



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

August 18, 1977

Honorable Joseph M. Hendrie
Chairman
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: REPORT ON BABCOCK-205 STANDARD NUCLEAR STEAM SYSTEM

Dear Dr. Hendrie:

At its 208th Meeting, August 11-13, 1977, the Advisory Committee on Reactor Safeguards completed its review of the application of Babcock & Wilcox Company (Applicant) for a Preliminary Design Approval (PDA) for its Standard Nuclear Steam System (NSS), Babcock-205. A Subcommittee meeting was held with representatives of Babcock & Wilcox Company (B&W) and the Nuclear Regulatory Commission (NRC) Staff in Washington, D.C., on July 27, 1977. The Committee had the benefit of discussions with representatives of the NRC Staff and the Applicant. The Committee also had the benefit of earlier reviews of other Standardized Nuclear Steam Supply Systems and of the documents listed.

The B&W Standard Safety Analysis Report (B-SAR-205) describes the B&W standardized two loop NSS for a 3820 Mwt pressurized water nuclear plant with a core thermal power output of 3800 Mwt. Its scope includes the Reactor, Reactor Coolant System, Pressurizer Relief System, Emergency Core Cooling System, Decay Heat Removal System, Chemical Addition and Boron Recovery System, Makeup and Purification System, Instrumentation and Controls, and Fuel Handling System. The reference design is similar to recent B&W 3620 Mwt NSS designs reported on by the Committee: Bellefonte Nuclear Plant Units 1 and 2 (July 16, 1974), Washington Public Power Supply System Nuclear Power Stations 1 and 4 (June 11, 1975) and Pebble Springs Nuclear Plants 1 and 2 (February 11, 1976). Earlier ACRS reports on PDA applications for standard reference nuclear steam supply designs are the March 14, 1975 report on the General Electric Company GESSAR-238 Nuclear Island and the December 17, 1976 report on the General Electric Company GESSAR-238 and GESSAR-251 Nuclear Steam Supply Systems, the September 17, 1975 report on Combustion Engineering, Inc., CESSAR-80, and the September 18, 1975 and July 14, 1976 reports on Westinghouse Electric Corporation RESAR-41 and RESAR-3S.

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The Applicant has selected horizontal ground accelerations of 0.3g and 0.15g as appropriate design values for the safe shutdown and operating basis earthquakes, respectively. Designs for the protection of Babcock-205 safety-related components and systems from other site-related hazards will be included in the balance of plant design. The reference NSS design includes the interface requirements information essential to a balance of plant safety design consistent with the assumptions used in the NSS design-basis accident analyses. Since the utility-applicant will be responsible for instituting the quality assurance programs necessary to assure that all safety-related design requirements have been met, the Committee will review these matters in more detail with the utility-applicants on a case-by-case basis.

The NRC Staff had listed thirteen outstanding issues in its report to the ACRS. The NRC Staff now believes that it has the information it needs to resolve eight of the thirteen issues, and that the remaining five issues can be resolved before the anticipated time of granting the PDA. The ACRS recommends that all outstanding issues be resolved in a manner satisfactory to the NRC Staff.

The Committee believes that for Babcock-205, as well as for other standardized nuclear steam supply systems, studies should be made to quantify the reliability, effectiveness and safety margins for the Emergency Core Cooling Systems. The studies should include evaluation of current NRC and EPRI programs on alternate ECC Systems to determine what, if any, improvements are practicable and desirable. These efforts will require the substantiation of the bases for best estimate analyses and verification of codes, and increased input to and participation in the related NRC programs for safety research.

New features in the instrument and control systems have been introduced through the specification of functional designs and design criteria which the NRC Staff has found to be adequate for the PDA. On all issues involving instrumentation and control, the Committee will use the case-by-case basis to ascertain progress of the work until the Babcock-205 design has progressed to the stage where Final Design Approval is achieved.

The Committee has encouraged Applicants to consider instrumentation with the necessary ranges and diversity to follow the course of an accident. Regulatory Guide 1.97 (Revision 1) embodies these recommendations. For standardized PWR's, such as Babcock-205, the Committee recommends that a study be made of the merits of including instrumentation to sense the water level in the reactor pressure vessel.

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The Babcock-205 design includes provisions which anticipate maintenance, inspection, and operational needs of the plant throughout its service life. The Committee believes that the NRC Staff and the Applicant should continue to seek improvements in provisions of this type and, in addition should review procedures for removing accumulations of radioactive contamination so that maintenance and inspection programs and eventual decommissioning can be more effectively and safely carried out.

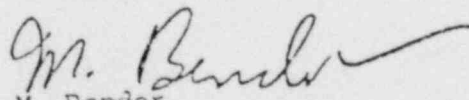
The Committee believes that B&W and the NRC Staff should intensify their review for design provisions that will further improve protection against sabotage and that provisions found timely should be incorporated in early applications of Babcock-205.

With regard to other generic problems cited in the Committee's report, "Status of Generic Items Relating to Light-Water Reactors: Report No. 5," dated February 24, 1977, items considered relevant to Babcock-205 are: II-3, 4, 5, 6, 7, 9, 10; IIA-3, 4, 5, 6, 7; IIB-1, 2; IIC-1, 4, 5; IID-1, 2. These problems should be dealt with by the Staff and the Applicant as solutions are found.

The Committee believes that methods that seek to develop reference systems through standardization and through replication need to be coupled with ongoing programs that will permit design changes which improve safety and which, when justified, will be implemented in a timely manner. Use of reference systems should lead to more efficient and effective licensing reviews. Standardized designs such as Babcock-205 will contribute to this process. A transition period will be required in which the Committee will still give attention to the items noted, on a case-by-case basis.

The Committee believes that, subject to the above comments and successful completion of the R&D programs, the Babcock-205 design can be successfully engineered to serve as a reference system.

Sincerely yours,


M. Bender
Chairman

Honorable Joseph M. Hendrie

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REFERENCES:

1. The B&W Standard Safety Analysis Report (B-SAR-205) and Amendments 1 through 16.
2. Report to the Advisory Committee on Reactor Safeguards by the Office of Nuclear Reactor Regulation, (ONRR), U. S. Nuclear Regulatory Commission in the Matter of Babcock and Wilcox Company Reference Safety Analysis Report, B-SAR-205, Docket No. STN 50-561, July 8, 1977.
3. Babcock and Wilcox letter to ONRR, Attention: Mr. Roger S. Boyd, Subject: B-SAR-205 - Outstanding Issues, dated July 15, 1977, Docket STN 50-561.
4. Babcock and Wilcox letter to ONRR, Attention: Mr. Roger S. Boyd, Subject: B-SAR-205 - Outstanding Issues, dated July 21, 1977, Docket STN 50-561.