PROPRIETARY

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North America LLC
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July 3, 2012
U7-C-NINA-NRC-120053
10 CFR 2.390

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 No. PROJ0772
Response to Request for Additional Information

Reference: Letter from Michael Eudy 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. ME4505)," April 2, 2012 (ML120830334)

Attached are the responses to the following NRC staff questions included the reference:

NRR RAI 9 S1	
NRR RAI 12 S1	NRR RAI 34 S1
NRR RAI 15 S1	NRR RAI 42
NRR RAI 32 S1	NRR RAI 43

The responses to some of these RAI questions contain information proprietary to Westinghouse Electric Corporation. Since this letter contains information proprietary to Westinghouse Electric Company LLC, it is 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.

T007
NRO

STI 33569256

Attachments 1 through 7 contain the responses to the RAI questions. Attachments 8 through 13 contain the non-proprietary version of the proprietary responses. Attachment 14 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 CAW-12-3505 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, 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 7/3/12

Scott Head
Manager, Regulatory Affairs
Nuclear Innovation North America LLC

jet

Attachments:

1. NRR RAI 9 S1 (Proprietary)
2. NRR RAI 12 S1 (Proprietary)
3. NRR RAI 15 S1 (Proprietary)
4. NRR RAI 32 S1 (Proprietary)
5. NRR RAI 34 S1 (Proprietary)
6. NRR RAI 42
7. NRR RAI 43 (Proprietary)
8. NRR RAI 9 S1 (Non-Proprietary)
9. NRR RAI 12 S1 (Non-Proprietary)
10. NRR RAI 15 S1 (Non-Proprietary)
11. NRR RAI 32 S1 (Non-Proprietary)
12. NRR RAI 34 S1 (Non-Proprietary)
13. NRR RAI 43 (Non-Proprietary)
14. Request for Withholding Proprietary Information

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

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NRR RAI 9.S1

a) **The response to NRR RAI 9b indicates that stored energy in the fuel is related to fuel rod initial power. The sensitivity case performed in the response varied a different parameter than that used in evaluating fuel rod stored energy in NRO RAIs 9d S01 and 20 S02 (i.e., [ ]^{a,c}). Furthermore, other parameters than power and heat capacity influence stored energy, such as thermal conductivity. While such parameters may be included separately in the PIRT, the [ ]^{a,c} . Thus, it appears these parameters may be excluded from the statistical analysis without regard to the impact on initial stored energy. As such, clarification is requested as to why a [ ]^{a,c} captures the total uncertainty associated with fuel rod stored energy.**

b) **The response to NRR RAI 9c indicates that feedwater transients involving significant pressure changes due to valve opening or closure need not be modeled only as pressure increase or decrease transients. However, since the PIRT phenomena for various steam system valves' opening and closure (e.g., H8, H9, H11) are [ ]^{a,c}, it is not clear that feedwater transients involving significant pressure changes can be accurately modeled using the criteria established for this transient class. Please reconcile the response to NRR RAI 9c with the response to NRR RAI 17, which the staff considers acceptable.**

c) **The response to NRR RAI 9e states that [ ]^{a,c}. Please clarify whether this response covers operating boiling-water reactors (BWRs) equipped with high pressure core spray and, if so, provide adequate technical justification. Please further identify whether the PIRT table will be modified to emphasize the [ ]^{a,c} for this case.**

Response to NRR RAI 9.S1

a) The stored energy in the fuel rod[1] (per unit length) is given by:

$$Q' = \rho \cdot c_p \cdot \pi \cdot r_{fo}^{\,2} \cdot \left(T_{ave} - T_{ref}\right) \quad \left[\frac{J}{m}\right] \qquad \text{Eq. 1}$$

Where ρ is the fuel density [kg/m^3], c_p is the fuel specific heat capacity [J/kgK], r_{fo} is the fuel pellet outer radius [m], T_{ave} is the average temperature in the fuel pellet [°C], and T_{ref} is a selected reference temperature, e.g., cold shutdown temperature (95°C). For constant fuel conductivity, T_{ave} can be written as:

$$T_{ave} - T_{\infty} = \frac{q'}{2\pi}\left[R_{fuel} + R_{gap} + R_{clad} + R_{conv}\right] \qquad \text{Eq. 2}$$

where T_∞ is the bulk fluid temperature, q' is the linear heat rate, R_{fuel}, R_{gap}, R_{clad}, and R_{conv} are the thermal resistances of the fuel pellet, the gap between the fuel and the cladding, the cladding, and the convective resistance, respectively. The thermal resistances in Eq. 2 are defined according to:

