UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

March 22, 2007

# NRC REGULATORY ISSUE SUMMARY 2007-06
# REGULATORY GUIDE 1.200 IMPLEMENTATION

## ADDRESSEES

All holders of or applicants for operating licenses for nuclear power reactors under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of or applicants for early site permits, early site reviews, standard design certification, standard design approvals, combined operating licenses, manufacturing licenses, or duplicate design licenses under 10 CFR Part 52.

## INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees of how the NRC will implement its technical adequacy review of plant-specific probabilistic risk assessments (PRAs) used to support risk-informed licensing actions after the issuance of Regulatory Guide (RG) 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities."

This RIS requires no action or written response on the part of an addressee.

## BACKGROUND AND INFORMATION

Over the past 30 years, the NRC and the nuclear industry have performed many PRAs for various purposes and uses, with the scope, depth, and technical content dictated by the specific purpose and use. Encouraging the use of PRA in all regulatory matters, the NRC issued a policy statement on the use of PRA methods in NRC activities, in the *Federal Register* on August 16, 1995 (60 FR 42622). Since then, the NRC has used PRAs for many applications; including generic safety issue prioritization, regulatory analysis in support of rulemaking and backfits, reactor oversight and inspection programs, and risk-informed regulation. At the same time, the nuclear industry increasingly uses PRA to support their operating and licensing processes, including risk-informed license amendment requests, relief requests, configuration risk management, and design certification and licensing of new reactors.

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As a result, PRAs are becoming a mainstream regulatory tool and are providing valuable input into the decisionmaking process for plant design, operation, and maintenance. Consequently, confidence in the information derived from a PRA must be high. That is, the scope of the analysis must be sufficiently broad and the accuracy of the technical content must be of sufficient rigor to justify the specific results and insights from the PRA supporting the decision under consideration.

As the application of PRAs in decisionmaking increases, the staff has employed different approaches to ensure that the PRA has sufficient scope and technical adequacy for the specific application. In 1998, the NRC issued RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and Standard Review Plan (SRP) Chapter 19, "Use of PRA in Plant-Specific Risk-Informed Decisionmaking: General Guidance." These guidance documents describe how to apply PRA to support licensing actions and determine the technical acceptability of the PRA for specific applications.

In March 1999, the General Accounting Office (GAO) issued GAO/RCED-99-95, "Nuclear Regulation: Strategy Needed to Regulate Safety Using Information on Risk." GAO identified issues for NRC to resolve to successfully implement a risk-informed regulatory approach. Among these issues, GAO indicated that more attention was needed to "develop standards on the scope and detail of risk assessments needed for utilities to determine that changes to their plants' design will not negatively affect safety."

PRA standards have been under development by the American Society of Mechanical Engineers (ASME) and American Nuclear Society (ANS) for many years. In addition, reactor owners' groups have been developing and applying a PRA peer review program for several years.

The staff briefed the Commission on its concerns regarding PRA quality and the standards development effort in the Risk-Informed Regulation Implementation Plan on March 31, 2000. In an April 18, 2000, staff requirements memorandum (SRM), the Commission directed the staff to "provide its recommendations to the Commission for addressing the issue of PRA quality until the ASME and ANS standards have been completed, including the potential role of an industry PRA certification process." Subsequently, on December 18, 2003, the Commission issued SRM COMNJD-03-0002, "Stabilizing the PRA Quality Expectations and Requirements" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML033520457). In this SRM, the Commission approved implementation of a phased approach to achieving an appropriate quality for PRAs for NRC risk-informed regulatory decisionmaking. The Commission described the phased approach in an attachment to the SRM and directed the staff to develop an action plan that would define a practical strategy for its implementation. The staff submitted its action plan in SECY-04-0118 on July 13, 2004 (ADAMS Accession Nos. ML041470505 and ML04153009), which the Commission subsequently approved in an SRM dated October 6, 2004 (ADAMS Accession No. ML042800369).

The central concept of the action plan requires the development of consensus PRA standards and associated industry guidance documents, with endorsement by the staff. These standards address internal initiating events (including internal flooding), internal fires, and external initiating events for full power and low power and shutdown operations. The guidance documents address peer review guidance. The NRC has endorsed the use of PRA with the

appropriate clarifications or qualifications in RG 1.200, which was issued initially for trial use beginning February 2004. RG 1.200 provides guidance to licensees for determining the requisite technical adequacy of a PRA and endorses the PRA standards and related industry guidance. Licensees can use RG 1.200 to determine PRA technical acceptability and adequacy in support of risk-informed regulation applications and licensing actions using risk-informed guidance. These applications include 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors." These risk-informed licensing actions using risk-informed regulatory guidance include the following:

- RG 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis";
- RG 1.177, "An Approach for the Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications";
- RG 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking Inservice Inspection of Piping"; and
- RG 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance."

In Appendix A to the trial-use issuance of RG 1.200, the NRC endorsed the PRA standard in ASME RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," dated April 5, 2002, and its Addenda A RA-Sa-2003, "Addenda to ASME RA-S-2002," dated December 5, 2003. The ASME PRA standard only addresses Level I (i.e., core damage) and limited Level II (i.e., large early release frequency (LERF)) from internal initiating events (excluding internal fires) occurring during full power operations. In Appendix B of the trial-use issuance of RG 1.200, the NRC endorsed the industry peer review process described in NEI 00-02, Revision A3, "Probabilistic Risk Assessment Peer Review Process Guidance," dated March 20, 2002. This document also provides guidance for performing self assessments to ensure that previously performed peer reviews are properly augmented to fully address the ASME PRA Standard for Level I and LERF.

