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

August 13, 1974

Honorable Dixy Lee Ray
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: REPORT ON THE GREENWOOD ENERGY CENTER, UNITS 2 AND 3

Dear Dr. Ray:

At its 172nd meeting, August 8-10, 1974, the Advisory Committee on Reactor Safeguards completed its review of the application of the Detroit Edison Company for a permit to construct the Greenwood Energy Center, Units 2 and 3. This application had been considered previously during a Subcommittee meeting in Port Huron, Michigan on July 24, 1974, subsequent to a tour of the site. In addition, the ACRS Subcommittee on Babcock and Wilcox Water Reactors discussed topics pertinent to the nuclear steam supply system for this plant at a meeting in Washington, D. C. on July 5, 1974. In the course of its review, the Committee had the benefit of discussions with representatives and consultants of the Detroit Edison Company, the Bechtel Corporation, the Babcock and Wilcox Company, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed.

The Greenwood Energy Center is located on a 3,620 acre tract in St. Clair County, Michigan about 10 miles inland from Lake Huron and approximately 15 miles northwest of Port Huron, Michigan. An oil-fired electric generating plant is under construction on the site.

The Greenwood Energy Center consists of two nuclear units, each using a Babcock and Wilcox two-loop pressurized water nuclear steam supply system having a design power level of 3600 MW(t). The reactor core will use 205 Babcock and Wilcox Mark C (17 x 17) fuel assemblies. The Committee recommended in its report of January 7, 1972, on Interim Acceptance Criteria for ECCS, that significantly improved ECCS capability should be provided for reactors for which construction permit applications were filed after January 7, 1972. This position was repeated in its report of September 10, 1973 on Acceptance Criteria for ECCS. The Mark C fuel assemblies are responsive to this recommendation. The new fuel assemblies will be operated at lower linear heat generation rates and are expected to yield greater

thermal margins for fuel design limits and improved safety margins in the analyses of the loss of coolant accidents. An extensive program has been initiated for determining the mechanical and thermal-hydraulic characteristics of the new fuel assemblies. A program of control rod tests also is proposed, including testing of trip times and control rod wear. Should modifications become necessary as a result of the control rod tests, retesting of the entire control rod drive would be undertaken. While many of the details of the proposed design are available, complete analyses of the performance of the Mark C fuel are not yet available, and the AEC Regulatory Staff has not completed its review. The Committee reserves judgment concerning the final design until the required performance information is presented and has been adequately reviewed. The Committee recommends that the applicant continue studies directed at further improvement in the capability and reliability of the ECCS. The Committee wishes to be kept informed.

The applicant proposes to utilize a new reactor protection system designated as RPS-II. The system, a hybrid using both analog and digital techniques, represents an evolution from the analog system, RPS-I, currently in use in the Oconee reactors. RPS-II incorporates a single-chip central processor unit as a microcomputer for the more complex trip functions. The applicant proposes to qualify this system by a series of environmental, reliability, and in situ tests prior to its use in Greenwood 2 and 3. The matter should be resolved in a manner satisfactory to the Regulatory Staff.

The Committee agrees with the position of the Regulatory Staff that the prestressed concrete containment structures for the Greenwood Units are different from those that have been tested previously as prototypes under the provisions of Regulatory Guide 1.18. Unless a similar structure will be tested as a prototype, tests should be made on the containment for Unit 2 in accordance with the requirements of Regulatory Guide 1.18. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The applicant has provided, as an emergency heat sink, an Emergency Cooling Reservoir. The applicant proposes careful control of the compaction procedures for the fill portions of the embankment. The Committee recommends that the compaction specifications should include strength tests as well as in situ density tests to assure that the soil strength is adequate.

The Staff analysis of the decay heat removal system proposed by the applicant concluded that it does not meet the single failure criterion. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The Committee believes the applicant and the Regulatory Staff should continue to review Greenwood Units 2 and 3 for design features that could reduce the possibility and consequences of sabotage, in accordance with Regulatory Guide 1.17, "Protection of Nuclear Plants Against Industrial Sabotage."

The Regulatory Staff has been investigating on a generic basis the problems associated with a potential reactor coolant pump overspeed in the unlikely event of a particular type of rupture at certain locations in a main coolant pipe. Some additional protective measures may be warranted for Greenwood in this regard. The Committee recommends that resolution of this matter be expedited. The Committee wishes to be kept informed.

Generic problems relating to large water reactors have been identified by the Regulatory Staff and the ACRS and discussed in the Committee's report dated February 13, 1974. These problems should be dealt with appropriately by the Regulatory 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 Greenwood Energy Center, Units 2 and 3, can be constructed with reasonable assurance that it can be operated without undue risk to the health and safety of the public.

Sincerely yours,

W. R. Stratton
Chairman

References

1. The Detroit Edison Company Application for Construction Permit for the Greenwood Energy Center, Units 2 and 3, with Preliminary Safety Analysis Report, Vols. 1-7 (Vols. 8 and 9 received with subsequent Amendments to the Application)
2. Amendments 1-8, 10, 11 to the Application
3. Directorate of Licensing letter, July 17, 1974, transmitting Safety Evaluation Report