ASME/ANS RA-S-1.2-2014

Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactors (LWRs)

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Secretary, Joint Committee on Nuclear Risk Management
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

The American Society of Mechanical Engineers

ANS

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The American Society of Mechanical Engineers
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(This Foreword is not a part ASME/ANS RA-1.2-2014, "Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactor (LWRs)".)

FOREWORD

The American Society of Mechanical Engineers (ASME) Board on Nuclear Codes and Standards (BNCS) and the American Nuclear Society (ANS) Standards Board mutually agreed in 2004 to form the Nuclear Risk Management Coordinating Committee (NRMCC). The NRMCC was chartered to coordinate and harmonize standards activities related to probabilistic risk assessment (PRA) between ASME and ANS. A key activity resulting from the NRMCC was the development of PRA standards structured around the levels of PRA (i.e., Level 1, Level 2, and Level 3) to be jointly issued by ASME and ANS. In 2011, ASME and ANS decided to combine their respective PRA standards committees to form the ASME/ANS Joint Committee on Nuclear Risk Management (JCNRM).

The Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactors (LWRs) was initiated by the ANS Risk Informed Standards Committee (RISC) in 2005 and is currently within the responsibility of the JCNRM Subcommittee on Standards Development. The Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactors (LWRs) was developed to provide requirements for the evaluation of containment performance and radiological releases to the environment. The radiological releases considered result from postulated accidents that cause fuel damage. The requirements of this standard apply to the evaluation of risk informed applications that use radionuclide release information or as input to the determination of inputs for Level 3 PRA evaluations (e.g., ex-plant consequences). This standard addresses sequences initiated by internal or external events during all modes of operation for operating and evolutionary commercial light water reactor (LWR) nuclear plants. This standard is used in conjunction with the ASME/ANS PRA Standard RA-Sa-2009. Specifically, the applicable requirements of the ASME/ANS PRA Standard RA-Sa-2009 are also applicable to those comparable parts of the Level 2 Analysis. In addition, the Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Nuclear Power Plant Applications for Light Water Reactors (LWRs) is structured to provide the requirements for all of the hazards defined in ASME/ANS PRA Standard RA-Sa-2009 and analyzed with a Level 1 PRA. The original draft of this standard was developed in 2011 and has undergone several revisions prior to the current ballot.

This standard sets forth the criteria for the technical adequacy of a Level 2 analysis to support risk-informed decisions for commercial nuclear power plants. Supporting requirements are provided for determining the chronology and physical processes governing core damage progression, containment response, and radiological release to the environment as part of PRAs and related analysis methodologies. This standard establishes the requirements to characterize the fission product release frequencies for various containment performance outcomes.

Significant input has been received from the JCNRM, specifically the JCNRM Subcommittee on Standards Development (SC-SD). In addition, an SC-SD consensus ballot readiness review team provided a valuable assessment of the proposed Level 2 PRA Standard prior to its submittal for ballot.

Publication for Trial Use

The technical requirements in this standard are based on source material from the existing ASME/ANS PRA standard ASME/ANS RA-Sa-2009 as well as the draft PRA standard under development by JCNRM for Level 3 PRA. Although RA-Sa-2009 was revised in 2013 in ASME/ANS RA-Sb-2013