

POLICY ISSUE
(INFORMATION)

October 27, 2011

SECY-11-0151

FOR: The Commissioners

FROM: Brian W. Sheron, Director
Office of Nuclear Regulatory Research

SUBJECT: ANNUAL UPDATE OF THE RISK-INFORMED AND PERFORMANCE-BASED PLAN

PURPOSE:

This paper provides the Commission with an annual update on activities contained in the Risk-Informed and Performance-Based Plan (RPP), including a summary of the recent accomplishments and near-term anticipated accomplishments. This paper does not address any new commitments or associated resource implications.

SUMMARY:

The breadth and depth of programs across the agency demonstrate the staff's commitment to the Commission's goal for a risk-informed and performance-based regulatory structure. Since the Commission promulgated the Probabilistic Risk Assessment (PRA) Policy Statement (60 FR 42622) in 1995, the staff has continued to expand the application of risk-informed methods within regulatory programs. Many NRC risk-informed programs, such as the Reactor Oversight Process, are mature elements in the regulatory structure and are not discussed in this paper. These mature programs continuously improve as the PRA state-of-practice continues to advance. Other risk-informed and performance-based initiatives, such as most of those discussed in this paper, are in a developmental stage and are being integrated into the agency's regulatory process. The staff continues to engage stakeholders as appropriate to seek feedback and insights to improve the agency's regulatory programs.

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BACKGROUND:

On June 1, 2006, the Commission issued a staff requirements memorandum (SRM) (Agencywide Documents Access and Management System [ADAMS] under Accession No. ML061520304) that directed the U.S. Nuclear Regulatory Commission (NRC) staff to improve upon the Risk-Informed Regulation Implementation Plan (RIRIP) by developing an integrated master plan for activities designed to help NRC achieve its goal of a holistic, risk-informed, and performance-based regulatory structure. The Commission also directed the staff to seek ways to communicate more transparently to the public and stakeholders on the purpose and use of PRA in the agency's reactor, materials, and waste regulatory programs. SECY-07-0074, "Update on the Improvements to the Risk-Informed Regulation Implementation Plan," dated April 26, 2007 (ADAMS Accession No. ML070890396), conveyed that plan, which the staff retitled as the "Risk-Informed and Performance-Based Plan."

To help meet the Commission's expectations for both a risk-informed and a performance-based regulatory structure, Enclosure 1 to SECY-07-0074 included explicit criteria for the staff's review and consideration of performance-based approaches to help determine which initiatives should be both risk-informed and performance based. SECY-07-0191, "Implementation and Update of the Risk-Informed and Performance-Based Plan," dated October 31, 2007 (ADAMS Accession No. ML072700587), discusses the staff's progress in implementing the RPP and includes an updated set of objectives, bases, and goals for the reactor, materials, and waste regulatory arenas. In November 2007, the staff completed its commitment to make all aspects of the RPP available to the general public via the agency's public website. The most recent version of the plan was provided as SECY-10-0143, "Annual Update of the Risk-Informed and Performance-Based Plan," dated October 28, 2010 (ADAMS Accession No. ML102790619).

DISCUSSION:

This SECY paper contains information on some of the ongoing risk-informed and performance-based activities. The enclosure contains additional information on risk-informed and performance-based activities; detailed information appears on the NRC's public website at <http://www.nrc.gov/about-nrc/regulatory/risk-informed/rpp.html>. The website provides a readily accessible overview and current status of the agency's risk-informed and performance-based regulatory activities.

Recently, the Commission has issued guidance in a number of areas that will expand and improve the way in which risk insights are used in the regulatory process. As the staff continues to make progress on these initiatives, the website will be updated.

- Fire Protection for Nuclear Power Plants. In 2004, the Commission approved a voluntary risk-informed and performance-based fire protection rule for existing nuclear power plants. The Commission issued SRM-SECY-11-0033, "Proposed NRC Staff Approach to Address Resource Challenges Associated with Review of a Large Number of NFPA 805 License Amendment Requests," dated April 20, 2011 and SRM-SECY-11-0061, "A Request to Revise the Interim Enforcement Policy for Fire Protection Issues on 10 CFR 50.48(c) to Allow Licensees to Submit License Amendment Requests in a Staggered Approach," dated April 29, 2011 to manage the implementation of this program. The first license amendment request has been accepted for review by the staff.

