ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

September 11, 1961

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

Subject: REPORT ON MOLTEN SALT REACTOR EXPERIMENT

Dear Dr. Seaborg:

At its thirty-sixth meeting on September 7-9, 1961, the Advisory Committee on Reactor Safeguards considered the Molten Salt Reactor Experiment. The Committee had available for review the documents listed below and discussed the reactor facility with representatives of the Oak Ridge National Laboratory and the AEC staff.

The MSRE is a 10 MW(th) reactor experiment to be constructed and operated at the Oak Ridge National Laboratory as a continuing investigation in the study of molten fluoride mixtures and containier materials for circulating fuel reactors. This reactor concept is based upon molten salt experiments and investigations at ORNL which have been underway for several years. The design of the MSRE is about 85% complete at the present time.

The reactor is to be located in the 7300 Area of Oak Ridge about three-fourths of a mile south of the main area of ORNL from which it is separated by a 1000-foot ridge. Although the reactor site is located within a mile of several other existing or proposed reactors, it is several miles from the nearest residential area. The MSRE is to be located in a building which had been used originally for the ARE and later for the ART. (The latter was never operated.) Since the ART was approved for operation at a higher power level at this location, preliminary building modification for the MSRE has already been authorized by the General Manager to expedite the program. The ACRS was asked to consider the reactor and its site at this meeting.

Because of late submission by ORNL, the Committee did not review in detail the additional documents supplied at the meeting. The applicant stated, however, that additional consideration must be given to the possibility that excessive pressures (beyond those originally conceived) may develop in the secondary containment following a major accident. Ways of coping with this problem are under investigation.

The Committee believes that the proposed containment system and the suggested means for preventing excessive pressures are fundamentally sound and should protect the environment and public. We are concerned, however, that the instrumentation and control rod systems are marginal for a reactor being used to evaluate a new concept. In particular, the duplication of important nuclear instrumentation channels is borderline. The worth of the control rods appears to provide inadequate shutdown margin and no fast scram action is available. The Committee recommends that these features be given further study.

It is the opinion of the ACRS that with satisfactory resolution of the above problems, the MSRE can be constructed with reasonable assurance that it can be operated at the site proposed without undue hazard to the health and safety of the public, or to site personnel.

Dr. William K. Ergen did not participate in this review.

Sincerely yours,

/s/ T. J. Thompson

T. J. Thompson
Chairman

References:

1. ORNL-CF-61-2-46 - "Molten Salt Reactor Experiment Preliminary Hazards Report" - dated February 28, 1961.
2. Addendum to ORNL-CF-61-2-46, dated August 14, 1961.
3. Memorandum - F. K. Pittman, DRD, to R. Lowenstein, DL&R, dated May 24, 1961, "MSRE Preliminary Hazards Review", w/attachments.