

Regulatory issues for final disposal

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The criticality safety committee of the German institute of standardization DIN (“Deutsches Institut für Normung”) is working out a criticality safety standard for final disposal of radioactive waste containing fissile materials. The first complete draft version of this standard just finished give consideration to a risk-informed approach: The criticality acceptance criteria for the pre-closure period as well as for the post-closure phase are consistently derived from the fact that the probability P_{krit} of a criticality event is given by the conditional probability $P(k_{\text{eff}} \geq 1|E)$, that the k_{eff} -value of a Nuclear Fuel System under a given event E is greater than 1, and the probability of occurrence $P(E)$ of the event E,

$$P_{\text{krit}} = P(k_{\text{eff}} \geq 1 | E) \cdot P(E) .$$

Reasons for the maximum values allowable for P_{krit} as established for the pre-closure period and the post-closure phase in the present draft version of the DIN standard will be given. The problems related to the estimation of the probabilities $P(k_{\text{eff}} \geq 1|E)$ and $P(E)$ will be described, and examples for interfaces with probabilistic safety analysis techniques will be given. In addition, the requirements for including balancing the risks from potential criticality excursions under repository conditions in the post-closure period against the risks resulting from safety measures, that have to be taken in the pre-closure period for ensuring prevention of criticality in the post-closure phase, will be described..