

Developments in the MSRR SSL

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Abstract

A survey was conducted to determine the key quantities that should be captured by the Scientific Surveillance Layer (SSL) of Abilene Christian University's Molten Salt Research Reactor (MSRR). Furthermore, significant theoretical progress has been made in the technique of estimating void fraction using spectra of molten salts, with computational validation forthcoming. The survey aimed to gather insights from members of the MSRR project. Participants were asked to identify critical parameters to monitor in order to ensure the most valuable quantities were collected. The responses were analyzed, and a consensus was reached on the key quantities to be collected by the SSL. Additionally, advancements have been made in estimating void fraction, a crucial parameter for quantifying uncertainties in ex-core reactivity. Traditional methods for void fraction estimation are either impractical or limited to offline use, prompting the exploration of alternative approaches. By utilizing the relative intensity of the gamma spectrum of the molten salt, the void fraction may be estimated. Theoretical models have been developed to establish correlations between void fraction and spectral characteristics of molten salts. This model is currently being validated in MCNP.