

RESOLUTION OF WESTINGHOUSE ELECTRIC COMPANY  
COMMENTS ON DRAFT SAFETY EVALUATION FOR  
TOPICAL REPORT WCAP-16865-P/WCAP-16865-NP, REVISION 1,  
“WESTINGHOUSE BWR ECCS EVALUATION MODEL UPDATES:  
SUPPLEMENT 4 TO CODE DESCRIPTION,  
QUALIFICATION AND APPLICATION”  
WESTINGHOUSE ELECTRIC COMPANY  
PROJECT NO. 700

By letter dated June 6, 2011, Westinghouse Electric Company (Westinghouse) provided eighteen comments on the draft safety evaluation (SE) for Topical Report (TR) WCAP-16865-P/WCAP-16865-NP, Revision 1, “Westinghouse BWR ECCS Evaluation Model Updates: Supplement 4 to Code Description, Qualification and Application.” Some information in the draft SE for this TR was identified as proprietary; therefore, the draft of this SE will not be made publicly available. The following are the NRC staff’s resolution of these comments:

Draft SE comments for TR WCAP-16865-P/WCAP-16865-NP, Revision 1:

1. The third sentence of Section 1.0, Paragraph 1, reads:

The Evaluation Model (Reference 2) was updated to include a change to the manner in which the computer code GOBLIN determines the end of lower plenum flashing.

Westinghouse proposed the following change for the third sentence of Section 1.0, Paragraph 1:

The Evaluation Model (Reference 2) was updated to include a change to the manner in which the end of lower plenum flashing is defined.

NRC Resolution for Comment 1 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The third sentence of Section 1.0, Paragraph 1, IS changed to read:

The Evaluation Model (Reference 2) was updated to include a change to the manner in which the end of lower plenum flashing is defined.

2. The fifth and sixth sentences of Section 1.0, Paragraph 1, read:

Thus the code GOBLIN turned off lower plenum flashing before the phenomenon ended. The new determination of the end of lower plenum flashing is based on the completion of flashing in the lower plenum and as such, GOBLIN continues to credit the flashing in the lower plenum as long as the lower plenum continues to flash.

Westinghouse proposed the following change for the fifth and six sentences of Section 1.0, Paragraph 1:

Thus the convective cooling from lower plenum flashing that was passed as a boundary condition to the downstream heat-up code was ended prematurely. The new determination of the end of lower plenum flashing is based on the completion of flashing in the lower plenum and as such, credit is taken for the convective cooling due to flashing in the lower plenum as long as the lower plenum continues to flash or the core spray flow reaches rated conditions.

NRC Resolution for Comment 2 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The fifth and sixth sentences of Section 1.0, Paragraph 1, are changed to read:

Thus the convective cooling from lower plenum flashing that was passed as a boundary condition to the downstream heat-up code was ended prematurely. The new determination of the end of lower plenum flashing is based on the completion of flashing in the lower plenum and as such, credit is taken for the convective cooling due to flashing in the lower plenum as long as the lower plenum continues to flash or the core spray flow reaches rated conditions.

3. The first sentence of Section 2, Paragraph 4, states: "WCAP-16865-P/WCAP-16865-NP, Revision 1, requests a change to a physical model in an approved code."

Westinghouse proposed the following change for the first sentence of Section 2, Paragraph 4: "WCAP-16865-P/WCAP-16865-NP, Revision 1, requests a change to the manner in which the end of lower plenum flashing is defined."

NRC Resolution for Comment 3 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The first sentence of Section 3.1, Paragraph 2, is changed to read: "WCAP-16865-P/WCAP-16865-NP, Revision 1, requests a change to the manner in which the end of lower plenum flashing is defined."

4. The fifth sentence of Section 3.1, of the draft SE states:

GOBLIN calculates the peak cladding temperatures (PCT) and other figures of merit and these are compared to regulatory limits to ensure the safety of the public if such an unlikely event were to occur.

Westinghouse proposed the following change to the fifth sentence of Section 3.1:

GOBLIN calculates the system transient response to a LOCA and other figures of merit that are used as boundary conditions in the heat-up calculation where the results are compared to regulatory limits to ensure the safety of the public if such an unlikely event were to occur.

NRC Resolution for Comment 4 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The fifth sentence of Section 3.1 is changed to read:

GOBLIN calculates the system transient response to a LOCA and other figures of merit that are used as boundary conditions in the heat-up calculation where the results are compared to regulatory limits to ensure the safety of the public if such an unlikely event were to occur.

5. The second and third sentences of Section 3.1.1, Paragraph 4, of the draft SE state:

The core spray pumps generate the most head and will be first to inject water into the core. They will spray water into the upper plenum of the core thereby condensing the steam.

