

April 23, 2002

Mr. W. E. Cummins, Director
AP600 & AP1000 Projects
Westinghouse Electric Company
Post Office Box 355
Pittsburgh, PA 15230-0355

SUBJECT: AP1000 DESIGN CERTIFICATION REVIEW

Dear Mr. Cummins:

In your letter dated January 18, 2002, as supplemented by letter dated February 6, 2002, you requested the NRC staff's determination of the cost and schedule for the AP1000 DC review. Your January 18 and February 6, 2002, letters, provided a highlight/strikeout version of the *Westinghouse AP1000 Design Control Document* to assist the NRC staff in the development of a preliminary schedule and an updated cost estimate for the DC review. These documents identified the changes to the AP600 design control documents (DCDs) for the larger AP1000 design.

In SECY-01-0188, "Future Licensing and Inspection Readiness Assessment [FLIRA]," dated October 12, 2001, the staff estimated that the DC review effort would include 30 full-time equivalent staff and \$1.5 million in contract funds. Additionally, because the AP1000 is based on the AP600, the staff believes the review can be completed in less than the 42-60 months that the staff estimated for a new DC application.

The *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents identified areas where changes would be made for the AP1000 design but did not include all sections of the DCD. The DC application dated March 28, 2002, included the missing sections. However, based on your letter dated March 25, 2002, your application will not be complete until the end of April 2002 when all of the supporting documents are provided. Consequently, the staff has not yet had an opportunity to review these documents in detail in support of its efforts to produce a DC review schedule. Based on the assumption that your application will be complete on April 30, 2002, the staff intends to complete its acceptance review by May 30, 2002. After it completes the acceptance review, the staff should be able to formulate a more realistic DC review schedule. The staff's current target date for issuance of the requests for additional information (RAIs) associated with your March 28, 2002, application is September 30, 2002.

Based on our review of the *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents, the staff has identified issues that may require increased review effort. In addition, during the pre-application review the staff identified issues that could potentially impact the DC review schedule. The staff thought that listing these issues now may facilitate efficient resolution during the DC review. The issues discussed in the Enclosure are not RAIs, but are areas where the staff may need to focus its review efforts.

In summary, the staff believes that, based on the similarity between the AP600 and AP1000 designs, the DC review should be completed in a shorter time than that estimated for a new DC application. However, at this time, there exists some uncertainty in the amount of time it will take to complete the various stages of the AP1000 DC review. This uncertainty should be reduced after the staff has an opportunity to review the DC application and all supporting documents and complete the acceptance review. The target date for completion of the acceptance review is May 30, 2002, after which the staff will issue a realistic DC review schedule. The staff's current target date for issuance of the RAIs associated with your March 28, 2002, application is September 30, 2002.

Sincerely,

/RA/

James E. Lyons, Director
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Project No. 711

cc: See next page

Based on our review of the *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents, the staff has identified issues that may require increased review effort. In addition, during the pre-application review the staff identified issues that could potentially impact the DC review schedule. The staff thought that listing these issues now may facilitate efficient resolution during the DC review. The issues discussed in the Enclosure are not RAIs, but are areas where the staff may need to focus its review efforts.

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Sincerely,

/RA/

James E. Lyons, Director
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Project No. 711

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DISCUSSION OF ISSUES
THAT MAY AFFECT THE
DESIGN CERTIFICATION REVIEW SCHEDULE

Based on our review of the *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents, the staff has identified issues that may require increased review effort. The staff thought that listing these issues now may facilitate efficient resolution during the DC review. These issues are based on a preliminary review of the documents and are not RAIs, but are areas where the staff may need to focus its review efforts. Following are discussions of these issues.

