

POLICY ISSUE
(Information)

October 27, 2015

SECY-15-0135

FOR: The Commissioners

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

SUBJECT: ANNUAL UPDATE OF THE RISK-INFORMED ACTIVITIES PUBLIC
WEB SITE

PURPOSE:

This paper provides the Commission with summaries and status of major activities contained in the risk-informed activities public web site, including new activities. This paper does not address any new commitments or associated resource implications.

BACKGROUND:

On June 1, 2006, the Commission issued a staff requirements memorandum (SRM) (Agencywide Documents Access and Management System [ADAMS] Accession No. ML061520304) that directed the U.S. Nuclear Regulatory Commission (NRC) staff to improve on the Risk-Informed Regulation Implementation Plan (RIRIP) by developing an integrated master plan for activities designed to help the 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 probabilistic risk assessment (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."

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To 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 determine which initiatives should be risk-informed and performance-based. SECY-07-0191, "Implementation and Update of the Risk-Informed and Performance-Based Plan (RPP)," dated October 31, 2007 (ADAMS Accession No. ML072700587), discussed the staff's progress in implementing the RPP and included 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 through the agency's public Web site. The NRC provided its most recent version of the public Web site list of risk-informed activities as SECY-14-0121, "Annual Update of the Risk-Informed Activities Public Web Site," dated October 31, 2014 (ADAMS Accession No. ML14283A497).

Under Project AIM 2020, the staff is evaluating NRC activities to rebase line its efforts to ensure the effective and efficient use of the staff's time and resources. Discontinuing this annual SECY paper would support this AIM 2020 initiative without eliminating the communication of Risk-Informed-Activities to the Commission or the public, since the update of the public website would continue annually. All RPP planning has been completed, while the last three annual SECY papers transitioned into listing current Risk-Informed Activities. The staff plans to include the sun-setting of this annual SECY paper with the list of Project AIM 2020 recommendations for Commission consideration.

DISCUSSION:

This Commission paper contains summary information on significant ongoing risk-informed and performance-based activities. More comprehensive and detailed information for all risk-informed activities will appear approximately one month later on the NRC's public Web site at <http://www.nrc.gov/about-nrc/regulatory/risk-informed/rpp.html>. The Web site provides a readily accessible overview and current status of the agency's risk-informed and performance-based regulatory activities, updated at least annually coincident with this paper. Five new risk-informed activities were added this year as described below in items 1 through 5. Items 6 through 25 are ongoing activities updated from their status reported to the Commission last year.

The following regulatory initiatives are summarized here with more details in the enclosure:

1. Medical Use of Byproduct Material (Part 35) – Medical Event Definitions, Training and Experience, and Clarifying Amendments (New Activity)

In this rulemaking, the NRC addresses ongoing rulemaking projects and several other related topics. The rule amends reporting, notification, training, and experience requirements. The administration of certain drugs represents a lower risk significance than others and this is reflected in the training and experience requirements of 10 CFR Part 35. The staff is preparing a rulemaking package for the Commission's consideration.

2. NRC "Grow Your Own" PRA Capability (New Activity)

This NRC-wide program was established to provide less-experienced staff with high technical potential the opportunity to have a focused hands-on experience with risk-

informed regulations, licensing actions, and decision-making. Five staff members completed this 3-year program.

3. Use of Risk Insights To Enhance Technical Reviews of Design Certification (DC) Applications (New Activity)

Under this initiative, the staff develops high-level risk insights based on the DC application information and shares that information with the technical review branches to help risk-inform their decision-making for each application. This supports the staff performance of the risk-informed review of the Advanced Power Reactor (APR) 1400 new reactor DC application.

4. Standard Review Plan, Chapter 19.0, "Severe Accidents," to NUREG-0800 (New Activity)

The staff will update NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition." This chapter will be updated to incorporate risk-informed interim staff guidance, lessons learned from new reactor reviews, and insights regarding small modular reactor designs.

5. Risk-Informing Agency Actions on Low Risk Compliance Issues (New Activity)

The agency is developing a risk-informed approach to resolve license compliance issues that are determined to be of low risk/low safety significance. A working group has been formed with a goal to develop a risk-informed alternative to enforcement of technical specification compliance when it can be demonstrated that the non-compliance does not pose an undue risk to public health and safety.