Westinghouse proposed the following change to the second and third sentences of Section 3.1.1, Paragraph 4:

When core spray pumps' injection valves open, subcooled water will spray into the upper plenum of the core thereby condensing steam.

NRC Resolution for Comment 5 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The second and third sentences of Section 3.1.1, Paragraph 4, are changed to read:

When core spray pumps' injection valves open, subcooled water will spray into the upper plenum of the core thereby condensing steam.

6. Section 3.2 of the draft SE states:

In this TR, Westinghouse proposes to change how GOBLIN determines when the end of lower plenum flashing occurs. This change credits lower plenum flashing for a longer time than the code is currently crediting the phenomenon. The additional crediting of lower plenum flashing would provide steam cooling to the fuel and reduce the PCT.

Westinghouse proposed the following change to the Section 3.2:

In this TR, Westinghouse proposes to change how the end of lower plenum flashing is determined. This change credits lower plenum flashing for a longer time in the current evaluation model. The additional crediting of lower plenum flashing would provide increased steam cooling to the fuel and reduce the PCT.

NRC Resolution for Comment 6 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

Section 3.2 is changed to read:

In this TR, Westinghouse proposes to change how the end of lower plenum flashing is determined. This change credits lower plenum flashing for a longer time in the current evaluation model. The additional crediting of lower plenum flashing would provide increased steam cooling to the fuel and reduce the PCT.

7. Paragraph 2 of Section 3.2.1 of the draft SE states:

This determination is conservative, in that the code will turn off lower plenum flashing prematurely and calculate higher fuel temperatures than would be expected. To gain back some margin, Westinghouse submitted this TR to more accurately determine the end of lower plenum flashing.

Westinghouse proposed the following change to the paragraph 2 of Section 3.2.1:

This determination is conservative, in that the credit for lower plenum flashing ends prematurely and the calculated PCT is higher than would be expected. To gain back some margin, Westinghouse submitted this TR to more accurately determine the end of lower plenum flashing.

NRC Resolution for Comment 7 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

Paragraph 2 of Section 3.2.1 is changed to read:

This determination is conservative, in that the credit for lower plenum flashing ends prematurely and the calculated PCT is higher than would be expected. To gain back some margin, Westinghouse submitted this TR to more accurately determine the end of lower plenum flashing.

8. Section 3.2.2 of the draft SE states:

Westinghouse's proposed methodology (Reference 1) would use code calculated parameters in the lower plenum to determine if the remaining water in the lower plenum is flashing. Lower plenum flashing would end when: (1) the water temperature in the lower plenum is no longer greater than the saturation temperature, or (2) there is no longer any water in the lower plenum to flash.

Westinghouse proposed the following change to Section 3.2.2:

Westinghouse's proposed methodology (Reference 1) would use code calculated parameters in the lower plenum to determine if the remaining water in the lower plenum is flashing. Lower plenum flashing would end when: (1) depressurization in the lower plenum stops or the water in the lower plenum becomes subcooled, or (2) there is no longer any water in the lower plenum to flash.

NRC Resolution for Comment 8 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

Paragraph 2 of Section 3.2.1 is changed to read:

Westinghouse's proposed methodology (Reference 1) would use code calculated parameters in the lower plenum to determine if the remaining water in the lower plenum is flashing. Lower plenum flashing would end when: (1) depressurization in the

lower plenum stops or the water in the lower plenum becomes subcooled, or (2) there is no longer any water in the lower plenum to flash.

9. The third sentence of Section 3.3.1 of the draft SE states:

This was accomplished by filling the test section to an elevation above the top of the fuel assembly, and allowing the heat from the fuel to boil off the water.

Westinghouse proposed the following change to the third sentence of Section 3.3.1:

This was accomplished by filling the test section to an elevation above the top of the fuel assembly, and allowing the heat from the fuel rod simulator to boil off the water.

NRC Resolution for Comment 9 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

The third sentence of Section 3.3.1 is changed to read:

This was accomplished by filling the test section to an elevation above the top of the fuel assembly, and allowing the heat from the fuel rod simulator to boil off the water.

10. Section 5.0 of the draft SE states:

As proposed by Westinghouse [

]

Westinghouse proposed the following change to the Section 5.0:

As proposed by Westinghouse [

]

NRC Resolution for Comment 10 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the suggested revision clarifies the scope and context of the staff review. The NRC staff agrees that such a revision is consistent with the staff's review findings and provides additional clarification.

Section 5.0 is changed to read:

As proposed by Westinghouse [

]

11. Westinghouse provided several comments related to typographical errors and stylistic changes.

NRC Resolution for Comment 11 on Draft SE:

The NRC staff reviewed the Westinghouse recommendation and found it acceptable, because the changes are editorial in nature.