

U. S. NUCLEAR REGULATORY COMMISSION

REQUEST FOR ADDITIONAL INFORMATION FOR THE

TOPICAL REPORT WCAP-18240-P/WCAP-18240-NP, REVISION 0,

“WESTINGHOUSE THERMAL DESIGN PROCEDURE (WTDP)”

WESTINGHOUSE ELECTRIC COMPANY

To facilitate better communication, each of the U.S. Nuclear Regulatory Commission (NRC) staff’s request for additional information (RAI) questions for the topical report (TR) WCAP-18240-P/WCAP-18240-NP, Revision 0, “Westinghouse thermal design procedure (WTDP),” have been categorized by the NRC staff. The three categories considered are:

- Level of Concern (i.e., “How concerned is the NRC staff with the statements in the submittal which generated this RAI?”),
- Level of Impact (i.e., “What is the perceived level of impact of RAI to the approval of the submittal?”, and
- Level of Effort (i.e., “What is the perceived level of work which will be needed to resolve this RAI?”)

Each RAI item is assigned a level in each category (1-5) and the scores are combined to generate the Level of Significance of that RAI. The resulting significance score from each category is summed to determine the RAI overall significance (0 = Low, 1 = Moderate, 2 and above = High).

Table 1: RAI Significance Summary

Level of Significance	Number of Draft RAIs
High	0
Medium	0
Low	4

Table 1: RAI Categorization Summary

RAI	Concern	Impact	Effort	Significance
RAI-WTDP-01	3	3	2	Low
RAI-WTDP-01	3	3	3	Low
RAI-WTDP-01	3	3	3	Low
RAI-WTDP-01	3	3	3	Low

Level of Concern

Level of Concern	Definition	Significance Score
1	The NRC staff is very concerned as the RAI is focused upon statements which the staff understands, but the NRC staff believes are incorrect.	1
2	The NRC staff is concerned as the RAI is focused upon statements which the staff understands, but the staff is skeptical about being correct, OR the NRC staff is unsure of their concern as the as the RAI is focused upon very important statements which the staff does not understand; therefore, clarification is needed.	1
3	The NRC staff is somewhat concerned as the RAI is focused upon statements which the NRC staff understands and believes are correct but considers the supporting documentation to be inadequate.	0
4	The NRC staff is unsure of their concern as the as the RAI is focused upon statements which the NRC staff does not understand; therefore, clarification is needed.	0
5	The NRC staff is minimally concerned.	0

Level of Impact

Level of Impact	Definition	Significance Score
1	The RAI could have a very large impact. If it is not resolved, either the submittal will be denied, or the approval would be so limited that the method described in the submittal may be unusable.	1
2	The RAI could have a large impact. If it is not resolved, the approval will be limited such that the submittal would be usable, but significantly limited.	1
3	The RAI could have somewhat of an impact. If it is not resolved, the approval will be limited such that the submittal would be usable and only slightly limited.	0
4	The impact of the RAI is unknown as it is address information in the submittal which the staff does not understand.	0
5	The RAI likely has a minimal impact. If it is not resolved, the approval would likely not be limited.	0

Level of Effort	Definition	Significance Score
1	<p>The RAI will likely require a very significant level of effort to resolve. Such requests are typically made when important aspects of a specific assertion of the submittal are missing and likely require substantial additional analysis by the submitter or the NRC staff. Additionally, the NRC staff believes that there is a high likelihood of having an additional RAI on the newly submitted information.</p> <p>Examples: data required for independent verification, need for additional computational runs, need for additional experimental data</p>	1
2	<p>The RAI will likely require a significant level of effort to resolve. Such requests are typically made when important aspects of a specific assertion of the submittal are missing and likely require additional analysis by the submitter. Additionally, the NRC staff does not believe that there is a high likelihood of having an additional RAI on the newly submitted information.</p> <p>Examples: complete justifications of an assertion, detailed summary</p>	0
3	<p>The RAI will likely require some level of effort to resolve. Such requests including requesting data or information which may not be immediately available but is likely known or understood by the submitter.</p> <p>Examples: further explanations or details, high level summary</p>	0
4	<p>The RAI will likely require a small level of effort to resolve. Such requests include requesting a data or information which is likely to be immediately available but has not been given.</p> <p>Examples: a citation for a reference, a figure or a table of known data</p>	0
5	<p>The RAI will likely require a minimal level of effort to resolve. Such requests include requesting an affirmation of a certain position (i.e., “yes” or “no”).</p> <p>Examples: a confirmation that a certain procedure is being used</p>	0

1) RAI-WTDP-01

Clarification

Provide the following clarifications:

a) Section 2

- a. Rewrite the equations in a style more consistent with the previous TRs. The equations should use common mathematical notation and each term in the equation (e.g., variables, functions, indices) should be fully defined and consistent among all of the equations.
- b. For random variables that are defined by probability distributions that use the mean and standard deviation or upper and lower bound, discuss how each parameter of the distribution is determined.
- c. Clarify the equations to specify what set of inputs are used to generate the nominal case and how that set of inputs is changed to generate the perturbed case (i.e., how the conditions for the second sub-case are determined).

b) Section 3

- a. Provide additional detail on how the fuel damage probability table (denoted the departure from nucleate boiling (DNB) probability distribution in the TR) is defined. [

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- b. Provide additional detail on how the fuel census table, the DNB ratio (DNBR) versus fuel rod power table, and the fuel damage probability table are combined to generate the expected number of rods experiencing fuel damage due to DNB. Provide a sample calculation showing the entire process for one power interval.

Associated Section	Multiple				
Level of Concern	3	Level of Impact	3	Level of Effort	2
Overall Significance	Low				

2) RAI-WTDP-02

Epistemic Uncertainties					
What is the impact on the DNBR limit of assuming a []					
How does Westinghouse ensure that the DNBR specified acceptable fuel design limit is satisfied for every statepoint that the reactor operates at during a cycle, and is not simply satisfied based on the initially assumed set of possible conditions?					
Associated Section	3.1.1 Input Selection				
Level of Concern	3	Level of Impact	3	Level of Effort	3
Overall Significance	Low				

3) RAI-WTDP-03

Spatial Sensitivity					
Westinghouse's current method for determining the DNBR sensitivity is to use a []					
Associated Section	3.1.2 Generation of the DNBR Sample				
Level of Concern	3	Level of Impact	3	Level of Effort	3
Overall Significance	Low				

4) RAI-WTDP-04

Criteria for case exclusion					
What criteria are used to ensure that code cases which fail to execute or produce an error are reasonable to exclude from the statistical analysis?					
Associated Section	3.1.2 Generation of the DNBR Sample				
Level of Concern	3	Level of Impact	3	Level of Effort	3
Overall Significance	Low				