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# UNCERTAINTY QUANTIFICATION OF THE FISSION PRODUCT RELEASE DURING SEVERE ACCIDENTS IN NORDIC BWRS

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Source term evaluation constitutes an important feature and element for Severe Accident Management (SAM) strategy. For assessment of SAM efficiency it is crucial to identify phenomena and parameters that present major contributions to the uncertainty in the magnitude and timing of the releases, assess their sensitivity, and quantify the uncertainty. In this work source term evaluation and uncertainty quantification were performed using MELCOR for two accident scenarios, large break LOCA and station blackout, that leads to containment failure due to ex-vessel phenomena at RPV melt-through. Preliminary screening was performed using best-estimate and bounding assessment, where parameters were varied one-at-a-time. Dakota was used to perform Morris sensitivity analysis, followed by uncertainty quantification of the cesium and iodine release fractions using point-estimate values of phenomenological uncertain parameters that were identified to affect the accident progression, release paths and magnitude of release. It was observed from the sensitivity indices that during LOCA, melt candling, fission product diffusion in the fuel and bubble characteristic models are phenomenologically important. Whereas, aerosol dynamics, vapour diffusivity, hygroscopic aerosol and bubble characteristic models were phenomenologically important during SBO accident. The melt debris release characteristics was shown to affect fission product release in both accident scenarios. For the uncertainty quantification, parameters were sampled using Monte-Carlo and Latin-Hypercube sampling methods. 95th percentiles for cesium and iodine releases were computed with empirical CDFs and Wilks' methods. The results of the study provide valuable insights into the impact of MELCOR models, modelling parameters, and sensitivity coefficients on code predictions.

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