UNITED STATES
NUCLEAR REGULATORY COMMISSION
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January 3, 1997

Mr. Nicholas J. Liparulo, Manager
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Westinghouse Electric Corporation
P.O. Box 355
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SUBJECT: COMMENTS ON THE REVISED REPORT ON WCOBRA/TRAC APPLICABILITY TO AP600 LARGE-BREAK LOSS-OF-COOLANT ACCIDENT

Dear Mr. Liparulo:

Westinghouse letter NSD-NRC-96-4871, dated October 30, 1996, submitted revision 1 to WCAP-14171, WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident. The revision addresses previous NRC staff comments including those provided in an NRC letter to Westinghouse dated May 17, 1996. In addition, request for additional information (RAI) responses related to the revised WCAP were submitted by Westinghouse letter NSD-NRC-96-4908, dated December 10, 1996. The NRC staff and its contractor, INEL, have reviewed the revised WCAP and related RAI responses and have additional questions and comments which are included as an enclosure to this letter.

Many of the enclosed questions and comments may not merit the issuance of formal RAIs. To expedite the review process, Westinghouse is requested to provide brief written responses to each item in the enclosed material which can then be used to conduct detailed discussions during a subsequent telecon or meeting. The staff requests that Westinghouse provide the written responses to the enclosed items in advance of any further discussions (excepting requests for clarifications by Westinghouse). The staff expects that the enclosed questions and comments will be included in the open item tracking system so that the status and disposition of these items can be tracked.

DF03

If you have any questions regarding this matter, you may contact me at (301) 415-1141.

Sincerely,

original signed by:

William C. Huffman, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: As stated

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COMMENTS ON WESTINGHOUSE'S REPORT
WCAP-14171, REV. 1
WCOBRA/TRAC APPLICABILITY TO AP600 LBLOCA

NOTE: The questions are based on the review of information Westinghouse submitted in Reference 1.

1. The following questions relate to the AP600 Phenomena Identification and Ranking Table (PIRT) presented by Westinghouse in Section 2.1 of Reference 1. They also represent followup questions to Item 8e in the May 17, 1996, NRC letter.

   a. In several cases, Westinghouse stated that a lower ranking was given to a certain phenomenon in the AP600 because of the low peak cladding temperatures (PCTs) calculated for the plant. Examples include reflood heat transfer, entrainment/deentrainment in the core, and containment pressure. For these phenomena, and for others if Westinghouse makes similar arguments for them, clarify if (a) calculating these phenomena are important even if PCTs are low or (b) they are important because they contribute to the calculation of the lower PCTs. If Westinghouse answers yes to either a or b above, provide additional information to justify the lower AP600 ranking.

   b. For containment pressure, reflood heat transfer, and core entrainment/deentrainment, and for other phenomena if Westinghouse makes similar arguments about the lower AP600 PCTs for them, clarify if the INEL understanding is correct regarding the conservatism of the calculations or how the uncertainty is accounted for in the Westinghouse methodology:

      (1) containment pressure: Westinghouse uses a lower bound containment pressure consistent with current conservative (Appendix K) analyses.

      (2) reflood heat transfer: Uncertainties in this area are included in the uncertainty methodology.

      (3) core entrainment/deentrainment: WCOBRA/TRAC analyses are conservative in this area as discussed in Section 3.1.6 of the Revised Methodology Report (RMR).[2] In addition, the uncertainty in core entrainment/deentrainment is covered in Westinghouse's overall heat transfer coefficient (HTC) multiplier methodology, which captures differences in local fluid conditions.

   c. Westinghouse ranked downcomer entrainment/deentrainment slightly lower in reflood for the AP600 relative to 3-/4-loop plants but did not discuss why. Clarify the reason for the lower AP600 ranking. If the reason(s) is(are) similar to that discussed in part a, provide the same type of information requested in parts a and b.

