

D911114

The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

SUBJECT: NRC STAFF RECOMMENDATIONS FOR REVIEWING, MONITORING, AND APPROVING VENDORS' TEST PROGRAMS TO SUPPORT THE DESIGN CERTIFICATION OF PASSIVE LIGHT WATER REACTORS AS DESCRIBED IN SECY-91-273

During the 379th meeting of the Advisory Committee on Reactor Safeguards, November 7-8, 1991, we discussed the NRC staff's recommendations for reviewing, monitoring, and approving test programs to support the design certification of passive light water reactors (LWRs) as described in SECY-91-273. The Committee had previously been briefed on the major design features of the passive LWRs by the vendors. An enclosure to SECY-91-273 provides an initial assessment of the planned testing program for the Westinghouse AP-600 passive plant. Our Advanced Boiling Water Reactors and Advanced Pressurized Water Reactors Subcommittees held a joint meeting on November 6, 1991, to discuss this matter. During these meetings, we had the benefit of discussions with representatives of the NRC staff and comments by the Westinghouse Electric Corporation on its planned test program for the AP-600 passive LWR. We also had the benefit of the document referenced.

The staff also discussed two SECY papers that are in preparation; one will describe the need for large-scale, full-pressure, integral systems testing for the Westinghouse AP-600, and the other will provide an initial assessment of the planned testing program for the General Electric Simplified Boiling Water Reactor (SBWR). We plan to comment on these SECY papers when they become available.

Our overall conclusion is that the staff is developing a comprehensive program for reviewing, monitoring, and approving vendors' test programs to support the design certification of passive LWRs. Our specific comments are as follows:

1. The staff's intent to initiate an early formal relationship with the vendors to provide review and oversight of their test programs in advance of receipt of their applications for design certification should be fully implemented. This staff initiative is of considerable importance if the present schedules for design certification of passive LWRs are to be maintained.
2. The staff's program may go beyond what is needed to support the design certification of passive LWRs. Accordingly, we plan to closely follow implementation of items 4 and 5 of the staff's proposed formal review procedure, which state respectively that, "The NRC may require the vendors to perform

additional tests beyond those originally approved, if information from other tests or analyses indicates that previous testing and analyses are not adequate to satisfy the 10 CFR 52.47 requirements," and "The NRC may identify additional confirmatory testing to be done at NRC's expense in the vendor's facilities, beyond the testing required for design certification."

3. Although the SECY paper identifies the staff's concerns, there is little to indicate what would be required to allay these concerns or to provide answers to related questions. Before beginning a test program, the staff should spend additional effort to define not only its concerns, but also to identify what information must be obtained in order to allay those concerns and allow licensing action to proceed. Unless this is done, there is little assurance that the results of the test programs will be useful or used.
4. At the time of our meetings, SECY-91-273 had not been released to the public. This hindered our review since Westinghouse was not aware of the staff's concerns relative to its planned test program for the AP-600 plant. The present policy of delaying the issuance of SECY papers relating to the design certification of advanced reactors until the final Staff Requirements Memorandum is made available should be reconsidered. A change in this policy would facilitate the review process of future SECY papers.
5. Staff representatives informed us that the staff is evaluating the need to construct its own test facilities to model the AP-600 plant. We were told that one of the justifications for the NRC constructing its own facilities is a concern that sharing test facilities with Westinghouse to obtain independent data might represent a "conflict of interest." This matter should be reviewed in light of past examples of successful NRC/industry cooperative efforts in reactor safety testing and the expense and potential schedule impacts.
6. Consideration should be given to testing the thermal hydraulic aspects of ATWS scenarios for the AP-600 plant, including the performance of safety and automatic depressurization system valves and the passive containment heat removal system under ATWS conditions.
7. Consideration should be given to the capabilities of the containment system relative to molten core spreading and core-concrete interaction, steam explosions, hydrogen detonation, direct containment heating, direct attack of molten core on containment structures, and extremely high level temperatures that could occur in certain accident scenarios. The SECY paper describes, under the heading of Severe Accident Performance Tests, a set of investigations of the above listed phenomena that could provide information about containment loading during severe accidents. Further, the SECY paper contains the statement, "The staff recommends that the testing and evaluations detailed above be performed." However, staff representatives told us that this statement was not correct

and that the staff does not intend to recommend these tests.

8. The SECY paper being prepared for the SBWR testing program should include consideration of the performance requirements for the primary containment isolation valves associated with the Reactor Water Cleanup/Shutdown Cooling System. These valves should be selected and tested on the basis of their critical need to interrupt large pipe-break flows in a highly reliable manner. If isolation is not achieved, it is necessary to show that the passive core cooling water supplies inside of containment do not drain through a break outside of containment.
9. We are concerned about the issue of human factors in the review of advanced LWR instrumentation and control systems. The staff should begin developing "General Human Factors Criteria," analogous to the "General Design Criteria," contained in Appendix A of 10 CFR Part 50, as a means to prescribe NRC requirements in this area. Some rules are needed for this important area that are understood by both the staff and the advanced LWR vendors.
10. The staff believes that a full-height, high-pressure integral facility simulating the AP-600 plant is needed for confirmatory research and for validation of its computer codes. The staff is concerned about interactions between different aspects of the various passive safety systems as well as operator actions to recover from a plant upset. The staff was not prepared to defend its view. At this time, we are not convinced that such a facility is needed. We will comment further when the staff completes the development of its basis for such a facility.

We wish to be kept informed as the staff implements the program described in SECY-91-273, and plan to review the related SECY papers that the staff has in preparation when they become available.

Sincerely,

David A. Ward
Chairman

Reference:

SECY-91-273, Memorandum dated August 27, 1991 for the Commissioners from James M. Taylor, Executive Director for Operations, Subject: Review of Vendors' Test Program to Support the Design Certification of Passive Light Water Reactors (Predecisional)