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Document Control Desk
U S Nuclear Regulatory Commission
One White Flint North
Rockville, MD 20852-2738

ATTENTION: Samuel J. Collins

SUBJECT: Revised Proposal for the Use of Design Acceptance Criteria for AP1000

Dear Mr. Collins,

A meeting between Westinghouse and the NRC staff was held on January 23, 2002 to review the technical issues related to the AP1000 pre-certification review. This letter outlines our response to the staff's position regarding our proposed use of Design Acceptance Criteria (DAC) in the areas of seismic analysis, structural design, and piping design.

The staff position regarding the Westinghouse approach on DAC is that our approach does not meet the intent of 10 CFR Part 52 regarding the level of completeness necessary for the staff to make a safety determination for Design Certification. The staff has also expressed concerns that use of DAC will diminish standardization, which is an expressed goal of both the NRC and the industry.

Westinghouse recognizes that the staff's position on this issue may delay our schedule and jeopardize our overall project goals. Considering that there is no clear precedent for the application of DAC/ITAAC to the areas of structural design and seismic analysis, we are revising our proposal for AP1000 Design Certification in these areas. Considering that clear precedents exist for the use of Piping DAC/ITAAC, Westinghouse maintains our position to use the same DAC/ITAAC approach for piping design as was approved and certified for System 80+ and ABWR. The following describes our revised proposal on these subjects:

Seismic Analysis

Westinghouse will request design certification for a plant to be founded on hard rock. This possibility was discussed with the staff at the January 23 meeting. The Design Control Document

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(DCD) submitted at the end of March will include all methodology and typical results for the AP1000 nuclear island seismic analyses.

The seismic analysis for the AP1000 will include:

- Finite element models for AP1000 (auxiliary building, shield building, containment vessel, containment internal structures, and reactor coolant loop)
- Simplified stick models for use in dynamic seismic analyses
- Fixed base time history seismic analyses of stick models for rock site, including typical results (accelerations, displacements, member forces and floor response spectra)
- Equivalent static acceleration seismic analyses of the finite element building models (auxiliary building, shield building, containment vessel, containment internal structures)
- Overturning and stability analyses for rock site

Structural Design

Westinghouse will perform structural design calculations for the same critical sections of the auxiliary and shield building, nuclear island basemat and containment internal structures as was defined in ITAAC Table 3.3-7 for the AP600. These will incorporate member forces from the seismic analyses described above. The AP1000 DCD submitted at the end of March will include the design criteria and methodology for the AP1000 structural design, and will include the same level of information for the AP1000 structures that was provided in the AP600 DCD. Structural design reports will be available for NRC audit in 1QCY03.

Piping Design

The following provides our justification for the application of DAC/ITAAC to AP1000 Design Certification.

Background

During the Certification review for the General Electric Advanced Boiling Water Reactor, and subsequently the Combustion Engineering System 80+, the staff and the vendors agreed to a process of using DAC/ITAAC as a substitute for selected design detail where such information was not available. General Electric and Combustion Engineering requested that detailed design information not be submitted for areas where technology was rapidly evolving (such as instrumentation and control system and control room), or where detailed design information (i.e. vendor component drawings) was unavailable to perform the detailed design analysis (such as piping design). The DAC/ITAAC approach is to certify top-level requirements and design acceptance criteria, and approve analysis methodology as Tier 1/Tier 2* information. Staff verification that the final piping design meets the acceptance criteria in the selected areas is performed during the ITAAC phase.

The Commission found this DAC/ITAAC approach acceptable for meeting 10 CFR 52 regarding content of an application for Design Certification. Using this approach, the staff was able to make the necessary safety determinations to grant Design Certification for the ABWR and System 80+.

Westinghouse also followed the DAC/ITAAC approach for AP600 Design Certification in the area of instrumentation and control systems and control room design. However, for piping

design, Westinghouse performed a significant amount of the piping design calculations using preliminary vendor information for such items as valves and components. The staff reviewed the piping calculations prior to certifying the design. But even for the AP600, the final piping design is subject to ITAAC verification, since Westinghouse could not perform the piping analysis with final vendor information. Consequently, the AP600 ITAAC contain the same requirements as the System 80+ and ABWR ITAAC, and the design criteria and methodology contained in the System 80+ and ABWR DAC are also documented in the AP600 Design Control Document and designated Tier 2*.

AP1000 Approach to Piping DAC

For AP1000 piping design, Westinghouse proposes to use a DAC/ITAAC approach similar to what was used for ABWR and System 80+. The vendor information required to perform the piping analysis such as valve weights and centers of gravity is not available until the vendors are selected. An important guideline set forth in the EPRI ALWR Utility Requirements Document was that final vendor selection of components be left open until the time of plant order. The basis for this requirement was to ensure that utilities could realize the benefits from competitive bidding for purchased components. The three certified designs did not specify equipment vendors as part of their Design Certification.

