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Author: Mr. Roger X. Lenard
LPS, United States, rxlenard@gmail.com

A RIGOROUS APPROACH TO NUCLEAR REACTOR SAFETY ANALYSES

Abstract

It is generally conceded that nuclear reactors pose effectively no radiological hazard prior to generating fission power. The only recognized safety issue is that of accidental or inadvertent criticality during ground processing or from a launch vehicle failure. The space power or nuclear propulsion reactor involved in a ground processing mishap will be subjected to all manner of abuses. These could include, for example, compaction on concrete or sand, water immersion with or without compaction, intermittent immersion and exposure; these can occur coupled with partial disassembly, including loss of safety devices. Historic experiments such as the SNAPTRANS and Transient Nuclear Test (TNT), show that large insertions of reactivity result in a limited number of fissions $10^19to10^20beforethereactorenergeticallydisassembles.Thisfactorlimitsthefissi$