Central Files

APR 3 1980

Mr. Michael P. Rosewell
5155 South Natchez Avenue
Chicago, Illinois 60638

Dear Mr. Rosewell:

This is in reference to your letter received March 11, 1980.

The Department of Energy is the government agency concerned with developmental aspects of nuclear reactor devices, and they may be contacted simply by writing to the Department of Energy, Washington, D. C., 20585.

Any device installed on a nuclear reactor must be carefully integrated with the total system design to ensure that it does not interact unfavorably. For this reason, the approval of all such devices is handled through the reactor licensee. The licensee for large civilian power reactors is generally the utility or consortium that owns and operatesthe facility. Most licensees employ a Nuclear Steam Supply Sy[illegible]S) designer to design that portion of the plant. Your task t[illegible]ore, would be to gain approval from the licensee and his NSSS designer so that they would incorporate your devices in their proposed designs with possible developmental assistance from the Department of Energy. These designs would then be submitted by the licensee to the Nuclear Regulatory Commission for approval.

Studies of core retention devices have been made since the early days of nuclear reactors. When highly enriched fuel is used, as in sodium-cooled fast breeder reactors, the possibility that a molten core could assume a configuration in which it would again be critical is recognized. This recriticality, if it occurred, would probably dominate the post-accident heat removal problems. For this reason, the Enrico Fermi Fast Breeder Reactor (critical in 1963) was equipped with a device for distributing a molten core into a subcritical geometry.

8006040415

L-4-1, Pt. 50

OFFICE ➔						
SURNAME ➔						
DATE ➔						

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

The light water cooled reactors use a low enriched fuel for which recriticality is not thought to be a prime problem. Heat generation in the molten fuel is associated with the radioactive beta/gamma decay of fission products. The materials used for core retention or sacrificial devices are subject to extremely high temperatures if the continuous heat generated from the fission products is not withdrawn. The material must meet the exacting requirements of chemical inertness (with respect to exothermic reactions with molten core materials) as well as high heat capacity and lack of gas generation. Since the reactor core is largely uranium oxide, anhydrous oxide materials are given highest consideration for retention and sacrificial devices. Iron oxide, uranium oxide, basaltic rock, fire brick, high-alumina cement and magnesium oxide have all been proposed and have some merits. Reeearch on the behavior of some of these materials under core-melt conditions is being sponsored by the NRC.

We appreciate your interest and initiative concerning core retention devices, and please feel free to contact us if you are interested in further information on our core-melt retention program.

Original signed by
D. F. Ross

Denwood F. Ross, Acting Director
Division of Project Management
Office of Nuclear Reactor Regulation

DISTRIBUTION:
H. R. Denton
E. G. Case
H. Berkow/W. Russell
D. Muller
D. Ross
D. Eisenhut
Central File
ARB Rdg. File
D. Ross
T. Speis
J. Long
NHughes-NRR-3857
M. Groff

OFFICE ▶	ARB/DPM	ARB/DPM	Act. Dir/DPM			
SURNAME ▶	JLong:dlr	TSpeis	DRoss			
DATE ▶	4/2/80	4/2/80	4/ /80			

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166