



PROPRIETARY

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May 31, 2011  
U7-C-NINA-NRC-110077  
10 CFR 2.390

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
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South Texas Project  
Units 3 and 4  
Docket Number PROJ0772  
Responses to Supplemental Request for Additional Information

Reference: Letter from Tekia Govan to Mark McBurnett, "Request for Additional Information  
Re: South Texas Project Nuclear Operating Company Topical Report (TR), WCAP-  
17203-P Fast Transient and ATWS Methodology (TAC No. RG17203), April 18,  
2011 (ML111040418)

Attached are responses to NRC staff questions included in the reference. The following RAI  
questions are addressed:

RAI-1b S01	RAI-10b S01
RAI-2 S01	RAI-10e S01
RAI-3 S01	RAI-10f S01
RAI-9b S01	RAI-10g S01
RAI-9c S01	RAI-10i S01
RAI-9d S01	RAI-11 S01
RAI-9e S01	RAI-12 S01
RAI-9j S01	RAI-15 S01
RAI-9k S01	

The responses to RAI-9b S01, RAI-9c S01, RAI-9d S01, RAI-9j S01, RAI-9k S01, RAI-10b S01,  
RAI-10e S01, RAI-10f S01, RAI-10g S01, RAI-10i S01, RAI-11 S01, RAI-12 S01, and RAI-15  
S01 contain information proprietary to Westinghouse Electric Corporation. Since these

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responses contain information proprietary to Westinghouse Electric Company 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 Section 2.390 of the Commission's regulations.

Attachments 1 through 17 contain the responses to the above RAI questions. Attachments 18 through 30 contain the non-proprietary versions of the thirteen proprietary responses. Attachment 31 contains the request for withholding of proprietary information, the affidavit, the proprietary information notice, and the copyright notice.

Correspondence with respect to the copyright or proprietary aspects of this information or the supporting Westinghouse Affidavit should reference letter CAW-11-3167 and should be addressed to: J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania, 16066.

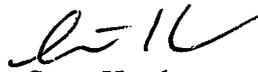
If this letter becomes separated from the proprietary material it is no longer proprietary.

There are no commitments in this letter.

If you have any questions other than those relating to the proprietary aspects of this response, 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 5/31/11



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

jet

Attachments:

1. RAI-1b S01
2. RAI-2 S01
3. RAI-3 S01
4. RAI-9b S01 (Proprietary)
5. RAI-9c S01 (Proprietary)
6. RAI-9d S01 (Proprietary)
7. RAI-9e S01
8. RAI-9j S01 (Proprietary)
9. RAI-9k S01 (Proprietary)
10. RAI-10b S01 (Proprietary)
11. RAI-10e S01 (Proprietary)
12. RAI-10f S01 (Proprietary)
13. RAI-10g S01 (Proprietary)
14. RAI-10i S01 (Proprietary)
15. RAI-11 S01 (Proprietary)
16. RAI-12 S01 (Proprietary)
17. RAI-15 S01 (Proprietary)
18. RAI-9b S01 (Non-Proprietary)
19. RAI-9c S01 (Non-Proprietary)
20. RAI-9d S01 (Non-Proprietary)
21. RAI-9j S01 (Non-Proprietary)
22. RAI-9k S01 (Non-Proprietary)
23. RAI-10b S01 (Non-Proprietary)
24. RAI-10e S01 (Non-Proprietary)
25. RAI-10f S01 (Non-Proprietary)
26. RAI-10g S01 (Non-Proprietary)
27. RAI-10i S01 (Non-Proprietary)
28. RAI-11 S01 (Non-Proprietary)
29. RAI-12 S01 (Non-Proprietary)
30. RAI-15 S01 (Non-Proprietary)
31. Request for Withholding Proprietary Information

cc: w/o enclosure except\*  
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**RAI-1b S01**

**The material included in the LTR Sections 7.2 and 7.3 does not constitute separate effects and integral effects testing and scaling analysis. Provide the separate effects and integral effects testing and scaling analysis used to validate the Evaluation Model, including the results applicable to ABWR.**

**Response to RAI-1b S01**

As stated by the NRC in the original RAI-1, the Fast Transient and ATWS methodology topical report provides only a portion of the whole Evaluation Model. The purpose of the LTR is to cover those portions of the LTR that are code-independent. As a result, the Integral Effects Tests (IETs) and Separate Effects Tests (SETs), used to qualify and validate different parts of the evaluation, are provided as part of the code-specific topicals and are beyond the scope of this code-independent methodology topical report.

