

Table of Accomplishments

Activity	Accomplishment
Reactor Oversight Process SA-1	Based on its assessment of stakeholder feedback and the results and lessons learned from annual self-assessments, the NRC staff of the U.S Nuclear Regulatory Commission (NRC) believes that the Reactor Oversight Process (ROP) has satisfied the Commission’s direction to develop an oversight process that is more objective, risk-informed, understandable, and predictable than previous processes. The most recent self-assessment (SECY-04-0053) concluded that the risk-informed ROP was generally effective in monitoring the activities of operating nuclear power plants and in focusing the agency’s resources on significant performance issues for calendar year 2003. The staff continues to pursue initiatives to improve performance indicators and the Significance Determination Process (SDP). Nonetheless, the timeliness of the SDP continues to challenge the staff in instances where inspection findings are potentially greater than “green.” As a result, the staff continues to work on initiatives, defined by the SDP Task Action Improvement Plan, to address timeliness and other improvements to the SDP. Toward that end, in January 2005, the staff revised inspection procedures to incorporate recommendations from the Davis-Besse Lessons Learned Task Force.
ROP Support — Mitigating Systems Performance Index SA-2	The NRC’s Office of Nuclear Regulatory Research (RES) supports the agency’s Reactor Oversight Process (ROP) by developing and piloting the Mitigating Systems Performance Index (MSPI). MSPI monitors risk associated with changes in performance of selected mitigating systems, accounting for plant-specific design and performance data. As such, the MSPI enhances the safety of nuclear plants by addressing known problems with the existing Safety System Unavailability Performance Indicator, and providing a measure of both system reliability and availability. During 2004, the MSPI was developed and piloted for 20 plants. In January 2005, a NUREG report on the MSPI pilot verification was completed. Late in 2004 an MSPI PRA Quality Task Group was formed to provide guidance on the characteristics of the base PRA and on the activities needed to demonstrate that the base PRA is technically adequate to support the MSPI application. The Task group provided recommendations in a letter report dated December 16, 2004.
Industry Trends Program Support SA-3	Since the beginning of fiscal year (FY) 2005, the staff has continued to support the NRC’s Industry Trends Program (ITP) by analyzing and trending the operating experience data contained in its databases. This includes updating trends for initiating events, component and systems reliabilities, common-cause failures, and fire events, and then providing this information on the internal and public RES Web sites. In November 2004, updated trends, graphs, and charts for system studies, component studies, common-cause-failure evaluations, and initiating event evaluations through FY 2003 were included on the RES internal Web page.

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<p>Reactor Performance Data Collection Program</p> <p>SA-4</p>	<p>In September 2004, the Integrated Data Collection and Coding System (IDCCS) was updated with the latest quarterly data available through August 2004. The data collected include component and system failures, demands on safety systems, initiating events, fire events, and common-cause failures. The data, and data-analysis results, are stored in database systems for use by the NRC staff as part of other regulatory processes to help identify potential safety issues. These include the Industry Trends Program (ITP), the Accident Sequence Precursor (ASP) Program for evaluating the risk associated with operational events and/or conditions, and the Reactor Oversight Process (ROP). In addition, the data are used as input for the risk assessment models known as Standardized Plant Analysis Risk (SPAR) models. The database systems include the IDCCS, Reliability and Availability Data System (RADS), Common-Cause Failure Database, Fire Events Database, and ASP Events Database. RES continues to develop and maintain the operating experience database systems.</p>
<p>Accident Sequence Precursor (ASP) Program</p> <p>SA-5</p>	<p>In October 2004, the staff provided input to the NRC's Office of the Chief Information Officer (OCFO) concerning significant precursors through June 2004. In December 2004, input was provided to the OCFO on (1) significant radiation overexposures from nuclear reactors for FY 2004 and (2) significant releases to the environment for FY 2004. In November, 2004, the staff issued SECY- 04-0210 to document the status and results of the ASP program through September 2004.</p> <p>The risk associated with operational events and/or conditions is evaluated under the Accident Sequence Precursor (ASP) Program by systematically reviewing and evaluating operating experience to identify precursors to potential severe core damage sequences, documenting precursors, categorizing them by plant-specific and generic implications, and providing a measure of trends associated with nuclear plant core damage risk.</p>

