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

MAY 13, 1976

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

Subject: REPORT ON HARTSVILLE NUCLEAR PLANTS UNITS A-1, A-2, B-1, AND B-2

Dear Mr. Rowden:

At its 193rd meeting, May 6-8, 1976, the Advisory Committee on Reactor Safeguards reviewed the application of the Tennessee Valley Authority (TVA) for a license to construct the Hartsville Nuclear Plants Units A-1, A-2, B-1, and B-2. This application was previously reviewed at a Subcommittee meeting in Nashville, Tennessee on April 23, 1976, subsequent to a visit to the site on April 22. The Committee also had the benefit of discussions with representatives and consultants of the Tennessee Valley Authority, the Nuclear Regulatory Commission Staff, and the General Electric Company, statements by area residents, and the documents listed.

The Hartsville Nuclear Plants consist of four 3579 MWt reactors of the GESSAR-238 design which uses a BWR-6 boiling water reactor with a Mark III containment. Preliminary design approval for GESSAR-238 (PDA-1) was issued December 22, 1975. This is the first use of a PDA as part of a Construction License Application. PDA-1 covers the nuclear island which consists of the nuclear steam supply system, the reactor building, and associated facilities. The Tennessee Valley Authority will design the turbine island portion and other installations external to the nuclear island for the Hartsville Plants.

The plants will be located in Trousdale and Smith Counties in North Central Tennessee, approximately 40 miles east northeast of Nashville and approximately five miles southeast of Hartsville, Tennessee (1970 population 2,243). The site consists of approximately 1,940 acres on the north bank of the Old Hickory Reservoir of the Cumberland River. The minimum exclusion area distance measured from the edge of the reactor building nearest the site boundary is approximately 4,000 ft. The low population zone has a radius of three miles and includes a population of 625 persons. The nearest population center is Nashville, Tennessee (1970 Metropolitan population 887,000).

In its March 14, 1976, report on GESSAR-238 for the PDA, the ACRS identified four items requiring further consideration by the Committee. Of these, only the matter related to continuous venting of the containment remains to be resolved by the NRC Staff.

The Committee believes that the Applicant and the NRC Staff should review the Hartsville Plants for design features that could significantly reduce the possibility and consequences of sabotage, and that such features should be incorporated into the plant design where practicable. The Committee wishes to be kept informed.

The matter of suitable design loadings for the Mark III containment has been a continuing concern of the Committee and the NRC Staff. The Staff has reviewed the ongoing tests being made by the General Electric Company and has specified what it believes to be loadings that are sufficiently conservative to allow for the uncertainties in the empirical and limited knowledge now available. The ACRS believes that this approach is acceptable at this stage of design and construction, but urges that the tests being made by the General Electric Company should be continued and, if necessary, accelerated in order to assure that the hydrodynamic phenomena important to the design of the Mark III containment will be understood and defined more completely before operation of the first of the Hartsville Units.

The ACRS report on GESSAR-238 also identified a number of generic matters requiring attention prior to final design approval (FDA). In particular, the following generic items should have a specific plan and implementation schedule established prior to issuing a Construction Permit for the Hartsville Plants:

1. Fire protection features required in both the GESSAR-238 and TVA portions of the plant design, taking into account the NRC Staff's new fire protection regulatory requirements.

2. Anticipated transients without scram, if changes in the scram system are anticipated from that presently used in BWRs in order to meet regulatory requirements.

3. A thorough assessment of the adequacy of the provisions to reduce the likelihood of stress corrosion cracking in BWR systems.

4. An assessment of occupational exposures in accordance with the ALARA criteria taking into account the need for improved decontamination capability, personnel access for in-service inspection, and general accessibility for maintenance of installed equipment in both the nuclear island and the turbine island portions of the plants.

5. The adequacy of the planned instrumentation to follow the course of accidents.

The Committee wishes to be kept informed regarding these items.

The NRC Staff should take the necessary steps to assure direct participation of the TVA personnel in the GESSAR-238 Final Design Approval actions in order to make certain that the Applicant is fully aware of the regulatory requirements pertaining to the FDA.

Generic problems relating to large water reactors are discussed in the Committee's April 19, 1976, Status Report, No. 4. These problems should be dealt with in a timely fashion by the NRC Staff and the Applicant.

The Advisory Committee on Reactor Safeguards believes that the items mentioned above can be resolved during construction and that, if due consideration is given to the foregoing, the Hartsville Nuclear Plants Units A-1, A-2, B-1, and B-2, can be constructed with reasonable assurance that they can be operated without undue risk to the health and safety of the public.

Mr. J. Ebersole did not participate in the review of this project.

Sincerely yours,

Dade W. Moeller

Dade W, Moeller
Chairman

REFERENCES:

1. Hartsville Nuclear Plants Units A-1, A-2, B-1, and B-2, Preliminary Safety Analysis Report, Volumes 1-4.
2. Amendments 1-17 to the Preliminary Safety Analysis Report.
3. Safety Evaluation Report, NUREG-0014, related to the construction of the Hartsville Nuclear Plants Units A-1, A-2, B-1, and B-2, April 8, 1976.