Enclosure

d. On page 2-8, Westinghouse discussed flow from the upper plenum to the core during flow reversal in blowdown. During the flow reversal, Westinghouse argued that all the upper head water flows to the upper plenum and then to the core due to the large pressure drop between the upper plenum and the break. However, the flow path to the break through the hot leg is another possible route for upper head water. To clarify the flow split from the upper plenum to the core versus the upper plenum to the hot legs, provide plots of the flows at the intact and broken loop hot leg junctions for comparison to the top of the core flows provided in Reference 1. Clarify how the hot leg flows support Westinghouse's position on the flow to the core or provide additional information to clarify Westinghouse's understanding of the flow split and how any uncertainty in the calculation is accounted for in the AP600 uncertainty analysis. This is a followup to Discussion Item 5b in the May 17, 1996, letter.

e. For core countercurrent flow (CCF) during reflood, provide plots that show the flows calculated at the core outlet to clarify if downward liquid flow is calculated and contributes to core cooling. If yes, justify not ranking this phenomena or provide a ranking and its justification. If liquid flow downflow at the top of the core contributes to core cooling during reflood, clarify how the uncertainty in this phenomenon is accounted for in the AP600 uncertainty analysis.

f. On page 2-2, Westinghouse stated that core top down flow/CCF limit is addressed under the PIRT upper plenum component discussion. However, the PIRT does not rank upper plenum CCF drain/fallback while the upper head blowdown flow is ranked. Clarify if the upper head ranking is what Westinghouse was referring to on page 2-2, or if Westinghouse was referring to the information on page 2-8 discussed in part d.

g. Given the AP600 results in Section 2.2.3, clarify if the INEL is correct in interpreting that accumulator nitrogen discharge is not an large break loss-of-coolant accident (LBLOCA) issue with AP600 because the core quenches before the accumulators empty. Clarify how much liquid is left in the AP600 accumulators at the end of the analysis discussed in Section 2.2.3 and how long it would take for the accumulators to empty. If there is less than 20% of the accumulator liquid left at the end of the analysis (so that a change in plant design or the analysis could result in the accumulators emptying) or Westinghouse concludes accumulator nitrogen discharge is a LBLOCA issue for AP600, then provide the following information. On page 2-10, Westinghouse stated that the affects of nitrogen discharge after the accumulators empty were addressed in the Code Scaling, Applicability, and Uncertainty (CSAU) report.[3] However, in the CSAU report, only the affects of dissolved non-condensibles were studied, not the large amounts of nitrogen discharged after the accumulators empty. Therefore, clarify this reference to the CSAU report or provide the correct reference. Also, is accumulator nitrogen discharge addressed for AP600 in the same manner as for 3-/4-loop plants?

h. In the call on November 25, 1996, Westinghouse stated Discussion Item 8b from the May 17, 1996, letter was discussed in the 4th paragraph of Section 2.1. This paragraph, however, addresses downcomer behavior not upper plenum CCF/fall back. Should Westinghouse have referred INEL to page 2-8, 4th paragraph?

i. As a followup to Discussion Item 8d, May 17, 1996, letter.

(1) Westinghouse gave the same ranking to pump performance in the AP600 as for the 3-/4-loop plants. For 3-/4-loop plants the ranking was justified in Section 3.1.2 of the RMR. Because of the different type of pumps in AP600, Westinghouse needs to supply the same kind of information provided in the RMR for the AP600 pumps.

(2) For core entrainment/deentrainment and reflood interfacial heat and mass transfer (as part of reflood heat transfer) see parts a and b above. For core top down flow/CCF, upper plenum multidimensional flow/flow distribution (hot legs/core), and upper plenum CCF/fall back see parts d and e above.

