October 28, 1996

APPLICANT: Westinghouse Electric Corporati

PROJECT: AP600

SUBJECT: AP600 TELEPHONE CONFERENCE TO DISCUSS THERMAL-HYDRAULIC UNCERTAINTY REQUEST FOR ADDITIONAL INFORMATION (RAI) RESPONSES

The subject telecon was held on October 15, 1996, between representatives of Westinghouse Electric Corporation and the Nuclear Regulatory Commission (NRC) staff. The purpose of the teleconference was to address questions the staff had on RAI responses provided by Westinghouse letter NSD-NRC-96-4808, dated August 30, 1996. Attachment 1 is the list of individual participating in the telephone conference.

Attachment 2 contains the questions the staff had on the RAI responses. Attachment 3 is a summary of the Westinghouse responses to these questions. Attachment 4 is an update to the open item tracking system based on the results of the telecon.

original signed by:

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Docket No. 52-003

Attachments: As stated

cc w/attachments:
See next page

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WESTINGHOUSE/NRC AP600
THERMAL-HYDRAULIC UNCERTAINTY RAI RESPONSE QUESTIONS
TELECONFERENCE PARTICIPANTS
OCTOBER 15, 1996

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Debra Ohkawa	WESTINGHOUSE
Cindy Haag	WESTINGHOUSE
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Attachment 1

Staff telecon questions on Westinghouse RAI responses provided by Westinghouse letter NSD-NRC-96-4808:

RAI

492.15 Please provide a quantitative estimate of what Westinghouse considers "ample margin" to the PCT limit as discussed in this response.

Regarding the response to how margins will be reflected in the overall baseline PRA, Westinghouse has indicated that scenarios which have less than 1 percent impact on the focused PRA will not be considered. Although this may be justifiable for the focused PRA, scenarios that are less than 1 percent of the focused PRA frequencies are of the same order of magnitude as the baseline PRA and would appear to potentially impact the baseline results. Please provide additional information on this.

492.21 The response to this question did not specifically address the staff's concerns. It is understood that during steam cooling conditions there is relatively little difference in the results if either "good" or "poor" heat transfer is assumed. The staff is more interested in the heat transfer during the transition from covered to uncovered and the return to covered. For those sequences in which the core uncovers but "damage" is not predicted because the core recovers before PCT exceeds whatever cutoff is established (to account for "adequate margin), the timing and modeling of the transition from nucleate boiling to steam cooling and vice-versa may have a significant effect on the predicted peak temperature. It is for this reason that it would appear that core heat transfer should be a high-importance phenomenon (it is tied to some extent to calculation of the two-phase level, as well). The transition of most interest is probably from uncovered to rewetted. It is assumed that dryout is modelled as essentially concurrent with reaching a void fraction of 1 at a particular level (though that may not actually be the physical case). However, depending on the rod surface temperature when the mixture level recovers, "quenching" may well not coincide with the mixture level reaching a given elevation. If there is a delay between recovery and rewet, the calculation of film boiling heat transfer and the transition to nucleate boiling is important.

492.23 The staff's question regarding this RAI response is how one differentiates between the importance of one source of ECC injection and another in terms of its PIRT ranking. Westinghouse did not address this aspect in the response.

In addition, the response states that there "is no modelling consideration of whether RNS prevents ADS-4 actuation." It was the staff's understanding that if RNS was available in a baseline PRA LOCA event tree, it affected the consideration of whether ADS-4 was needed--i.e., failure of ADS-4 would not need to be considered in the event tree. Please provide additional information on the role of RNS in the baseline PRA.

492.24 The response to this RAI does not clarify how Westinghouse will treat the discharge coefficient for breaks that are near or equal to the pipe diameter in question. Specifically, for full diameter breaks (or equivalent), how would Westinghouse establish the break coefficient impact without varying it explicitly. The staff has seen analysis results from Westinghouse that appeared to indicate that relatively small changes in this parameter could cause significant changes in calculated peak temperatures (although it was not clear why that should have been the case). The RAI response does not provide a convincing argument that the break discharge coefficient should not be an important parameter in the PIRT. Westinghouse should be prepared to explain the values of discharge coefficients used in the T-H analyses and why they are conservative.

492.25 Please provide some elaboration on this response. For instance, if both NOTRUMP and MAAP show the same "trend" of decreasing core mixture level, but NOTRUMP uncovers and MAAP does not, is that "okay" or "not okay?" Further, the second part of the answer seems in part to contradict the first, or at least, they do not appear entirely consistent. For the first paragraph, if differences in the trend are, in fact, caused by a "well-defined deficiency in MAAP4" does this mean that the comparison is "okay?" (That's what the sentence seems to say.) If there is a "well-defined deficiency in MAAP4," wouldn't this be a case where (in para. 2) "phenomena are encountered that are beyond the capability of MAAP4?" (i.e., doesn't a deficiency imply a situation beyond the capability of the code?)

