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Reactor Oversight Process (ROP)	Based on its assessment of stakeholder feedback and the results and lessons learned from annual self-assessments, the staff has developed a higher level of confidence that the ROP has met the Commission's direction to develop an oversight process that is more objective, risk-informed, understandable, and predictable. The most recent self-assessment (SECY-04-0053) concluded that the risk-informed ROP was generally effective in monitoring operating nuclear power plant activities and focusing NRC resources on significant performance issues for calendar year 2003. The staff continues improvement initiatives on performance indicators and the Significance Determination Process (SDP). SDP timeliness for inspection findings determined to be potentially greater than green continues to challenge the staff. The staff continues to work on SDP Task Action Improvement Plan initiatives to address the timeliness issue and other improvements to the SDP. Important changes were incorporated into the SDP by completion of SDPs for containment integrity, plant shutdown, fire protection, and steam generator tube integrity to provide improved methodologies to assess inspection findings. A Mitigating Systems Performance Index (MSPI) was jointly developed and piloted by the NRC staff and the industry. The NRC has decided to implement MSPI.
ROP Support - Mitigating Systems Performance Index	During FY 2004, the staff developed the Mitigating Systems Performance Index (MSPI) in support of the reactor oversight program and piloted it in 20 plants. MSPI monitors risk associated with changes in performance of selected mitigating systems, accounting for plant-specific design and performance data. The MSPI addresses known problems with the existing safety system unavailability performance indicator, and provides a measure of both system reliability and availability. The pilot program exercised the MSPI guidance, did validation and verification, and performed temporary instruction inspections. Following MSPI guidance provided by the licensees, the 20 plants participating in the pilot program represented a reasonable cross section of U.S. plant type, age and design, and reactor manufacturers. MSPI validation and verification was conducted and included a plant-by-plant performance data cross-comparison, use of SPAR models to validate importance measures, and identification and resolution of significant issues with the MSPI methodology. The MSPI temporary instruction inspections exercise was performed and included an item-by-item verification of many of the tasks performed by the licensees, although not on all systems on all plants. Overall, the MSPI results from the pilot plant submittals and from SPAR models were found to be in very good agreement.
Special Treatment Requirements	On June 30, 2004, the final rulemaking package (SECY-04-0109) for § 50.69 was sent to the Commission. The Commission approved the final rule, with some modifications, in an affirmation session on October 7, 2004.
LOCA Frequency Estimates	In SECY-04-0060, "Loss-of-Coolant Accident Break Frequencies for the Option III Risk-informed Reevaluation of 10 CFR 50.46, Appendix K to 10 CFR Part 50, and General Design Criteria (GDC) 35," dated April 13, 2004, the staff provided preliminary LOCA frequency estimates and the technical basis for these frequencies. During August 2004, the statistical basis for the updated frequencies was peer-reviewed by outside experts.

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PRA Quality	Phased Approach to Achieving Appropriate PRA Quality and Completeness: The staff has developed an action plan, SECY-04-0118, dated July 13, 2004. The objective of the phased approach to stabilizing the PRA quality expectations and requirements is to achieve an appropriate level of PRA quality for NRC's risk-informed regulatory decision making. The phased approach results in the definition of the PRA quality needed for current or anticipated applications and defines the process for achieving this quality, while allowing risk-informed decisions to be made using currently available methods until all the necessary guidance documents defining the PRA quality are developed and implemented.
PRA External Events	In December 2003, the American Nuclear Society issued a PRA standard for external events, "American National Standard External Events PRA Methodology," ANSI/ANS-58.21-2003. The staff reviewed the standard and developed a preliminary position (documented in Appendix C of RG 1.200). Two public meetings were held. A draft of Appendix C was issued in August 2004 for preliminary public review and comment.