[1] The stored energy in the fuel rod can be represented by the stored energy in the fuel pellet alone because the stored energy in the cladding is lower by an order of magnitude and can be neglected for our purposes.

$$R_{fuel} = \frac{1}{4k_f},\ R_{gap} = \frac{1}{r_{fo}h_{gap}},\ R_{clad} = \frac{1}{k_c}\ln\left(\frac{r_{co}}{r_{ci}}\right) \text{ and } R_{conv} = \frac{1}{r_{co}h_{conv}}$$

where k_f fuel thermal conductivity, h_{gap} is the gap conductance coefficient, k_c is the cladding thermal conductivity, r_{ci} and r_{co}, is the inner and outer cladding radius, respectively, and h_{conv} is the convection heat transfer coefficient at the cladding surface.

The thermal resistance of the UO_2 fuel is by far the largest (during initial and normal operating conditions), as can be inferred from a typical pin temperature profile. The next largest resistance is that of the gap. The thermal resistances due to the cladding and convection are both small at normal operating conditions and can therefore be neglected. Thus, the initial stored energy can be represented as a function of the following parameters:

$$Q' = Q'\left(\rho, c_p, r_{fo}, q', R_{fuel}, R_{gap}\right) \qquad \text{Eq. 3}$$

Furthermore, by observing Eq. 1, it can be concluded that Q' is linearly dependent on c_p and $(T_{ave}-T_{ref})$. Thus, variations in c_p or $(T_{ave}-T_{ref})$ have the same impact in terms of initial stored energy.

Westinghouse agrees that other parameters besides power and heat capacity influence stored energy, as can be seen from Eq. 3. While the combined impact of all these parameters was not investigated in the response to NRO RAIs 9d.S01 and 20.S02, [

]^{a,c}

The fuel pellet radius, r_{fo}, is accounted for in pellet and cladding dimensions (A4). Phenomenon A4 is ranked as [

]^{a,c}

b) In some cases, the increase in feedwater flow transient evolves from the FI (Feedwater flow Increase) group into the Pressure Increase (PI) group. To ensure that the analysis methodology is conservative for all feedwater flow transients, feedwater flow increase transients that

involve a valve position disturbance in the steamlines (MSIV closure, TSV closure, or safety relief valves lifting) [

]^{a,c}

c) Condensation effects are considered by phenomenon D8, Condensation/Flashing. Westinghouse modified the PIRT table and added phenomena D8 as a specific phenomenon in the response to NRO RAI-10f.S01. This was done to capture condensation effects explicitly, including direct-contact condensation on the ECCS as it is injected either into the upper plenum as is the case for the BWR/5-6 and the ABWR, or into the downcomer for the BWR/2-4. The rankings for D8 can be found in the response to NRO RAI 10-f.S01. [

]^{a,c}

The explicit treatment of condensation by D8 explains why such effects [

]^{a,c} Westinghouse recognizes that this distinction was not clear in the rationale on H5 in the PIRT. The purpose of phenomenon H5 "Upper plenum" is, according to the definition provided in Table A-1 of Appendix A, to deal with the impact of [

]^{a,c} The rationale portion of PIRT phenomenon H5 will therefore be updated as follows:

Original formulation:

[ ]^{a,c}

Updated formulation:

[

]^{a,c}

The importance of H5 for pressure increase events was investigated in the response to NRO RAI-20.S2 [

]^{a,c}. No changes as to rank of H5 will be made in the LTR.

NRR RAI 12.S1

a) The response to NRR RAI 12 refers to a supplemental table that [

]^{a,c} . Although informative, this table lacks a metric to gauge the importance of the three-dimensional behavior associated with phenomena. (Note that such a measure would be assigned independently of code-specific capabilities.) As a result, when the proposed table is reviewed against a code capability assessment, it ultimately does not provide a basis to judge whether the cumulative three-dimensional behavior for phenomena associated with specific transients is sufficiently significant as to motivate either (1) modeling with a three-dimensional code or (2) conservative treatment of certain phenomena when the transient is modeled with a one-dimensional code to offset unrealistic impacts of dimensional simplification. Therefore, please assign a qualitative metric (e.g., H, M, L) to the cumulative three-dimensional phenomena affecting each transient class or specific transient, or else justify why a metric is not necessary.

b) Regarding this same table, please provide justification that the phenomenon of [ ]^{a,c} does not depend on three-dimensional flows in the reactor vessel.