As stated in Section 7.2.1 of the topical, because the methodology presented is code-independent, Code Capability Assessments are beyond its scope. Instead, Section 7.2 outlines the process used in the code specific topicals to validate the Evaluation Model. It is not the intention of Section 7.2 or 7.3 to provide separate effects and integral effects test results, it is intended to provide a guide for the process that should be applied in the development of the code specific topicals.

The results of the IETs and SETs for POLCA-T are presented in WCAP-16747-P-A and its appendices. For BISON the corresponding information has been provided in RPA-90-90-P-A and its supplements.

**RAI-2 S01**

**The applicant states that “Due to design differences in plant designs, fast transients will be categorized as AOOs or events with a lower frequency of occurrence on a design specific basis.”**

**Changing to a lower frequency event will require comprehensive event frequency analysis. Due to resource limitations and to improve the efficiency and consistency in the review of generic topical reports, it is recommended that any category event changes be undertaken on a generic basis rather than on a plant specific basis. Provide clarification if you are requesting an event re-categorization, and if so provide the rationale and update the LTR to reflect this request.**

**Response to RAI-2 S01**

Westinghouse is not requesting any re-categorization of events. The events are categorized based on the plant’s licensing basis and are analyzed accordingly.

**RAI-3 S01**

**In Section 15.0, Subsection VI, Definitions, of the SRP, Rev. 3, the definitions of the terms AOO, design basis accidents and ATWS are distinctly defined. In SERs, when NRC uses the term AOO, accidents or ATWS, they are stated as such and no generalized term such as transients, may be used instead. We require consistency between the SER and the LTR content. Revise the LTR to use the accepted terminology.**

**Response to RAI-3 S01**

While the Definitions portion of Section 15.0 in NUREG-0800, Rev. 3 lists specific definitions for AOOs, design basis accidents and ATWS, the more generalized term “transient” is used throughout the SRP section when discussing the analysis of these types of events. In particular, the SRP discussion of Acceptance Criteria uses the more generic term “transient.” Because the information presented in WCAP-17203 deals with the impact of particular phenomena on figures of merit, and ultimately acceptance criteria, referring to these events as “transients” is consistent with the guidance provided in NUREG-0800.

Additionally, “transient” is the terminology used throughout Regulatory Guide 1.203 which deals with Transient and Accident Analysis Methods. Because this topical report details the Westinghouse methodology for analysis of transients and accidents, the use of “transient” is consistent with NRC guidance provided in Regulatory Guide 1.203.

A number of other Westinghouse topical reports that have been reviewed and approved by the NRC have SERs issued using the more generic term of “transient,” including the overall reload methodology topical report CENPD-300-P-A. To remain consistent with previously approved topical reports and the regulatory guidance, the term “transient” is appropriate. Therefore no changes will be made in the approved version.

**RAI-9e S01**

**Coolant flow distribution:**

**In response to this RAI, the applicant clarified that the coolant conditions in phenomenon A7 refers to integral coolant conditions (in the case of coolant mass flow rate it refers to the total reactor core flow) while Phenomenon A18 (coolant flow distribution in the core), refers to the coolant mass flow distribution between the channels in the core. However, the description of these phenomena provided in Tables 5-2 and Table A-1 of WCAP-17203-P is inadequate to arrive at the same interpretation of these phenomena as stated in the RAI response. Without a clear definition or description of the phenomena through a discussion of the influence determination in the background or bases, it is difficult to understand what was intended. Since the PIRT is important for all subsequent Evaluation Model development activities, a detailed description of phenomena background and bases for the influence ranking determination is necessary to provide a sufficient level of understanding to guide the subsequent activities.**

**Confirm that the description of phenomena A7 and A18 in the PIRT (Table 5-2 and A-1) refers to the integral (or global) conditions and phenomenon A18 (core flow distribution) describes local flow conditions and then update the LTR accordingly.**

**Response to RAI-9e S01**

Westinghouse confirms that the description of Phenomenon A7 refers to the integral (global) mass flow rate through the reactor core and Phenomenon A18 describes local flow conditions.

