Ensuring Comparability of Measured Results in Aerosol-related Experiments – Exemplary Approach using Experiments on Water-induced Particle Retention –

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ABSTRACT

A significant part of the fission products released in the process of a loss of coolant accident enter the containment in the form of airborne particles. Once leaked into the surrounding atmosphere after possible failure of the containment building structures, aerosols accumulate over time and might lead to long-term land contamination. Consequently, reliable prediction of aerosol behavior inside the containment during severe accidents is key to assessing the radiological source term and thus to optimizing Severe Accident Management (SAM) procedures, e.g. Filtered Containment Venting (FCV).

In order to develop and/or validate numerical models addressing fission product issues, a broad experimental data base with detailed particle characterization is of high importance. However, since several important source-term-related test series were carried out years or even decades ago, the experimental data available are not always suitable for modeling purposes due to missing information regarding e.g. measurement precision, uncertainties and documentation of test procedures. Consequently, several different institutions are planning new test series using various, far more sophisticated measurement techniques.

To emphasize the necessity of a common understanding within the nuclear community in this particular field, this paper discusses several different aspects regarding requirements for e.g. measurement procedures, data analyses and documentation in aerosol-related experimental research using pool scrubbing tests as an example.

It should be mentioned that the aim of this paper is not to set specific requirement, but rather to initiate a discussing among experimenters so that more reliable and comparable research results on any nuclear aerosol topic can be achieved overall.

KEYWORDS

Severe accident, source term, aerosols, experimental research, pool scrubbing