

February 26, 1997

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: SCHEDULE FOR THE STAFF'S REVIEW OF THE AP600 DESIGN CERTIFICATION APPLICATION

PURPOSE:

To provide the Commission with the schedule for the staff's review of the AP600 design certification application.

BACKGROUND AND DISCUSSION:

In its various staff requirements memoranda (SRMs), the Commission directed the staff to inform it of changes to the schedules for the review of advanced reactor designs. In SECY-94-117, "Revised Review Schedules for the Design Certification Applications," dated April 29, 1994, the staff submitted its estimated schedule for completing the AP600 review. On the basis of comments received on the schedule proposed in that Commission paper, as described in a memorandum to the Commission dated July 14, 1994, the staff presented an expedited review schedule for the AP600 that was described as "an optimistic schedule with no margin that can be met only if the staff receives high quality responses that address its concerns and review needs sufficiently in time to support the schedule." The staff worked to that expedited schedule until mid-1995.

Because of (1) the extensive review associated with the unique design features and (2) delays in submittal of information by Westinghouse, in August 1995, the staff reported that it needed to revise the review schedule for the AP600 design. During the fall of 1995, the staff and Westinghouse held several scheduling meetings and discussions to ensure that the staff was fully cognizant of Westinghouse's schedules for submitting information necessary to support the staff's review. However, during these discussions, Westinghouse indicated that it wished to decelerate the review in certain areas that were expected to have a lesser impact on the schedule to accommodate available Westinghouse resources. The staff told Westinghouse that, as a result of the deceleration, AP600 reviewers would be reassigned to other work, and that when Westinghouse requested resumption of the review, these same reviewers may not be available due to high priority operating reactor work. In its memorandum to the Commission dated November 28, 1995, the staff informed the Commission that the Westinghouse resources available to support the expected review fees were inconsistent with the review effort estimated by the staff, and that the staff could not prepare the final safety evaluation report (FSER) on the expedited schedule detailed in the July 14, 1994, memorandum to the Commission. Accordingly, the staff focused its review efforts on the specific technical areas of the AP600 design requested by Westinghouse and reduced its review efforts in other technical areas. The staff reassigned resources that had previously been dedicated to the AP600 to other review tasks within the Office of Nuclear Reactor Regulation.

However, in February 1996, at the request of Westinghouse, the staff agreed to resume its full-scale review of the AP600. Recommencing some of the review activities that were curtailed in late 1995 depended on the availability of technical staff who were knowledgeable of the unique aspects of the design. Review staff who had begun work on other higher priority tasks (mostly dealing with operating reactor issues) were directed to complete those efforts before resuming the AP600 review.

In SECY-96-068, "Status of the Staff's Review of Advanced Reactor Designs," dated April 1, 1996, the staff established interim target dates (on the basis of submittal dates committed to by Westinghouse in its February 2 and March 8, 1996, letters). The target dates were to be used until the staff issued the supplement to the DSER on codes and testing, and until certain policy and key technical issues were addressed, recognizing that the staff would then be better able to determine how much review effort would be needed to complete the technical review of the AP600 application. The staff issued the DSER supplement in May 1996.

However, from May through October 1996, the staff issued several letters to Westinghouse expressing its concern that Westinghouse was delaying submittal of key information, that information was missing from submitted documents, and that Westinghouse had deleted a significant amount of information from the Standard Safety Analysis Report (SSAR) without discussing the deletions with the staff. The staff told Westinghouse that these actions were expected to affect both the staff's resource allocations for the review and the review target dates presented in SECY-96-068. In its September 26, 1996, letter, the staff asked Westinghouse to provide revised submittal dates in order for the staff to establish a revised review schedule. Westinghouse subsequently provided its proposed submittal schedule in an October 15, 1996, letter. The staff met with Westinghouse in November 1996 to establish the detailed schedule for completing the AP600 review.

Attachment 1 to this paper discusses the results of the recent scheduling meetings with Westinghouse, assumptions used in developing the revised schedule, and the staff's estimation for completing the review. Attachment 2 to this paper gives the estimated dates for the key milestones that must be completed in order to finish the AP600 design certification review.

