October 30, 2000

Dr. Dana A. Powers, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: PRE-APPLICATION REVIEW OF THE AP1000 STANDARD PLANT DESIGN

Dear Dr. Powers:

Thank you for your letter of September 14, 2000, regarding the pre-application review of Westinghouse's proposed AP1000 Standard Plant Design. The following discussion provides the staff's views regarding your recommendations.

Uncertainty Distributions

The ACRS recommended that the probabilistic risk assessment (PRA) should include uncertainty distributions on core damage frequency (CDF), conditional containment failure probability (CCFP), and large, early release frequency. It was determined during the AP600 design review that thermal-hydraulic (T-H) uncertainties are the major contributors to uncertainties in the assessed CDF value. However, the quantification of T-H uncertainties for all accident sequences involve statistical evaluations that require a very large number of calculations. The NRC staff's position is that a "margins" approach, used to conservatively assess success criteria for both systems and human actions in the AP600 PRA, adequately addresses T-H uncertainties in the CDF associated with passive systems without compromising safety. Therefore, uncertainty distributions are not needed. The staff will request Westinghouse to implement the "margins" approach for the AP1000 design to address differences in the design as well as the increased plant size and power rating with respect to the AP600 design.

Seismic Analysis

The ACRS recommended that the seismic analysis for AP1000 should not be left solely to the combined license applicant and should be included in the PRA using a representative site. It is our understanding that a seismic analysis of the AP1000 design for a hard rock site will be provided for NRC review in phase 3. Also, the NRC staff's position is that a PRA-based seismic margins analysis that utilizes sequence-level high confidence, low probability of failure assessments for all sequences leading up to core damage or containment failure will provide adequate insights on the seismic vulnerability of the AP1000 design. This position was approved by the Commission in its Staff Requirements Memorandum, dated July 21, 1993, on SECY-93-087. Thus with the seismic analysis for a hard rock site and a PRA-based seismic margins analysis, we believe that the Committee's recommendation will be satisfactorily addressed.

Assessment of Computer Code Uncertainties

ACRS recommended that the applicant's results from the codes for the design basis accidents should be accompanied by uncertainty assessments. The thermal/hydraulic and containment design basis accident analysis codes used in the evaluation of the response of the AP1000 design will be accompanied by uncertainty assessments where appropriate, to support staff's review. The staff notes that uncertainty analysis is a regulatory requirement for loss of coolant accident analyses performed using realistic or best estimate analysis methods.

Independent Evaluation and Validation of Computer Codes

The ACRS recommended that the NRC staff should obtain and exercise Westinghouse's analysis codes to assist its independent evaluation and validation of these codes. The staff's current position regarding thermal-hydraulic computer code reviews is that the codes and all necessary documentation must be submitted for review. Examples include RETRAN-3D (EPRI), S-RELAP5 (Siemens Power Corporation), and TRACG (GE Nuclear Energy). For each example, the staff performed an acceptance review to determine if the documentation was adequate and the code had been submitted in electronic form for installation on an NRC computer. Our experience with these reviews has been that having a code available for use during the review has expedited the review process and has resulted in an opportunity to discover shortcomings in the code. The staff intends to continue this policy for future reviews of computer codes, including the AP1000 review. The staff will also continue to perform independent confirmatory analyses using its own thermal-hydraulic accident analysis computer codes.

The NRC staff is currently developing a plan and schedule for proceeding with Phase 2 of the pre-application review and we will advise the ACRS staff of our schedule for this review in the future. For your information, a letter from Westinghouse dated October 2, 2000, that also addresses the ACRS recommendation is enclosed.

Sincerely,

/RA by Carl J. Paperiello Acting For/

William D. Travers
Executive Director
for Operations

Enclosure: As stated

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
SECY

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cc: Chairman Meserve
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