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SPAR Model Development Program SA-6	<p data-bbox="561 285 1419 443">In November 2004, staff completed revision of Low Power Shutdown (LP/SD) SPAR models for Peach Bottom and River Bend to address comments obtained during onsite QA reviews. In November 2004, staff also issued the Large Early Release Frequency (LERF) SPAR models for the lead plant in the second plant class to the licensee in anticipation of onsite QA review.</p> <p data-bbox="561 474 1419 940">SPAR models are used to: (1) evaluate the risk significance of inspection findings in SDP Phase 3 analyses; (2) evaluate risk associated with operational events/conditions in the ASP program; (3) improve the quality of probabilistic risk assessments (PRAs) — including identification of modeling issues that are risk-significant, and ranking and prioritizing those issues as part of the PRA quality efforts (e.g., as part of R.G. 1.200); (4) perform analyses in support of Generic/Safety Issue resolution (e.g., GSI-189 and GSI-191) by screening (or prioritizing) analyses, performing detailed analysis to determine if licensees should be required to make change(s) to their plants, assessing whether NRC should modify or eliminate an existing regulatory requirement, and performing flexible and quick analyses that result in minimum resources required to perform generic studies; (5) performing analyses in support of the staff's risk-informed review of license amendments (e.g., tech spec changes, notices of enforcement discretion (NOEDs), fire-protection requirements); and (6) independently verifying the Mitigating Systems Performance Index (MSPI).</p>

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<p>High-Level Waste Program</p> <p>SA-7</p>	<p>In December 2004, the staff issued an update of the consolidated Issue Resolution Status Report for issue closure using risk insights. That report provides background information on the status of precicensing interactions between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) concerning a potential high-level waste geologic repository at Yucca Mountain, Nevada. The report updates information in NUREG-1762 (to March 2004), incorporates the Risk Insights Baseline report that was previously provided to the Commission on April 29, 2004, and documents the staff's application of the risk insights in their review of DOE's responses to the key technical issues. The report also documents the information that the staff considered in formulating their views, including results of the in-depth review of DOE and contractor documents; the independent work of the NRC and its contractor, the Center for Nuclear Waste Regulatory Analyses; published literature; and other publicly available information.</p> <p>In December 2004, the staff completed a set of risk analyses and a review of the Risk Insights Baseline report to determine whether an update of that report was necessary. As previously described, the staff provided the Commission with the Risk Insights Baseline report in mid-2004. Then a set of 13 process-level and total system performance assessment analyses were conducted to: (1) determine sensitivity of some parameters used in describing the consequences of igneous activity; (2) to develop more realistic approaches to be incorporated into the staff's Total system Performance Assessment (TPA) code (e.g., chemistry of water contacting the engineered barriers); and (3) to develop more defensible approaches for the TPA code [e.g., an approach for modeling ash redistribution, and a different and more defensible approach for ash distribution during an igneous eruption (i.e., no longer assuming wind blows directly to the location of the reasonably maximally exposed individual)]. Based upon these analyses it was determined that several of the approaches tested in the analyses would be incorporated into the TPA code, but the Risk Insights Baseline report would not be updated because these analyses did not fundamentally change the risk insights (compared to those in the Risk Insights Baseline report).</p>

