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

March 17, 1965

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

Subject: REPORT ON MOLTEN SALT REACTOR EXPERIMENT (MSRE)

Dear Dr. Seaborg:

At its sixty-second meeting on March 11-13, 1965, the Advisory Committee on Reactor Safeguards considered the proposed operation of the Molten Salt Reactor Experiment (MSRE), a 10 MW(t) graphite-moderated, circulating fuel reactor, at Oak Ridge National Laboratory. The Committee had available for review the documents listed below, and it discussed the reactor facility, safety analyses and proposed operation with representatives of the Oak Ridge National Laboratory, the AEC Regulatory Staff, and the Division of Reactor Development and Technology. The Committee had previously considered and reported on construction of this reactor at its thirty-sixth meeting in September 1961. A subcommittee meeting was held at Oak Ridge on December 15, 1964.

Although many novel features are incorporated in the design, and the chemistry of the fuel and its corrosive properties are not completely understood, the reactor characteristics are such that equipment failures, other than those affecting the reactivity control system, are unlikely to present serious safety problems. The fuel is not under any significant pressure, and other sources of stored energy appear to be absent. Leaks in the primary fuel system will decrease reactivity.

Because of the experimental nature of this reactor and the possibility of reactivity anomalies, additional emphasis should be placed on the reactivity control and instrumentation. In particular, provisions should be made to check the reliability of the three control rods by surveillance and by exercising them frequently during operations, since these are the only external means available for rapidly inserting negative reactivity into the reactor. In addition the Committee believes that the reactor should be provided with a suitable positive period scram and that consideration should be given

to a negative period scram and to provisions for protection against possible adverse effects of the automatic control system. The Committee also believes that the operating group should establish appropriate allowable limits on reactivity anomalies. These limits should be established before criticality tests begin and should be adhered to during all operations.

It is understood that the MSRE group at Oak Ridge will report on low-power experiments prior to proceeding to a stepwise approach to full power.

With attention to reactivity control and instrumentation as recommended, the Committee believes that the Molten Salt Reactor Experiment may be operated without undue risk to the health and safety of the public.

Dr. F. A. Gifford, Mr. W. D. Manly, and Dr. H. W. Newson did not participate in the review of this project.

Sincerely yours,

/s/ David Okrent

David Okrent
Acting Chairman

References:

1. ORNL-TM-732, MSRE Design and Operations Report, Part V, Reactor Safety Analysis Report, dated August 1964.
2. ORNL-3708, Molten Salt Reactor Program, Semiannual Progress Report for Period Ending July 31, 1964, dated November 1964.
3. ORNL-TM-728, MSRE Design and Operations Report, Part I, Description of Reactor Design, dated January 1965.
4. ORNL-TM-730, MSRE Design and Operations Report, Part III, Nuclear Analysis, dated February 3, 1964.