6. NRC Risk-Informed Steering Committee (RISC)

The NRC's RISC is an NRC senior management committee with representatives from the major program offices that provides strategic direction to the NRC staff to advance the use of risk-informed decision making in licensing, oversight, rulemaking, and other regulatory areas consistent with the Commission's PRA policy statement. Two working groups were established to address PRA technical adequacy and uncertainties in risk-informed decision-making.

7. Risk Prioritization Initiatives (RPI)

This initiative encourages development of high-quality PRA models for power reactor licensees to reduce cumulative effects of regulation. A schedule was proposed for implementing regulatory actions as an integrated set and in a way that reflects their risk significance on a plant-specific basis. Based on the Commission direction in SRM-15-0050, the staff discontinued work on RPI.

8. Interim Staff Guidance (ISG) on PRA Technical Adequacy for Advanced Light-Water Reactors

The staff has received public comments on the ISG, for applicants' use of the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) PRA standard to assess the technical adequacy of their PRA for design certification application and

combined license applications. Advisory Committee on Reactor Safeguards (ACRS) comments are being considered before final publication of the interim staff guidance early in 2016.

9. Risk Management Regulatory Framework (RMRF)

The Chairman's tasking memorandum dated June 14, 2012 (ADAMS Accession No. ML121660102) directed the staff to review NUREG-2150, "A Proposed Risk Management Regulatory Framework," to identify options and to make recommendations including the potential development of a Commission policy statement. In 2014, the Commission provided further direction to provide a description of any interrelationships of ongoing risk-informed initiatives. The staff will meet with the ACRS full committee in early November 2015 and the staff will provide an update on framework development to the Commission in a SECY paper in December 2015.

10. Probabilistic Flood Hazard Assessment (PFHA)

NUREG/CP-0302, "Proceedings for the Workshop on Probabilistic Flood Hazard Assessment," was issued in October 2013, and a "Probabilistic Flood Hazard Assessment Research Plan" has been prepared. Eleven new research projects have been initiated. A program review for progress on these projects was conducted October 13-14, 2015.

11. Risk Informing Oversight of Emergency Preparedness (EP) and Response Plans

The staff completed an evaluation and concluded that a performance-based offsite response system is feasible to enhance the effectiveness and efficiency of EP oversight. In SRM-14-0038, the Commission directed the staff to continue under the current regulatory framework while remaining vigilant to the possibility of moving to a performance-based framework in the future.

12. Methods, Tools and Guidance for Including Digital Systems in Nuclear Power Plant PRAs

The staff continues to develop methods and analytical tools for including models of digital systems in nuclear plant PRAs. Recent accomplishments include the development of a failure mode taxonomy for digital instrument and control systems and quantifying software reliability using a Bayesian Belief Network model.

13. Rulemaking for Reprocessing Facilities

Process flow diagrams and facility descriptions have been developed for a conceptual aqueous reprocessing facility with associated event and fault trees considering a hypothetical red-oil explosion. Preliminary best-estimate source term analyses indicate a potential dose reduction of orders of magnitude, compared to the existing conservative approaches.

14. Assess Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance, Generic Safety Issue (GSI)-191

Staff efforts for the generic issues program and 10 CFR 50.46c rulemaking are considering debris accumulation on the emergency core cooling sump screen that might restrict water flow to the pumps, following a loss-of-coolant accident (LOCA). In FY2015, the staff continued to review a licensee's pilot program and published draft guidance (DG-1322, "Alternative Risk-Informed Approach for Addressing the Effects of Debris on Post Accident Long-Term Core Cooling") for licensees choosing to implement the optional, risk-informed provision of the rule.

15. Emergency Core-Cooling System Requirements: Redefinition of Loss-of-Coolant Accidents (LOCA)

The staff's proposed rulemaking is considering redefining the large-break LOCA requirements to provide a risk-informed alternative maximum break size. No action has been taken in FY2015 because this activity is on hold as directed in SRM-SECY-10-0161, dated April 26, 2012 (ADAMS Accession No. ML12117A121) and consistent with the staff response to Fukushima Dai-ichi Near Term Task Force (NTTF) Recommendation 1 and evaluation of risk-informed initiatives in the context of staff activities on a Risk Management Regulatory Framework.

