American Nuclear Society

methods for determining neutron fluence in BWR and PWR pressure vessel and reactor internals

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American National Standard Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals

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Foreword

(This Foreword is not part of American National Standard "Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals," ANSI/ANS-19.10-2009.)

It is the intent of this American National Standard to provide guidance for the evaluation of pressurized water reactor (PWR) and boiling water reactor (BWR) pressure vessel and reactor internals fast ($E > 1.0$ MeV) neutron fluence. This standard outlines the attributes of the method(s), the necessary types of data, the required benchmarking of the method, and the necessary steps in performing the calculations. The method(s) described herein require both experimentally measured vessel dosimetry data and corresponding fast neutron fluence calculations to perform the benchmark. This also allows the user to determine the existence of a bias in the calculated values and to quantify its magnitude. Likewise, the information needed for the benchmark allows the quantification of uncertainties. The method or methods described in this standard calculates a best-estimate value that is suitable (and acceptable) for use in applications related to *Code of Federal Regulations*, Title 10, "Energy," Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 61, "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events," Appendix G, "Fracture Toughness Requirements," and Appendix H, "Reactor Vessel Material Surveillance Program Requirements." The intended applications are for American-made PWRs and BWRs.

Compliance with the intent of this standard can be demonstrated by meeting the following two requirements:

(1) The calculation must be validated as described in Sec. 5 of this standard;

(2) the validation must be based on a qualified data set from dosimetry measurements performed as described in Sec. 4 of this standard.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the reference section that provides guidance on the use of references.

This standard was developed by Working Group ANS-19.10 of the American Nuclear Society. At the time of the standard's completion, the following members participated in the current version:

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