Westinghouse will update the description of Phenomena A7 and A18 in Table A-1 of the approved topical report to include more detailed descriptions of these phenomena, as:

ID	Category	Phenomenon	Definition
A7	Initial conditions	Coolant conditions including pressure, temperature, quality, void fraction, and mass flow rates.	Thermal-hydraulic conditions in the core including pressure, temperature, quality, void fraction, and mass flow rate. This includes: Pressure – initial pressure distribution in the coolant channel along the rods including pressure drop at flow obstructions, friction pressure drop (single and two-phase friction), elevation pressure difference and two phase flow acceleration Temperature – initial temperature distribution along the heated channel, including initial inlet subcooling temperature Quality and Void Fraction – Initial void and quality profile along the heated channel. <b>Mass flow – initial integral (global) mass flow rate through the reactor core</b>
A18		Coolant flow distribution in the core	<b>Local flow conditions – Distribution of coolant mass flow between the fuel assemblies</b> , including distribution between the active channels, bypass channels and internal water channels.

The updates to Table A-1 do not impact Table 5-2. Therefore no changes will be made to Table 5-2 as a result of this response in the approved version of the topical report.

**RAI-9b S01**

[ ]<sup>a,c</sup>

**In response to the question related to the ranking of [ ]<sup>a,c</sup>, the applicant does not provide the reason for the [ ]<sup>a,c</sup> ranking assigned in the BWR LOCA PIRT (NUREG/CR-6744). This phenomenon has been ranked [ ]<sup>a,c</sup> in the BWR LOCA PIRT because of its contribution to establishing [ ]<sup>a,c</sup>. The rationale for [ ]<sup>a,c</sup> this phenomenon provided in Table 5-2 of WCAP-17203 states that [ ]<sup>a,c</sup> is not addressed in either WCAP-17203-P or in the RAI response.**

**Provide rationale for [ ]<sup>a,c</sup>**

**Response to RAI-9b S01**

In order to provide adequate justification for the ranking of [ ]<sup>a,c</sup> detailed sensitivity studies similar to that presented in the response to RAI 9j S01 are being performed. Westinghouse is currently in the process of completing such calculations. Results of this sensitivity study will be submitted to the NRC with the responses to the 60 day RAIs.

**RAI-9c S01**

[ ]<sup>a,c</sup>

**The applicant agrees that the ranking of phenomenon [ ]<sup>a,c</sup> should be [ ]<sup>a,c</sup> the ranking of phenomenon [ ]<sup>a,c</sup> and to update WCAP 17203-P accordingly. The response to RAI-9(c) indicated that the influence ranking for PIRT Item [ ]<sup>a,c</sup> will be [ ]<sup>a,c</sup> Since background information nor the bases for the influence ranking determination of either PIRT item has been provided it is not clear [ ]<sup>a,c</sup> should be made. The important parameter affecting the response of the fast transient or ATWS is [ ]<sup>a,c</sup> which, as noted in the PIRT, is affected by [**

**]<sup>a,c</sup> it is important to understand how the influence ranking for the PIRT table was determined.**

**Provide the basis for the determination of the influence ranking for [ ]<sup>a,c</sup>**

**Response to RAI-9c S01**

In order to provide adequate justification for the ranking of [ ]<sup>a,c</sup> detailed sensitivity studies similar to that presented in the response to RAI 9j S01 are being performed. Westinghouse is currently in the process of completing such calculations. Results of this sensitivity study will be submitted to the NRC with the responses to the 60 day RAIs.

