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

August 10, 1978

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

Subject: REPORT ON WESTINGHOUSE ELECTRIC CORPORATION REFERENCE SAFETY ANALYSIS REPORT, RESAR-414

Dear Dr. Hendrie:

At its 220th meeting, August 3-5, 1978, the Advisory Committee on Reactor Safeguards completed its review of the Westinghouse Electric Corporation's application for Preliminary Design Approval (PDA) for the standardized nuclear steam supply system described in its Reference Safety Analysis Report, RESAR-414. A Subcommittee meeting was held with representatives of the Applicant and the Nuclear Regulatory Commission (NRC) Staff in Washington, DC, on July 24, 1978. The Committee had the benefit of discussions with representatives of the NRC Staff and the Westinghouse Electric Corporation. The Committee also had the benefit of the documents listed.

RESAR-414 is a Westinghouse standardized four-loop nuclear steam supply system with a core thermal power of 3800 MWt. Systems within the scope of RESAR-414 include the reactor and reactor core; reactor coolant system and supports; systems for chemical and volume control, emergency core cooling, boron recycle, and residual heat removal; systems and equipment for fuel handling; and associated instrumentation and controls. RESAR-414 is a modification of the Westinghouse nuclear steam supply system RESAR-41, which was reviewed in the ACRS report of September 18, 1975. Changes from RESAR-41 include an integrated protection system, the use of two rather than three independent trains in the emergency core cooling system (ECCS), the use of boron carbide as a control rod material, and the deletion of the emergency boration system.

RESAR-414 has been designed for application to a range of plant sites and will be designed to withstand a Safe Shutdown Earthquake with horizontal ground acceleration of 0.40g.

The Westinghouse Integrated Protection System (IPS) proposed for RESAR-414 will monitor plant conditions and initiate the protective functions of reactor trip and engineered safety features actuation. In this design the reactor trip system and engineered safety features actuation system have been integrated. The IPS will use digital processing techniques and programmable equipment.

The NRC Staff is conducting a two part review of the IPS. The first part included the design bases which establish the functional and performance requirements, and has been completed for the PDA. The second part will include review of the verification program and program results to assure that the system meets the design criteria and design bases. It is expected that the second part will be completed in 1979. The Committee agrees with this method of performing the review, and will continue its review of the IPS with the NRC Staff and the Applicant. The Committee recommends that the NRC Staff give special attention in their review to testing procedures, to the safety problems associated with manufacturing and maintenance errors, and to the potential for adverse interaction between the control, scram, and engineered safety feature functions.

In its report of July 14, 1976 on the Westinghouse RESAR-3S design, the Committee discussed several matters that should also be considered in relation to RESAR-414. These include:

> Safety-related interface requirements that are essential to designing the balance of plant to be consistent with the assumptions used in the accident analysis.
>
> Analytical and experimental programs to substantiate the conservatisms in the current Westinghouse ECCS evaluation model and to establish the accuracy and uncertainties in best-estimate calculations.
>
> The adequacy of provisions for the maintenance, inspection, and operational needs of the plant throughout its service life and for eventual decommissioning.
>
> Review for design changes that will further improve protection against sabotage.

Other generic problems are discussed in the Committee's report, "Status of Generic Items Relating to Light-Water Reactors: Report No. 6," dated November 15, 1977. Those problems relevant to the RESAR-414 should be dealt with by the NRC Staff and the Applicant as solutions are found. The relevant items are: II-3, 4, 6A, 7, 9, 10; IIA-2, 3; IIB-2; IIC-1, 4, 5, 6; and IID-2.

The Committee believes that, subject to the above comments, RESAR-414 can be successfully engineered to serve as a reference system.

Sincerely yours,

Stephen Lawroski

Stephen Lawroski
Chairman

References

1. Westinghouse Electric Corporation, "RESAR-414 Reference Safety Analysis Report." Volumes I through VIII and Amendments 1 through 16.

2. U.S. Nuclear Regulatory Commission, "Report to the Advisory Committee on Reactor Safeguards by the Office of Nuclear Regulation in the Matter of Westinghouse Electric Corporation Reference Safety Analysis Report RESAR-414," July 1978.