- Risk-Informed Regulatory Guidance for New Reactors. In SRM-SECY-10-0121, "Modifying the Risk-Informed Regulatory Guidance for New Reactors," dated March 2, 2011, the Commission directed staff to engage external stakeholders in a series of tabletop exercises to test various realistic performance deficiencies, events, modifications, and licensing bases changes against current NRC policy, regulations, guidance and all other requirements that are or will be relevant to the licensing bases of new reactors. The staff has conducted these exercises and briefed the ACRS on its progress on September 20, 2011. The SRM also directed staff to submit a notation vote paper with options and recommendation to the Commission by June 4, 2012.
- Revised Fuel Cycle Oversight Process. Based on Commission guidance received in SRM-M100429 and SRM-SECY-10-0031, "Revising the Fuel Cycle Oversight Process," dated August 4, 2010, the staff developed and discussed with the ACRS a paper comparing integrated safety analyses (ISA) and probabilistic risk assessments (PRA). Additionally, the Commission directed the staff to continue to work on specific elements of the oversight program. In response, the staff submitted SECY-11-0140, "Enhancements to the Fuel Cycle Oversight Process," dated October 7, 2011 to provide the Commission with recommendations for next steps to enhance the fuel cycle oversight process.
- Part 61: Site-Specific Analyses-Rulemaking. In SRM-SECY-08-0147, "Response to Commission Order CLI-05-20 Regarding Depleted Uranium," dated March 18, 2009, the Commission directed the staff to pursue a limited rulemaking to specify a requirement for a site-specific analysis and associated technical requirements for unique waste streams including, but not limited to, the disposal of significant quantities of depleted uranium. Furthermore, SRM-SECY-10-0043, "Blending of Low-Level Radioactive Waste," dated October 13, 2010, approved the staff's recommendation to include blended waste in the limited scope rulemaking for depleted uranium. The staff has published draft proposed rule text, held a public meeting and briefed ACRS. The staff will consider comments from the ACRS and the public as it finalizes the proposed rule before submitting it to the Commission.
- Waste Confidence Rule and Extended Storage and Transportation (EST). SRM-COMSECY-10-0007, "Project Plan for Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel," dated December 6, 2010, directs staff to continue efforts to support extended storage and transportation of spent nuclear fuel including research activities and the gap assessments identified in Phase 1 of the project. Furthermore, staff is directed to integrate work with the plan being developed in response to SRM-SECY-09-0090, "Final Update of the Commission's Waste Confidence Decision," dated June 15, 2009. SECY-11-0029, "Plan for the Long-Term Update to the Waste Confidence Rule and Integration with the Extended Storage and Transportation Initiative," dated February 28, 2011, provides the plan to develop a long-term waste confidence rule and describes the integration of Waste Confidence and EST project plan activities. Limited scope risk assessments will be performed to identify methodological or information gaps, including a survey of relevant risk information.
- Future Level 3 PRA Activities. In SRM-M100218, the Commission directed staff to provide various options for proceeding with the level 3 PRA related activities including costs and perspectives on future uses for level 3 PRAs. SECY-11-0089, "Options for Proceeding with

Future Level 3 Probabilistic Risk Assessment Activities,” dated July 7, 2011, provides the Commission with three primary options for proceeding. The Commission, in SRM-SECY-11-0089 has directed staff to perform a Level 3 PRA on a 4 year schedule. The staff is developing a detailed plan for the project and has initiated interactions with stakeholders for site selection. Technical work is expected to begin in fiscal year 2012.