**RAI-9d S01**

[ ]<sup>a,c</sup>

**The applicant agreed to update the ranking of [ ]<sup>a,c</sup> for RI/RD transients in order to [ ]<sup>a,c</sup>**

**for RI/RD events. However, the response does not clearly explain the [ ]<sup>a,c</sup>**

**The applicant agrees that the ranking of phenomena [ ]<sup>a,c</sup> should be consistent for the RI/RD transients. The applicant agreed to update the ranking of phenomena [ ]<sup>a,c</sup> from [ ]<sup>a,c</sup> in the for the RI/RD transients. However, since background information nor the bases for the influence ranking determination of either PIRT item has been provided it is not clear in which direction a [ ]<sup>a,c</sup> should be made.**

**Provide the basis for the determination of the influence ranking for [ ]<sup>a,c</sup>**

**Response to RAI-9d S01**

In order to provide adequate justification for the ranking of [ ]<sup>a,c</sup> detailed sensitivity studies similar to that presented in the response to RAI 9j S01 are being performed. Westinghouse is currently in the process of completing such calculations. Results of this sensitivity study will be submitted to the NRC with the responses to the 60 day RAIs.

**RAI-9j S01**

[ ]<sup>a,c</sup>

The rationale for [ ]<sup>a,c</sup> phenomenon for ATWS events in BWRs/2-6 is not clear. In response to this RAI, the applicant states that [

[ ]<sup>a,c</sup> Consequently, this phenomenon is assigned [ ]<sup>a,c</sup> ranking. Nonetheless, due to the [

