

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE
STRATEGIC PLAN, Rev. 0 – Nov. 2009



Member Organizations:

**American Nuclear Society
American Society of Mechanical Engineers
Institute of Electrical and Electronic Engineers
U. S. Nuclear Regulatory Commission
U. S. Department of Energy
Nuclear Energy Institute
Electric Power Research Institute
Nuclear Steam Supply Systems Owners Groups**

Approved by NRMCC November 19, 2009

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

CHARTER of the COMMITTEE

A Nuclear Risk Management Coordinating Committee (NRMCC or “Committee”) has been established by the American Nuclear Society (ANS) and the ASME (American Society of Mechanical Engineers).

The Committee coordinates the development and maintenance of Codes and Standards that address risk management and risk-informed decision-making for current and new nuclear power plants (both light water reactors (LWRs) and non-LWRs) and other nuclear facilities, through the full fuel cycle and related applications in order to avoid redundancy in requirements. The Committee also facilitates the training and use of the resulting Codes and Standards.

The objectives of the Committee are to:

- develop a plan designed to facilitate the implementation and use of nuclear risk-related standards required to meet the identified needs of the user community.
- determine the relative priority of individual standards to guide when their development should be initiated.
- recommend to standards development organizations (SDOs) who should assume responsibility for the development of each standard with due consideration of the SDO’s scope of responsibility, related experience, resource availability, closely related standards, and other ongoing risk-related standards work. These recommendations require mutual acceptance by the interested SDOs.

STRATEGIC PLAN, Rev. 0 – Nov. 2009

KEY INITIATIVES/ISSUES TO BE ADDRESSED

Standards¹ to Support Risk Management Initiatives

1. Ensure that current and emerging standards are developed and maintained to meet the needs of the user community, and are consistent and compatible for ease of applicability.

Action Plan:

- The NRMCC provides a forum for coordinating, exchanging technology and information with organizations that are using or that are developing risk-informed Codes and Standards.
 - The NRMCC ensures that these organizations are aware of the activities of the NRMCC and that they receive invitations to all NRMCC meetings. Liaisons will be identified and assigned.
 - The NRMCC will identify specific interfaces with the following organizations:
 - ASME Board on Nuclear Codes and Standards
 - ANS Standards Board
 - Institute of Electrical and Electronic Engineers (IEEE)
 - U. S. Nuclear Regulatory Commission (NRC)
 - U. S. Department of Energy (DOE)
 - Nuclear Energy Institute (NEI)
 - Electric Power Research Institute (EPRI)
 - Nuclear Steam Supply System (NSSS) Owners Groups (OGs)
 - Other individuals and organizations, as deemed appropriate
2. Integrate the methodology set forth in PRA Standards into other application-specific Codes and Standards, as appropriate.

Action Plan:

- The table on pages 10 to 12, entitled “Risk Management Development Areas” identifies the risk management applications and activities that are currently being developed or are envisioned, the responsible organization, and the status of each of these efforts.

¹ The term “Standards” in this document refers to Codes, Standards, or Guides

STRATEGIC PLAN, Rev. 0 – Nov. 2009

3. Develop a plan designed to facilitate the implementation, use, and maintenance of nuclear risk-related Standards required to meet the identified needs of the user community.

Action Plan:

Actions have been taken to issue the ASME/ANS Probabilistic Risk Assessment (PRA) Standard for Level 1/ large early release frequency (LERF) (excluding low power/shutdown (LP/SD) plant operating states (POSs)). The following actions are provided to fully meet the intent of Item 3 above:

- Incorporate LP/SD POSs conditions for Level 1/LERF at-power PRA.
 - Outline process and organizational structure for long-term maintenance of the ASME/ANS PRA Standard (currently ASME/ANS RA-Sa-2009).
 - Complete and issue ASME/ANS Standard for Levels 2 PRA and Level 3 PRA, as assigned to the ANS Risk-Informed Standard Committee (RISC).
4. Work with all stakeholders to implement the Commission's Risk-Informed Performance-Based Plan according to a reasonable schedule that permits adequate time for PRA development, peer reviews, and pilot programs (as needed).

Action Plan:

Work with all stakeholders to –

- Develop a process that makes these Standards consistent and user-friendly.
- Establish priorities with respect to risk management activities.
- Develop a long-term schedule to account for the need complete and peer review Fire PRAs to support NFPA-805 (and other utilities to support Appendix R) and other risk-informed applications.
- Develop a long-term schedule to account for the need to start, develop, and peer review external hazards PRAs to support risk-informed applications. Schedule should consider the need for pilot program for first-of-a-kind activities.