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<p>10 CFR 50.46 [including frequency estimates for loss-of-coolant accidents (LOCA)]</p> <p>SA-8</p>	<p>The staff held a public meeting on August 17, 2004, to obtain stakeholder input for a regulatory analysis of risk-informed changes to 10 CFR 50.46. ACRS full committee meetings to discuss the proposed rule were held in November 2004, December 2004, and March 2005. The most recent EDO memorandum to the Commission discussing the proposed redefinition of the large break LOCA was issued October 22, 2004. It contained the current draft rule language and its conceptual basis. In March 2005, the staff forwarded the proposed rule defining the risk-informed ECCS requirements and evaluation criteria for associated plant design and operational changes to the Commission (SECY-05-0052).</p> <p>The draft NUREG Report, “Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process,” provides preliminary LOCA frequency estimates which have been developed using an expert elicitation process to consolidate service history data and insights from probabilistic fracture mechanics (PFM) studies with the knowledge of plant design, operation, and material performance. Separate BWR and PWR piping and non-piping passive system LOCA frequency estimates have been developed as a function of effective break size and operating time. The document was provided to ACRS and reviewed during meetings on November 16, 2004, and March 3, 2005.</p>

Activity	Accomplishment
Risk Management Technical Specifications (RMTS) SA-10	<p>The staff continues to work on risk-informed initiatives to modify the NRC's standard technical specifications:</p> <ul style="list-style-type: none"> • On Initiative 1, "Modified End States," issues were resolved in January 2005 concerning Combustion Engineering (CE) TSTF-422, "Risk-Informed Modification to Selected Action End States for [Pressurized-Water Reactors Operated by the CE Owners' Group]," and the Boiling Water Reactor (BWR) TSTF-423, "Risk-Informed Modification to Selected Action End States for [Boiling-Water Reactors]. In the near future, the TSTF-422 and TSTF-423 safety evaluations will be published in the Federal Register, requesting public comment, as part of the Consolidated Line Item Improvement Process (CLIIP). • On Initiative 4b, "Risk-Informed Completion Times," The industry and staff will meet in March 2005 to define RMTS Initiative 4b requirements with respect to PRA and CRMP scope and capability. South Texas Project (STP) submitted their pilot plant license amendment request in August 2004. In January 2005, the staff visited STP to observe their CRMP capabilities. The industry will provide updated RMTS Risk Management Guidance, CE topical report and CE TSTF-424, in April 2005 for staff review. • On Initiative 5b, "Relocation of Surveillance Frequencies," the staff received a license amendment request for the Limerick Generating Station (a pilot plant) in August 2004. A draft Initiative 5b methodology was received in February 2005. The staff will complete an integrated review of Limerick's proposed pilot plant license amendment, generic TSTF-425, and the Initiative 5b methodology. • On Initiative 6, "Modification of Limiting Condition for Operation (LCO) 3.0.3, 'Actions and Completion Times'," the staff issued a safety evaluation report (SER) concerning the related CE topical report. The staff issued requests for additional information (RAIs) in November 2004 on CE TSTF-426. In the near future the CE TSTF-426 safety evaluation will be published in the Federal Register, requesting public comment, as part of the CLIIP Process. • On Initiative 7, "Non-TS Support System Impact in TS System Operability," the staff issued an SER concerning TSTF-372, "Addition of LCO 3.0.8, 'Inoperability of Snubbers'," and a safety evaluation was published in the Federal Register (November 2004) requesting public comment, as part of the CLIIP Process; comments were received and are being addressed.

