7.1 Multiphase Flows in Nuclear Reactors

This and the following sections will include descriptions of how multiphase flow is pertinent to the understanding and analysis of nuclear power generation and nuclear reactor accidents. The focus will be on those multiphase issues that arise in the reactor itself though, of course, there are many multiphase flow issues associated with the conventional components of the power generation process such as the steam generators and steam turbines.

Multiphase flows that might or do occur in a nuclear reactor are most conveniently subdivided into those that occur during nominal reactor operation and those that might occur and have occurred during a reactor accident. Both sets of issues are complex and multifaceted and many of the complexities are beyond the scope of this monograph. The reader is referred to texts such as Hsu and Graham (1976), Jones and Bankhoff (1977a & b), Jones (1981), Hewitt and Collier (1987), Todres and Kazimi (1990) for a broader perspective on these issues.