

7.7.1 Hypothetical Core Disassembly Accident

Detailed analyses of hypothetical core disassembly accidents in LMFBRs have been conducted by Fauske (1976, 1977, 1981) and others. Much of this analysis begins with the hypothetical melting of the cladding that allows molten fuel to mix with the sodium coolant. As Wilson (1977) observes, the questions that necessarily follow are complex and difficult to answer. What is the potential for a fuel coolant interaction involving the molten fuel, the coolant and pieces of solid or liquid cladding? Does the cladding melting then progress to other parts of the core? Where does the fuel end up? Is there a physical argument that could be used to place a limit on the damage to the core? And, most importantly, does the reactivity increase or decrease during the various scenarios that follow? While many of these complex questions will need to be addressed, primary focus needs to be placed on the maximum possible accident for public acceptance of LMFBRs will depend on the design of safety systems to contain such an accident. As with LWRs, computational analyses will need to be coupled with experimental programs to validate those predictions. For a comprehensive summary of these issues the reader is referred to the review by Wilson (1977).