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

December 17, 1976

Honorable Marcus A. Rowden
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: GENERAL ELECTRIC STANDARD NUCLEAR STEAM SUPPLY SYSTEMS (GESSAR-238 NSSS and GESSAR-251)

Dear Mr. Rowden:

At its 200th meeting, December 9-11, 1976, the Advisory Committee on Reactor Safeguards completed its review of the applications by the General Electric Company for preliminary design approvals for the standardized nuclear steam supply systems described in the General Electric Standard Safety Analysis Reports, GESSAR-238 NSSS and GESSAR-251. These systems were also considered at the 199th meeting of the Committee, November 11-13, 1976. The review by the Committee was facilitated by the meeting of a Subcommittee with representatives of the General Electric Company and with members of the Nuclear Regulatory Commission (NRC) Staff on November 6 and 7, 1976, in Los Angeles, California. The Committee also had the benefit of the documents listed below.

These GESSAR systems consist of BWR/6 nuclear steam supply systems with thermal power ratings of 3579 MW for GESSAR-238 NSSS and 3800 MW for GESSAR-251. They do not include the containment structure, the reactor building, the fuel building, the auxiliary building, or other structures outside the nuclear systems, which are the responsibility of the utility-applicant.

GESSAR-238 NSSS and GESSAR-251 have essentially the same design, the principal differences arising from differences in power level. Many aspects of GESSAR-238 NSSS and GESSAR-251 are the same as those previously reviewed by the Committee in the General Electric Standard Safety Analysis Report for a nuclear island. The Committee's report on the GESSAR-238 Nuclear Island was issued on March 14, 1975.

The Committee and the Applicant discussed the possibility of damage to a heat exchanger of the Residual Heat Removal (RHR) system by overpressurization or by hydrodynamic forces that could conceivably result from valve malfunction or operator error. This hypothetical condition is associated with the steam condensing mode of operation of the RHR or when the Reactor Core Isolation Cooling system is in use. The Committee recommends that the NRC Staff review this problem, applying their usual

criteria of assuming malfunction and operator error, to determine whether such conditions can occur. The review should include particular study of the initial phase of steam entry, during which water initially present, or inadvertently accumulated, must be expelled from piping into and through the heat exchanger.

The Committee recommends that GESSAR-238 NSSS and GESSAR-251 incorporate appropriate systems to mitigate the consequences of an ATWS event.

Safety related interfaces between the reference system and the balance of plant are identified in these GESSAR's. It will be necessary for the NRC Staff to assure that all of the safety-related requirements are fulfilled when an application for a construction permit is filed. The Committee will review this matter in more detail when applications for construction permits referencing these systems are received.

The Committee recommends that, during the design, procurement, construction, and startup, timely and appropriate interdisciplinary system analyses be carried out to assure complete functional compatibility across each interface for an entire spectrum of anticipated operations and postulated design basis accident conditions.

Other generic problems relating to large water reactors are discussed in the Committee's report dated April 16, 1976. Those problems relevant to large boiling water reactors should be dealt with appropriately by the NRC Staff and General Electric Company as solutions are found. The relevant items are: II-3, 4, 5, 6, 7, 8, 9, 10, 11; IIA-2, 6; IIB-2, 4; IIC-1, 2, 3, 4, 6, 7.

The Committee believes that, subject to the above comments and to successful completion of the necessary R&D programs, GESSAR-238 NSSS and GESSAR-251 can be successfully engineered to serve as reference systems.

Sincerely yours,

Dade W. Moeller

Dade W. Moeller
Chairman

References

1. 238 Nuclear Steam Supply System GESSAR and Amendments 1 through 4.

2. Report to the Advisory Committee on Reactor Safeguards in the Matter of General Electric Safety Analysis Report GESSAR-238 NSSS (Docket No. STN 50-550) Published: October 1976 by the U.S. Nuclear Regulatory Commission.

3. 251 General Electric Standard Safety Analysis Report (251 GESSAR) and Amendments 1 through 21.

4. Report to the Advisory Committee on Reactor Safeguards in the Matter of General Safety Analysis Report GESSAR-251 (Docket No. STN 50-531) Published: October 1976 by the U. S. Nuclear Regulatory Commission.

5. General Electric Company letter dated February 13, 1975 forwarding proprietary information regarding fuel assembly and core design.