

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

MAR 13 1969

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

Subject: REPORT ON THE SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR

Dear Dr. Seaborg:

At its 107th meeting, March 6-8, 1969, the Advisory Committee on Reactor Safeguards considered the application of the General Electric Company for a provisional operating license for the Southwest Experimental Fast Oxide Reactor (SEFOR). Operation of this facility at steady-state power levels up to 1 Megawatt was discussed by the Committee in its report of October 10, 1968. A Subcommittee of the ACRS discussed the proposed SEFOR operation on March 5, 1969. In its current review the Committee had the benefit of discussions with representatives of the applicant and the AEC Regulatory Staff, and of the documents listed.

The final design provisions for protection of core integrity against primary system leaks do not meet all the criteria proposed by the applicant during the construction permit review. For example, in the unlikely event of a large primary system leak, siphon breaker action will not be adequate to prevent the core from becoming uncovered temporarily and to prevent interruption of flow in the auxiliary cooling system. Dependence for core cooling in this unlikely event would then be placed upon the ability to replenish the sodium supply in the reactor vessel via the pump-around-loop, and the ability to reprime and initiate cooling via the auxiliary cooling system. Nevertheless, the ACRS believes the provisions for coping with primary system leaks to be acceptable in view of the low steady-state power and power density of the core in the proposed experimental program, and because of the other engineered safety features of the facility. However, for significant changes in power density or level, or for extended operation considerably beyond the experimental program described in the current documentation, the Committee believes that further regulatory review would be appropriate.

894

Guidelines for determining actions in the event of anomalous behavior have been proposed. Prior to operation at full power (20 MWt), the applicant and the Regulatory Staff should agree on quantitative definitions of suitable limits on unexplained behavior of reactivity, coolant temperatures, and other parameters of significance.

The primary system does not currently include a sampling station that permits routine monitoring of the sodium for fission product or other impurities of significance. However, the applicant stated that he will attempt to provide, at an early date, equipment that would enable the operators to obtain samples much more frequently than is now practical. Because of the potential usefulness of relatively frequent sampling in characterizing impurities in the sodium and in diagnosing and understanding the probable status of fuel element defects which may arise during reactor operation, the Committee recommends that such equipment be made available prior to the start of 20 MWt operation.

Before operation at full power, the applicant and the Regulatory Staff should also agree on the necessary detection steps and on specific criteria, and the bases thereof, for judging the acceptability of continued steady-state operation in the presence of a known loss of fuel clad integrity.

The ACRS believes that, if due attention is given to the foregoing comments and if experience in the stepwise experimental program is favorable, the SEFOR reactor can be operated at steady-state powers up to 20 MWt and in the pulsed mode, as proposed, without undue risk to the health and safety of the public.

Sincerely yours,

Original Signed by  
Stephen H. Hanauer

Stephen H. Hanauer  
Chairman

References attached.

References - Southwest Experimental Fast Oxide Reactor - (SEFOR)

1. Letter from General Electric Company, dated October 9, 1963; Amendment No. 23 to License Application
2. Letter from General Electric Company, dated November 1, 1963; Amendment No. 24 to License Application
3. Letter from General Electric Company, dated December 10, 1963; Amendment No. 25 to License Application; Supplement No. 21 and Errata 4 to FDSAR
4. Letter from General Electric Company, dated January 14, 1969; Amendment No. 26 to License Application
5. Letter from General Electric Company, dated January 24, 1969; Amendment No. 27 to License Application; Supplement No. 22 and Errata 5 to FDSAR
6. Letter from General Electric Company, dated January 31, 1969; Proposed Technical Specifications for 20 MWt Operation of SEFOR
7. Letter from General Electric Company, dated February 20, 1969; Amendment No. 28 to License Application; Supplement No. 23 and Errata 6 to FDSAR
8. Letter from General Electric Company, dated February 28, 1969