Safety in spent nuclear fuel storage

Nuclear data (ND) underpin al nuclear physics and engineering, and modelling has become increasingly important in these fields. Uncertainty quantification (UQ) in modelling combines two difficult tasks, scientific modelling of advanced systems, and application of novel statistical methods. ND UQ is of particular importance in nuclear engineering for nuclear engineering applications due to safety implications.

Present nuclear data libraries contain uncertainties due to uncertainties in the underlying nuclear physics model parameters and their covariance's. Today, reactor codes do not request information about the uncertainty range for different nuclear data input and hence have the output data from these codes unknown uncertainties. The consequence of this is that important reactor safety parameters such as keff, and void coefficient have unknown uncertainties that might influence the reactor safety margins. The manner to handle the uncertainty in underlying nuclear physics data and their correlation is essential in order to have a safe energy production from nuclear power.

Since the Fukushima accident, more emphasis has been put in also studying the safety in the nuclear fuel storage. This work concerns investigating the uncertainty in decay-heat and criticality due to uncertainties in nuclear data to insure safe handling of spent nuclear fuel.

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