492.30 The staff notes that one aspect of a SGTR that distinguishes it from a SBLOCA scenario is the potential for containment bypass. Westinghouse should address this difference when it prepares the pertinent documentation the discusses SGTRs and SBLOCAs

RAI #	Subject	October 15 Telecon Discussion
492.15	Provide a quantitative estimate of what Westinghouse considers "ample margin" to the PCT limit as discussed in this response	"Ample margin" is based on expecting calculated PCTs to be in the range of 1200° to 1800°F, which is below the temperature of significant zirc oxidation.
	Regarding the response to how margins will be reflected in the overall baseline PRA, Westinghouse has indicated that scenarios which have less than 1% impact on the focused PRA will not be considered. Although this may be justifiable for the focused PRA, scenarios that are less than 1% of the focused PRA frequencies are of the same order of magnitude as the baseline PRA and would appear to potentially impact the baseline results. Please provide additional information on this.	Westinghouse will address the impact on the Baseline PRA, as well as the Focused PRA, if the MAAP4 benchmarking identifies issues that switch scenarios from successful core cooling to failure. The reference to the letter that discusses the T/H uncertainty resolution process is to indicate that that process is a subset of (it will "supplement") the assessment; the T/H uncertainty resolution is not the entirety of the assessment mentioned in the RAI response.
492.21	Why is the core heat transfer not ranked "high" or "important" in the PIRT? The staff is more interested in the heat transfer during the transition from covered to uncovered and the return to covered.	Discussion centered on the predicted PCT dependency on the two-phase mixture level. Westinghouse agreed to search through our existing LOCA documentation to find support for position that the ranking of the two-phase mixture level is sufficient, and the effect of the core heat transfer on PCT is small.
492.23	The staff's question regarding this RAI response is how one differentiates between the importance of one source of ECC injection and another in terms of its PIRT ranking.	The issue is why the CMT temperature is not ranked as high importance on the PIRT, while the IRWST temperature is. The CMT operates at high enough pressures that the CMT water injecting will be significantly subcooled. By contrast, the IRWST injects at low pressures, and relatively small changes in the temperature can affect the subcooling. It was also noted that while CMT temperature is not identified as "high importance," it is identified as an area of "high interest" because it is unique to AP600. Therefore, CMT temperature is a parameter that will be examined in the benchmarking.

NRC's October 10, 1996 Comments on MAAP4 and T/H Uncertainty RAI Responses		
RAI #	Subject	October 15 Telecon Discussion
492.23 (Cont)	The response states that there "is no modelling consideration of whether RNS prevents ADS-4 actuation." It was the staff's understanding that if RNS was available in a baseline PRA LOCA event tree, it affected the consideration of whether ADS-4 was needed...	There is a difference between saying that RNS prevents ADS-4 actuation and whether ADS-4 actuation is needed for RNS. ADS-4 is not needed to lower the RCS pressure to achieve RNS injection. Therefore, ADS-4 is not a decision point on event paths that have successful RNS. Questions that do not differentiate between successful core cooling and core damage are not asked on the event trees. It was also noted that if the ADS-4 question is not asked on an event tree, that does not mean that its actuation has been prevented; it only means that it was not credited. During the discussion, another issue on a potential adverse interaction was identified by the NRC. However, the issue has already been transmitted via an RAI, and will be addressed through that pathway.
492.24	The RAI response does not provide a convincing argument that the break discharge coefficient should not be an important parameter in the PIRT. Westinghouse should be prepared to explain the values of discharge coefficients used in the T-H analyses and why they are conservative.	The discussion started with Westinghouse re-iterating the position that analyzing a range of break sizes addresses the issue. The dialogue turned to a discussion of a broader issue of whether the uncertainties of all the high importance items in the PIRT are going to be substantiated as being bounded. It was agreed between Westinghouse and the NRC that we need further discussion on this broader issue.
492.25	The questions are on the interpretation of trends in the comparison of MAAP4 and NOTRUMP, and what is meant by code deficiencies.	Westinghouse and the NRC agreed that we will need to see the results of the benchmarking to be sure that we agree on the interpretation of trends, and whether differences are significant. The NRC noted that the key to this issue is the last statement of the RAI response: "This will be judged based on whether wrong conclusions would be drawn if analysis results were available from MAAP4 only."
492.30	The staff notes that one aspect of a SGTR that distinguishes it from a SBLOCA scenario is the potential for containment bypass.	Westinghouse agrees with the comment, and will include this issue within documentation.

OPEN ITEM TRACKING SYSTEM STATUS

RAI NUMBER	NRC STATUS	DESCRIPTION OF REMAINING ACTION
492.15	RESOLVED	NONE
492.16	RESOLVED	NONE
492.17	RESOLVED	NONE
492.18	RESOLVED	NONE
492.19	RESOLVED	NONE
492.20	RESOLVED	NONE
492.21	ACTION W	Westinghouse agreed to find additional support for its position on the PIRT ranking of two-phase mixture level and its affect on core heat transfer.
492.23	RESOLVED	NONE
492.24	ACTION W ACTION N	Westinghouse and the staff need to have further discussions on how high importance items in the PIRT will be substantiated as bounded.
492.25	ACTION W	Resolution pending results of MAAP4 benchmarking effort.
492.26	RESOLVED	NONE
492.27	RESOLVED	NONE
492.28	RESOLVED	NONE
492.29	RESOLVED	NONE
492.30	ACTION W	Westinghouse to address the difference between SBLOCAs and SGTRs in terms of the potential for containment bypass in the final T-H uncertainty documentation.
492.31	RESOLVED	NONE
492.32	RESOLVED	NONE