

Consideration of Failed Fuel Detector Location through Computational Flow Dynamics Analysis on Primary Cooling System Flow with Two Outlets

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Abstract : Failed fuel detector (FFD) in research reactor is a very crucial instrument to detect the anomaly from failed fuels in the early stage around primary cooling system (PCS) outlet prior to the decay tank. FFD is considered as a mandatory sensor to ensure the integrity of fuel assemblies and mitigate the consequence from a failed fuel accident. For the effective function of FFD, the location of them should be determined by contemplating the effect from coolant flow around two outlets. For this, the analysis on computational flow dynamics (CFD) should be first performed how the coolant outlet flow including radioactive materials from failed fuels are mixed and discharged through the outlet plenum within certain seconds. The analysis result shows that the outlet flow is well mixed regardless of the position of failed fuel and ultimately illustrates the effect of detector location.

Keywords : computational flow dynamics (CFD), failed fuel detector (FFD), fresh fuel assembly (FFA), spent fuel assembly (SFA)

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