

**RESOLUTION OF COMMENTS ON DRAFT SAFETY EVALUATION FOR**  
**TOPICAL REPORT WCAP-16996-P/WCAP-16996-NP, VOLUMES I, II, AND III,**  
**REVISION 1, “REALISTIC LOSS-OF-COOLANT ACCIDENT EVALUATION METHODOLOGY**  
**APPLIED TO THE FULL SPECTRUM OF BREAK SIZES” (TAC NO. ME5244)**  
**WESTINGHOUSE ELECTRIC COMPANY**  
**PROJECT NO. 700**

By letter dated April 14, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16131A660), Westinghouse Electric Company (Westinghouse) provided comments on the draft safety evaluation (SE) for Topical Report (TR) WCAP-16996-P/WCAP-16996-NP, Volumes I, II, and III, Revision 0, “Realistic LOCA Evaluation Methodology Applied to the Full Spectrum of Break Sizes (FULL SPECTRUM™ LOCA Methodology).” 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 U.S. Nuclear Regulatory Commission (NRC) staff’s resolution of these comments:

Draft SE comments for TR WCAP-16996-P/WCAP-16996-NP, Volumes I, II, and III, Revision 0:

1. Last part of Table 1 on page 3 in regards to FSLOCA™ reads: “FSLOCA™ BE EM based on WCOBRA/TRAC-TF2 Rev. 1.1 (WCAP-16996-P Rev. 0).”

Westinghouse stated that “The frozen code associated with the FULL SPECTRUM LOCA evaluation model is WCOBRA/TRAC-TF2 Version 1.3 as identified on page 2-52 of WCAP-16996-P, Volume I, Revision 1. WCOBRA/TRAC-TF2 Version 1.1 was the as-submitted version.”

NRC Resolution for Comment 1 on Draft SE:

The NRC staff has reviewed Westinghouse comment and agrees with this comment. The NRC staff has updated last part of Table 1. “WEC EMs for LOCA Analyses with Their Areas of Applicability” that reads now:

FSLOCA™ BE EM based on WCOBRA/TRAC-TF2 Rev. 1.1 (WCAP-16996-P Rev. 0) The frozen FULL SPECTRUM™ LOCA evaluation model is WCOBRA/TRAC-TF2 Version 1.3 as noted in WCAP-16996-P, Vol. 1, Rev. 1 (page 2-52). Note Version 1.1 was the as-submitted version.

2. Second sentence in the Step 18 of the element 4 on page 37 reads:

Tests performed at the Rig-of-Safety Assessment (ROSA) test facility were initially selected to assess the EM for SBLOCA scenarios.

Westinghouse proposed the following change for the last sentence of Section 1.0, paragraph 3:

Tests performed at the Rig-of-Safety Assessment (ROSA) test facility, as well as the LOFT facility, were initially selected to assess the EM for SBLOCA scenarios.

NRC Resolution for Comment 2 on Draft SE:

The NRC staff reviewed the proposed Westinghouse change and finds 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 last sentence of Section 1.0, paragraph 3, is changed to read:

Tests performed at the Rig-of-Safety Assessment (ROSA) test facility, as well as the LOFT facility, were initially selected to assess the EM for SBLOCA scenarios.

3. On page 38 fourth sentence of Section 4.2.1 (line 31 through 35) reads:

The assessment summary is documented in Table 32-1, "Summary of Assessment Results and Uncertainty Treatment for High PIRT Ranked Phenomena," which lists 24 FSLOCA™ EM PIRT high-ranked phenomena groups. Phenomena in the "minimum" and "insufficient" assessment categories would require conservative treatment in the EM.

Westinghouse proposed to change 24 to 23 due to erroneously numbered table in Westinghouse submittal.

NRC Resolution for Comment 3 on Draft SE:

The NRC staff reviewed the Westinghouse proposed change and finds it acceptable. The fourth sentence in the last paragraph of Section 4.2.1 is changed to read:

The assessment summary is documented in Table 32-1, “Summary of Assessment Results and Uncertainty Treatment for High PIRT Ranked Phenomena,” which lists 23 FSLOCA™ EM PIRT high-ranked phenomena groups. Phenomena in the “minimum” and “insufficient” assessment categories would require conservative treatment in the EM.

4. On page 49 last sentence of Section 4.5.3 reads:

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Westinghouse proposed the following change to the last sentence of Section 4.5.3 on page 49:

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NRC Resolution for Comment 4 on Draft SE:

The NRC staff reviewed Westinghouse proposed change and finds it acceptable. The last sentence of the Section 4.5.3 on page 49 is changed to read:

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5. On page 53 second and third sentences of paragraph four reads:

Westinghouse chose to compare the code to only one facility, ROSA-IV, which displayed no long term core uncover that is characteristic of the limiting small breaks described above and illustrated in Figure 1. From the eight small break tests simulated, only three produced minimal core uncover when the PCT was

found to be less than 900 °F.

Westinghouse proposed the following change to the second and third sentences of paragraph four page 53:

Westinghouse chose to compare the code to only two facilities, ROSA-IV and LOFT, which displayed no long term core uncovering that is characteristic of the limiting small breaks described above and illustrated in Figure 1. From the ten small break tests simulated (nine ROSA-IV and one LOFT), only three produced minimal core uncovering when the PCT was found to be less than 940 K (1,232 °F).

NRC Resolution for Comment 5 on Draft SE:

The NRC staff reviewed the Westinghouse proposed change and finds it acceptable.