CONCLUSIONS:

The schedule indicates that the staff will issue an Advanced FSER to the Commission and ACRS in November 1997, and issue the Final Design Approval in March 1998. However, a number of key assumptions have been made. The reviews can be completed by the projected dates provided Westinghouse submits timely, high-quality information in (1) the SSARs, (2) the inspections, tests, analyses, and acceptance criteria (ITAAC) documents, and (3) other supporting documentation in accordance with the dates Westinghouse has proposed during the November 1996 scheduling meetings with the staff, and if the analyses of test results demonstrate the adequacy of Westinghouse's designs. The staff notes that certain key information concerning the NOTRUMP

and the WGOthic codes have already not been submitted in accordance with the November 1996 proposal. Approval of the NOTRUMP code has far-reaching effects in the design review of the AP600, because NOTRUMP is being used as a benchmarking tool in the staff's review of the thermal-hydraulic uncertainty in the design. Approval of the WGOthic code is key to the acceptance of the passive containment cooling system. The staff has drafted a letter to Westinghouse (Attachment 3) forwarding this paper and identifying its concerns regarding the schedule. The staff intends to send this letter within 5 work days from the date of this paper.

Another key assumption is that the staff's availability to work on the review of the AP600 design does not change. Since the November 1996 meeting, the staff has also missed milestones, such as a review milestone concerning combustible gas control inside containment because of assignments to higher priority work (Shutdown Rule). Because of the unique design of the AP600, experienced senior staff have been assigned to this project. It is expected that such senior staff may be called on to review other, higher priority work when necessary. When such situations arise, senior NRR management is committed to make every effort to minimize the impact on the AP600 schedule.

WESTINGHOUSE'S RESPONSE TO THE PROPOSED SCHEDULE

During a December 9, 1996, meeting, Westinghouse stated that the schedule was inconsistent with its funding and its desire to complete the review in FY97. However, the staff believes the March 1998 goal for the Final Design Approval is optimistic and is based on a challenging schedule, which is unlikely to improve given the experience to date.

RESOURCES

The FY 1998 Green Book includes approximately \$5.3M and 50 FTE in FY 1997 and \$1.8M and 15 FTE in FY 1998 to continue the AP600 review in FY 1998. These resources are adequate to complete the AP600 review consistent with the revised schedule.

COORDINATION

While developing the schedule for the AP600 review, the staff considered the schedular templates requested by the Office of the General Counsel (OGC) and the Advisory Committee on Reactor Safeguards (ACRS). The staff's revised schedule assumes that the ACRS will be able to meet in accordance with the proposed dates, and that it will not raise unexpected issues that will significantly affect the design review of the AP600. In addition, this paper has been coordinated with the Office of the Chief Financial Officer.

DOCUMENT AVAILABILITY

The staff intends to make this paper publicly available within 5 work days from the date of this paper.

CONTACT: Thomas J. Kenyon, NRR
415-1120

L. Joseph Callan
Executive Director for Operations

Attachments: 1. Schedule Assumptions for the Review of the AP600
2. Key Milestones for Completing the AP600 Review
3. Letter to Westinghouse Concerning AP600 Review Schedule

ATTACHMENT 1

SCHEDULE ASSUMPTIONS FOR THE REVIEW OF THE AP600

BACKGROUND

In its various staff requirements memoranda (SRMs), the Commission directed the staff to inform it of changes to the schedules for the review of advanced reactor designs. In SECY-94-117, "Revised Review Schedules for the Design Certification Applications," dated April 29, 1994, the staff submitted its estimated schedule for completing the AP600 review. On the basis of comments received on the schedule proposed in that Commission paper, as described in a memorandum to the Commission dated July 14, 1994, the staff presented an expedited review schedule for the AP600 that was described as "an optimistic schedule with no margin that can be met only if the staff receives high quality responses that address its concerns and review needs sufficiently in time to support the schedule."

Because of (1) the extensive review associated with the unique design features of the AP600 and (2) delays in Westinghouse submittals, the staff noted the need to revise the review schedule during an August 24, 1995, senior management meeting with Westinghouse. During the fall of 1995, the staff and Westinghouse held several scheduling meetings and had discussions to ensure that the staff fully understood Westinghouse's schedules for submitting information necessary to support the staff's review. However, during the discussions, Westinghouse indicated that it wished to decelerate the review in certain areas to accommodate available Westinghouse resources. The staff informed Westinghouse that higher priority operating reactor work

could result in the original reviewers being unavailable to perform the AP600 review when the review was resumed.

