

Uncertainty analysis of Steam Generator Tube Rupture (SGTR) combined with Steam Line Break (SLB) outside of containment (with RELAP/RAVEN coupling)

Internship / Master thesis in collaboration with TRACTEBEL

For PWRs, the combination of SGTR and SLB outside of containment leads to a containment bypass accident, meaning that part of the content of the primary circuit could be directly discharged to the environment leading to significant radiological consequences. Various sources of uncertainties make the accident analysis challenging in terms of safety demonstration: for instance the break flow is very sensitive to physical parameters such as the break discharge coefficient, and flow rates of injection systems; and the complexity in the accident management introduces also uncertainties on the performance of operator interventions. Thanks to a coupling between a thermal-hydraulics code (RELAP) and a statistical tool (RAVEN), it is intended to perform uncertainty analysis for this accident, in order to establish an approach to better estimate the radiological consequences in the form of a distribution (best-estimate value plus variation range).