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

5. Work with all stakeholders to develop its plans to implement 10CFR50.69.

Action Plan:

- Support the NRC plan for the implementation of the Commission's Risk-Informed Performance-Based Plan.

[Note: Both ANS and ASME have provided extensive comments to the NRC to address the Advanced Notice of Public Rulemaking to Make 10CFR50 Requirements Risk-Informed and Performance-Based.]

- Support the development and implementation of codes, standards, and guidelines for risk-informed, performance-based applications using the risk significance categorization processes endorsed for 10CFR50.69.

Training:

1. Define appropriate training and qualification initiatives for users of risk-informed standards, including Integrated Decision-Making Panels.

Action Plan:

- Work with all stakeholders to develop a PRA Standards training course to provide a clear understanding of the content and application of the subject standards such that there would be consistency and uniformity in applying the standards by different individuals within a spectrum of organizations.
- Design the training course to be comprised of two modules for different types of users – an overview and a more detailed course for practitioners.
- The training course should be developed using the Institute of Nuclear Power Operations (INPO) Systematic Approach to Training (SAT).

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Current Status of Operating LWR Projects^{2,3}

The ASME Committee on Nuclear Risk Management (CNRM) and the ANS Risk-Informed Standards Committee (RISC) have the responsibility for development of consensus standards. Guidance can also be provided. However, such actions should be discussed with the NRMCC prior to ASME or ANS doing this work.

ASME CNRM has accepted the overall responsibility to develop and maintain a new ASME/ANS Standard that incorporates the requirements to determine the technical adequacy to support risk-informed applications using a Level 1/LERF PRA (estimating core damage frequency CDF)) supplemented by an estimation of large early release frequency (LERF) for three plant operating conditions (power, low power, and shutdown), and for accidents initiated by internal hazards (including internal events, internal floods and internal fires), and external hazards (including external flood, seismic events, and wind). ANS RISC has accepted the overall responsibility to develop and maintain new ASME/ANS Standards to ascertain Level 2 PRA and Level 3 PRA technical adequacy to support risk-informed applications.

- An ASME/ANS PRA Standard has been issued as ASME/ANS RA-Sa-2009, “Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications” (this is Addendum A to Revision 1). Revision 1, Addendum A of the PRA Standard has been endorsed by the NRC via Regulatory Guide (RG) 1.200, Revision 2, issued in March 2009.
- Low Power/Shutdown (LP/SD) – ANS RISC is preparing a LP/SD PRA Standard for incorporation into the above mentioned ASME/ANS PRA Standard.
- Extend PRA to full Level 2 PRA and Level 3 PRA – ANS RISC has established two writing groups to prepare these new standards.

² Current Projects are defined as those that are key to the organization’s overall risk-informed efforts. They do not include sub-level projects (e.g., Code Cases, specialized research projects, etc.) that have no effect on the coordination efforts of the Committee.

³Related NRC and NEI efforts are summarized in Appendix A.

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Risk-Informed Developments for New LWRs

Identify needs, priorities and timing for development of new or modification of existing Standard(s) to address unique PRA requirements for new LWRs.

Action Plan:

- The NRMCC will assign a New Reactor Task Group to develop recommendations in this area.
- The committee works with industry, NSSS vendors and NRC on risk initiatives needed to support 10CFR52 licensing for new LWRs.
- ASME CNRM has established a project team to address changes in the existing LWR standards to treat new plant licensing, design and construction phases as well as unique requirements for advanced LWRs.
- ANS RISC will support the standard, providing expertise in Low Power/Shutdown and Level 2 and Level 3 PRA.
- Pending formation of a joint ANS/ASME committee and new agreements that may result, both societies will ballot this standard.

Risk-Informed Developments for Advanced Non-LWRs

Determine the need for a Standard to assess the technical adequacy of a PRA to support risk-informed applications and risk-informed safety classification scheme, to assist the advanced non-LWR designs.

Action Plan:

- ANS is addressing safety classification requirements for high temperature gas-cooled reactors (HTGRs). ASME is developing complementary risk-informed safety classification requirements for pressure boundary systems and components.
- ASME CNRM has established a project team to address the PRA standards needs for the advanced non-LWRs, such as HTGRs. This standard includes development of PRAs to be used in the design and construction stage. In addition, the ASME/ANS PRA Standard is being reviewed in detail for applicability for future reactors and identification of missing needed guidance.