Westinghouse asked the staff to continue the review in a number of critical areas, especially those related to testing and code development. In a letter dated November 13, 1995, Westinghouse prioritized the work it wanted done by the staff and indicated specific areas on which it would like the staff to focus its near-term certification review. In its memorandum to the Commission dated November 28, 1995, the staff informed the Commission that the Westinghouse resources available to support the expected review fees were inconsistent with the review effort estimated by the staff, and that the staff could not complete the final safety evaluation report (FSER) in accordance with the expedited schedule in the July 14, 1994, memorandum to the Commission. Accordingly, the staff focused its review efforts on the specific technical areas of the AP600 design requested by Westinghouse and significantly reduced its review efforts in other technical areas that were not identified in Westinghouse's November 13, 1995, letter.

In accordance with Westinghouse's request, the staff began to formally document the status of its safety review of those technical areas that were not identified in the November 13, 1995, letter using documentation, submittals, and related application materials that had already been supplied by Westinghouse. The staff then began reassigning resources that had previously been dedicated to the AP600 to other high-priority review tasks within the Office of Nuclear Reactor Regulation.

However, in February 1996, at the request of Westinghouse, the staff agreed to resume its full-scale review of the AP600. Recommencing some of the review activities that had been curtailed in late 1995 depended on the availability of technical staff who were knowledgeable of the unique aspects of the design. Review staff who had begun work on other higher priority tasks (mostly dealing with operating reactor issues) were directed to complete those efforts before resuming the AP600 review.

In SECY-96-068, "Status of the Staff's Review of Advanced Reactor Designs," dated April 1, 1996, the staff established interim target dates (based on submittal dates committed to by Westinghouse in its February 2 and March 8, 1996, letters) that were to be used until the review of key technical issues had progressed sufficiently to give the staff a clearer understanding of the remaining technical issues and the length of time it would take to resolve them. These interim target dates were to be used until the staff issued the supplement to the DSER on codes and testing, and certain policy and key technical issues were addressed.

From May through October 1996, the staff issued several letters to Westinghouse expressing its concern that Westinghouse was delaying submittal of key information beyond the dates committed to in its February 2 and March 8, 1996, letters. In addition, the staff identified technical areas in which expected information was missing from submitted documents. The staff further stated that it had found many areas in Revision 6 to the Standard Safety Analysis Report (SSAR) in which Westinghouse had deleted a significant amount of information without discussing the deletions with the staff. The staff told Westinghouse that removal of these design descriptions may have resulted in the removal of key information which was used to support the staff's conclusions in the Draft Safety Evaluation Report (DSER). Therefore, the staff has to re-review those areas in order to verify that the information relied on for the staff's safety conclusions had not changed. The staff stated that this re-review was not considered in the staff's estimate of the review schedule discussed in SECY-96-068, and informed Westinghouse that this practice was expected to affect both the staff's resource allocations for the review and the review target dates presented in SECY-96-068. Westinghouse continued removing SSAR information up to and including Revision 9 of the SSAR (August 1996). In a letter to Westinghouse dated September 26, 1996, the staff informed Westinghouse that it did not agree with Westinghouse that all of the removed information was "extraneous," and reiterated to Westinghouse that the continuing process of removal and resubmittal of information in the SSAR increased the staff's review time in several areas.

In addition, during the early part of 1996, Westinghouse notified the staff that it no longer intended to insert responses to requests for additional information (RAIs) directly in the SSAR, nor did it intend to update all of the approximately 3400 responses. Westinghouse indicated that salient information necessary for the staff to make its safety finding would be incorporated when such incorporation was requested by the staff. Again, this required that the staff re-review the SSAR to ensure that information required to support its safety findings was acceptably incorporated into the SSAR. This was also not considered in the development of the interim review target dates in SECY-96-068.

In its September 26, 1996, letter, the staff asked Westinghouse to provide revised submittal dates in order for the staff to establish a revised review schedule. Westinghouse had missed approximately two-thirds of the submittal dates committed to in the March 8, 1996, letter. Westinghouse subsequently provided the NRC with its proposed submittal schedule in an October 15, 1996, letter. The staff met with Westinghouse on November 20-21, 1996, to schedule the detailed review milestones for each technical discipline. The discussion of that effort follows.

