

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

July 19, 1965

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

Subject: REPORT ON SAXTON NUCLEAR EXPERIMENTAL CORPORATION

Dear Dr. Seaborg:

At its sixty-fourth meeting, held July 8-10, 1965, the Advisory Committee on Reactor Safeguards considered the application of the Saxton Nuclear Experimental Corporation for the use of a partial plutonium core in the second core loading of the Saxton reactor. The Committee had the benefit of a Subcommittee meeting held on May 4, 1965, of the referenced documents, and of discussions with representatives of Saxton Nuclear Experimental Corporation, Westinghouse Electric Corporation and the AEC Regulatory Staff.

The Committee has previously reported on the application for a construction permit, on the proposed use of a multi-layer pressure vessel, on the request for an operating license, on the Phase I Research and Development Program, and on the application for a full-term operating license in letters dated September 14, 1959, September 26, 1960, July 8, 1961, May 12, 1962, and September 12, 1963.

To date, Saxton has operated its first core loading to an average burnup of more than 8500 MWD/MTU. Since late 1962, the Saxton reactor has used boric acid in the coolant to meet some reactivity control requirements. Operation is reported to have been satisfactory, and reactivity anomalies which may have been attributable to boron hideout have been kept within 0.002Δ k/k during a variety of experimental studies on coolant pH, nucleate boiling, and deposits on fuel elements.

The applicant has suggested that the detailed reactivity-follow program and the requirement that unexplained reactivity not exceed 0.003Δ k/k are no longer needed. The Committee agrees and recommends that the applicant and the Regulatory Staff select new appropriate limits to reactivity anomalies beyond those attributable to discrepancies between prediction and observations of long term reactivity effects due to burnup.

In the proposed second core loading, nine assemblies are fueled with UO_2 spiked with 6.6 w/o PuO_2 , while the remaining twelve assemblies will contain enriched uranium, as at present. The basic thermal design criteria for Core II are the same as for Core I. The new assemblies are expected to have improved mechanical features. The applicant reports that nuclear characteristics have been confirmed with critical experiments and that they lead to a dynamic reactor behavior generally similar to that of Core I.

Analyses by the applicant indicate that, in the unlikely event of a serious accident, the consequences to the health and safety of the public are not significantly affected by the use of plutonium oxide fuel in the second core loading.

With the establishment of an appropriate limit on reactivity anomalies, the ACRS believes that the Saxton reactor can be operated with the partial plutonium loading of Core II, as proposed, without undue hazard to the health and safety of the public.

Dr. N. J. Palladino did not participate in the review of this project.

Sincerely yours,

/s/
W. D. Manly
Chairman

References:

1. The Saxton Chemical Shim Experiment, dated August, 1964.
2. Safeguards Report for the Saxton Reactor Partial Plutonium Core II, dated March, 1965.
3. Supplement No. 1 to Safeguards Report for the Saxton Reactor Partial Plutonium Core II, dated May, 1965.