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

November 24, 1965

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

Subject: REACTOR PRESSURE VESSELS

Dear Dr. Seaborg:

The design of pressurized and boiling water nuclear power plants has undergone many improvements with regard to safety, improvements which markedly reduce the risk of significant radiation exposure to the public in the unlikely event of certain accidents or system failures in such reactors.

There is a facet of current pressurized and boiling water reactor design practice which should be recognized, however. Containment design is generally predicated on the basis that a sudden, large-scale rupture of the reactor pressure vessel or its closure is incredible. Reactor designers have supported this view by detailing the extreme care to be taken in design, fabrication, and inspection of a vessel, and by specifying pressurization only at temperatures above the nil ductility transition temperature. They further cite the excellent record for large pressure vessels which comply with the ASME Boiler and Pressure Vessel Code.

The Committee believes, with the industry, that the probability of a sudden major pressure vessel failure leading to breaching the containment is very low. Nevertheless, it seems desirable and possible to make some provisions in future designs against this very unlikely accident.

1. To reduce further the already small probability of pressure vessel failure, the Committee suggests that the industry and the AEC give still further attention to methods and

(more)

details of stress analysis, to the development and implementation of improved methods of inspection during fabrication and vessel service life, and to the improvement of means for evaluating the factors that may affect the nil ductility transition temperature and the propagation of flaws during vessel life.

2. The ACRS also recommends that means be developed to ameliorate the consequences of a major pressure vessel rupture. Some possible approaches include:

(a) Design to cope with pressure buildup in the containment and to assure that no internally generated missile can breach the containment.

(b) Provide adequate core cooling or flooding which will function reliably in spite of vessel movement and rupture.

(c) If breaching the containment cannot be precluded, provide other means of preventing uncontrolled release of large quantities of radioactivity to the atmosphere.

In view of the very small probability of pressure vessel rupture, the Committee reconfirms its belief that no undue hazard to the health and safety of the public exists, but suggests that the orderly growth of the industry, with concomitant increase in number, size, power level, and proximity of nuclear power reactors to large population centers will in the future make desirable, even prudent, incorporating in many reactors the design approaches whose development is recommended above.

Sincerely yours,

/s/ W. D. Manly

W. D. Manly
Chairman

226-page enclosure entitled

"Emergency Core Cooling"
Report of Advisory Task Force
on Power Reactor Emergency Cooling

On file in Public Document Room
and Public Proceedings Branch,
Office of the Secretary of the Commission