Response to NRR RAI 12.S1

a) The table specifying 3D phenomena serves as guidance for model development and provides input to the choice of a suitable code for a specific analysis task, which is why it was added on the request of NRO RAI-11.S1. It was not intended to provide a ranking for the importance of 3D behavior associated with the phenomena. The capability of the underlying computational models to reproduce the high ranked phenomena, including 3D effects or not, is determined by the code capability assessment. This is a code-specific step where uncertainties are determined and the computational models are qualified against separate effects test data. At this stage, simplified models, such as 1D models, may be penalized due to large uncertainties when applied to model phenomena that include 3D effects, i.e., it may be determined that additional conservatisms are needed to ensure that the 1D models used will produce conservative results. All "High" ranked phenomena will go through this evaluation process. The phenomena which are listed to include 3D effects (as shown in Table 1) are all high ranked by the PIRT and will be addressed in the uncertainty evaluation process. Thus, dimensional aspects of the analysis will be captured in the standard code capability assessment process despite lack of an explicit metric of the three-dimensional phenomena. As such, [

]^{a,c} .

b) As stated in the definition for [

]^{a,c}

Boron transport (B10), as discussed in Rationale portion of Table 1 in the response to NRR RAI 12, accounts for the 3D distribution of the boron concentration. As stated in the response to NRR RAI 12, phenomena B10 will be addressed as a 3D phenomenon, thereby accounting for the multi-dimensionality associated with [ ]^{a,c}

NRR RAI 15.S1

The response to NRR RAI 15 offers Westinghouse's opinion that the loss of feedwater event should not activate the automatic depressurization system (ADS). However, no assurance is provided that this transient would not result in ADS actuation and/or partial fuel uncovery. The responses to this and other RAIs raise further questions as to whether Westinghouse's evaluation model is capable of predicting the minimum water level following this event. Therefore, please provide the following additional information:

a) **Justification for the position that the Level 3 scram setpoint is an appropriate termination criterion for the loss of feedwater event. Considering a potentially limiting single failure for this event (e.g., loss of high pressure coolant injection / core spray), the reactor vessel water level will continue to decrease well beyond the Level 3 setpoint, potentially approaching the Level 1 setpoint and the top of the active fuel region. (Note that consideration of the limiting single failure is prescribed for the analysis of this event in Section 15.2.7 of the Standard Review Plan.) Therefore, it is unclear how the anticipated operational occurrence (AOO) figures of merit in Table 3-1 of the topical report could be considered satisfied if the evaluation model does not verify that the minimum water level following the loss of feedwater event will not result in ADS actuation and/or partial uncovery of the core.**

b) **Justification that [ ]^{a,c} in determining the minimum water level that may occur following a loss of feedwater event (see NRR RAI 9 and response) in light of the extended time prior to the turnaround of the vessel water level.**

c) **Justification that [ ]^{a,c} in determining the minimum water level that may occur following a loss of feedwater event (see NRO RAI 10b S01 and response) in light of the expectation that vessel water level may decrease below the Level 2 setpoint, resulting in a trip of the recirculation pumps.**

d) **Justification for [ ]^{a,c} for the loss of feedwater event, given their [ ] over the long-term water level. Please further confirm whether the reactor core isolation cooling system and isolation condenser are included under PIRT item H10 or another highly ranked phenomenon.**

Response to RAI 15.S1

a) Assurance that the loss of feedwater event does not result in activation of the ADS and/or partial fuel uncovery is provided by the design of the engineered safety features and the determination of the initiation of the safety functions setpoints. The verification of this is performed during the Design Certification process or for a plant change during the license amendment request process, and is done considering the worst single failure in accordance with SRP 15.2.7.

[

]^{a,c} Westinghouse finds the methodology presented in the subject LTR adequate for water level predictions for the short term fuel and core response during the loss of normal feedwater flow transient.