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Fire Protection SA-11	<p>In February 2003, the staff held a facilitated workshop to discuss Risk-Informing the Post-Fire Safe-Shutdown electrical circuit inspections. The purpose of this workshop was to exchange information with our stakeholders concerning risk-informing the inspections. The staff also held a workshop for a number of regional inspectors in July 2004. The staff issued Regulatory Issue Summary (RIS) 2004-03 on March 2, 2004, to discuss risk-informing this process. The staff revised the inspection procedure, and held another public workshop in October 2004 to discuss how the associated circuit inspections will be risk-informed. In December 2004, a revision to RIS 2004-03, which included the risk-informed inspection process and notification that circuit inspections would resume in January 2005, was issued.</p>
Evaluation of Loss of Offsite Power Events and Station Blackout Risk SA-14	<p>NRC developed an action plan for resolving electrical grid concerns resulting from the electrical blackout in the northeast United States and Canada on August 14, 2003. In response to that action plan, RES used data from recent events involving a loss of offsite power (LOOP) to update the frequency and duration of station blackout (SBO) LOOPs. In October 2004, RES documented the results in a draft report and submitted the report for internal and external review. Also, in January 2005, RES reevaluated SBO risk (in terms of core damage frequency, or CDF) with updated SPAR models for a spectrum of plants and submitted a draft report for internal and external review.</p>
Develop a regulatory guide and guidance documents for related technical issues on PRA technical acceptability EF-2 (part 1)	<p>The NRC staff reviewed the American Nuclear Society (ANS) PRA standard for external events, and developed the agency's preliminary position, which has been documented in Appendix C to Regulatory Guide 1.200. The staff subsequently held two public meetings before issuing a draft of Appendix C for preliminary public review and comment in August 2004. The staff also conducted a public workshop on Appendix C on November 9, 2004.</p> <p>In support of the PRA standards, the staff is developing guidance and criteria regarding the treatment of uncertainties and the use of alternate PRA methods in risk-informed decision-making. In December 2004, the staff issued a draft document internally for review and comment. The staff has also held public meetings and met with the ACRS on November 16, 2004.</p>

Activity	Accomplishment
PRA Quality EF-2 (Part 2)	<p data-bbox="561 283 1398 604">On July 13, 2004, the staff issued SECY-04-0118, "Plan for the Implementation of the Commission's Phased Approach to Probabilistic Risk Assessment Quality." The objective of that phased approach is to establish appropriate and stable quality expectations and requirements for PRAs to support the NRC's risk-informed regulatory decision-making. The phased approach defines the expected PRA quality for current or anticipated applications, establishes the process through which that level of quality will be achieved, and allows the Commission to make risk-informed decisions using available methods until all of the guidance documents for PRA quality are developed and implemented.</p> <p data-bbox="561 636 1406 888">As directed the staff developed a plan which was provided to the Commission in July 2004 as SECY-04-0118. The Commission approved the plan in a staff requirements memorandum (SRM) dated October 6, 2004. In August 2004, a list of PRA applications of in the reactor area (Task 1.1 of the plan) was completed (including operational uses, use of PRA in the ROP, license amendments, and implementation of new rules). In addition, based on the role of the PRA results in the application type, in December 2004, the scope and level of detail needed to support that role (Task 1.2 of the plan) were evaluated.</p>
Develop structure for new plant licensing EF-6	<p data-bbox="561 913 1398 1199">The staff has developed and implemented a plan to develop a regulatory structure for new plant licensing. The structure includes four major activities:</p> <ol data-bbox="561 978 1365 1199" style="list-style-type: none"> 1. Development of a technology neutral framework/guideline for the regulatory structure. 2. Subsequent derivation of content of a set of technology neutral requirements. 3. Formulation of guidance for applying the framework on a technology specific basis. 4. Formulation of technology-specific regulatory guides. <p data-bbox="561 1203 1419 1480">The staff has only performed work to date on Part 1 (technology-neutral framework) and associated policy and technical issues for new plant licensing. The staff issued SECY-04-0103 (June 2004), SECY-04-0157 (August 2004), and SECY-05-0006 (January 2005). These SECY papers provided the status of the policy and technical issues, the technology-neutral framework (including a working draft), and policy and technical issues. The staff issued the working draft of the framework for public review and comment on January 25, 2005. The staff also held a public workshop on the framework from March 14, 2005 through March 16, 2005.</p>