(3) For core multidimensional flow in reflood, clarify the low Westinghouse ranking relative to the CSAU study and the LANL PIRT (see page 64 of the LANL report).[4]

2. These items relate to Table 2.1-2 and followup Item 8f (5/17/96 letter).

a. Because of low PCTs, Westinghouse has a low ranking for cladding oxidation in its PIRT and did not discuss cladding oxidation in Table 2.1-2. The INEL agrees that the low cladding temperatures currently calculated by Westinghouse for the AP600 indicate this is not an important phenomenon for the AP600. For 3-/4-loop plants, however, the uncertainty evaluation included the cladding oxidation uncertainty. Clarify if Westinghouse has removed cladding oxidation uncertainty from the AP600 uncertainty evaluation. If yes, will Westinghouse commit to including cladding oxidation uncertainty if plant design or analysis changes result in calculated cladding temperatures that cause oxidation to be important?

b. Gap conductance was not listed in Table 2.1-2. Based on the discussion on page 2-4, is the INEL correct in interpreting that this highly ranked phenomenon is covered under stored energy?

c. Westinghouse stated decay heat uncertainty is addressed in the same manner as 3-/4-loop plants. However, the portion of the 3-/4-loop plant methodology that addressed decay heat was changed for application to AP600. Therefore, provide additional information to justify how the decay heat uncertainty is addressed for the AP600 plant.

d. For rewet, Westinghouse stated the same approach for 3-/4-loop plants would be used to address the uncertainty. Clarify if

Table 2.1-2 should also state that this approach is supplemented by the information in Section 4.1

e. Westinghouse did not discuss the following highly ranked PIRT items in Table 2.1-2: core 3D flow and void generation/distribution, core flow reversal/stagnation, upper head blowdown flow and flow area, downcomer condensation, and direct vessel injection (DVI).

f. Westinghouse stated that downcomer liquid level oscillations were covered by the a conservative emergency core coolant (ECC) bypass calculation. Clarify this approach because these oscillations are a reflood phenomenon that occurs after ECC bypass is over. In a similar way, Westinghouse stated core flow oscillation are covered by the core level calculation (see page 2-2). In Table 2.1-2, Westinghouse stated the core level uncertainty is addressed by a conservative core level calculation. Clarify and justify how this accounts for core flow oscillations and the uncertainty in calculating that phenomenon.

g. For hot wall effects in the downcomer and lower plenum, Westinghouse provided information different from that supplied for 3-/4-loop plants in Reference 5. Clarify the reasons for the differences.

3. For the AP600 WCOBRA/TRAC model, clarify if AP600 has flow mixers in the upper plenum. If yes, include the flow mixers in Westinghouse's response to the following question. Channel 25 is used to combine two types of structures (see top of page 2-25). Justify the flow paths of the two types of structures in the upper plenum are sufficiently similar to allow this combination without biasing the combined calculated flow relative to what each type of structure would receive if modeled separately.

4. Westinghouse discussed pressurizer location in AP600 LBLOCA analyses on page 2-32. The reference given to support the chosen location does not seem correct; therefore, provide the correct reference. Also, have any AP600 specific studies been performed to support the pressurizer location relative to the break? If yes, provide them for review. If not, justify why they are not needed.

5. On page 2-33, Westinghouse stated that after 10 s vapor flows out of the core in the guide tube locations. Clarify this statement because Figure 2.2-34 shows vapor downflow after 10 s.

6. Westinghouse's discussion on the response of the low power rod in Figures 2.2-31 to 2.2-33 on page 2-34 is confusing. First, Westinghouse indicates that the low power rod undergoes a small temperature excursion but later states that no initial temperature excursion in blowdown. Based on Figures 2.2-31 to 2.2-33, the later statement appears to be correct. Therefore, clarify the apparent inconsistency or correct the report

7. The following questions relate to the CCTF analysis in Section 3.1.

   a. Clarify the statement on page 3-8 that in the calculation the low power rods quench early at the lower elevations. Figures 3.1-16 to 20 show an early quench calculated at all elevations.

   b. Clarify the statement on page 3-9 that Figures 3.1-31 to 33 show the calculated quench front is 80 s too early. This is true for the high power rods, but the quench fronts on the medium and low power rods are early by approximately 120 s.

   c. Clarify if the first paragraph on page 3-10 should be deleted because it refers to the WCOBRA/TRAC analysis in Rev. 0 of Reference 1.

