ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

March 18, 1966

Honorable Glenn T. Seaborg
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON BROOKWOOD NUCLEAR STATION UNIT NO. 1

Dear Dr. Seaborg:

At its seventy-first meeting, March 10-12, 1966, the Advisory Committee on Reactor Safeguards considered the proposal by the Rochester Gas and Electric Corporation to build a 1300 MW(t) pressurized-water reactor at its Brookwood site. The Committee had the benefit of discussions with representatives of the applicant, the Westinghouse Electric Corporation, Gilbert Associates, Inc., and consultants to the applicant; with the AEC Staff and its consultants; and of the documents listed. The Committee had previously reviewed some features of the plant at its seventieth meeting in February 1966. A subcommittee of the ACRS visited the site on July 16, 1965, and met with the applicant to review the proposal on January 27, 1966 and March 9, 1966.

The reactor system will be housed in a concrete containment building of novel design, with tensile forces carried by a combination of reinforcing steel and pre- and post-stressed tendons. The containment is an important engineered safeguard and should be accorded careful study commensurate with the importance and novelty of the structure.

The Committee believes that the following action should be taken before design of the containment is set:

1. Detailed design criteria and general specifications should be formalized by the applicant, and reviewed by the Staff and its consultants to assure that the design will take into account not only the ACI Code for conventional structures but also European experience with design, construction, and testing of prestressed-concrete nuclear pressure vessels. A high degree of conservatism should be reflected in the design to allow for uncertainties in the state of the art.

2. The Committee calls attention to the potential problem of loss of strength or failure of tendons by corrosion over a 40-year life, and since the applicant proposes to use nonreplaceable tendons, the Committee recommends that this problem be given close attention. Provision for a surveillance program may be appropriate or even necessary. The Committee notes that there is some difference of opinion among experts in the field concerning the use of grouted versus ungrouted tendons and suggests that the applicant review the advantages and disadvantages associated with each approach and provide means for coping with any shortcomings of the selected approach to assure the reliability of the containment during its lifetime.

3. Quality control and inspection procedures for construction should be formalized, including a statement of the authority and prequalification of inspectors.

4. Criteria for testing the containment and evaluation of test results should be developed as far as necessary to assure that desired embedded instrumentation will be available during the test.

5. The desirability of model testing should be reconsidered for regions that do not lend themselves to reliable analysis; testing to destruction may be desirable to establish failure modes. As an alternative to model testing, difficult design areas should be appropriately instrumented during construction so that relevant data can be obtained at the time of the pressure test.

The Staff and its consultants should follow the above items closely and be satisfied as to the adequacy of the approaches adopted. The applicant has already agreed to work out details of test instrumentation, testing procedures, and acceptance standards for the containment.

The pressure test of the containment will be conducted at 69 psig and the leak test at 60 psig. The applicant states that the 60 psig test can be repeated as necessary over the life of the containment.

The applicant has agreed to provide additional specified redundancy or independence in the containment spray system, the fan and filter systems of the auxiliary building, and the service water supply. Additional measures will be taken, if found necessary, to preclude any credible possibility of the containment pressure exceeding 60 psi. Additional control room shielding will also be provided. The reactor may be subject to low-frequency xenon oscillations, and the applicant has stated that, if further analysis shows such to be necessary, he will take measures to control the instability. The postulated accident involving sudden ejection of a control rod will be analyzed by the applicant during detailed design, and suitable measures will be taken to limit the consequences of the accident, if necessary. The Committee believes that these problems can be resolved during construction.

The applicant described a program of improved quality control in the fabrication of the reactor vessel and also described a program for surveillance of the increase in nil-ductility transition temperature over the life of the vessel; the Committee attaches considerable importance to these programs. The Committee suggests that the applicant give further consideration to the development and use of improved methods of in-service inspection of the reactor vessel.

It is the opinion of the ACRS that, with due regard to the above considerations, a satisfactory containment of the proposed type can be designed and constructed, and the Brookwood Unit No. 1 can be built at the proposed site with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,

/s/

David Okrent
Chairman

References attached

References: Brookwood

1. Rochester Gas and Electric Corporation, Brookwood Nuclear Station Unit No. 1, Preliminary Facility Description and Safety Analysis Report, Volume 1, Volume 1 - Appendices, Volume 2 - Part A, and Volume 2 - Part B, transmitted by Le Boeuf, Lamb & Leiby letter dated November 1, 1965.

2. First Supplement to: Preliminary Facility Description and Safety Analysis Report, dated January 17, 1966.

3. Second Supplement to Preliminary Facility Description and Safety Analysis Report, undated, received January 27, 1966.

4. Third Supplement to: Preliminary Facility Description and Safety Analysis Report, dated February 28, 1966.