

## Best Estimate Evaluation of Steam Line Break Accident Using Uncertainty Quantification Method

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### Abstract

Uncertainty quantification evaluation using a best estimate methodology, the CABUE technique, was applied to the steam line break analysis for UCN 3&4. In the evaluation, uncertainty parameters were identified based on PIRT process and their associated distribution types and ranges were conservatively assumed. Then, the accident simulations were performed by using the RETRAN-3D code for selected uncertainty parameter sets. As a safety parameter reactivity margin to criticality after reactor trip was evaluated. The 95 percentile of the reactivity was determined by Wilks formula from the reactivity values from 59 code simulations with 59 randomly sampled parameter vectors. The resultant reactivity was compared against that of licensing calculation. The comparison showed that applying the CABUE methodology to non-LOCA safety analysis has potential to enhance safety margin. However, the success of the methodology relies on the adequacy of statistical data and identification process associated with the uncertainty parameters. In order to establish more reliable best estimate analysis methodology for non-LOCA transient analysis, more intensive and careful study is necessary on the identification of uncertainty parameters, determination of distribution types and ranges of the parameters, and computer model validation by comparison with plant transient data .