[ ]<sup>a,c</sup>

**Response to RAI-9j S01:**

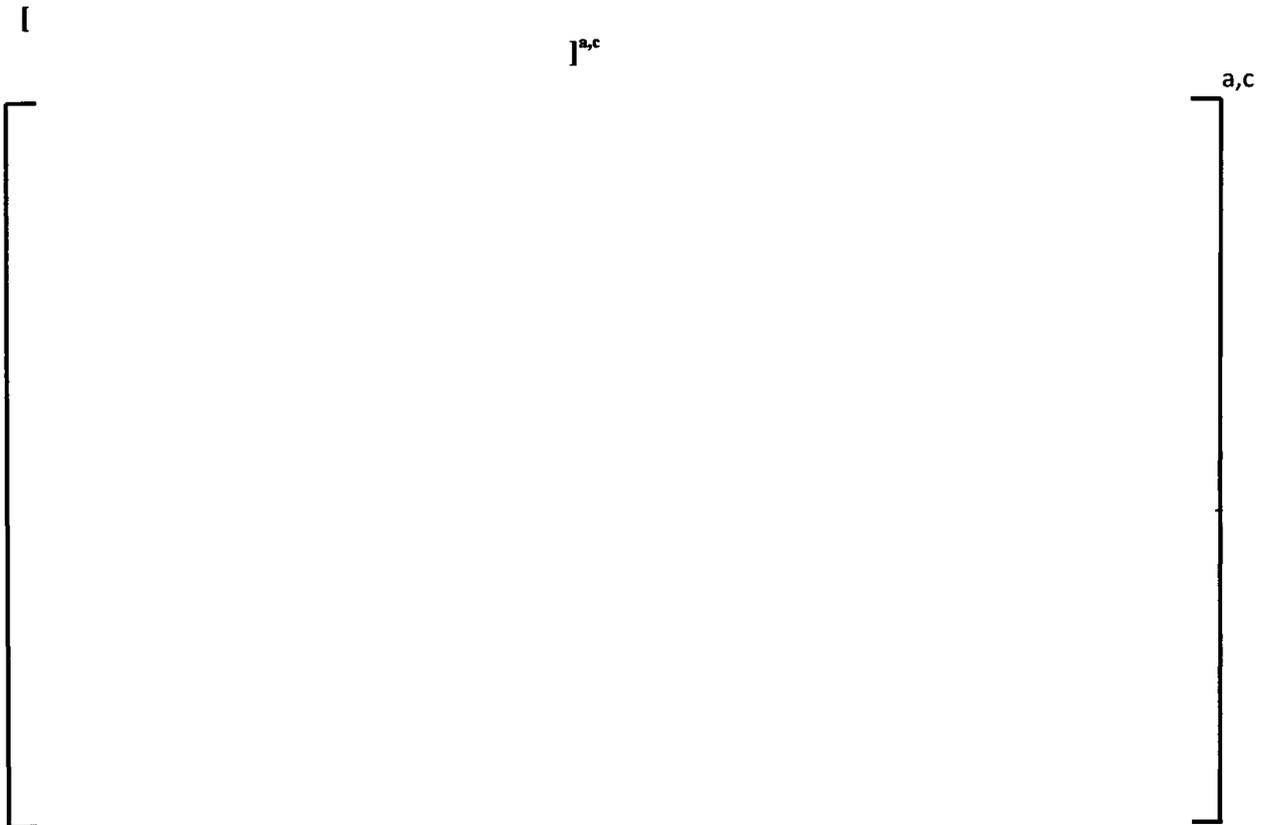
[

[ ]<sup>a,c</sup>

---

<sup>1</sup> [

[ ]<sup>a,c</sup>



**Figure 1.** [

] <sup>a,c</sup>

[

] <sup>a,c</sup>



**Figure 2.** [

]<sup>a,c</sup>

[

]<sup>a,c</sup>



**Figure 3.** [

]a,c

[

]a,c

<sup>2</sup> [

]a,c

[

] <sup>a,c</sup>

**References**

1. POLCA-T: System Analysis Code with Three-Dimensional Core Model, Chapter 14.4, WCAP-16747-P-A, Rev 0, September 2010
2. [

] <sup>a,c</sup>

**RAI-9k S01**

**Cladding temperature:**

**In response to this RAI, the applicant clarified that the [**

**] <sup>a,c</sup> This clarification should be also incorporated in Tables 5-2 and A-1 of the update to WCAP-17203-P**

**Update the description of phenomena E6 (cladding temperature) to clarify that it refers to [**

**] <sup>a,c</sup>**

**Response to RAI-9k S01**

Westinghouse will update the description of phenomenon E6 in Table 5-2 and Table A-1 in the approved topical report to clarify that the phenomenon refers to the [

<sup>a,c</sup>. Table 5-2 will be updated as follows:



Table A-1 will be updated as follows:

ID	Category	Phenomenon	Definition
E6	E. Fuel rod response	Cladding temperature	The influence of cladding temperature on cladding properties, cladding-to-coolant heat transfer, and radial thermal expansion.

**RAI-10b S01**

**Single and two-phase natural circulation**

**In response to this RAI, the applicant clarified that the [ ]<sup>a,c</sup> is covered by the phenomena [ ]<sup>a,c</sup> and [ ]<sup>a,c</sup> in the PIRT. However, the description of these phenomena in Table A-1 of WCAP-17203-P does not provide sufficient details to support the RAI response.**

**Update the description of phenomena [ ]<sup>a,c</sup> and [ ]<sup>a,c</sup> in the PIRT to clearly indicate that the [ ]<sup>a,c</sup> are also covered under these phenomena.**

**Response to RAI-10b S01**

Westinghouse will update the PIRT to include natural circulation as a separate phenomenon (D7) in the approved topical. The explicit inclusion of this phenomenon assures that the subsequent steps of the Evaluation Model will not overlook its importance. Rankings for natural circulation are provided in Table-1 and the phenomenon description is provided in Table-2. Tables 5-2 and A-1 in the approved topical report will be updated accordingly.

Table 1 - Ranking of Natural Circulation (to be used to update Table 5-2)

[Empty table area with large brackets on the left and right sides]

**a,c**

Table 2 – Natural Circulation – phenomena description (to be used to update Table A-1)

<b>ID</b>	<b>Category</b>	<b>Phenomenon</b>	<b>Definition</b>
D7	D. Transient coolant conditions as a function of elevation and time	Natural Circulation	Flow in the RPV driven by density difference (buoyancy driven flow).

**RAI-10e S01**

[ ]<sup>a,c</sup>

**The response does not provide an acceptable basis for not including [ ]<sup>a,c</sup>  
in the PIRT. In response to this RAI, the applicant states that the [**

]<sup>a,c</sup>

**Response to RAI-10e S01**

Westinghouse will update the PIRT in the approved topical report to include the RPV Level Measurement System as a separate Phenomenon. This phenomenon will be added to Category H and assigned ID H17.