DISCUSSION AND KEY ASSUMPTIONS

In determining the review schedule for the design certification of the AP600, the staff considered Westinghouse's proposed submittal schedule (October 15, 1996 schedule as modified during the November 1996 scheduling meetings), staff reviewer availability, contractor funding and availability, impact of other higher priority reviews, number and complexity of remaining open items, number of intermediate milestones (submittals, number of expected future meetings, additional requests for information, etc.), and the staff's experience gained through the reviews of the evolutionary and advanced reactors.

Staff Availability

One key assumption regarding the AP600 review schedule is that the staff's availability to work on the review of the AP600 design does not change. For example, the review schedule for ITAAC assumes the review teams are available for quick interaction. Because of the unique design of the AP600, experienced senior staff have been assigned to this project. It is expected that such senior staff may also be called on to review other higher priority work within the agency when necessary. When such situations arise, senior NRR management has committed to make every effort to minimize the impact on the AP600 schedule.

As discussed earlier, some key NRC personnel were already reassigned to higher priority work on operating reactors in 1996. The staff was directed to complete its work on these projects before resuming its work on the AP600. In some cases, this delayed the review of certain open items on the AP600. For example, since the November 1996 scheduling meeting, the staff has missed milestones concerning its review of combustible gas control inside containment because of assignments to higher priority work (such as the Shutdown Rule).

If experienced personnel are not available within a reasonable time to support the review, staff members not acquainted with the design may be assigned to the review. If so, they will have to be trained on the unique aspects of the AP600.

Key Issues

The review of the AP600 involves a number of first-of-a-kind issues that are unique to the design of the passive plants. In SECY-96-128, "Policy and Key Technical Issues Pertaining to the Westinghouse AP600 Standard Pressurized Reactor Design," dated June 12, 1996 (as clarified in its November 12, 1996, memorandum to the Commission), the staff identified three policy issues specific to the AP600 design concerning (1) equipment necessary to strike an appropriate defense-in-depth balance between prevention and mitigation in advanced reactor design, (2) reliance on in-vessel retention as an accident management strategy for the AP600, and (3) post-72 hour actions. The staff is currently submitting additional information to the Commission regarding its proposed approach to resolve the first policy issue. Depending on the approach taken to resolve these issues, the staff believes that implementation could have a significant affect on the schedule.

In addition, in its December 6, 1996, letter to Westinghouse, the staff identified 27 licensing issues which it believes are potential critical path issues in the review of the AP600. These issues include, among others, ITAACs, the initial test program, the regulatory treatment of non-safety-related systems, code documentation and qualification, systems reliability of hydrogen mitigation systems, the basemat design, the fire protection program, the spent fuel pool cooling system, and adverse systems interaction. Final resolution of these design issues could significantly affect the design of the plant, and therefore, delay the review schedule. The staff concludes that these key technical issues must be resolved soon in order to support the proposed review schedule for the AP600. The staff has been conducting internal meetings with NRR senior management to establish positions on these issues, where appropriate. Westinghouse will be informed of the staff's positions on these matters in the near term as they are finalized by NRR management.

Westinghouse's initial approach to ITAAC was significantly different from that approved for the evolutionary plants. The schedule estimates for ITAACs were based on the assumption that Westinghouse would submit revised ITAACs consistent with evolutionary plant ITAACs, so that the staff could use the experience it gained during its reviews of the evolutionary plants. In addition, the certified design material (CDM)/ITAAC and the SSAR information must be sufficiently consistent so that an Independent Review Group (as used during the review of the ITAACs for the evolutionary designs) will not be required. The staff has established multi-discipline review teams to ensure an integrated review of the ITAAC consistent with the review schedule. During recent discussions with the staff, Westinghouse indicated that the revised ITAAC submittal will address the staff's concerns.

Other Open Issues

The staff has issued approximately 3400 requests for additional information (RAIs) on the AP600 design; Westinghouse has responded to approximately 3200. In addition, the staff's November 1994 DSER contained more than 1100 open items, and the staff's May 1996 Supplement to the DSER contained 120 open items. In its October 15, 1996, letter, as modified at the November 1996 meetings, Westinghouse provided its planned submittal dates for revisions to the AP600 SSAR, PRA, ITAACs, and other key information. Westinghouse has committed to submit most of the key information in the February -- March 1997 time frame.