   d. Clarify if the references to Figures 3.1-41 and 3.1-41A, Rev. 0 and Rev. 1, respectively, in the fourth paragraph on page 3-10 should have been to Figures 3.1-45 and 3.1-45A.

   e. Is the basis for the better comparison of the BLHL liquid flow in the Rev. 1 CCTF analysis the improved BL modeling in the revised calculation? This will clarify the response to Discussion Item 1b, in the May 17, 1996, NRC letter.

   f. WCOBRA/TRAC analysis no oscillations vs test data with oscillations. Westinghouse did not clarify the reasons for differences between the code results and the data for the core and downcomer differential pressure differences or the steam flows in the cold legs or the liquid flows in the hot and cold legs. (Discussion Item 6c, May 17, 1996, letter).

8. The following questions relate to the UPTF analysis in Section 3.2.

   a. On page 3-72, Westinghouse noted the test results showed increased flow to the lower plenum when liquid was discharged from the cold leg to the downcomer. WCOBRA/TRAC does not calculate liquid slug discharge for UPTF Test 21 because it underpredicted cold leg filling. As noted on page 3-75, this is one reason for the conservative WCOBRA/TRAC calculation. However, cold leg filling is not expected in AP600 because of steam flow in the cold leg that was not represented in the UPTF test. How does Westinghouse factor this test to AP600 difference into the interpretation of the code/data comparisons for this test?

   b. Does the discussion in part a of this question impact the information provided and conclusions drawn by Westinghouse on page 3-80 as it relates to the DVI location difference between UPTF and AP600 and the effect of the DVI location difference on application of the UPTF Test 21 results to AP600?

   c. In the discussion on page 3-81 on the LOFT lower plenum refill, provide comparisons between the Westinghouse WCOBRA/TRAC results for LOFT Tests L2-2/2-3 and the test data for L2-2/2-3 already provided in Reference 1. This is a followup to Item 7, May 17, 1996, letter.

d. In response to RAI 440.348, Westinghouse provided a table comparing UPTF Test 21 test conditions to AP600 conditions. For the comparison in Reference 1, the AP600 table was different from that provided in the RAI response. Clarify the reasons for the differences.

e. Based on the information in Section 3.2.8, is the INEL correct in assuming that there is not sufficient data to develop a flooding curve for the CCTF and UPTF DVI tests directly from the test data and that other flooding correlations are not applicable for the reasons discussed in that section? This is a followup question to Discussion Item 6a, May 17, 1996, letter.

f. On page 3-82 Westinghouse stated that WCOBRA/TRAC predicts the different flow behavior that results from cold leg or downcomer injection. In Test 21, ECC water breakup on the downcomer wall resulted in greater bypass relative to UPTF Test 6 (see page 3-82). This implies that the WCOBRA/TRAC calculated bypass for Test 21 should be greater than the WCOBRA/TRAC bypass calculated for UPTF Test 6. Provide the calculated ECC bypass results for Tests 6 an 21 that support this argument. This also implies that the conservatism of the WCOBRA/TRAC ECC bypass results for UPTF Test 21 should be greater than the conservatism of the WCOBRA/TRAC ECC bypass results for Test 6. Clarify if this is true.

g. As a followup to Discussion Item 6b in the May 17, 1996, letter, clarify if the following interpretation by the INEL of the information in Section 3.2.7 is correct. Westinghouse argues:
   (1) In the UPTF Test 21 configuration, it is easier to bypass ECC than in AP600.
   (2) WCOBRA/TRAC provides a conservative calculation of ECC bypass in Test 21.
   (3) The AP600 plant calculation ends bypass at a lower steam flow than end-of-bypass in UPTF.

   Based on 1, 2, and 3, Westinghouse concluded that WCOBRA/TRAC provides a conservative ECC bypass calculation for AP600.