During the RG 1.200 trial-use period, the staff reviewed five pilot plant applications, which included NRC staff site visits. The staff evaluated whether RG 1.200 and its associated SRP Section 19.1 provided adequate guidance for demonstrating the technical adequacy of a PRA in the context of a risk-informed license application. The staff compiled lessons learned from the pilots and site visits in a memorandum dated June 8, 2005 (ADAMS Accession No. ML051590519).

The NRC intends to revise RG 1.200 as additional PRA standards and guidance documents are developed to address other scope areas (e.g., internal fires, external events, low power and shutdown, peer reviews) with the appropriate qualifications and clarifications. ASME added Addendum B to the ASME RA-S-2002, ASME RA-Sb-2005, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," in December 2005. Addendum B addressed the staff comments on the trial-use issuance of RG 1.200 and the concerns raised during a trial application of the ASME standard itself. In addition, the Nuclear Energy Institute (NEI) recently revised their peer review guidance. ANS is scheduled to issue a revised PRA standard for external events by the middle of 2007, a PRA standard for internal fires in the fall of 2007, and a PRA standard for low power and shutdown by the end of 2007. Finally, the industry owners' groups expect to complete peer review guidance for internal fires by the middle of 2007. The NRC endorsed the ASME and NEI revisions in Revision 1 of RG 1.200 which was issued in January 2007.

**SUMMARY OF ISSUE**

In the Phased Approach to PRA Quality Action Plan, the NRC allocated an implementation period of 1 year for licensees to adopt the NRC-endorsed PRA standards. The implementation period allowed additional time after the NRC's endorsement of a PRA standard to develop or revise the PRA, perform a self-assessment and any necessary peer reviews, and address any findings of these reviews and previous reviews.

The staff originally intended that the implementation period for RG 1.200, which endorsed only the ASME standard and the NEI peer review process, would begin after the revision to RG 1.200 to address the lessons learned from the pilots. The staff completed pilot activities in June 2005. However, most licensees delayed implementation of RG 1.200 until the staff finalized its position on Addendum B to the ASME PRA standard. Subsequently, many licensees have realized that considerably more resources will be needed to upgrade their PRAs to meet the guidelines for PRA quality in the NRC-endorsed standards. At the same time, there are limited industry resources with the requisite PRA expertise to support these upgrades. Consequently, the industry has indicated that an additional implementation period is necessary to upgrade their PRAs to meet the standards.

The NRC recognizes the need for an additional implementation period, for routine, limited scope applications (e.g., single allowed outage time extensions, risk-informed inservice inspection, integrated leak rate testing extensions). Licensees should use this time to develop or revise their PRAs, perform self-assessments and any necessary peer reviews, and address the findings of these reviews and previous reviews, in order to meet the NRC-endorsed standards. Thus, the staff will review routine, limited-scope applications using its current practices through December 2007. However, for broad-scope applications submitted during this implementation period, the NRC staff will use Revision 1 of RG 1.200 in the performance of these reviews to assess PRA adequacy. This approach is consistent with the industry guidance documents related to these types of applications. In this context, broad-scope applications include the following:

- 10 CFR 50.69 applications,
- Risk Management Technical Specification (RMTS) Initiative 4b, "Risk-Informed Completion Times," applications,
- RMTS Initiative 5b, "Risk-Informed Surveillance Frequencies," applications, and
- other risk-informed applications as determined by the NRC (e.g., 10 CFR 50.46a applications upon promulgation of this rulemaking).

In addition, the staff expects that PRAs required under 10 CFR Part 52 will also use NRC-endorsed standards, to the extent practicable.

For all risk-informed applications received after December 2007, the NRC staff will use Revision 1 of RG 1.200 to assess technical adequacy.

While significant progress has been made in the development of the other PRA standards and related guidance documents, these efforts have taken longer than expected and will not meet the original schedule in the Phased Approach to PRA Quality Action Plan. The staff attributes the delay to the complex technical nature of the subject matter and the reliance upon volunteers, who can devote their efforts only on a part-time basis, to develop industry consensus standards.

Based on the current schedule for completing the other PRA standards and guidance documents during 2007, the NRC expects to address these standards and guidance documents in Revision 2 of RG 1.200 by the end of 2008. If an implementation period for routine, limited scope risk-informed license applications is needed, the NRC would expect licensees to fully address all scope elements consistent with Revision 2 of RG 1.200 by the end of 2009. However, during the implementation period for Revision 2, routine, limited scope risk-informed license applications would still have to address Revision 1 of RG 1.200 for the internal initiating events Level I/LERF PRA and address the other scope areas based on their current practices.

## VOLUNTARY ACTION

This RIS requires no action or written response.

## VOLUNTARY RESPONSE

This RIS requires no action or written response.

## BACKFIT DISCUSSION

This RIS requires no action or written response and is, therefore, not a backfit under 10 CFR 50.109. Consequently, the staff did not perform a backfit analysis.

## *FEDERAL REGISTER* NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because this RIS is strictly informational; pertaining to how the staff will implement its PRA technical adequacy reviews following issuance of RG 1.200.

## CONGRESSIONAL REVIEW ACT

The NRC has determined that this action is not subject to the **Congressional Review Act**.

**PAPERWORK REDUCTION ACT STATEMENT**

This RIS does not contain any information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

**CONTACT**

Please direct any questions about this matter to the technical contact listed below.

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