

May 16, 2002

APPLICANT: Westinghouse Electric Company

PROJECT: AP1000 Standard Plant Design

SUBJECT: SUMMARY OF MEETING HELD ON MAY 1, 2002, TO DISCUSS THE AP1000
PROBABILISTIC RISK ASSESSMENT

The Nuclear Regulatory Commission (NRC) hosted a public meeting on May 1, 2002, at NRC Headquarters to discuss the probabilistic risk assessment (PRA) that was submitted in support of Westinghouse Electric Company's (Westinghouse's) March 28, 2002, request for final design approval and design certification of the AP1000. A list of attendees is provided as Enclosure 1.

The primary purpose of the meeting was to allow Westinghouse representatives the opportunity to present the AP1000 PRA to the NRC staff members who will be involved in the design certification review. Westinghouse's handouts, including an agenda, are listed as Enclosure 2 and can be accessed through the NRC's Agencywide Documents Access and Management System (ADAMS) under Accession No. ML021260664.

The NRC staff had a brief opportunity prior to the date of the meeting to review the AP1000 PRA that was submitted on March 28, 2002. As a result of this brief review, the staff provided a list to Westinghouse of issues and topics for possible discussion at the May 1, 2002, meeting via electronic mail from Mr. Lawrence J. Burkhart to Mr. Michael M. Corletti on April 22, April 24, and April 30, 2002. The list of topics is provided as Enclosure 3. These topics are not requests for additional information (RAIs) but are areas that the staff wished to discuss with Westinghouse at the May 1, 2002, meeting. If answers to questions associated with these topics are required for the staff to make a safety finding, the staff will forward questions to Westinghouse in an official RAI.

/RA/

Lawrence J. Burkhart, AP1000 Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Project No. 711

Enclosures: As stated

cc w/encls: See next page

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DATE	5/8/2002	5/8/2002

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ATTENDEES OF THE MAY 1, 2002, MEETING
TO DISCUSS THE AP1000 PROBABILISTIC RISK ASSESSMENT

<u>Attendee</u>	<u>Organization</u>
Charles Brinkman	Westinghouse
Mike Corletti	Westinghouse
Daniel McLaughlin	Westinghouse
Selim Sancaktar	Westinghouse
Jim Scobel	Westinghouse
Terry Schulz	Westinghouse
Jean-Luc Foret	Westinghouse
Stanley Levinson	Framatome ANP
Stephen Mazurkiewicz	Framatome ANP
Jim Lyons	NRC/NRR
Tom Bergman	NRC/NRR
Larry Burkhart	NRC/NRR
Hulbert Li	NRC/NRR
Y. Gene Hsii	NRC/NRR
Walton Jensen	NRC/NRR
S. B. Sum	NRC/NRR
G. Bagchi	NRC/NRR
Mike Snodderly	NRC/NRR
Nick Saltos	NRC/NRR
Bob Palla	NRC/NRR
David Fisher	NRC/NRR
Jerry Wilson	NRC/NRR
Sunil Weerakkody	NRC/NRR
Andre Drozd	NRC/NRR
Narinder Trehan	NRC/NRR
Craig Harbuck	NRC/NRR
Richard Lee	NRC/RES

Enclosure 2

Westinghouse Handouts
for
May 1, 2002, Meeting

The NRC maintains an Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The handouts mentioned above may be accessed through the ADAMS system under Accession No. ML021260664. If you do not have access to ADAMS or if there are problems in accessing the handouts located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737 or by e-mail to pdr@nrc.gov.

ISSUES PROVIDED BY THE NUCLEAR REGULATORY COMMISSION STAFF
FOR DISCUSSION AT THE
MAY 1, 2002, MEETING
REGARDING THE AP1000 PROBABILISTIC RISK ASSESSMENT

The staff would like to discuss the following issues at the public meeting scheduled for May 1, 2002. These issues were sent to Westinghouse via e-mail prior to the meeting. These issues are not requests for additional information (RAIs) but are areas upon which the staff may like clarification. If answers to questions associated with these issues are necessary for the staff to make a safety finding, appropriate questions will be forwarded to Westinghouse in an official RAI.

1. Fire PRA - 10 CFR 52.47 requires a plant-specific probabilistic risk assessment (PRA). The staff would like to discuss the information that was submitted in the PRA regarding the fire protection program and how the information meets the requirements of 10 CFR Part 52.