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

- ANS RISC will support the standard, providing expertise in Low Power/Shutdown and Source Term and Consequence Analysis, as appropriate.
- Pending formation of a joint ANS/ASME committee and new agreements that may result, both societies will ballot this standard.

STRATEGIC PLAN, Rev. 0 – Nov. 2009

PROPOSED LONG TERM PROJECTS

- Assign a Task Group to investigate approaches for the development of a Life Cycle, Risk-Informed Nuclear Code.
- Determine need for, and, if appropriate, develop standards for Qualification of RISC-3 items (Safety-Related, Low Safety Significant SSCs).
- Address PRA for other nuclear facilities, transportation and storage of nuclear materials, and related activities.
- Develop risk methodology to address terrorism threats at nuclear power plants.
- Promote use of risk-informed approaches in the design, safety review, licensing and operation of nuclear facilities.

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Risk Management Development Areas

Risk Management Standard/Guideline Scope of Activities Risk Management Activity	Risk Management Area of Responsibility				Owning Organization Completion Schedule	
	Completed	Development Underway (In Review)	Approved & In Use	Document Number	Responsible Organization	Scheduled Year for Development
	Performing a PRA					
At-Power Internal Hazards Level 1	X		X (add. a.)	ASME/ANS RA-Sa-2008,	CNRM	
At-Power Internal Hazards Level 2		X			ANS RISC	
At-Power Internal Hazards Level 3		X			ANS RISC	
Low Power/Shutdown Internal Hazards Level 1		X		ANS-58.22	ANS RISC ⁴	2009/2010
Low Power/Shutdown Internal Hazards Level 2		X		ANS-58.24	ANS RISC	Unknown
Low Power/Shutdown Internal Hazards Level 3		X		ANS-58.25	ANS RISC	Unknown
External Hazards (At-Power)	X (inc. into ASME/ANS RA-Sa-2008)		X	ANS-58.21	ASME CNRM	
External Hazards (Low Power/Shutdown)					ANS RISC	
Fire PRA (At-Power)	X (inc. into ASME/ANS RA-Sa-2008)		X	ANS-58.23	ASME CNRM	
Fire PRA (Low Power/Shutdown)					ANS RISC ⁴	Unknown
Seismic PRA (At-Power)	X (inc. into ASME/ANS RA-Sa-2008)		X	ANS-58.21	ASME CNRM	
Seismic PRA (Low Power/Shutdown)					ANS RISC ⁴	Unknown
Uncertainty Analysis						
Data Analysis						
Spent Fuel Pool PRA						
Dry Cask Storage PRA						
Spent Fuel Shipping & Handling PRA						
PRA for Instrumentation						

⁴ ANS RISC has the initial responsibility to develop these requirements. Then, they are to be incorporated into ASME/ANS RA-Sa-2009 and will become the responsibility of ASME CNRM.

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Risk Management Standard/Guideline Scope of Activities Risk Management Activity	Risk Management Area of Responsibility				Owning Organization Completion Schedule	
	Completed	Development Underway (In Review)	Approved & In Use	Document Number	Responsible Organization	Scheduled Year for Development
Severe Wind PRA	X (inc. into ASME/ANS RA-Sa-2008		X	ANS-58.21	ASME CNRM	
Probabilistic Threat Assessment (Security) Qualification of PRA Personnel Combined PRA Standard	X ASME/ANS RA-Sa-2008				Undecided ASME CNRM/ANS RISC	
Maintaining a PRA						
General PRA Update Process Specific PRA Update Process Process for Periodic Review and Peer Review of PRA & PRA Applications PRA Software Quality Assurance						
PRA Upgrades						
Process for Approving New Methods Process for Implementation of New Methods						
PRA Applications						
PRA Risk Ranking Risk Significance Categorization RI-IST RI-ISI BNCS Strategic Plan Initiatives RI Emergency Planning Work Activity Risk Assessment Risk Informed Technical Specifications Option 3 – Large Break LOCA, etc. Configuration Risk Management Programs 10CFR50.69 Implementation Risk Informed Treatment Strategies RI-MOV Program		X(ASME) X (ASME) X (ASME)				

