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

May 15, 1969

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

Subject: REPORT ON EDWIN I. HATCH NUCLEAR PLANT

Dear Dr. Seaborg:

At its 109th meeting, May 8-10, 1969, the ACRS completed its review of the application by Georgia Power Company for authorization to construct the Edwin I. Hatch Nuclear Plant. This project was considered at the 108th ACRS meeting, April 10-12, 1969, a special meeting on May 2, 1969, and at a Subcommittee meeting and site visit on March 27 and 28, 1969. During its review, the Committee had the benefit of discussions with representatives of the Georgia Power Company, General Electric Company, Southern Services, Inc., Bechtel Corporation, the AEC Regulatory Staff, and their consultants. The Committee also had the benefit of the documents listed below.

The Edwin I. Hatch Plant will be located in a sparsely populated area in southeastern Georgia, approximately 75 miles west of Savannah, Georgia. The Altamaha River flows through the 2100 acre site with the reactor located on its south bank. A minimum exclusion distance of 4400 feet has been provided. Only 840 persons are located within five miles of the site, and no concentrated areas of population of 2000 or more are within ten miles. Baxley, Georgia, with a population of approximately 4800, is situated eleven miles to the south. A major north-south highway, U. S. Route No. 1, passes through the site near its western boundary.

The nuclear plant will utilize a General Electric boiling water reactor similar to that provided for the Cooper Nuclear Station, which was discussed in the Committee's report dated March 12, 1968. Each reactor is essentially identical to those proposed for the Brunswick Steam Electric Plant, also under review for a construction permit. The Hatch reactor is designed to produce 2436 MWt with a maximum performance rating of 2537 MWt. Primary and secondary containment structures for the nuclear steam system will be similar to those for the Cooper Station. A closed-cycle cooling system employing two banks of cooling towers will be used; makeup water will be supplied from the river.

The geology and meteorology of the site appear favorable. Provision will be made for protection of the plant against earthquakes, floods, hurricanes, and tornadoes.

Several problems unique to boiling water reactors have been identified by the Regulatory Staff and the ACRS and cited in previous ACRS reports. The Committee believes that resolution of these items should apply equally to the Hatch Plant.

The Committee continues to reiterate its interest in an appropriate program for in-service inspection of the reactor primary system. The applicant is conducting a study to establish a more vigorous in-service inspection program than that initially proposed and to specify design provisions to facilitate the new program, particularly with regard to access to the primary system. The applicant stated he will give careful attention to the provisions of the USA draft standard on in-service inspection in this study, and he will complete the study within six to nine months. The Regulatory Staff should review this program and should report the results of its review to the Committee.

In the area of reactor instrumentation, the Committee believes:

(a) that the rod block monitor system can perform an important safety, as well as operational, function and that incorporation of such a system, or its equivalent, is necessary;

(b) that there should be suitable provisions to ensure that low-pressure core cooling capability will be available before the auto-relief depressurization can be initiated;

(c) that the flux scram point should be automatically reduced to an appropriate level as the reactor recirculation flow is reduced below the normal full-power flow;

(d) the systems which perform these functions should be built to meet appropriate protection system criteria. The criteria to be used for each system should be established on a basis acceptable to the Regulatory Staff.

The Committee believes that, for transients having a high probability of occurrence, and for which action of a protective system or other engineered safety feature is vital to the public health and safety, an exceedingly high probability of successful action is needed. Common failure modes must be considered in ascertaining an acceptable level of protection. In the event of a turbine trip, reliance is placed on prompt control-rod scram to prevent large rises in primary system pressure. The applicant

and his contractors have devoted considerable effort to providing a reliable protective system. However, systematic failures due to improper design, operation, or maintenance could obviate the scram reliability. The Committee recommends that a study be made of further means of preventing common failure modes from negating scram action, and of design features to make tolerable the consequences of failure to scram during anticipated transients.

For purposes of design of the engineered safety features, the applicant has proposed using a fission-product source term smaller than that suggested in TID-14844, and a treatment of this source within the containment different from that recommended in the same document. The Committee believes that the assumptions of TID-14844 should be used as a design basis for the engineered safety features of the Hatch plant, unless and until the use of a different set of assumptions has been justified to the satisfaction of the Regulatory Staff and the ACRS.

The Committee reiterates its concern that the post-accident cooling system retain its integrity throughout the course of an accident and the subsequent cooling period. The applicant should review the effects of coolant temperature, pH, radioactivity, corrosive materials from the core or other parts of the containment (including stored chemicals), and potentially abrasive slurries. Degeneration of components such as filters, pump impellers, and seals by any of these mechanisms should be reviewed. Particular attention should be paid to potential problems arising from the use of dissimilar metals in these systems.

Engineered safety systems that are required to recirculate water after a loss-of-coolant accident should be designed so that a gross system leak will not result in critical loss of recirculation or in loss of isolation capability. The Committee believes that exception to this general rule may be made in respect to a very short run of pipe from the torus to the first valve, if extremely conservative design of the pipe (and its connection to the torus) is used and suitable remote operability of the valve is provided. The design of these systems also should provide adequate leak detection and surveillance capability.

The applicant has agreed to supply, for review by the Regulatory Staff, preliminary details concerning aseismic design of the supports for the torus and associated piping and of the personnel lock prior to installation of these components.

Studies are continuing on the possible effects of radiolysis of water in the unlikely event of a loss-of-coolant accident. The Committee believes the applicant should evaluate all problems which may arise from hydrogen generation, including various levels of Zircaloy-water reactions which could occur if the effectiveness of the emergency core cooling system were significantly less than that predicted. The matter should be resolved between the applicant and the AEC Regulatory Staff.

The applicant proposes acceptable standards of design, fabrication, and inspection of the steam lines downstream of the second isolation valve. The Committee understands that a simplified dynamic analysis of the turbine building will be made to determine the displacements and forces transmitted to the main steam piping supports in the event of an Operating Basis Earthquake. Consideration should be given to an appropriate program of in-service inspection.

The ACRS believes that the above items can be resolved during construction and that, if due consideration is given to these items, the nuclear plant proposed for the Edwin I. Hatch site can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,

/s/

Stephen H. Hanauer
Chairman

References - Edwin I. Hatch Nuclear Plant

1. Letter from Shaw, Pittman, Potts, Trowbridge and Madden, dated May 6, 1968; License Application; Volumes I, II, III, and IV of the Preliminary Safety Analysis Report.

2. Letter from Bechtel Corporation, dated August 9, 1968; Amendment No. 1 to License Application, dated August 6, 1968.

3. Amendment No. 2 to License Application, dated January 24, 1969.

4. Letter from Bechtel Corporation, dated March 10, 1969; Amendment No. 3 to License Application, dated March 7, 1969; Volume V of PSAR.

5. Letter from Bechtel Corporation, dated March 24, 1969; Amendment No. 4 to License Application, dated March 21, 1969.

6. Letter from Bechtel Corporation, dated April 9, 1969; Amendment No. 5 to License Application, dated April 1, 1969.

7. Letter from Bechtel Corporation, dated April 28, 1969; Amendment No. 6 to License Application, dated April 25, 1969.