   Is this argument also the basis for the response to discussion Item 6d?

i. On page 3-80, Westinghouse stated termination of ECC bypass is more easily achieved in AP600 than in UPTF Test 21 configuration. However, based on the information provided by Westinghouse regarding steam flow at end-of-bypass, this is not the case. What are the implications of this difference on determining the applicability of WCOBRA/TRAC to the AP600?

9. The following questions relate to Section 4.1.

   a. Westinghouse discussed removing some tests from the previous database used to develop the minimum film boiling temperature

(T_{MIN}) uncertainty distribution. Clarify this statement as some of the tests listed were not part of the original T_{MIN} database.

b. Is the T_{MIN} identified in Section 4.1 used in blowdown only or both blowdown and reflood?

c. Table 4.1-1 lists the tests used to determine the T_{MIN} uncertainty for AP600. Section 4.1 also listed the tests not used from the 3-/4-loop review. However, comparison of the tests shown in Section 4.1 to those listed in Table B-7 of the RMR found Westinghouse did not discuss its inclusion or exclusion of all the tests used to develop the T_{MIN} uncertainty for 3-/4-loop plants. For those tests not discussed in Section 4.1, clarify the reasons for Westinghouse's handling of those tests.

d. On page 4-4, Westinghouse discussed the temperature criterion used to screen the initial temperatures of the thermocouples used in the T_{MIN} evaluation. The temperature given was an average T_{MIN} based on bundle average data from the RMR analysis. Justify whether it is appropriate to use this bundle average temperature T_{MIN} to screen individual thermocouples as done in Section 4.1.

10. The following questions relate to Section 4.2.

a. Westinghouse revised the database for the blowdown cooling heat transfer uncertainty evaluation to better match the AP600 conditions, but in the end concluded the original uncertainty distribution was better and more conservative because the new distribution had less scatter than the original distribution. Justify this conclusion because the original distribution allows for larger multipliers and a larger average multiplier than the one developed in Section 4.2.

b. Clarify what Westinghouse means in Section 4.2 by the original distribution because distributions from the RMR, Reference 2, and the final 3-/4-loop plant distribution from Reference 6 are referenced.

c. For the comparisons provided in Section 4.2, Westinghouse found WCOBRA/TRAC overpredicted the ORNL heat transfer data used as the database. In Reference 6, however, Westinghouse found that WCOBRA/TRAC underpredicted the same data. Clarify whether the overprediction or the underprediction of the ORNL data is correct, and clarify the reason(s) for the different results in Section 4.2 versus Reference 6.

d. Because Reference 6 contains the final blowdown cooling heat transfer distribution for 3-/4-loop plants, justify why that distribution was not used in Figure 4.2-1.

e. Clarify the meaning of the word saturated in Table 4.2-1 regarding inlet water temperatures for AP600. Is Westinghouse implying that AP600 sees only saturated water inlet conditions during blowdown? If yes, clarify the temperature range relative to the pressure range which indicates some subcooling for the temperatures given.

f. Followup to Discussion Item 5a, May 17, 1996, letter. Based on Table 4.2-1, Westinghouse stated the Oak Ridge National Laboratory data better represented the AP600 during blowdown cooling than the original data base in the RMR/Reference 6. However, Westinghouse decided to use the uncertainty range based on the original database. Therefore, Westinghouse still needs to provide a response to Item 5a to show the mass fluxes for the tests in the database for the original uncertainty range are representative of AP600 or are conservative.

11. The following question relates to Section 4.3.

a. While the reflood heat transfer results for the low temperature tests for AP600 are within the bounds of the 3-/4-loop plant results, the 3-/4-loop plant results have a wider range than the low temperature data for the AP600. Because Westinghouse concluded it was acceptable to use the 3-/4-loop plant uncertainty distribution for the AP600, this implies that a larger multiplier than that supported by the low temperature data is applied in the AP600 uncertainty evaluation. It also implies that a smaller multiplier than that supported by the low temperature data is applied in the AP600 uncertainty evaluation. Therefore, more information is needed to justify the proposed Westinghouse approach for the reflood heat uncertainty distribution.

