American Nuclear Society

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fire PRA methodology

an American National Standard

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Methodology

Secretariat
American Nuclear Society

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American National Standard

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Foreword

(This Foreword is not a part of the American National Standard, "Fire PRA Methodology," ANSI/ANS-58.23-2007)

This standard sets forth requirements for probabilistic risk assessments (PRAs) and related analysis methodologies involving internal fires (i.e., fires that could occur within the boundaries of a nuclear power plant of causes inherent to the operation of the nuclear power plant) that can be used to support risk-informed decisions for commercial nuclear power plants. This standard also prescribes a method for applying these requirements for specific applications.

This standard is intended to be used together with other PRA standards that cover different aspects of PRA scope. Specifically, this standard is intended to be used directly with the PRA standard developed by the American Society of Mechanical Engineers ["Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002 up to and including ASME RA-Sb-2005 (hereafter referred to as ASME-RA-2002/RA-Sb-2005)], which covers an Internal Events PRA for a commercial nuclear power plant operating at nominal full power. Similarly, this standard is intended to be used with two other standards: the American Nuclear Society (ANS) PRA-methodology standard covering low-power/shutdown operations (ANS-58.22, under development) and the ANS PRA-methodology standard covering accidents initiated by external events (ANSI/ANS-58.21-2007).

The scope of a PRA covered by this standard is limited to analyzing accident sequences initiated by fires that might occur while a nuclear power plant is at nominal full power. It is further limited to requirements for (a) a Level 1 analysis of the core damage frequency and (b) a limited Level 2 analysis sufficient to evaluate the large early release frequency. The scope of a Fire PRA covered by this standard is commensurate with the scope covered by the Fire PRA method produced by the Electric Power Research Institute (EPRI) and the U.S. Nuclear Regulatory Commission (NRC), jointly published as EPRI TR-1011989 and NUREG/CR-6850.

In contrast, the scope of ASME-RA-2002/RA-Sb-2005 covers internal plant initiators (except internal fires) that might occur while the nuclear power plant is at nominal full power. Accidents initiated by internal flooding are explicitly included in ASME-RA-2002/RA-Sb-2005, as are accidents initiated by a loss of off-site power (LOOP), unless the LOOP is due to a fire as covered herein that also causes other important damage to the plant, in which case analysis of the LOOP is within the scope of this standard. Therefore, this standard, ANSI/ANS-58.21-2007, and ASME-RA-2002/RA-Sb-2005, when used together, cover all potential accident initiators arising at nominal full power. The only initiators explicitly excluded are accidents resulting from purposeful human-induced security threats (e.g., sabotage).

The types of risk-informed PRA applications contemplated under this standard are very broad and include applications related to design, procurement, construction, licensing, operation, and maintenance. Both regulatory risk-informed applications involving the NRC and applications not involving those regulations are contemplated. In this regard, this standard's approach is intended to be identical to that used in the closely related ASME-RA-2002/RA-Sb-2005, so the approach and supporting logic of ASME-RA-2002/RA-Sb-2005 are relied upon heavily in this standard's guidance in this area.

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.

Working Group ANS-58.23 of the Standards Committee of the American Nuclear Society had the following membership for the original issue:

D. W. Henneke (Chair), *General Electric Corporation*

F. J. Joglar-Biloch, Science *Applications International Corporation*
M. Kazarians, *Kazarians & Associates, Inc.*
A. M. Kolaczkowski, *Science Applications International Corporation*
B. Najafi, *Science Applications International Corporation*
S. P. Nowlen, *Sandia National Laboratories*
N. O. Siu, *U.S. Nuclear Regulatory Commission*
K. L. Zee, *ERIN Engineering & Research, Inc.*

This standard was processed and approved for submittal to the American National Standards Institute, Inc., by the Risk Informed Standards Committee (RISC) on ANS-58.23, "Fire PRA Methodology." Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, RISC had the following members:

W. E. Burchill (Chair), *Texas A&M University*

P. J. Amico, *Science Applications International Corporation*
R. A. Bari, *Brookhaven National Laboratory*
R. L. Black, *U.S. Department of Energy*
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D. W. Stillwell, *South Texas Project Nuclear Operating Company*

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