

This report describes the research performed during the period of March 1986 to March 1987 under a joint research program between the Mechanical Engineering Department of the University of Maryland and the Center for Fire Research of the National Bureau of Standards.

The research is conducted in the laboratories of the CFR by a Graduate Research Assistant of the ME Department under the joint supervision of Dr. Marino di Marzo (ME Dept. UMCP) and of Dr. David D. Evans (CFR - NBS).

The study of droplet evaporation on a high thermal conductivity semi-infinite solid is investigated as well as the solid thermal behavior both theoretically and experimentally. The behavior of a low thermal conductivity solid is the objective of experimental studies. A coupled analytical model for the solid and the evaporating liquid is being derived to predict the cooling effect induced by the evaporating droplet.

The results of the analytical model will be available in the Summer 1987. Parallely with the single droplet study, a preliminary modelling effort is initiated to characterize the cooling effect of a multi- droplet array. Typical spray distributions are used to derive some information on overall cooling effect of a hot surface.

A summary of the presentations and of the publications produced during the reporting period is also enclosed. A brief outline of the future research activities is given in the end of this report to provide a (prospective) of the reported results in the framework of the overall research program.