16. Standardized Plant Analysis Risk Models (SPAR)

The staff continues to maintain and improve models used for accident progression from systems, components and operator actions to assess the risk of events and degraded conditions. The staff currently maintains and updates the 75 SPAR models representing 99 commercial nuclear power plants and new reactors. The models include internal initiating events at power through core damage, seismic, and high-wind external hazards, internal fire, and shutdown conditions.

17. Develop Improved PRA Methods for Consequential Steam Generator Tube Rupture (C-SGTR)

The staff plans to develop a simplified methodology for the quantitative assessment of the risk of the C-SGTR event. A key focus of the work is closing technical gaps associated with thermal-hydraulic and structural analyses, assessment of steam generator flaw distributions, and PRA modeling. A draft report is being finalized to document the research results from this study that should be issued for public comment late in calendar year 2015 and finalized in 2016.

18. Develop Risk-Informed Improvements to Standard Technical Specifications (STS)

The staff has developed three initiatives to implement risk-informed technical specifications (TS): (1) allow hot shutdown repairs, (2) modify TS completion times, and (3) add actions to preclude entry into limiting condition for operation (LCO) 3.0.3, (times to shutdown modes when LCO and associated actions are not met). The staff continues to review STS initiatives as they are received.

19. National Fire Protection Association Standard 805

Consistent with 10 CFR 50.48(c) and the National Fire Protection Association 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," in 2015, the NRC staff issued 6 non-pilot NFPA 805 license amendments with 3 more expected to be completed by the end of the year. There are thirteen LARs currently under review. This standard uses PRA to transition from existing deterministic fire protection programs to risk-informed, performance-based programs.

20. Revise the Fuel Cycle Oversight Process (RFCOP)

In accordance with the RFCOP Project Plan, the staff has issued the cornerstone development document for public comment regarding an approach to use risk-information to determine the significance of inspection findings at fuel cycle facilities.

21. Full-Scope Site Level 3 PRA

The staff is conducting a full-scope multi-unit site Level 3 PRA that addresses all internal and external hazards, all plant operating modes, and all reactor units, spent fuel pools, and dry cask storage. A PWR Owners Group peer review of several level 1 and level 2 models has been completed.

22. Implement 10 CFR 50.69: Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors

In December 2014, the staff approved a licensee pilot license amendment to implement 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors." Following the initial pilot application, lessons learned from the application review will be used to revise the associated industry guidance and RG 1.201, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance."

23. Data Collection for Human Reliability Analysis (HRA)

The staff plans to improve the quality of HRA by addressing the adequacy of data available to ultimately improve the credibility and consistency of human error probability estimates. Programs are underway to collect operator simulator training data and add the information to a database. In addition to data being collected from operator training by the STP Nuclear Operating Company, international organizations from South Korea, the Czech Republic, and Taiwan, and from the Halden Human Machine Laboratory are collaborating with the NRC on collecting HRA data.

24. Maintenance and Development of the Systems Analysis Programs for Hands-on Analysis Integrated Reliability Evaluations (SAPHIRE) Code

The NRC has developed this computer code for performing PRAs. SAPHIRE in conjunction with the agency's SPAR models for commercial reactors, supports many agency risk-informed initiatives. These include: the Significance Determination Process (SDP) as described in Inspection Manual Chapter 0609, the Accident Sequence Precursor (ASP) Program, risk-informing 10 CFR Part 50, vulnerability assessments,

advanced reactors reviews, operational experience evaluation, generic issues identification and resolution and regulatory backfit analyses.

25. Develop Regulatory Framework for Spent Fuel Storage and Transportation

The goal of this effort is to develop a framework for spent fuel storage to enable the staff to perform a more risk-informed regulatory review, improve guidance, streamline casework activities, help assess changes to 10 CFR 72.48, "Changes, Tests, and Experiments", and evaluate requests for exemptions to the regulation while maintaining appropriate margins of safety and security. Several tasks in the scoping and implementation plan for risk-informing storage regulatory activities have been completed.

COORDINATION:

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

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Enclosure:
2015 Risk-Informed Activities List

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Enclosure:

2015 Risk-Informed Activities List

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