NUCLEAR RISK MANAGEMENT COORDINATING COMMITTEE

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Risk Management Standard/Guideline Scope of Activities Risk Management Activity	Risk Management Area of Responsibility				Owning Organization Completion Schedule	
	Completed	Development Underway (In Review)	Approved & In Use	Document Number	Responsible Organization	Scheduled Year for Development
RI-Procurement Program RI – Equipment Qualification Program RI – Categorization Process for Passive, Inherently Reliable Structures, Systems, and Components		X ASME Code Cases N-660, N-720			ASME O&M	
RI-Design Engineering Program Process for Risk Informing Engineering Programs Risk-Informed Safety Classification		X (ASME & ANS)			ANS Committee 28	
Risk Management Decision Making						
Risk Management Expert Panels Risk Informed Working Groups Assessment of Aggregate Effects Risk Informed Organizational Decision-Making Generic Failure Rate Data Base Risk informed Standards Training Process for Risk Informing Engineering Programs		X (ASME)			ASME Stds. Tech. LLC	

STRATEGIC PLAN, Rev. 0 – Nov. 2009

Appendix A

RELATED NRC AND NEI EFFORTS

- NRC issued RG 1.200 Rev. 1, for Trial Use to address PRA quality and regulatory positions on the ASME PRA Standard, and the NEI Peer Review Process. NRC has issued RG 1.200 Rev. 2 to endorse the use of the ASME/ANS PRA Standard (ASME/ANS RA-Sa-2009) incorporating internal fires and external hazards PRAs.
- NRC has published NUREG/CR-6823, Handbook of Parameter Estimation for Probabilistic Risk Assessment. This handbook was generated to support such documents as ASME-RA-S-2002 by providing a compendium of good practices that a PRA analyst can use to generate the parameter distributions required for quantifying PRA models.
- NRC has published Revision 1 to NUREG/CR-6595 for public review and comment. This revision expands the simplified approach for estimating Large Early Release frequency (LERF) to address low power and shutdown conditions. Revision 1 to this NUREG/CR is intended to support the ANS low power shutdown PRA Standard.
- NRC has published NUREG-1792, “Good Practices for Implementing Human Reliability Analysis,” April 2005 and NUREG-1842, “Evaluation of Human Reliability Analysis Methods Against Good Practices,” September 2006. As with the Parameter Estimation Handbook, these documents are also providing a compendium of good practices that a PRA analyst can use to perform the HRA required in a PRA.
- NRC has published NUREG-1855, “Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making,” March 2009. This document provides guidance for identifying and characterizing the uncertainties associated with PRA, for determining the impact of the uncertainties on the results of the PRA, and for factoring the results of the uncertainty analyses into the decision making. It is a companion document to EPRI’s “Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments,” EPRI TR 1016737, December 2008.

STRATEGIC PLAN, Rev. 0 – Nov. 2009

- NRC officially issued 10 CFR 50.69 (“Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors”) in the U.S. Federal Register on Nov. 22, 2004 as one of the initiatives to risk-inform regulations. Industry pilot plant efforts have been underway in order to provide submittals per 10 CFR 50.69. A draft safety evaluation report has been recently issued for an application at Wolf Creek that addresses an NEI Categorization Process Guide and ASME risk-informed repair/replacement activities.
- NEI has prepared a final Risk-Informed Categorization Process Guideline, NEI 00-04. It is intended to be an industry guidance document. More detailed guidance is needed for site specific implementation and development of site specific procedures as a lesson learned from operating experience in station implementation.
- NEI has requested that EPRI develop seismic and environmental qualification guidance for RISC-3 SSCs. Guidance exists in NEI 00-04 and industry experience has used “Targeted” and “Augmented” grades of QA to address RISC-2 and RISC-3 SSCs. Existing industrial programs and processes are sufficient for these SSCs in conjunction with Targeted and Augmented QA programs.
- Advanced Reactors – The NRC has published NUREG-1860, “Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing,” December 2007. This NUREG document outlines a “framework” that provides an approach, scope and criteria that could be used to develop a set of risk-informed and performance-based requirements that would serve as an alternative to 10 CFR Part 50 for licensing future nuclear power plants. The NRC has provided an NGNP licensing strategy to Congress (August 2008) and is developing user needs.
- The NRC is sponsoring the development of a “Roadmap” as a guide to the R&D and Code development tasks that should be considered in developing rules for High Temperature Gas Cooled Reactors (HTGRs). The primary focus of the Roadmap is on the development of a complete set of rules for the design and operating conditions that are being proposed for the Next Generation Nuclear Plant (NGNP) demonstration unit in collaboration with the U.S. Department of Energy. While the majority of the roadmap is

STRATEGIC PLAN, Rev. 0 – Nov. 2009

devoted to the development of standards for addressing materials and reactor system design related to pressure boundary integrity, the document is incorporating the need for rules for PRA for advanced reactors. The Roadmap should be soon completed.