loss coefficients are tuned to result in dome pressure of 71.7 bar (gage) and MS line pressure drop of 3.93 bar at 102% power.
Discharge coefficient for steam/water flow through the main steam line flow restricting nozzle	Specific value not readily available. Assumed 1.0
(b) Fuel	
Weight of UO_2 per assembly	Weight of UO2 per assembly [ ]^{a,c}
Pitch of the fuel assemblies (or spacing between the fuel assemblies)	Pitch of the fuel assemblies 15.494 cm
Length of the fuel channel	Length of fuel channel [ ]^{a,c}
Fuel channel inside dimensions and wall thickness	Fuel channel inside diameter [ ]^{a,c} Fuel channel wall thickness [ ]^{a,c}
Bottom elevation of the fuel channel	Lower elevation of fuel channel* 4.9467 m *elevation is relative to bottom of vessel (inside)
Length and material of the fuel assembly nose piece	Length of transition piece [ ]^{a,c} Material [ ]^{a,c}
Length of the active fuel	Length of active fuel 3810 mm
Elevation of the bottom of active fuel (BAF)	Elevation of BAF* 5.3421 m *elevation is relative to bottom of vessel (inside)
Diametrical gap between fuel pellet and cladding	Gap between pellet and cladding [ ]^{a,c} (at room temperature)
Length of gas plenum	Length of gas plenum [ ]^{a,c} Note there are 3 types of plena
Fuel rod cladding thickness	Fuel rod cladding thickness [ ]^{a,c}
Fuel rod outside diameter	Fuel rod outside diameter [ ]^{a,c}
Pitch of the fuel rods	Pitch is variable – [ ]^{a,c}
Fuel pellet density	Fuel pellet density [ ]^{a,c}
Fuel pellet diameter	Fuel pellet diameter [ ]^{a,c}
Fuel pellet length	Fuel pellet length [ ]^{a,c}

Table 1 – Assumptions and Input Parameters for GOTHIC Analysis

Request	Response
Flow area of fully open MSIV	ID of steam line 0.6398 m It is assumed that the fully open MSIV has the same flow area as the steam line
Flow resistance of open MSIV	Not explicitly modeled. Loss coefficients adjusted to obtain a steam line pressure drop of 0.393 MPa for 102% of rated power
Discharge coefficient of open MSIV	Not modeled
(c) Engineered Safety Features	
Flow area of fully open ADS valve	Flow area not used; flow capacity and pressure are input for GOTHIC modeling to simulate minimum required capacity: Number of ADS valves 8 Flow capacity of each valve 3.6 E+5 kg/hr Reference pressure 7.76 MPa (gage) Time delay of opening from initiation signal 30 s
Loss coefficient and discharge coefficient for the fully open ADS valve	Not readily available. ADS flow is modeled as a critical flow path to achieve the stated flow capacity
Setpoint value of drywell pressure at which reactor trip occurs	High drywell pressure setpoint 0.014 MPa (gage)
Setpoint value of the main steam line steam flow rate at which reactor trip occurs	MSIV position scram setpoint 90% open The reactor does not trip directly on high steam flow rate.
Setpoints for the closure of MSIV	MSIV high steam flow setpoint 140%
Elevations and radial positions of the HPCF, LPCF and RCIC systems suction strainer in SP	Not modeled in containment calculation
Elevations and radial positions of the SRV line quenchers in the SP	Not modeled in containment calculation
Elevations and radial position of the exit of the RCIC turbine steam exhaust line in the SP	Not modeled in containment calculation

