

## **Criticality Calculation for Cluster Fuel Bundles Using Monte Carlo Generated Grey Dancoff Factor**

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### **Abstract**

*The grey Dancoff factor calculated by Monte Carlo method is applied to the criticality calculation for cluster fuel bundles. Dancoff factors for five symmetrically different pin positions of CANDU37 and CANFLEX fuel bundles in full three-dimensional geometry are calculated by Monte Carlo method. The concept of equivalent Dancoff factor is introduced to use the grey Dancoff factor in the resonance calculation based on equivalence theorem. The equivalent Dancoff factor which is based on the realistic model produces an exact fuel collision probability and can be used in the resonance calculation just as the black Dancoff factor. The infinite multiplication factors based on the black Dancoff factors calculated by collision probability or Monte Carlo method are overestimated by about 2mk for normal condition and 4mk for void condition of CANDU37 and CANFLEX fuel bundles in comparison with those based on the equivalent Dancoff factors.*