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Post-Fire Operator Manual Actions EF-7	<p>The staff completed a draft letter report, entitled “Summary of Expert Opinion Elicitation on Determining Acceptable Time Margins for Local Operator Manual Actions in Response to Fire: Results of Initial Meeting held on April 1 and 2, 2004, and Final Meeting held on May 4 and 5, 2004.” This report supports the NRC’s rule-making activities to revise Section III.G.2 of Appendix R to 10 CFR Part 50. The proposed revision will allow licensees to rely on operator manual actions, provided that fire detection and suppression systems are installed in the fire area where the fire occurs, instead of implementing the fire barriers or 20 feet separation with no intervening combustibles that Section III.G.2 currently requires. The draft letter report documents an approach for addressing the “reliability” of operators’ manual actions by incorporating a “time margin” in the licensees’ time estimates for performing those actions. The staff has integrated the contents of this report into Draft Regulatory Guide (DG) 1136, “Guidance for Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire.”</p>
Coherence Program EF-8	<p>In response to an SRM dated February 8, 2002, the staff developed a plan for improving coherence among risk-informed activities. The goals of that plan were to develop a program demonstrating that the reactor regulations and staff processes are built on a unified safety concept and are properly integrated so that they complement each other. The staff completed a revised coherence program plan for internal management review in December 2004. In January 2005, a meeting was held to discuss the need and benefit of the Coherence Plan. Effort on this activity has been suspended due to other higher priority work - e.g., 10 CFR 50.46 rule-making.</p>

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Human Reliability Analysis (HRA) Good Practices EF-9	The staff received comments and revised NUREG-1732, "Good Practices for Implementing Human Reliability Analysis, Draft for Comment," in December 2004. That report is part of the NRC's activities to address probabilistic risk assessment (PRA) quality issues and supports the implementation of Regulatory Guide (RG) 1.200. NUREG-1732 documents widely accepted practices for performing HRA as part of a Level 1 and a limited Level 2 PRAs for internal events with the reactor at full power.
Advanced Reactors (ESBWR, ACR-700) EF-10	The staff completed its preliminary generic development for modeling passive systems in PRAs in December 2004. In support of the upcoming design certification review of the General Electric Company's Economic and Simplified Boiling Water Reactor (ESBWR), the staff is using the information learned from the generic model development to prepare a report summarizing the good practices in modeling passive systems in PRAs and identification of potential pitfalls in some modeling techniques. The generic model will also be used to develop an ESBWR-specific passive system model to provide staff with an independent tool to assess the adequacy of the ESBWR PRA portion of the design certification application. On November 1, 2004, a draft report summarizing the Advanced CANDU Reactor (ACR) 700 systems as they relate to modeling in a PRA was issued. This report identified systems which are expected to be risk-important and identified information that needs to be provided by Atomic Energy of Canada, Ltd. (AECL) before an assessment of the ACR-700 PRA could be completed.
PRA of a Dry Cask Storage System EF-14	In February 2003, the staff completed a revised draft pilot PRA, with integrated risk results, for a dry cask storage system. Experts subsequently peer-reviewed the report and the RES staff has revised the report to incorporate the peer review feedback. Additional studies were performed, as appropriate, to further risk-inform the NRC's inspection programs and other regulatory activities regarding dry cask storage. Another revised draft pilot PRA for peer review was completed in January 2005.
Multiphase Review of the Byproduct Materials Program (Implementation of Phase I and II Recommendations) EF-16	The National Materials Program (NMP) identified five pilot projects that were designated to test the "blended" option of the NMP. The revised IMC 2800 was one of the five pilot projects. On November 13, 2004, the notation vote paper (SECY-04-0215) included a description of the process to develop and implement the revised IMC 2800. The process included the NRC's Office of Nuclear Material Safety and Safeguards (NMSS), the Office of State and Tribal Programs (STP), the regional offices, and the Agreement States and the SRM was issued on January 5, 2005. In SECY-04-0215, the staff concluded that the NRC and Agreement State staff can work cooperatively to develop products under the "blended" option. However, to move the NMP closer to the Alliance option, assurance of budgeted funding to support Agreement State involvement in NMP activities would be needed and a set of implementing procedures would need to be developed. The staff recommended that NRC and the Agreement States should continue to work under the "blended" option and within the constraints of available resources. The SRM approved that staff and directed the staff to evaluate the effectiveness of implementing the pilot project work products before initiating new projects. The staff should notify the Commission if staff resource expenditures become a significant portion of the overall resources needed to maintain the NMP.