12. The following questions relate to Section 4.4.

a. Table 4.4-1: Has the Westinghouse grid deformation analysis been approved by the NRC? If not, will Westinghouse commit to addressing grid deformation if the NRC review results in this becoming a concern for the AP600? For mixed cores, how will Westinghouse address mixed cores if they are used in AP600 in the future?

b. Westinghouse identified power shapes (PSs) 2, 3, 4 and 11 as the PSs it would evaluate from the RMR to determine the limiting PS for AP600. Justify the basis for selecting these PSs as the ones to study the AP600. Could the excellent blowdown cooling for the AP600 cause the limiting axial power shape(s) to change for AP600 relative to the 3-/4-loop plants? Also, Westinghouse has an approach to identify limiting axial power shapes to meet Appendix K, Item I.A. Does this approach have any applicability for AP600? Justify your answer.

c. Justify the values used to represent F_q and $F_{\Delta H}$ in the WCOBRA/TRAC analyses include all the appropriate uncertainties that were covered by F_q and $F_{\Delta H}$ in the 3-/4-loop uncertainty evaluation. This includes the calculational uncertainty in Westinghouse's Code Qualification Document (CQD),[7] Table 21-2-2, and all augmented variables.

d. For Table 4.4-2, clarify the uncertainties entered for core power and γ-redistribution. The uncertainties are not consistent with RMR Table 3.1.3-1.

e. Clarify how the upper head temperature is calculated. The wording on page 4-14 is not clear.

f. Justify the basis for the choice of bounding accumulator conditions on page 4-14. Based on the CQD studies in Section 22, sometimes the limiting PCT was calculated when an accumulator condition other than those proposed for AP600 by Westinghouse was used. Are sensitivity studies needed? Justify your answer.

g. On page 4-16, Westinghouse discussed the basis for concluding that the uncertainty for reactor coolant pumps in 3-/4-loop plants could be applied to AP600. However, Westinghouse needs to provide a comparison for the AP600 pumps as in CQD, Volume 5, Appendix C. It is the information provided there that determines the pump uncertainty.

h. On page 4-16, Westinghouse discussed the basis for how loop resistances are handled in the AP600 uncertainty analysis. INEL would like to request Westinghouse provide WCOBRA/TRAC analyses to directly support the conclusions for AP600 (see RMR Section 5.1.5). This is because of the different pumps in AP600. Also the following needs to be addressed. Does the AP600 2 x 4 configuration change the estimates of the other loop resistances relative to the major resistances (see RMR Section 3.1.2 and CQD Section 26-4)? Is the flow split to the break via the vessel or via the hot leg due to the 2 x 4 configuration different enough from that in 3-/4-loop plants that it would affect this analysis and need to be considered?

i. For the broken loop cold leg nozzle loss coefficient and the condensation multiplier, are there any AP600 differences (such as the 2 x 4 configuration, DVI, or any others) that would affect the nominal values or ranging for these parameters relative to the 3-/4-loop plants? For the BLCL nozzle loss coefficient this is a followup to Discussion Item 4, May 17, 1996, letter.

j. Justify why the uncertainty ranges from RMR Table 3.1.3-1 apply to the AP600.

k. Justify that the models listed on page 4-17 are the only ones needing to be reviewed prior to application to the AP600. Clarify how the models listed were selected. How does Reference 8 support this list?

This question and the request in part j are related to the fact that Westinghouse is basing the AP600 methodology on the approved 3-/4-loop methodology but also making some changes. Where changes were made, Westinghouse realized that it had to discuss why the changes were made and provide supporting information. In general, Westinghouse has done this. The peaking factor discussion on page 4-12 and the initial conditions discussion on page 4-14 are examples of this. Where the approved methodology approach is carried over for the AP600, Westinghouse has also provided supporting information for some models, parameters, phenomena, and uncertainty distributions. The discussion on pages 4-15 and 4-16 related to the broken loop nozzle loss coefficient and the pump resistance are examples of this. However, this needs to be done for all the models, parameters, phenomena, and uncertainty distributions that entered into the approved uncertainty methodology approach and discussion (see RMR Section 3.1) and are carried over into the AP600 methodology. Some examples of items not discussed in this manner noted by the INEL are decay heat (see also questions 2c), γ-redistribution, and the other items in the table noted in part j, and blowdown heatup and refill heat transfer uncertainty. Westinghouse should ensure the application of these (and any others in this category) to the AP600 are justified. Note that the justification in some cases will probably be relatively simple. In other cases, a more detailed justification may be required.