For any plant change, Westinghouse reviews the plant licensing basis to determine if the proposed plant change affects the licensing analysis. If the plant licensing basis for the loss of normal feedwater flow is affected by the proposed plant change, Westinghouse evaluates the transient to ensure that reactor pressure vessel water level remains above the top of the active fuel and the ADS is not actuated for all times during the transient considering the worst single failure. The evaluation is performed [ ]^{a,c} prior to the fuel and core licensing analysis to establish the plant operating limits. This methodology is outside the scope of the subject LTR and is instead included in a plant specific Licensing Amendment Request.

b) -d) Westinghouse agrees with the NRC that [

]^{a,c} . However, the current ranking of these phenomena is considered adequate to determine the plant operating limits for AOOs as the PIRT was derived using MCPR, reactor vessel pressure and LHGR as the figures of merit.

Westinghouse confirms that the reactor core isolation cooling system and isolation condenser are included under PIRT item H10.

NRR RAI 32.S1

Responses to NRR RAIs 32 and 9, as well as other RAIs issued by NRR and NRO, identify that quantitative metrics have been proposed as criteria for (1) ranking PIRT phenomena and (2) the exclusion of PIRT phenomena and candidate parameters from statistical analysis.

Westinghouse's RAI responses further indicate that these quantitative metrics would be used in conjunction with sensitivity calculations with a particular code (BISON) and reactor type (ABWR) for generically ranking PIRT phenomena in WCAP-17203. Please address the following concerns with this approach:

a) Permitting the exclusion of PIRT phenomena and candidate parameters from statistical analysis using the criteria proposed by Westinghouse in Table 1 of the response to NRO RAI 23 S01 could lead to excessive truncation error in the statistical outputs. The operating limit MCPR, for instance, is typically reported to the hundredths place. If phenomena are ranked low and candidate parameters are discarded from the statistical analysis at an [ ]^{a,c}, how does Westinghouse obtain confidence that the resulting operating limit MCPR is determined to within an acceptable tolerance? (Although the response to NRO RAI 20 S02 notes that [ ]^{a,c} exists associated with the determination of the safety limit MCPR, this margin offsets uncertainties associated with determination of the safety limit MCPR and thus is not free margin.) Please clarify Westinghouse's position regarding the allowable truncation error for the operating limit MCPR and other figures of merit in a statistical, best-estimate analysis, and further demonstrate that the proposed cutoff limits for discarding phenomena and parameters from the uncertainty analysis will ensure a reasonable truncation error is not exceeded even if a significant number of individual phenomena and parameters are near the cutoff limits.
b) Westinghouse stated in response to NRR RAI 32 that its generic conclusion that [ ]^{a,c}. However, the generic conclusion is dependent on analysis that is code-specific (BISON), plant-specific (ABWR), and transient-specific (load rejection without bypass). Thus, while it may be possible to develop specific conclusions with limited applicability using such sensitivity calculations, it is not clear that generic conclusions [ ]^{a,c} in WCAP-17203 can be drawn. Please revise the conclusion concerning [ ]^{a,c} or provide adequate technical basis for its generality.
c) Although code calculations may provide insights, particularly with regard to phenomena and parameters of dominant or minimal influence, application of specific code calculations as the sole or deciding criterion for PIRT phenomena rankings is not consistent with the underlying philosophy of the PIRT and code, scaling, applicability, and uncertainty (CSAU) processes. In addition, for the same reasons that conservatism is applied in determining PIRT rankings using expert judgment, insights from code calculations should be tempered by the recognition that code models incorporate approximations and state-of-knowledge errors. Furthermore, a limited set of code calculations cannot account for all relevant conditions and does not comprise an independent evaluation metric relative to expert judgment because the development of computer codes ultimately depends on similar judgments to those used in the development of PIRT rankings. The staff recognizes that the PIRT rankings in Table 5-2 of the topical report were assigned using an approach consistent with the CSAU process;

however, Westinghouse RAI responses (e.g., the response to NRR RAI 9) appear to have generically re-ranked some PIRT items on the basis of a single code calculation. Therefore, please revise the practice of using specific code calculations to decide PIRT rankings or else provide adequate technical basis that this practice is appropriate.

d) **In Table 2 of the response to NRO RAI 23 S01, please clarify what the minimum and maximum values represent for normally and log normally distributed parameters.**

Response to NRR RAI 32.S1

a) Westinghouse agrees with NRC's concern that situations where several candidate parameters which are near the cut-off limit for their exclusion from a further analysis may lead to a significant truncation error in their combined influence on figures-of-merit. [

]^{a,c}

Regarding the influence of Low and Medium ranked PIRT phenomena and their respective exclusion from the further analysis, the confidence that the resulting operating margins are determined within an acceptable tolerance relies solely on the same principles as the initial PIRT ranking. These principles were discussed previously in several RAI responses and include the operating experience and expert judgment supported by hand calculation, analytical tools, sensitivity studies and other available tools.