- Clarify Defense in Depth to Ensure Consistent Interpretation. As directed in SRM-SECY-11-0014, “Use of Containment Accident Pressure in Analyzing Emergency Core Cooling System and Containment Heat Removal System Pump Performance in Postulated Accidents,” dated March 15, 2011, staff is updating Regulatory Guide 1.174 to clarify language describing defense in depth. Following staff alignment on the language for RG 1.174, other regulatory guidance that refers to defense in depth, will be updated, as appropriate.
- Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor (SMR) Reviews. In response to SRM-COMGEA-10-0001/COMGBJ-10-0004, “Use of Risk Insights to Enhance Safety Focus of Small Modular Reactor Reviews,” dated August 31, 2010, the staff developed a plan, described in SECY-11-0024, “Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews,” dated February 18, 2011, for a framework and design specific review plans for the integral pressurized water reactor (iPWR) class of SMRs. Furthermore, the plan includes activities for the development of a new risk-informed and performance-based regulatory structure for the licensing of advanced reactor designs. This plan was approved by the Commission in an SRM for SECY-11-0024 that further directs the staff to provide the Commission with a paper that explores the feasibility of including risk information in categorizing structures, systems and components (SSCs) as safety-related and non safety-related for the design-specific SMR review plans in both the short and long terms.
- Task Force for a More Holistic Risk-Informed and Performance-Based Regulatory Approach. At the request of Chairman Jaczko, Commissioner Apostolakis is leading a task force to develop a strategic vision and range of options that the NRC could pursue to achieve a more comprehensive and holistic, risk-informed and performance-based approach for the regulation of reactors, materials, waste, fuel cycle, security, and transportation. The charter for the task force is available in ADAMS under Accession No. ML110680621. The task force will provide options and recommendations in a report to the Chairman by spring 2012.
- Fukushima Response. A Near Term Task Force (NTTF) was established to complete the near-term review required by the Chairman’s March 23, 2011 tasking memorandum (COMGBJ-11-0002, “NRC Actions Following the Events in Japan”). In SECY-11-0093, “Near-Term Report and Recommendations for Agency Actions Following the Events in Japan,” dated July 12, 2011, the NTTF provided its recommendations to the Commission. The first recommendation from the NTTF states the following:

The task force recommends establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.

In the SRM for SECY-11-0093, dated August 19, 2011, the Commission directed the staff, by September 9, 2011, to “identify and make recommendations regarding any NTTF recommendations that can, and in the staff’s judgment, should be implemented, in part or in whole, without unnecessary delay.” SECY-11-0124, “Recommended Actions to be taken Without Delay From the Near-Term Task Force Report,” dated September 9, 2011 provides these recommendations. The Commission provided further direction in SRM-SECY-11-0124, dated October 18, 2011.

The staff notes that the last four activities noted above have some common aspects that will require close coordination and collaboration to ensure a holistic, risk-informed and performance based regulatory structure.

The above activities represent a significant demand for risk analysts and other specialists in engineering disciplines (e.g. fire, seismic) that provide the necessary foundation for risk modeling. To support these and other important risk-informed initiatives, the staff continues to assess and adjust priorities in the budget execution process. In addition, the applicable offices are working together to develop coordinated strategies to train staff in PRA and related disciplines, including through the Graduate Fellowship Program, to recruit new hires with PRA interest or expertise, and to leverage industry capability where appropriate. The staff will continue to keep the Commission informed of progress and if any policy issues arise.

In addition to the new Commission-directed initiatives noted above, one new staff initiative has been added to the website:

- Risk Informing Emergency Preparedness Oversight: Performance Based Offsite Response Organization Evaluation. In coordination with the Federal Emergency Management Agency (FEMA), the staff intends to initiate a study of performance based evaluation techniques that could be used for offsite response organization emergency response programs. This effort will also identify how radiological emergency response program elements could be integrated with nation-wide FEMA preparedness initiatives.

The enclosure provides an update for the following ongoing regulatory activities:

1. Fire Protection for Nuclear Power Plants
2. Risk-Informed Technical Specifications
3. Develop an Alternative Risk-Informed Approach to Special Treatment Requirements
4. NRC Risk Network
5. Risk-Informed Rulemaking and Related Activities Currently in Progress
6. Infrastructure for Risk-Informed and Performance-Based Environment for New Light Water Reactors
7. Human Reliability Analysis
8. Human Reliability Analysis Development for Fire PRA
9. Analytical Tools for Risk Applications
10. SPAR Model Development Program
11. Risk-Related Generic Issues
12. Use of Risk Insights to Enhance Safety Focus of Small Modular Reactor Reviews
13. Revised Fuel Cycle Oversight Process
14. Part 61: Site-Specific Analyses Rulemaking
15. Waste Confidence Rule and Extended Storage and Transportation of Spent Nuclear Fuel

16. Regulatory Basis to Support Rulemaking for Potential Reprocessing Facilities
17. Risk-Informed Security
18. Risk-Informed Emergency Action Levels

These initiatives demonstrate continued NRC commitment to use risk-informed and performance-based approaches throughout its regulatory structure. The staff will continue to keep the Commission informed of progress in these initiatives through the RPP and other reporting mechanisms.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

/RA/

Brian W. Sheron, Director
Office of Nuclear Regulatory Research

Enclosure:
Recent Accomplishments and Near-Term
Anticipated Accomplishments-2011

- 19. Regulatory Basis to Support Rulemaking for Potential Reprocessing Facilities
- 20. Risk-Informed Security
- 21. Risk-Informed Emergency Action Levels

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