On page 53 first sentence of paragraph four is changed to read:

Westinghouse chose to compare the code to only two facilities, ROSA-IV and LOFT, which displayed no long term core uncovering that is characteristic of the limiting small breaks described above and illustrated in Figure 1. From the ten small break tests simulated (nine ROSA-IV and one LOFT), only three produced minimal core uncovering when the PCT was found to be less than 940 K (1,232 °F).

6. Westinghouse indicated that: “Westinghouse did not couple the LOTIC2 code with WCOBRA/TRAC-TF2, but has included LOTIC2 within the FSLOCA EM, utilized in a similar manner as the ASTRUM EM.”

NRC Resolution for Comment 6 on Draft SE:

The NRC staff reviewed proposed by Westinghouse change and finds 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.

7. Westinghouse stated that “TS” should be removed before each instance of FQ owing to the fact that the [

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NRC Resolution for Comment 7 on Draft SE

The NRC staff reviewed proposed by Westinghouse change and finds 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 change has been applied.

8. Sixth sentence in the second paragraph of Section 4.6.4 reads: “In addressing RAI Nos. 72 through 72, noding sensitivity results for ORNL THTF and G2 tests.”

Westinghouse proposed to change the sentence to read: “In addressing RAI Nos. 59 through 71, noding sensitivity results for ORNL THTF and G2 tests were presented.”

NRC Resolution for Comment 8 on Draft SE:

The NRC staff reviewed the Westinghouse proposed changes and finds them acceptable.

Sixth sentence in the second paragraph of Section 4.6.4 is changed to read: “In addressing RAI Nos. 59 through 71, noding sensitivity results for ORNL THTF and G2 tests were presented.”

9. Westinghouse provided the following comment for the sentences 13 and 14 contained in the second paragraph of Section 4.6.4 (lines 50 through 55):

The 3 changes cited on lines 43 through 50 were all implemented into the code at the time of the cited audit. However, after that audit, it was discovered that only the first and third changes were required to remedy the unwanted behavior in the level swell predictions. As such, the second change was removed from the code downstream of the audit. Revision 1 of the topical report was updated to reflect the first and third changes (including model

descriptions, validation, plant application, etc.), but the second change was absent from the updates.

The sentences read:

Updated WCOBRA/TRAC-TF2 assessment results were included in the audit summary document to demonstrate the code performance with the updated drag package. Updated WCOBRA/TRAC-TF2 assessment results were presented for selected ORNL THTF core uncover and level swell tests, G2 boil-off tests, GE blowdown tests, and ROSA-IV LSTF 2.5 percent and 5 percent small cold leg break tests.

NRC Resolution for Comment 9 on Draft SE:

The NRC staff reviewed the proposed Westinghouse change and finds it acceptable because the suggested revision clarifies the staff scope and context of the staff review. The NRC staff updated the wording in the sentences 13 and 14 (lines 50 through 55) contained in the second paragraph of Section 4.6.4.

Updated WCOBRA/TRAC-TF2 assessment results were included in the audit summary document to demonstrate the code performance with the updated drag package. It is noted that after the audit, it was discovered that only the first and third changes, above, were required to remedy the unwanted behavior in the level swell predictions. Updated WCOBRA/TRAC-TF2 assessment results were then presented for selected ORNL THTF core uncover and level swell tests, G2 boil-off tests, GE blowdown tests, and ROSA-IV LSTF 2.5 percent and 5 percent small cold leg break tests.

10. Westinghouse proposed to add a following sentence to the line 19 on the page 82 of draft SE:

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NRC Resolution for Comment 10 on Draft SE:

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

11. Westinghouse proposed the following addition to the last paragraph of Section 4.7.4:

The discussion leading to limitation and condition #10 should reflect the 1 ft<sup>2</sup> limitation for the lower end of the Region II break area sampling (which is consistent with the approved ASTRUM EM).

NRC Resolution for Comment 11 on Draft SE:

The NRC staff reviewed the Westinghouse comment and finds it acceptable because the suggested addition clarifies the staff scope and context of the staff review. The NRC staff agrees that such an addition is consistent with the staff's review findings and provides additional clarification. The following sentence is added to the last paragraph of Section 4.7.4: "It is further noted that the lower break size limit to Region II sampling is 1.0 ft<sup>2</sup>, which is consistent with the approved ASTRUM EM."

12. Westinghouse provided the following comment on Section 4.7.9:

Westinghouse understands that the NRC staff found the proposed approach for Region II offsite power availability to be unacceptable; however, the proposed approach is mischaracterized on the cited page and lines in several regards. Given that the proposed approach is superseded in its entirety by limitation and condition 15, Westinghouse suggests removing the cited text from the draft SER to eliminate the mischaracterizations.

NRC Resolution for Comment 12 on Draft SE:

The NRC staff reviewed the Westinghouse comment and finds it acceptable, because the suggested clarification aids the staff scope and context of the staff review. The NRC staff agrees that such a clarification is consistent with the staff's review findings. The NRC staff revised Section 4.7.9.

13. Westinghouse provided proprietary markings on the draft SE.

NRC Resolution for Comment 13 on Draft SE:

The NRC staff reviewed the Westinghouse markings and incorporated them into the final SE.

14. Westinghouse provided comments related to the typographical errors and stylistic changes.

NRC Resolution for Comment 14 on Draft SE:

The NRC staff reviewed the Westinghouse comments and finds them acceptable, because the changes are editorial in nature.