Regarding the [

]^{a,c}

b) As the original response, where the results of the sensitivity study for the influence of medium ranked phenomena were presented, (NRO RAI-20.S02) was for the Office of New Reactors (NRO) the selected plant design was ABWR.

Westinghouse recognizes the limitations of this study regarding the selection of the plant type and analysis code.

Therefore, Westinghouse will evaluate [

]^{a,c}

[

]^{a,c}

If the influence of [ ]^{a,c} exceeds the values defined in Table 1 of the response to NRO RAI-23.S01, [

]^{a,c}.

c) Even though the sensitivity studies, as described by the NRC, carry the limitations stated above in the question, they are used by Westinghouse to confirm the PIRT designations made by the expert panel group. In the current LTR, consistent with the CSAU philosophy, sensitivity studies are not used as a primary tool for the PIRT ranking. Their use is limited to serve as an additional supporting argument for the ranking. Three possible scenarios are considered when performing the sensitivity studies:

1. Sensitivity study confirms the original ranking made by the expert panel group. In this case the study serves as an additional, supportive argument to the original designations.
2. Sensitivity study shows that an originally low or medium ranked phenomenon has a significant influence on figures-of-merit. The conclusion from the study is then generalized and phenomenon is re-ranked as high.
3. Sensitivity analysis of a high ranked phenomenon is usually not performed, as this is the most conservative ranking.

The use of sensitivity studies under the conditions described above is consistent with CSAU process. In several RAI responses, where the original ranking was questioned by the NRC, sensitivity studies were performed as a supporting argument, such as in the response to NRR RAI-9.

d) The uncertainty interval for each parameter in Table 2 of the response to NRO RAI-23.S01 is chosen as conservatively large (covering the possible variation in respective parameter), uniformly distributed between the minimum and the maximum value. As all of these parameters are assumed uniformly distributed, minimum and maximum values are sufficient to characterize this distribution.

As the normal and log-normal distributions are "open-ended", the minimum and maximum values cannot characterize them. Mean value and standard deviation are used instead.

NRR RAI 34.S1

Please address the remaining concerns with Westinghouse's response to NRR RAI 34:

a) **For a statistical, best-estimate methodology, the evaluation model consists of both computer code models and code uncertainties. Please clarify how implementation of the statistical, best-estimate approach outlined in WCAP-17203 with a particular code can be considered to comprise an approved evaluation model without NRC staff approval of the associated code capability assessment and portions of the data uncertainty assessment associated with phenomenological models in the code.**

b) **NRC staff acceptance of a code for application as part of a conservative evaluation model does not imply or provide assurance that use of the code is acceptable as part of a statistical, best-estimate evaluation model. Rather, use of such a code with a statistical, best-estimate evaluation model represents a new application that is beyond the scope of the conservative evaluation model approved by the staff. In the case of BISON, for example, although supplemental topical reports have included enhancements and additional models, these supplements have not addressed implementation within a statistical, best-estimate evaluation model. Therefore, the staff does not have assurance that individual code models are capable of best-estimate calculations, that assumed statistical distributions are supportable, and that statistical, best-estimate code predictions are consistent with available experimental and/or plant data for applicable transients. These issues are exacerbated by a lack of sensitivity analyses (e.g ., for parameter significance, nodalization, time step size) and statistical demonstration calculations for limiting and non-limiting transients to be analyzed by the code. In light of these concerns, please state Westinghouse's position regarding necessary qualifications or requirements for codes that will be used to implement the methodology in WCAP-17203.**

Response to RAI 34.S1

a) Westinghouse considers the methodology described in the LTR, together with the code qualification provided in code-specific topical reports, such as RPA-90-90-P-A and its supplements, sufficient to provide a complete evaluation model. As stated previously in NRO and NRR RAI responses, all computer codes used with the methodology described in this LTR, will be used according to their respective SER limitations and conditions.

Any model limitation coming from code qualification is unconditionally inherited in the methodology and is independent of the Code Capability Assessment (CCA) or Data Uncertainty Assessment (DUA).