Table 1 shows the ranking of RPV Level Measurement System. Table 5-2 in the LTR will be updated accordingly:

**Table 1 – PIRT Ranking of RPV Level Measurement System**

**a,c**

Table A-1 in the LTR will be updated with description of this phenomenon as follows:

**Table 2 – RPV Level Measurement System - Description**

<b>ID</b>	<b>Category</b>	<b>Phenomenon</b>	<b>Definition</b>
H17	H. Plant component/System	RPV Level Measurement System	Phenomenon includes measurement of single-phase (collapsed) and two-phase coolant levels. The collapsed coolant level is used to activate reactor safety system functions.

**RAI-10f S01**

**Interfacial heat and mass transfer (condensation and flashing):**

**The description in Table A-1 of WCAP-17203-P does not provide sufficient details to support the RAI response. In response to this RAI, the applicant states that the [**

**However, the descriptions of these phenomena provided in the PIRT do not clearly explain which fundamental processes are represented by these phenomena. In order for PIRT to be useful in subsequent Evaluation Model Development and Assessment Processes (EMDAP), clear and detailed explanation of the [ ]<sup>a,c</sup> ranked phenomena is essential.**

**Update the descriptions of phenomena [ ]<sup>a,c</sup> in the PIRT to clearly identify the fundamental phenomena covered by these PIRT items.**

**Response to RAI-10f S01**

In order to ensure that the condensation and flashing are not overlooked in the subsequent parts of the evaluation model, Westinghouse has reconsidered the original response and will include condensation and flashing as a separate phenomenon in Table 5-2 of the approved topical report. As the condensation/flashing is treated separately from phenomena [ ]<sup>a,c</sup>, their description will not be updated. The description of phenomenon D8 (see below) addresses NRCs considerations. Ranking of phenomenon D8 is as follows:

[ ]<sup>a,c</sup>

Table A-1 in the approved topical will be updated as follows:

<b>ID</b>	<b>Category</b>	<b>Phenomenon</b>	<b>Definition</b>
D8	D. Transient coolant conditions as a function of elevation and time	Condensation/Flashing	Mass and energy transfer between the phases due to subcooling / overheating.

The response to RAI-10i S01 provides additional phenomena [ ]<sup>a,c</sup> that will also be included in Table 5-2 of the approved topical.

**RAI-10g S01****Pressure drop:**

**The description in Table A-1 of WCAP-17203-P does not provide sufficient details to support the RAI response. In response to this RAI, the applicant states that [**

**]<sup>a,c</sup> ranked phenomenon in the PIRT.**

**However, the description of this phenomenon provided in the PIRT does not clearly explain which fundamental processes are represented by these phenomena. In order for PIRT to be useful in subsequent Evaluation Model Development and Assessment Processes (EMDAP), a clear and detailed explanation of the highly ranked phenomena is essential.**

**Update the descriptions of phenomenon A7 in the PIRT to clearly identify the fundamental phenomena covered by this PIRT item.**

**Response to RAI-10g S01**

Westinghouse will update the description of phenomena A7 and D5 (referred to in the original RAI response) in Table A-1 in order to provide a more clear and detailed explanation of these phenomena including the pressure drop contribution. The approved version of the topical report will be updated as follows:

ID	Category	Phenomenon	Definition
A7	Initial conditions	Coolant conditions including pressure, temperature, quality, void fraction, and mass flow rates.	<p>Thermal-hydraulic conditions in the core including pressure, temperature, quality, void fraction, and mass flow rate.</p> <p><b>This includes:</b></p> <p><b>Pressure – initial pressure distribution in the flow channel including pressure drop components of flow restrictions (inlet, outlet spacers, etc.), friction (single and two-phase), elevation and two phase flow acceleration.</b></p> <p><b>Temperature – initial temperature distribution along the flow channel, including initial inlet subcooling.</b></p> <p><b>Quality and Void Fraction – Initial steam mass and volume fraction along the flow channel.</b></p> <p><b>Mass flow – initial integral (global) mass flow rate through the reactor core</b></p>
D5	Transient coolant conditions as a function of elevation and time	Pressure	<b>The transient pressure distribution in the flow channel including pressure drop components of flow restrictions (inlet, outlet, spacers etc.), friction (single and two-phase), elevation and two phase flow acceleration.</b>