The schedule proposed in this paper assumes that Westinghouse meets its renewed commitment to provide high-quality submittals in accordance with the dates Westinghouse proposed during the November 20-21, 1996 scheduling meetings with the staff. The staff expects to perform a sufficiency review of each submittal within about 2 months of the date of receipt to determine whether the submittal contains sufficient information to close out the subject issue. The staff notes that certain key information concerning the NOTRUMP and the WGOETHIC codes was not submitted in accordance with the November 1996 agreements. In addition, documentation on the WGOETHIC code has been inconsistent and of low quality, making it extremely difficult to review. Approval of the NOTRUMP code has far-reaching effects in the design review of the AP600, because NOTRUMP is being used as a benchmarking tool in the staff's review of the thermal-hydraulic uncertainty in the design. Approval of the WGOETHIC code is key to the acceptance of the passive containment cooling system. The staff has drafted a letter to Westinghouse (Attachment 3) forwarding this paper and identifying its concerns regarding the schedule. The staff intends to send this letter within 5 work days from the date of this paper.

Successful implementation of this proposed schedule requires that unplanned RAIs do not result from the staff's review of final submittals. The staff assumed that it will have the opportunity to review docketed draft information, where appropriate, to expedite the review. The staff also assumed that Westinghouse will not remove any more design information from the SSAR without first discussing it with the staff, and that Westinghouse will reinsert into the SSAR information required by the staff to reach its safety conclusion. In addition, issues that are resolved late in the schedule (thermal-hydraulic uncertainty, ITAACs, codes, certain key technical issues) cannot have any cascading effect on the areas that the staff has previously closed out.

Staff Conclusions

While developing this revised schedule, the staff considered Westinghouse's proposed submittal dates and the NRC staff's availability. Using the assumptions of SECY-94-117, the staff believes it can issue the advanced copy of the complete FSER to the Commission and ACRS for final review in about 3 months after all FSER inputs are developed by the review staff. The staff concludes that it can issue an Advanced FSER to the Commission and Advisory Committee on Reactor Safeguards in November 1997, and can issue the Final Design Approval in March 1998. Attachment 2 to this paper gives the estimated dates for the key milestones that must be completed in order to finish the AP600 design certification review.

Westinghouse's Response to the Proposed Schedule

During a December 9, 1996, meeting, Westinghouse stated that the schedule was inconsistent with its funding and its desire to complete the review in FY97.

HEARING SCHEDULE

The time required for the rulemaking hearings is difficult to estimate without previous experience. The staff discussed possible hearing schedules in SECY-92-170, "Rulemaking Procedures for Design Certification," May 8, 1992, and SECY-92-381, "Rulemaking Procedures for Design Certification," November 10, 1992, estimating that a hearing could take from 1 to 2 years to complete. As discussed in the November 23, 1992, Commission meeting with the Office of the General Counsel (OGC) on this subject, 18 months is a good estimate of the time to complete the rulemaking hearings.

COORDINATION

The staff considered the schedule templates requested by OGC and ACRS while developing these schedules. The staff's revised schedule assumes that the ACRS will agree to meet in accordance with the proposed dates, and that it will not raise unexpected issues that significantly affect the design of the AP600.

FACTORS THAT COULD AFFECT THE SCHEDULES

The staff's experience with the reviews of the evolutionary LWRs has shown that issues remaining near the end of the review are more difficult to close, and take more time to reach an acceptable resolution. The schedule does not allow extra time for reviewing the ITAACs, initial test program, or technical specifications, which are expected to be difficult areas of review because of the novel design aspects of the AP600. In addition, the staff assumed that Westinghouse will develop the final design documentation (e.g., SSAR, CDM/ITAAC, and design control document) for the AP600 consistent with the resolutions of issues addressed on the evolutionary LWRs, such as treatment of the PRA, Tier 2* information, and secondary references.

The schedule can be achieved provided Westinghouse submits timely, high-quality SSAR, ITAAC, and technical specification information, and if the test results and code analyses demonstrate the adequacy of the designs. Deviation from these submittal dates may result in a delay in the schedule. Significant deviation from resolutions reached on applicable issues during the evolutionary reviews could also affect the schedule.