The selection process of uncertainty input parameters is justified by the CCA and DUA processes. The uncertainty input parameters are both, code specific and plant specific. The final list of uncertainty parameters (both code and input) will therefore be specified on a plant specific basis and will follow the CCA and DUA process. Westinghouse therefore requests the generic approval of CCA and DUA processes as a tool to define the final list of uncertainty input parameters which will be used in licensing applications. The result of CCA and DUA will be open for the NRC audit on a plant specific basis. The validation basis presented in code specific topical reports will be used to define model uncertainties for each specific high ranked phenomenon. Methods describing how the validation basis from the code specific LTRs will be used to derive probability distribution functions for code uncertainty parameters are described in this LTR with additional information in several RAI responses. The evaluation model is therefore considered complete.

b) The following describes Westinghouse's position regarding the necessary qualifications or requirements for codes that will be used to implement the methodology in WCAP-17203:

1. [

]^{a,c}

Therefore the BISON code, normally used with the conservative methodology may also be used with the best-estimate methodology.

NRR RAI 43

The response to NRR RAI 23 stated that the topical report would be modified to remove a number of unconditional conservatisms from the methodology. This planned revision to the topical report affects the balance of conservatism associated with the methodology and results in several additional requests from the staff:

a) **Please provide technical justification and perform a sensitivity study to support ranking the [**

]^{a,c} , thereby affecting the severity of pressurization transients.

b) **Please provide technical justification and perform a sensitivity study to confirm that, for a feedwater flow decrease transient (e.g., loss of feedwater), a [**

]^{a,c}, as stated in Section 6.4.3.3.2.

c) **Please provide additional technical basis to validate that the assumed biases for the fuel time constant in Section 6.4 of the topical report are conservative for both hot and average rods, or else commit to performing code-specific confirmatory calculations to validate the conservative direction of the fuel time constant prior to making assumptions for various transients in plant licensing calculations. Due to the complexity of the thermal-hydraulic/neutronic interactions, is not clear to the staff that the conservative direction for the fuel time constant for hot and average rods can be inferred by judgment alone or is independent of code-specific modeling of fuel channels.**

d) **Please clarify to what extent a hot rod / average rod fuel assembly model is capable of accurately predicting a quantity of failed fuel rods for a pump seizure or shaft break accident, as opposed to verifying that the limiting rod is undamaged.**

Response to NRR RAI 43

a) Westinghouse agrees with the NRC that the [

]^{a,c} Therefore, it affects the severity of the pressurization transients.

Westinghouse does not intend to revise the [

]^{a,c}

Phenomenon (H8) in Table 5-2 in the approved version of the LTR will be updated as follows (changes identified by **bold** text):

Original Formulation

[ ]a,c

Updated Formulation

[ ]a,c

Table A-1 in Appendix A of the LTR will also be updated as follows (changes identified by **bold** text):

Original Formulation

[ ]a,c

Updated Formulation

[ ]a,c

b) For a feedwater flow decrease transient (e.g., loss of normal feedwater flow), [

]a,c

The transient is initiated by loss of normal feedwater flow. The water level decreases and scram and trip of 4 recirculation pumps are activated on low water level L3. As can be seen in Table 1, for the first case the MCPR must be [

]a,c

Table 1 Analysis results for loss of normal feedwater flow with different recirculation pump inertia. a,c

[

]

The sensitivity studies performed to demonstrate that [

]a,c

c) Westinghouse agrees with the NRC that the conservative direction of the fuel time constant for the hot and average rods may be difficult to judge without confirmatory calculations. Westinghouse intends to validate the assumed biases for the hot and average rods in Section 6.4 of the LTR by performing code-specific confirmatory calculations on first application. The process employed to perform code-specific confirmatory calculations will be similar to the process used to determine the limiting off-rated statepoints as shown in the response to NRR RAI-16.S1.

d) A hot rod / average rod fuel assembly model is fully capable of accurately predicting a quantity of failed fuel rods for a pump seizure or shaft break accident. [

]a,c

CAW-12-3505

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

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 27th day of June 2012

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, 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 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 "Responses to NRR's Supplemental RAI 9.S1, 12.S1, 15.S1, 32.S1, 34.S1, 42 and 43 to WCAP-17203" (Proprietary), dated June 28, 2012, for submittal to the Commission, being transmitted by Nuclear Innovation North America (NINA) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is in response to the NRC's Request for Additional Information on the Fast Transient and ATWS Methodology topical report and may be used only for that purpose.

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

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

Further this information has substantial commercial value as follows:

(a) Its use by a competitor would improve their competitive position in the design and licensing of a similar product for ABWR fast transient and ATWS analysis.

(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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