2. Containment sprays (non-safety related sprays) - it appears that the AP1000 PRA does not acknowledge the sprays and how they would impact hydrogen flammability and combustion, containment pressurization, and source terms. This system was added late in the AP600 review and, consequently, Westinghouse did not revise the AP600 PRA to address it. The staff would like to discuss the appropriateness of incorporating the modeling of these systems into the AP1000 PRA.

3. In-vessel retention (IVR) - the uncertainties in whether molten core debris will be retained in-vessel were large for AP600 and are even larger for AP1000. During the Phase 1 (scoping) review we indicated that Westinghouse should assess the implications of relevant experiments and analyses performed (by the international community) subsequent to certification of AP600 for their impact on the IVR model used in AP1000. We also indicated that W should address the uncertainty issues raised in the staff's assessment of IVR for AP600 (as documented in INEEL report INEEL/EXT-97-00779, which was provided to Westinghouse). It appears that this was not completed. The staff feels that this issue should be addressed and the Level 2 PRA and containment event trees modified accordingly. The staff would like to discuss this issue further.

4. In-vessel Steam Explosion

For the AP600, Westinghouse submitted the following reports as referenced in Chapter 39 of the AP600 PRA: DOE/ID-10541, DOE/ID-10503, DOE/ID-10504. These reports were performed by Prof. Theofanous for the Department of Energy to support design certification of the AP600 and provided quantification of in-vessel steam explosion loads and the effect those loadings would have on the reactor vessel. The staff reviewed these reports and concluded that even though it had not conducted an independent verification of the PM-ALPHA code, a reasonably large data base supports Westinghouse's use of the PM-ALPHA code for this assessment (in-vessel steam explosion).

It appears that Westinghouse no longer references these reports in Chapter 39 of the AP1000 PRA. The staff would like to discuss the applicability of these reports to the AP1000.

5. Comments regarding the in-vessel and ex-vessel steam explosion analyses

In Section B.3, "Ex-Vessel Steam Explosion," of the Design Certification Documents submitted on March 28, 2002, Westinghouse states that, "As in the in-vessel steam explosion analysis, the results of this AP600 ex-vessel steam explosion analysis are extended to the AP1000. The vessel failure modes for AP600 and AP1000 are the same. The initial debris mass participating in the interaction, superheat and composition are assumed to be the same as in the AP600."

The staff will need to assess the validity of these assertions. As such, the staff would like to discuss the bases for these assertions. The staff would also like to discuss other possible ways to facilitate its assessment of this issue (e.g., providing updated analyses for the AP1000).

6. Equipment Survivability

The AP600 staff evaluation of Equipment Survivability is contained in Section 19.2.3.3.7 of the AP600 final safety evaluation report (FSER). The staff's evaluation was based in part on MELCOR analyses of the 3BE-FRF1 sequence to confirm the results of the Westinghouse computer model, MAAP4, to predict the environmental conditions attendant with a severe accident. On the basis of this confirmation, the staff concluded that the thermal hydraulic profiles predicted by MAAP4 are acceptable approximations of the environmental conditions for which mitigative features and instrumentation, identified in this section, must survive.

The staff would like to discuss how the AP1000 design has impacted the radiation and thermal-hydraulic environments described in Appendix D of the AP1000 PRA.

7. Figures D.7.1-1 through D.7.1-6 of the AP600 PRA provided the gas temperatures in the containment compartments, the containment pressure, and the reactor pressure vessel pressure. The staff would like to discuss why these figures have been eliminated from the AP1000 PRA?

8. It appears that the AP1000 PRA does not discuss the following:

- ▶ External events risk analysis during shutdown operation
- ▶ Focused PRA/RTNSS (used to be Ch. 52 in the AP 600 PRA)
- ▶ PRA-based insights and associated disposition (Table 59.29 in the AP600 PRA).

The staff would like to discuss the apparent omission of these discussions.

9. In addition, Chapter 55 (Seismic Margins Evaluation) appears to be significantly revised (e.g., revised event trees) with respect to AP600 without enough explanation of what was done.

The staff would like to discuss all design changes (with respect to AP600) that Westinghouse considered modeling in the PRA (i.e., they had the potential to impact the PRA models) as well as those that were actually modeled in the PRA.

10. The staff would like to discuss the changes that were made in Appendix A (Treatment of T-H uncertainties and robustness of the success criteria used in the PRA for systems and operation actions). (It would be helpful if Westinghouse brings to the meeting an analyst familiar with the T-H aspects of this issue, in addition to the PRA analysts).

AP 1000

cc:

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