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airborne release fractions at non-reactor nuclear facilities

an American National Standard

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American National Standard for Airborne Release Fractions at Non-Reactor Nuclear Facilities

Secretariat
American Nuclear Society

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard for Airborne Release Fractions at Non-Reactor Nuclear Facilities, ANSI/ANS-5.10-1998.)

Techniques for assessing potential downwind impacts of radionuclides released from nuclear facilities have evolved since the inception of the nuclear industry. The techniques have become more rigorous as well as more numerous. The many techniques applied in safety analyses have often resulted in divergent estimates of the downwind impacts from identical or very similar postulated events. Guidance toward more standard techniques for radionuclide release analysis is needed so that estimates can be compared in a meaningful fashion.

One technique used in evaluating the potential downwind impacts is the selection of an Airborne Release Fraction (ARF), which is the amount of the radioactive or hazardous material-of-concern made airborne through specific postulated accident stresses. This standard provides guidance for a consistent selection and application of ARFs in accident analyses.

The complexity of any actual situation precludes an analytical determination of the ARF. Thus, estimates from experimental data generally have been identified for specific materials (such as plutonium and uranium) or for physically similar materials (such as liquids, powders, or contaminated combustibles) under accident-induced types and levels of stress. ARFs derived from data are used to estimate the amount of a material-of-concern made airborne by thermal, aerodynamic, or mechanical stress over time periods ranging from seconds for explosively generated ARFs, hours for a fire, or potentially very long periods of time for aerodynamic stress. The applicability of experimentally derived ARFs is limited to the range covered in the experimental study. Experimental data are limited for some of the initiator-response sequences and values are also inferred from other experimental studies that appear to impose the same type and level of stress upon similar materials. As the need arises, additional data and information may be generated to improve or revise the ARFs.

Actual accidents are unique events that cannot be accurately defined, and it would be misleading to leave the impression that estimates of the potential impacts based upon analyses can be very accurate. Therefore, ARFs must be viewed as tools to provide estimates of airborne release but, due to the lack of accuracy in defining the response and behavior of other components, highly accurate ARFs do not assure highly accurate estimates of airborne release.

This standard was prepared by Working Group ANS-5.10 of the Standards Committee of the American Nuclear Society. Continuing efforts will be required to augment or modify the criteria in this standard and to implement additional information and experimental studies as they become available.

Working Group ANS-5.10 had the following membership at the time it developed this standard:

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