Application of A Best-Estimated Kinetics Code to RIA Evaulations

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Abstract

A best-estimated kinetics code, SIMULATE-K, was applied to numerical simulations for a control rod drop accident (CRDA) in a BWR core, to ensure the basic fuel behavior under the reactivity-initiated accident (RIA) events, and the sensitivities of the analysis models. The recent revise in terms of the fuel cladding failure thresholds accepted for the safety evaluation in Japan, are taken into account in the present analyses. The results show that the fuel cladding failure can occur in highly irradiated and low-reactive fuels near the dropped control rod. The sensitivity study indicates that the coolant density feedback reactivity plays an important role to suppress the power excursion. It should be noted that a fine thermohydraulic nodalization in the numerical representation for core coolant hydraulics behavior, more than 100 multi-channels for instance, is indispensable for accurate modeling of strongly space-dependent reactivity behavior around the dropped control rod.