



52-001

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20565-0001

March 4, 1994

MEMORANDUM FOR: The Chairman
Commissioner Rogers
Commissioner Remick
Commissioner de Planque

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: REVIEW OF ADVANCED BOILING WATER REACTOR (ABWR) DESIGN

In a January 28, 1994, Commission briefing on the progress of design certification reviews, the staff discussed several future actions related to the ABWR design review. The purpose of this memorandum is to clarify when the staff will be requesting guidance from the Commission on specific review issues.

In a memorandum dated December 23, 1993, I transmitted to the Commission the advance version of the ABWR safety evaluation report (SER), which documented the status of the design review and the resolution of open and confirmatory items identified in the draft-final SER issued on October 14, 1992. The remaining staff actions required to complete the SER are described in the enclosure to my December 23, 1993, memorandum. The staff will request Commission approval to publish the "final" SER for the ABWR when it is completed this spring. During the January 28, 1994, Commission meeting, the staff noted that there were some issues discussed in the SER that could be of particular interest to the Commission. The staff does not believe that these issues are policy matters requiring a specific Commission action. However, the staff requests that the Commission provide guidance on any issue discussed in the SER (and, in particular, the three issues discussed below) where the Commission disagrees with the staff position.

The first issue is the design power level of the ABWR, which is described in Section 1.2.7 of the SER. The ABWR power level exceeds the guidance in Regulatory Guide (RG) 1.49, "Power Levels of Nuclear Power Plants," which states that licensed power levels should be limited to a reactor core power level of 3800 MWt or less until January 1, 1979, at the earliest. The intent of this regulatory guidance was to stabilize the maximum size of nuclear plants until sufficient experience is gained with design, construction, and

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operation of large plants. Since the issuance of RG 1.49, Revision 1, in 1973, the staff has reviewed sufficient operating experience and has determined that licensing the ABWR at a rated power of 3926 MWT is acceptable. In addition, the Commission licensed the Grand Gulf Nuclear Station (NPF-29) for 3833 MWT on November 1, 1984.

The next issue is the design of the emergency core cooling system (ECCS) suction strainers located in the suppression pool. For this issue, the staff has proposed a resolution which is different from that used on operating plants. In Section 6.2.1.9 of the SER, the staff proposed that GE size the strainers in accordance with RG 1.82, Revision 1, but should provide a factor of 3 sizing margin (surface area) to account for the uncertainty in the synergetic effects of strainer clogging from insulation, corrosion products, and other debris. This is needed to preclude the excessive accumulation of debris on the strainer heads and the resulting loss of net positive suction head and failure of the ECCS pumps. GE has agreed to comply with this position and is preparing a revision to the standard safety analysis report (SSAR) for this design feature.

The final SER issue involves the staff's position on the need for diversity in the method of measuring water level in the reactor pressure vessel, which is described in Section 20.5.30 of the SER. Since issuing the advance version of the SER, the staff has had the benefit of the Advisory Committee on Reactor Safeguards' (ACRS) views. The staff has subsequently decided that diverse instrumentation is not necessary for the ABWR design and is revising its discussion of Open Issue F20.5.30-1 to indicate this resolution. This issue is still under review for the simplified boiling water reactor. A copy of the revised SER pages for this issue and the other open items will be sent to the Commission when they are transmitted to the ACRS for its review.

The acceptable level of design detail necessary for the staff to make its safety findings on the ABWR design was one of the most challenging aspects of the staff's review. The staff requirements memorandum for SECY-90-377, "Requirements for Design Certification Under 10 CFR Part 52," set forth the Commission's guidance on the level of design information that is required for a certification application, and the staff has followed that guidance in the ABWR review. In order to accommodate evolving technology, the ABWR application does not include detailed design information in the areas of instrumentation and controls (I&C) and control room design. The staff based its safety decisions for these areas of the design on the use of design acceptance criteria (DAC) as discussed in SECY-92-196, "Development of Design Acceptance Criteria for the Advanced Boiling Water Reactor (ABWR)," and in SECY-92-299, "Development of Design Acceptance Criteria for the Advanced Boiling Water Reactor (ABWR) in the Areas of Instrumentation and Controls (I&C) and Control Room Design." The staff requests that the Commission approve the level of design detail, including the use of DAC, for the ABWR design as part of its review of the final SER.

The staff will seek Commission approval of design certification rulemaking issues, such as the use of applicable regulations and the identification of so-called Tier 2* matters (limited design information where changes will

require prior staff review and approval), when a proposed rule is submitted for the first evolutionary design that receives final design approval for certification. The staff will submit this proposed rule in a Commission paper, along with a statement of considerations for the proposed rule and an analysis of the comments submitted in response to the advance notice of proposed rulemaking for design certification that was issued on November 3, 1993. This Commission paper will be submitted within 90 days from the issuance of the final design approval for certification.

Original signed by
James M. Taylor

James M. Taylor
Executive Director
for Operations

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