10 CFR 50.46	On July 1, 2004, responding to SECY-04-0037, the Commission provided guidance on a number of technical and policy issues which required resolution before rulemaking could begin. Based on this guidance, the staff completed and posted on the NRC web site a conceptual basis narrative and draft rule language for a risk-informed proposed rule on large-break LOCA redefinition. The staff held a second public meeting on August 17, 2004, to obtain input for a regulatory analysis for risk-informed changes to 10 CFR 50.46.
Risk Management Technical Specifications	The staff continues to work on the risk-informed technical specification initiatives. On Initiative 1, Modified End States, the staff issued RAIs on the CE TSTF-422; on Initiative 4b, Risk-Informed Completion Times, the staff issued RAIs on the industry Risk Management Guidance Document, the CE pilot proposal, TSTF-424, and the South Texas Project pilot proposal, and briefed the ACRS Full Committee in May 2004; on Initiative 5b, Relocation of Surveillance Frequencies, the staff received the Limerick pilot plant license amendment request; on Initiative 6, Modification of LCO 3.0.3 Actions and Completion Times, the staff issued the SER on the CE topical report; and on Initiative 7, Non-TS Support System Impact in TS System Operability, the staff issued the SER for TSTF-372.
Update of NUREG/CR-6595 to Address LPSD Conditions	The staff completed NUREG/CR-6595, "An Approach for Estimating Frequencies of Various Containment Failure Modes and Bypass Events," per the staff requirements memorandum dated May 30, 2001, on SECY-01-0067, "Report on Support to the American Nuclear Society for the Development of Standard on Probabilistic Risk Assessment for Low-Power and Shutdown." The Commission directed the staff to update NUREG/CR-6595 to address low-power and shutdown (LPSD) conditions to provide support to the American Nuclear Society. The report provides a simplified method to estimate the large early release frequency (LERF) for the various containment types. Insights gained from containment studies were incorporated, and a simplified method for estimating LERF for LPSD conditions was provided. The staff incorporated public comments on the draft revised report and submitted the final report for publishing in September 2004.
Risk Assessment Standardization Project (RASP) Note: This will be proposed as a new RES operating plan activity starting in FY 2005	In FY 2004 the staff started to develop standard procedures and methods for risk assessments of inspection findings and reactor incidents via the Risk Assessment Standardization Project (RASP). RASP is developing guidelines for the analysis of internal events during power operations and developing new methods and guidelines for the SDP Phase 3, Accident Sequence Precursor, and Management Directive 8.3 analyses of events.

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Fire Protection	The staff worked with the National Fire Protection Association (NFPA) to develop an alternative performance-based, risk-informed fire protection standard for nuclear power plants. This standard, NFPA 805, was issued in January 2001. The staff published a proposed rule on November 1, 2002. Public comment ended January 15, 2003. Comment resolution has been developed with OGC and a <i>Federal Register</i> notice package prepared for concurrence. The ACRS full committee was briefed on the final rule December 4, 2003. A final rule was published June 16, 2004, and became effective on July 16, 2004.
Probabilistic Risk Assessment of a Dry Cask Storage System	The staff completed a revised draft pilot PRA with integrated risk results (February 2003). A peer review of the report has been completed and RES is updating it. Additional studies will be performed as appropriate to help risk-inform NRC's inspection programs and other regulatory activities for dry cask storage.
Integrated Risk-Informing Guidance Documents for NMSS	The staff has integrated various stand-alone risk-informing guidance documents developed from previous efforts into a single unified set of guidance documents. The guidance documents provide a systematic risk-informed decisionmaking process and associated draft risk guidelines that can be used by NMSS staffers in their daily work. Following the April 2004 briefing of the ACNW on the progress of risk-informing NMSS activities, the staff received constructive feedback on several key technical areas. The staff has incorporated the ACNW recommendations into the version of the latest guidance document.