- ▶ The staff identified the fire protection program as an area that may require increased review focus. This is based on: (1) the large amount of time and effort required to review and resolve issues associated with the fire protection program for the AP600; and (2) the lack of availability of the AP1000 PRA, including the fire PRA. In addition, the staff has identified potential issues that may require an increased amount of effort and time to resolve. For example, in the *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents, the passive shutdown systems are classified as redundant or normal shutdown systems for fire events. However, these systems were classified as alternative shutdown systems in NUREG-1512. A second example of a potential issue is the lack of application of National Fire Protection Association (NFPA) 804, "Standard for Fire Protection for Advanced Light Water Electric Generating Plants," to the AP1000 design. This standard was not applied during the AP600 review because the standard was issued after the AP600 DC review was completed. However, this standard will be considered during the AP1000 review.
- ▶ Westinghouse revised its reactor internals flow-induced vibration assessment for the AP1000. For the AP600, the assessment was documented in WCAP-14761. For the AP1000, Westinghouse plans to defer this assessment to the combined operating license (COL) applicant. This deferral may not meet the requirements of 10 CFR 52.47(a)(2) because this assessment determines whether the reactor internals will be subject to unacceptable flow-induced vibrations.
- ▶ Westinghouse revised its design of the reactor internals for loss-of-coolant accident (LOCA) loads. For the AP1000, the design of the reactor internals will be based on leak-before-break (LBB) criteria rather than a 1 square-foot enveloping break size that was used in the AP600 design. If LBB analyses are not completed until the COL phase, then the adequacy of the reactor internals design for LOCA loads will not be determined until after design certification. This approach may not meet the requirements of 10 CFR 52.47(a)(2) because the design adequacy of the reactor internals will not be resolved prior to granting the certification. This issue supports the need for completion of the critical LBB analyses during the design certification.
- ▶ The fixed-based seismic model is fixed at the top of the mat rather than at the bottom of the mat. Justification is necessary as to why this assumption is conservative, especially for the evaluation of the dynamic stability of the nuclear island structures.

During the pre-application review, the staff identified issues that could potentially impact the design certification review schedule. Following are discussions of these issues.

- ▶ The staff found that, in general, the AP600 testing program and analysis codes are applicable to the AP1000 design. Some exceptions to this applicability are noted in the staff's pre-application review assessment dated March 25, 2002. An example of such an exception that may potentially impact the DC review schedule is the lack of sufficient test information that supports understanding of the phenomenon of liquid entrainment in the hot leg and upper plenum during certain blow-down stages of a LOCA. This is an area that may require additional testing or other justification. At this time, the extent of testing, if any, that will be required to enable the staff to reach a conclusion on all safety questions surrounding the AP1000 DC application is unknown. If it is eventually decided that additional testing is needed, the schedule will need to be adjusted accordingly. The other exceptions noted in the March 25, 2002, assessment could also impact the DC review schedule.

- ▶ With respect to the use of DAC, the *Westinghouse AP1000 Design Control Document Highlight/Strikeout Version* documents were based on your proposed use of DAC in lieu of providing detailed design information in the I&C; control room (human factors engineering); and seismic, structural, and piping design areas. In your letter dated February 13, 2002, you stated your intention to provide sufficient information to preclude the need for use of DAC in the seismic and structural areas. In support of changing your position regarding the use of DAC in the seismic and structural design areas, you stated that you would perform structural calculations of certain critical sections of several structures and that the associated structural reports would not be available for NRC audit until the first quarter of Calendar Year 2003. The late availability of these reports may result in a delay of the resolution of any issues that arise from the staff's review of these reports and could impact the overall schedule.

- ▶ Another potential impact to the review schedule involves the development and implementation of the piping DAC. The staff assumes that Westinghouse will develop piping DAC in a manner similar to that used by General Electric and ABB-Combustion Engineering for the ABWR and System 80+ designs, respectively. The established approach involves resolution of LBB, flooding and sub-compartment pressurization, and thermal-hydraulic issues prior to issuance of the design certification. The piping DAC approach would also entail establishing a benchmark piping analysis problem for a representative AP1000 piping system and assessing the piping issues addressed in Section 3.12 of NUREG-1512. If the development of DAC for the AP1000 design deviates significantly from the established method, impacts on the review schedule may result.

Distribution for Letter to W. E. Cummins dated April 23, 2002

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