RAI 06.02.01.01C-8

a,c

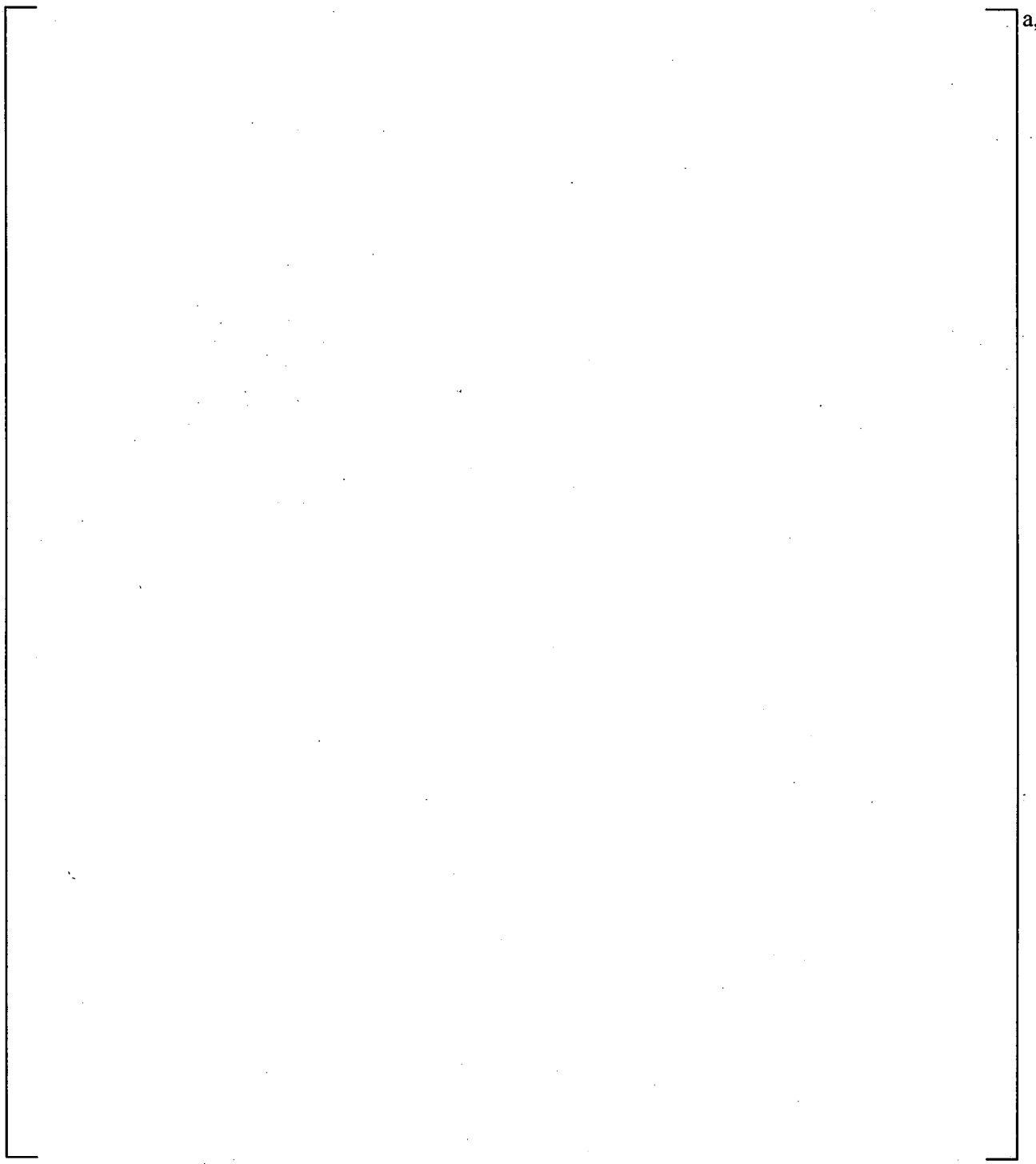


Figure 1 GOBLIN Noding Diagram

Westinghouse Electric Company
Nuclear Services
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

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Project Ltr. Ref. WEC-STP-2009-0008 P-Attachment

Our ref: CAW-09-2563

April 28, 2009

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: "Responses to NRC RAI 06.02.01.01.C-2 Supplement and RAI 06.02.01.01.C-8" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-09-2563 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by South Texas Project Nuclear Operating Company.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-09-2563 and should be addressed to B. F. Maurer, Manager, ABWR Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Manager
ABWR Licensing

G. Bacuta (NRC OWFN 12E-1)

Enclosures

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared B. F. Maurer, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

B. F. Maurer, Manager
ABWR Licensing

Sworn to and subscribed before me
this 28th day of April, 2009

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Sharon L. Markle, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Jan. 29, 2011
Member, Pennsylvania Association of Notaries

(1) I am Manager, ABWR Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(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.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(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.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in, "Responses to NRC RAI 06.02.01.01.C-2 Supplement and RAI 06.02.01.01.C-8" (Proprietary) for submittal to the Commission, being transmitted by South Texas Project Nuclear Operating Company (STPNOC) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with the NRC review of the South Texas Project Units 3 and 4 COL Application.

This information is part of that which will enable Westinghouse to:

(a) Assist the customer in obtaining NRC review of the South Texas Project Units 3 and 4 COL Application.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of this information to its customers for purposes of plant specific ABWR containment analysis for licensing basis applications.

(b) Its use by a competitor would improve their competitive position in the design and licensing of a similar product for ABWR containment analyses.

(c) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculations and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

Proprietary Information Notice

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

Copyright Notice

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.