Following the proposed DAC/ITAAC approach, the staff would review and approve the methodology, design criteria, and analysis acceptance criteria that would be used to perform the detailed piping design. The methods, design criteria, and analysis acceptance criteria would be referenced as Tier 2*. The final piping design and analysis will be subject to ITAAC verification. Westinghouse believes that this approach strikes an optimum balance in achieving the NRC's four performance goals:

1. Maintain safety,
2. Increase public confidence,
3. Make NRC activities and decisions more effective, efficient, and realistic, and
4. Reduce unnecessary regulatory burden on stakeholders.

The DAC approach meets the intents of goals 1 and 2 by ensuring that the applicant and the staff identify and agree upon the design process early in the review. The methodology, design criteria, and acceptance criteria are agreed upon during Design Certification. The final implementation is verified through ITAAC. Our approach to piping DAC is identical to what was approved for ABWR and System 80+. Our justification for using piping DAC is the same as was provided for the ABWR and the System 80+. The vendor information required to perform the piping analysis such as valve weights and centers of gravity, is not available until the vendors are selected. We believe the DAC/ITAAC approach is technically sound, and allows the staff to make a safety determination for the AP1000.

Our proposed DAC/ITAAC approach meets the intent of goal 3 by reducing the staff's burden necessary to perform a safety determination. Given that detailed final design (with as-built information) is subject to ITAAC verification, it is not efficient to review this same information in a preliminary state, (as was done for AP600 piping). The DAC/ITAAC process allows the staff to make the necessary safety determinations at the appropriate times during the design and implementation phases.

Our proposed approach meets the intent of goal 4 by reducing unnecessary burden on an applicant to invest in detailed final design activities during Design Certification if it is not needed

by the staff to make its safety determination. In retrospect, Westinghouse gained very little regulatory benefit by performing detailed piping design and analysis during Design Certification of the AP600. We base this conclusion on the little difference between the piping ITAAC for the AP600, ABWR and System 80+, where nearly the same verifications must be performed for any of the plants. All of the piping design and analysis will have to be re-evaluated once final vendor information is available for any of the applications. The verifications necessary during ITAAC are similar to what is reviewed and approved during Design Certification. As previously discussed, the staff has made safety determinations using this approach for the previous Design Certification reviews based on relieving unnecessary burden on the applicants.

Approach to Standardization

Early in the Advanced Light Water Reactor Program, it was recognized by the nuclear industry that an important element of a successful nuclear build program for the United States is plant standardization. The Power Companies, along with EPRI and the Department of Energy, created a process to require standardization in all of the phases of plant design and operation. The Standardization Policy was a key element in the Nuclear Power Oversight Committee (NPOC) Strategic Plan. The initial step in the standardization process was the development of a uniform set of power company requirements, the ALWR Utility Requirements Document. In addition to the standardization "imposed" by the requirements phase, processes were defined to deal with standardization in the follow-on phases including:

- Standardization Through Design Certification and Standard Licensing
- Commercial Standardization
- Life Cycle Standardization

The authors of the industry's Standardization Policy perceived that the 10CFR52 licensing process increased the probability of standardization since restrictions were placed on both the industry and the NRC on design changes following Design Certification. It is clear that the industry leaders envisioned a role for the NRC in standardization by resolving all safety issues at the time of certification. The industry leaders did not intend for the NRC to play a significant standardization role beyond licensing.

The NPOC "Position Paper on Standardization" update in October 1992 says in part:

"C-18 e. The level of design detail submitted for an NRC certification review is limited to that necessary for safety determinations. The economic success of standardization requires the avoidance of the time-consuming and costly regulatory review of engineering details outside of governing regulations."

Guidance was provided by the Commission in their endorsement of the SECY letters published between 1990-1992 regarding DAC. Westinghouse believes that the DAC/ITAAC approach endorsed by the Commission provides a workable model to base future regulatory decisions in this area. The DAC/ITAAC approach prescribes a method that allow a vendor to defer aspects of the detailed design, provided that sufficient information can be provided to the staff so that the requisite safety determination can be made.

Today, standardization of future nuclear power plants in the U.S. is not an option - it is an implicit mandate. In our discussions with U.S. Power Companies, it is widely acknowledged that the market economics will ensure plant standardization. Westinghouse is currently advocating that a family of multiple standard AP1000 plants be built by a consortium of U.S. power

companies. We have prepared a business plan model, which evaluates the competitiveness of this family of plants. It is clear to us and to the power companies that nuclear power plants will not be competitive in the present or future market without a standardized family of plants. Therefore, we do not believe that the staff should enforce standardization in the Design Certification Process over and above that which is required for them to make a safety determination.

Conclusion

Westinghouse's primary objective for the AP1000 is to achieve a Design Certification from the NRC within our budgetary constraints, on as short a schedule as possible. As we discussed at the beginning of our Pre-Certification review, Westinghouse believes that our objectives can best be served by making a reasonable use of the DAC/ITAAC approach. In order to achieve these goals without further delay, we have hereby modified our original proposal to make it acceptable to the NRC and still be within our schedule and budget constraints. Westinghouse plans on submitting our application for Design Certification by the end of March 2002 based on this revised proposal.

Please contact me at 412-374-6211 if you have any questions about this proposal.

Sincerely yours,

W. E. Cummins, Director
AP600 & AP1000 Projects

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