**RAI-10i S01**

**Identification of two-phase flow regimes:**

**In response to this RAI, the applicant states that the two-phase flow identification is not identified as a separate phenomenon in the PIRT because the effects of closure relations are included in the PIRT by phenomena which are affected by the closure relations (i.e., coolant temperature, quality, void fraction, and pressure). The cited phenomena included in the PIRT do not provide a direct indication of the importance of two-phase interfacial mass and energy transport mechanisms in multi-dimensional, and particularly non-equilibrium conditions. The reviewers are concerned that without some means of explicit treatment, neglecting these items could lead subsequent Evaluation Model Development and Assessment Processes (EMDAP) defined by Regulatory Guide 1.203 to be overlooked. The Fast Transient and ATWS Methodology should ensure that all important aspects of the Fast Transient and ATWS Evaluation Model are considered.**

**Describe in detail how the influence ranking determination will be provided for the interfacial transfer of mass, momentum, and energy in two-phase flow so that the subsequent steps of the Evaluation Model Development and Assessment Process (EMDAP) as defined in Regulatory Guide 1.203 may be addressed through the use of PIRT.**

**Response to RAI-10i S01**

In order to provide a direct indication of the importance of two-phase interfacial mass and energy transport mechanisms in multi-dimensional and non-equilibrium conditions, Westinghouse will update Section D of Table 5-2 in the approved topical report with the phenomena listed in Table 1. Including these as separate phenomena ensures that the subsequent steps of the Evaluation Model will not overlook their importance.

Table 1: Interfacial Mass, Momentum and Energy Transport – Additional Phenomena

	a,c
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Description of these phenomena in Table A-1 will be updated in the approved topical as follows:

ID	Category	Phenomenon	Definition
D8	See Response to RAI-10fS01		
D9	D. Transient coolant conditions as a function of elevation and time	Subcooled voiding	Void fraction distribution in a heated channel at temperatures below saturation.
D10		Interfacial momentum transport (slip) in channel	Transport of momentum between the phases in the bulk flow. Slip is defined as the velocity of vapor phase relative to the liquid phase velocity, $u_v/u_l$ , where $u_v$ – vapor velocity, $u_l$ – liquid velocity
D11		Void expansion/collapse	Change of void fraction caused by the pressure changes (excluding interfacial mass transfer)

[

] <sup>a,c</sup>

**RAI-11 S01**

**The response to RAI-11 correctly indicates that modeling issues are not considered during the PIRT development stage and that such aspects are taken into consideration during the model evaluation process. The response also provides the useful confirmation of 3D effects being applicable to certain PIRT phenomena [ ]<sup>a,c</sup>**

**However, the response does not address the intent of the RAI. As stated in Regulatory Guide 1.203: “Ultimately, the PIRT is used to guide any uncertainty analysis or in the assessment of overall EM adequacy.”**

**To accomplish this purpose, the PIRT should identify all phenomena that may have a 3D or other special aspect that is important to AOO or ATWS event(s). That information should be clearly presented so that when the PIRT is used as a guide in the EMDAP, the user will appropriately consider whether the 3D aspect is important enough to include the effect either directly or indirectly into the model. Furthermore, knowledge of such effects may in fact be an important consideration during the evaluation of the code to be used for analysis. The actual instructions for how to include such considerations may be placed in a variety of documents and not necessarily the LTR.**

**Identify each phenomena in the PIRT that has significant 3D effects that are applicable to AOO or ATWS events, reflect this information appropriately into the PIRT, and indicate where guidance may be found for using this PIRT in an EMDAP.**

**Response to RAI-11 S01:**

Table 1 below identifies all phenomena that include three-dimensional effects important enough to be considered in the model evaluation and development process. Only high-ranked phenomena have the potential to demonstrate significant three-dimensional effects on the figures-of-merit to be considered. Hence, Table 1 is restricted to high-ranked phenomena. Table 1 will be included in the LTR as a separate table.