Multiphase Review of the Byproduct Materials Program (Implementation of Phase I and II Recommendations)	The staff evaluated 13 recommendations to improve effectiveness and efficiency. Action was completed for four of the recommendations (i.e., promoting the use of the NUREG-1556 series by licensees, providing guidance to staff for the technical assistance request (TAR) process, revising the event evaluation policy (P&P letter 1-57), and promoting broader use of flexiplace by the staff). Further actions were not needed for three of the recommendations (i.e., delegation of Severity Level III cases to the regional offices, revision of allegation referral procedures for the States and licensees, and periodic counterpart meetings for regional and IMNS staff). Six recommendations were tested under Temporary Instruction 2800/033, Revised Materials Inspection Program, and have been incorporated into IMC 2800.
Fuel Cycle Integrated Safety Analyses	In September 2002, the FCSS staff published the Standard Review Plan to implement the requirements of 10 CFR Part 70 Subpart H. This guidance document is intended to assist the licensees in conducting integrated safety assessments (ISAs) and the staff in reviewing ISA documentation. In September 2003 and July 2004, FCSS held ISA workshops with industry and the public to discuss implementation of the Subpart H requirements. During March to June 2004, FCSS also held six internal staff workshops to discuss ISA requirements, implementation, and issues. Interim staff guidance (ISG) is being prepared for nine areas. Industry and public comments were requested on three draft ISGs in July 2004. The staff began conducting ISA summary reviews in FY 2004 for individual amendment requests, for certain existing and new processes, and for a new centrifuge enrichment license application in FY 2004. The staff anticipates conducting reviews of site-wide ISA summaries in FY 2005 and FY 2006 for six operating uranium fuel fabrication facilities.
High-level Waste Program	The staff completed and sent to the Commission the final "Risk Insights Baseline Report" in April 2004. The staff continued to use the Risk Insights Baseline to focus its independent assessments of DOE's pre-licensing program on the more risk-significant issues. The staff has increased the use of risk information in the issue resolution process by explicitly considering the risk insights in its review of DOE's agreement submittals. In March 2004, the Center for Nuclear Waste Regulatory Analysis completed and transmitted to the staff the "System-Level Performance Assessment of the Proposed Repository at Yucca Mountain Using the TPA Version 4.1 Code." This assessment provides the quantitative basis for many of the insights in the Risk Insights Baseline.

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Implement Integrated Decommissioning Program Improvement Plan	The staff completed the development of an integrated plan for implementing the recommendations in the License Termination Rule analysis (SECY-03-0069) and the Decommissioning Program Evaluation. The plan contains specific staff activities and schedules to complete the approved recommendations, some of which will further risk-inform the Decommissioning Program. These include (1) applying a risk-informed, graded approach for using institutional controls to restrict future land use at a site, (2) expanding the use of more realistic exposure scenarios using a risk-informed approach, (3) risk-ranking operating sites and activities to focus NRC inspections and licensee monitoring and reporting and to avoid future "legacy" sites, (4) implementing the consolidated decommissioning guidance, and (5) defining and managing all decommissioning sites using a graded approach to prioritize, allocate, and track licensing and inspection resources, based on site-specific insights and decommissioning challenges.
Advanced Reactors - ACR-700	The staff has completed the initial tool development for ACR-700 to support other areas of research, such as thermal/hydraulics (success criteria) and severe accident progression (accident sequences and source term identification). In support of NRR's pre-application review of the ACR-700 PRA, RES has issued to NRR a final report summarizing the strengths and weaknesses of Atomic Energy of Canada Ltd.'s PRA methodology for the CANDU 6, CANDU 9, and ACR-700. A draft report on the ACR-700 initiating events was prepared and forwarded to NRR.
Industry Trends Support	During FY 2004 RES continued to support the NRC's industry trends program by analyzing and trending operating experience data. This included updating trends for initiating events, component and systems reliabilities, common-cause failures, and fire events; providing this information on the RES internal Web site; and preparing to make this information available on the RES public Web site. This activity is significant because it makes the information available for use by NRC analysts in a timely manner. In support of the NRC's Action Plan for Resolving Electrical Grid Concerns resulting from the August 14, 2003, blackout in the Northeast, RES started to update Station Blackout (SBO) Loss Of Offsite Power frequency and duration and to reevaluate SBO risk with updated Standard Plant Analysis R models for a spectrum of plants.