ATTACHMENT 2

REVISED SCHEDULE FOR THE AP600

MILESTONE	SECY-94-117	July 14, 1995 Expedited Schedule	SECY-96-068	Revised Dates
DSER to Commission/ACRS	11/94	-	-	-
DSER Supplement to Commission/ACRS	11/95	10/95	4/96	-
Applicant Submits Final SSAR Revisions & Documentation	-	-	7/96	5/97**
FSER to PM	6/96	2/96	NA*	8/97**
FSER to Commission/ACRS	9/96	5/96	NA*	11/97
FSER Issued for Publication	1/97	8/96	NA*	2/98
FDA/FR Notice Issued	4/97	9/96	NA*	3/98
Design Certification Document Submitted	-	-	-	-
Proposed Rule/FR Notice Issued	5/97	-	-	-

* The time periods in SECY-96-068 do not correlate to the dates in this table.

** Date of last input.

ATTACHMENT 3

Mr. Nicholas J. Liparulo
Nuclear Safety and Regulatory Activities
Westinghouse Electric Corporation
P.O. Box 355

Pittsburgh, PA 15230

SUBJECT: WESTINGHOUSE'S SUPPORT OF THE NUCLEAR REGULATORY COMMISSION'S REVIEW OF THE AP600 DESIGN CERTIFICATION REVIEW

Dear Mr. Liparulo:

During the November 12, 1996, senior management meeting to discuss the review schedule for the AP600, Westinghouse renewed its commitment to provide timely, high-quality submittals to support the completion of the AP600 design certification. As a result of the followup November 20 and 21, 1996, scheduling meetings with the staff, Westinghouse and the staff established a submittal and review schedule (documented in the meeting summary). After considering the proposed submittal dates and the NRC staff's availability, the staff concludes that it can issue an Advanced Final Safety Evaluation Report to the Commission and Advisory Committee on Reactor Safeguards in November 1997, and can issue the Final Design Approval in March 1998, as discussed in the enclosed Commission paper, SECY-97-XXX, "Schedule for the Staff's Review of the AP600 Design Certification Application."

The staff notes that certain key information concerning the NOTRUMP and the WGOTHIC codes was not submitted in accordance with the November 1996 agreements. In addition, documentation on the WGOTHIC code has been inconsistent and of low quality, making it extremely difficult to review. Approval of the NOTRUMP code has far-reaching effects in the design review of the AP600, because NOTRUMP is being used as a benchmarking tool in the staff's review of the thermal-hydraulic uncertainty in the design. Approval of the WGOTHIC code is key to the acceptance of the passive containment cooling system. Although the staff understands that certain submittal dates may be delayed due to consideration of new information, responses to new concerns raised during the review, or other extenuating circumstances, the staff continues to be concerned with Westinghouse meeting the revised schedular commitments discussed during the November 1996 meetings.

In addition, as discussed in this Commission paper, the schedule is also predicated on the assumption that design information will not be removed from the SSAR without first discussing such an action with the staff, and that the SSAR information required by the staff to reach its safety conclusion will be reinserted, where appropriate. The staff believes that the revised review schedule can be met provided that Westinghouse does not deviate significantly from resolutions reached on applicable issues during the evolutionary reviews.

In its December 6, 1996, letter to Westinghouse, the staff identified 27 licensing issues which it believes are potential critical path issues in the review of the AP600. The staff concludes that these key technical issues must be resolved soon in order to support the proposed review schedule for the AP600. The staff has been conducting internal meetings with NRR senior management to establish positions on these issues, where appropriate. We will inform you of the staff's positions on these matters when they are finalized by NRR management.

The staff concludes that the schedule presented in the enclosed Commission paper can be achieved provided Westinghouse submits timely, high-quality SSAR, ITAAC, and technical specification information. Deviation from these submittal dates may result in a delay in the schedule. We request that you be prepared to address actions taken to ensure that your schedular commitments will be met and that documentation will contain high quality information that sufficiently addresses the staff's concerns at the next senior management meeting. We expect to schedule this meeting within the next month.

If you have any questions regarding this matter, you can contact Thomas J. Kenyon at (301) 415-1120.

Sincerely,
L. Joseph Callan
Executive Director for Operations