Even though phenomena in Table 1 have been identified to include three-dimensional effects, a three dimensional modeling treatment may not necessarily be required, as is the case in many transient safety analysis simulations. The determination of whether a 1D model can be used, or if a 3D model is required, is done as part of the CCA evaluation described in the topical report. During this CCA evaluation, the level of accuracy required is determined, which drives the decision between a 1D or 3D model. This evaluation is documented in Westinghouse internal documentation according to Westinghouse QA procedures.

**Table 1.** Phenomena that may include three-dimensional (3D) effects of importance for AOO and ATWS event analysis

a,c



**RAI-12 S01**

**The applicant's response declares that the methodology for modeling [ ]<sup>a,c</sup> is code specific and therefore beyond the scope of this LTR. However, it also states that the code which includes this [ ]<sup>a,c</sup> methodology will be one which has been reviewed and approved by NRC, and two examples are included: POLCA-T and BISON. However, it is not completely clear how the [ ]<sup>a,c</sup> of a code would be evaluated as [ ]<sup>a,c</sup> in the context of the code capability assessment.**

**Define what is meant by [ ]<sup>a,c</sup>.**

**Provide criteria for how a code would be established to be [ ]<sup>a,c</sup> (e.g., what figure-of-merit would be used and what would be compared with the code results) in the code capability assessment.**

**Explain whether the process for establishing a code as [ ]<sup>a,c</sup> be performed generically, or for individual classes of AOO or ATWS scenarios defined in the LTR. If the former, demonstrate that the process would be adequate to assure the code is [ ]<sup>a,c</sup> for all classes of AOO and ATWS thus defined.**

**Response to RAI-12 S01:**

[

] <sup>a,c</sup>

Table 1: [

] <sup>a,c</sup>

<sup>a,c</sup> ]

**References**

1. Westinghouse Report WCAP-16606-P-A, Rev 1, "Supplement 2 to BISON Topical Report RPA 90-90-P-A," January 2008.
2. WCAP-16747-P-A, "POLCA-T: System Analysis Code with Three-Dimensional Core Model," Rev 0, September 2010.

**RAI-15 S01**

**The applicant proposed changes to equations in LTR Section 6.2.1**

**The reviewers have solved the revised equation 3 by use of equation 2 and arrive at the revised equation 4 with the exception of the subscript on the variable CPR<sub>min</sub>. Our understanding is that in order to describe the material presented equation 2 also needs to be employed in the same manner whereas:**

$$[ \quad ]^{a,c}$$

**Confirm that the appropriate form of equation 2 is:**

$$[ \quad ]^{a,c}$$

**Response to RAI-15 S01**

Westinghouse confirms that, as stated in the question, the appropriate form of equation 2 in the LTR is:

$$[ \quad ]^{a,c}$$

The approved topical report will be updated accordingly.

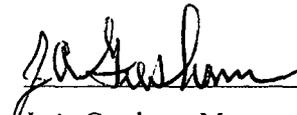
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COMMONWEALTH OF PENNSYLVANIA:

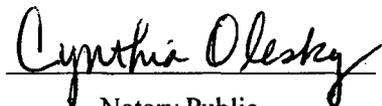
SS

COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared J. A. Gresham, 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:

  
\_\_\_\_\_  
J. A. Gresham, Manager  
Regulatory Compliance

Sworn to and subscribed before me  
this 23rd day of May 2011

  
\_\_\_\_\_  
Notary Public

COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Cynthia Olesky, Notary Public  
Manor Boro, Westmoreland County  
My Commission Expires July 16, 2014  
Member, Pennsylvania Association of Notaries

- (1) I am Manager, Regulatory Compliance, 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 Proprietary Information from Public Disclosure 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 "Response to the NRC's Request for Additional Information for WCAP-17203, 'Fast Transient and ATWS Methodology'" (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 WCAP-17203, and may be used only for that purpose.

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

- (a) Assist customers in obtaining NRC review of the Westinghouse Fast Transient and ATWS Methodology topical as applied to current BWR and ABWR plant designs.

Further this information has substantial commercial value as follows:

- (a) Assist customer to obtain license changes.
- (b) 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 fuel design 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).

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