

The SAAB Project: Experimental Studies on Several Phenomena Related to the Assessment of Aerosol Behavior in Severe Accidents

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ABSTRACT

Minimizing the effects of severe accidents on the environment is one of the most essential goals of reactor safety research. A significant risk in the process of a loss of coolant accident is that released fission products and resulting activation products can reach the containment in the form of gaseous aerosols and represent the radioactive source term. Consequently, reliable prediction of aerosol behavior during a severe accident is key to optimizing accident management measures and thus to minimizing consequences for the surrounding environment. This is of particular relevance when it comes to understanding relevant processes regarding development, transport, accumulation and retention of aerosols.

Therefore, the overarching aim of the German national research project SAAB (“Severe Accident Aerosol Behavior”) conducted in collaboration of RWTH Aachen University and Forschungszentrum Juelich GmbH is to provide a database to develop a more thorough understanding of aerosol behavior in general. In this context, the depletion behavior of representative aerosols under different thermodynamic boundary conditions, the impact of aerosols generated by cable fires on the start-up behavior of different catalysts used in passive hydrogen recombiners, and particle retention in water pools (pool scrubbing) are investigated using a unique and variable experimental infrastructure.

This paper gives a comprehensive overview of the work program of the SAAB project, introduces the experimental facilities used, and highlights some examples of the obtained results.

KEYWORDS

Severe Accident, Source Term, Aerosol Behavior, Experimental Research