l. Clarify the condensation multiplier range to be used in the run matrix. Page 4-16 and Table 4.5-1 show one thing and page 4-17 another. Based on the approved methodology, the page 4-17 values seem to be correct.

m. For the single-failure discussed on page 4-17, justify that it is the most limiting that can be assumed for the AP600.

13. On page 4-24, Westinghouse stated the thermal-hydraulic run matrix was developed to include the effects of the limiting split break. Clarify this statement as Table 4.5-1 does not show split breaks. On page 4-25, Westinghouse stated split breaks would be investigated further if it proves more limiting than the double-ended guillotine break. Provide additional information to clarify what Westinghouse meant by this statement.

14. Section 4.6 discussed the 95th percentile calculation. Clarify the following questions:

a. What is the base PCT used for the Monte Carlo analysis? Justify the PCT chosen.

b. Provide a complete example of the entire AP600 uncertainty analysis. For example, see RMR Section 4.5

15. Reference 1 only discussed the PCT calculation. 10 CFR 50.46, part b, includes other criteria to be met. Clarify how the AP600 methodology accounts for the other criteria.

16. In the November 25, 1996 call, Westinghouse stated than Discussion Item 12 in the May 17, 1996, letter was addressed in Section 4. Review of Section 4 did not find all the information needed to address this item. Westinghouse needs to provide a comparison that shows for AP600 conditions how all the highly ranked PIRT items or items identified in Regulatory Guide 1.157 are covered by the assessments. See Table 3.1.2-1 in the RMR as an example of the what the INEL is looking for on the AP600. Additional illustrations of the needed information are found in References 9 and 10.

17. While reviewing Westinghouse's responses to NRC RAIs 440.585, 440.586, and 440.587,[11] the INEL noted that the reflood temperature response for the peak cladding temperature (PCT) calculated by WCOBRA/TRAC[1] (see Figure 2.2-26) is different from the one calculated in the NRC calculations performed by Los Alamos National Laboratory (LANL)[12] (see Figure 13). Provide information to answer the following questions to help clarify the reasons for this difference.

    (a) In the LANL report, LANL stated their model represented the AP600 design as of November 15, 1994. Are there design changes made to AP600 after that date that would account for the differences in calculated responses? If design differences are affecting the results, clarify the design changes and the impact they have on the PCT differences noted between the two calculations.

    (b) If part (a) did not explain the differences, are they due to code modeling differences? If code modeling differences are affecting the results, Westinghouse should provide information where possible that may explain the reason for the differences between the code results.

    (c) Are the reflood differences affected by the blowdown cooling differences discussed in RAIs 440.585 and 440.586? If yes, does the calculated reflood PCT difference impact Westinghouse's response to those RAIs or indicate the need to consider other models or phenomena to include the AP600 uncertainty evaluation.

    (d) Even accounting for the blowdown cooling differences, there is still approximately 180°F difference in reflood PCT. Can Westinghouse offer any information that may explain the reasons for this difference? Are models and phenomena that affect this reflood PCT difference accounted for in Westinghouse's AP600 uncertainty methodology? If yes, clarify how. If not, justify why not.

    (e) If Westinghouse argues that the parameter variation in the global run matrix covers the models/phenomena that cause the PCT differences, clarify if Westinghouse has completed any of those analyses. If yes, provide the results for review. If no, will Westinghouse commit to performing some of the runs to show the size of the PCT variation in AP600 as a result of the parameter ranges analyzed in the run matrix?

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