Reactor Performance Data Collection Program	During FY 2004 RES continued to develop and maintain operating experience database systems. The databases include the Integrated Data Collection and Coding System (IDCCS), the Reliability and Availability Data System (RADS), the Common-Cause Failure Database, the Fire Events Database, and the Accident Sequence Precursor (ASP) Events Database. IDCCS became fully operational after a 1 year trial test and includes the Licensee Event Report (LER) Search System for searching and retrieving LERs by selected fields and text searches. The databases are significant because they are used to provide the basic data for estimating PRA parameters for input into NRC Standardized Plant Analysis Risk (SPAR) models, to support the industry trends program, to guide the development of risk-informed inspection guidance, and for development of enhanced performance indicators for the Reactor Oversight Process.
Accident Sequence Precursor (ASP) Program	During FY2004 the staff continued to evaluate the risk associated with operational events and/or conditions 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 for trending nuclear plant core damage risk. Significant issues that ASP techniques were used to analyze were the barrier integrity and mitigating systems issues at Davis-Besse and LOOP events resulting from the August 14, 2003, blackout in the Northeast.

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SPAR Model Development Program	<p>During FY 2004 the staff continued to develop plant-specific Standardized Plant Analysis Risk (SPAR) models, which are significant because they permit NRC staff analysts to independently evaluate the risk significance of inspection findings in SDP Phase 3 analyses, evaluate risk associated with operational events and conditions in the ASP Program, improve the quality of PRAs, perform analyses in support of generic safety issue resolution (e.g., GSI-189 and GSI-191), perform analyses in support of the staff's risk-informed review of license amendments, and verify the Mitigating Systems Performance Index (MSPI). A complete set of 72 models for full-power operation (Level 1, Revision 3) was made available for use by NRC staff analysts, and a preliminary LOOP/SBO module was developed in support of the Grid Action Plan task of calculating SBO risk (core damage frequency) with updated SPAR models for a spectrum of plants. Development of SPAR models for low-power and shutdown (LPSD) operations continued, including onsite Quality Assurance reviews, work on human reliability analysis methodology, and updating operational data used to model shutdown. Development of SPAR models for calculating large early release frequency continued with the issuance of the LERF SPAR model for the first lead plant (a PWR with large dry containment) for licensee review and the preliminary development of the model for the second lead plant (a BWR/4 with Mark I containment). Work was started on developing SPAR models for external events (fires, floods, seismic events, high winds, etc.) by completing discussions with key users regarding the need for the analysis tool and starting a feasibility study for adapting SPAR models to analyze external events. Work was also started on development of a user-friendly, input/output front-end interface for the SAPHIRE suite of PRA computer codes. The interface will make it easier for analysts to perform analyses of risk by conducting a user survey, issuing specifications to users, and completing a development plan and associated schedule.</p>
HRA Good Practices	<p>The staff completed a draft version of the Human Reliability Analysis (HRA) Good Practices. This provided a lower level guidance than the guidance in the ASME PRA standards on HRA. This document was made available for public review and comment in August 2004.</p>
Post-Fire Operator Manual Actions	<p>The staff completed a draft letter report, "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 rulemaking activities for revising Section III.G.2 of Appendix R to 10 CFR Part 50. The proposed revision of Section III.G.2 will allow licensees to rely on local manual actions, including detection and suppression, instead of implementing the fire barriers currently required in Section III.G.2. The draft letter report documents an approach for addressing the issue of "reliability" for the manual actions by incorporating a "time margin" in the licensee's time estimates for performing the human actions. The contents of this report are being incorporated in the Draft Regulatory Guide DG-1136, "Guidance for Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire."</p>