

Reactor Oversight Process Program Area Evaluations

In accordance with Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program," dated March 23, 2009, the U.S. Nuclear Regulatory Commission (NRC) staff evaluated all four key program areas of the Reactor Oversight Process (ROP). The four areas are the performance indicator (PI) program, the inspection program, the significance determination process (SDP), and the assessment program. The annual ROP performance metric report provides data and a staff analysis for all of the program area metrics (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13063A009). The results of the staff's review are provided below.

Performance Indicator Program

The PI program continued to provide insights to help ensure plant safety and security. The staff continued to improve PI program guidance and implementation. The staff revised Inspection Procedure 71151, "Performance Indicator Verification," to clarify guidance for documenting inspection results. The NRC staff is investigating potential updates to the public PI Web site to support openness and transparency of the PI program. The staff continues to discuss PI validity during and following extended shutdown with industry representatives at public ROP Working Group meetings. Industry has drafted PI validity guidance, which the staff is currently reviewing. The staff will revise ROP inspection manual chapters and procedures, as necessary, when the approach and infrastructure for determining PI validity are finalized. The staff and industry also will explore any potential impacts to the safety system functional failure PI resulting from changes to NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73." The staff is currently evaluating the appropriateness of existing PIs and the related thresholds for new reactors as directed in staff requirements memorandum (SRM) for SECY-12-0081, "Risk-Informed Regulatory Framework for New Reactors."

In 2008, the staff discontinued two of three security PIs in the Security Cornerstone, noting that reasonable confidence exists through the conduct of the NRC Baseline Inspection Program (BIP) that regulatory oversight and performance assessment of power reactor licensees will remain effective and efficient, ensuring safe and secure operations. To date, the staff has not identified the need for additional security PIs. The Office of Nuclear Security and Incident Response (NSIR) will continue evaluating the effective and efficient use of PIs, along with the inspection program for the Security Cornerstone. If the staff identifies potential additional PIs, future pilot PI assessments may be conducted in coordination with the industry and other key stakeholders.

The staff continued efforts to improve and clarify emergency preparedness (EP) PIs and maintain EP baseline inspection procedures. The NRC revised the alert and notification system reliability PI guidance for sirens to allow sirens intentionally removed from service in areas deemed uninhabitable by State or local agencies as a result of a natural disaster to not be counted as siren failures. The staff and industry are currently working to revise the drill and exercise performance (DEP) PI to clarify the difference between the offsite notification timeliness criteria for the PI and offsite notification criteria for regulatory compliance.

The ROP met all but one of its PI program metrics for calendar year (CY) 2012. The timely PI data reporting and dissemination metric (PI-5) was not met because of a late quarterly posting to the external Web site. The late posting was caused by a miscommunication between the

Performance Assessment Branch (IPAB) and the Office of Nuclear Reactor Regulation (NRR) Web Services staff. The staff has implemented internal actions to ensure the timely posting and dissemination of PI data. The majority of internal ROP survey respondents indicated that the PI program provided insights to help ensure plant safety and security, provided an appropriate overlap with the inspection program, was clearly defined, and contributed to the identification of performance outliers. There was a decline in responses to the PI understandability metric. No major changes to Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," have occurred since the last internal survey. A new revision to NEI 99-02 should occur in early 2013. Some survey respondents expressed concerns about the PI performance band thresholds, the NRC's enforcement response to PI reporting violations, the effectiveness of the frequently asked questions (FAQ) process, the complexity of indicators within the Mitigating Systems Cornerstone, and the potential need for new PIs. The staff will evaluate this feedback and consolidate all responses to the survey comments in a separate document.

Inspection Program

NRC inspectors independently verified that plants were operated safely and securely. All inspection program metrics were met, including the completion of the required baseline inspection program for CY 2012. The staff made changes to selected ROP inspection procedures (IPs) based on feedback from the regions. The staff continued to integrate operating experience information into the baseline inspection program.

The staff will review each baseline inspection procedure for CY 2013 in support of the ROP enhancement initiative review. The purpose of the ROP enhancement project is to evaluate whether the baseline inspection program remains relevant for the current environment, eliminate redundant or unnecessary inspection areas, maximize efficient and effective use of resources, and incorporate flexibility in program implementation, where appropriate. This project will validate the basic philosophy and key principles of the baseline inspection program while allowing changes where necessary. This in-depth baseline inspection program effectiveness review encompasses all baseline inspection procedures in all ROP cornerstones (Initiating Events, Mitigation Systems, Barrier Integrity, Occupational Radiation Safety, Public Radiation Safety, Emergency Preparedness, and Security). The staff plans to make changes to the IPs during summer and fall of 2013, with the goal of the revised IPs being effective in CY 2014.

Additionally, as part of the ROP Reliability Initiatives, regional and NRR inspection staff completed an internal review of the Problem Identification and Resolution (PI&R) inspection program to assess its effectiveness in several areas. Overall, the staff concluded that the PI&R inspection program is being effectively implemented and offered several recommendations to improve the reliability and effectiveness of the program. These recommendations are currently being evaluated in concert with the ROP enhancement project.

The staff developed and issued Temporary Inspection (TI) 2515/186, "Inspection of Procedures and Processes for Responding to Potential Aircraft Threats," TI 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3—Flooding Walkdowns," and TI 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 – Seismic Walkdowns." The flooding and seismic walkdowns were performed by licensees at all sites in response to a letter from the NRC to licensees entitled, "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* [10 CFR] 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3 of the

Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident,” dated March 12, 2012. The TIs provided guidance to inspectors on how to inspect licensee efforts as well as conduct independent inspector walkdowns.

The staff revised several existing EP inspection procedures to reflect the EP rulemaking as described in SECY-11-0053, “Final Rule: Enhancements to Emergency Preparedness Regulations (10 CFR Part 50 and 10 CFR Part 52) (RIN-3150-A110).” The staff also created two new EP procedures: IP 71114.07, “Exercise Evaluation – Hostile Action Based Event,” and IP 71114.08, “Exercise Evaluation – Scenario Review,” to support the EP rule requirements.

NRC staff plans to transition the Kewaunee and Crystal River plants from the ROP to the decommissioning inspection program during CY 2013. The inspection programs for these facilities will be adjusted as necessary to address their transition to decommissioned status. Additionally, resident staffing for both Kewaunee and Crystal River will be reduced from the current staffing policy to no residents being assigned to these sites. Currently assigned resident inspectors at the Kewaunee and Crystal River plants will be reassigned to other sites or to the regional office. Additionally, during CY 2013, the staff is completing its transition to a Unique Site Budget Model at Indian Point. The staffing will change from two senior residents to one senior resident inspector. These units were previously treated as two single-unit sites for resident inspector staffing purposes.

The staff developed and implemented training in CY 2012 to ensure that the inspectors remain efficient and effective in their inspection activities. Specifically, inspectors completed refresher training on IMC 0620, “Inspection Documents and Records,” and training to implement the TI 2515/187 and TI 2515/188 inspections discussed above. The staff added safety culture training to existing courses and issued safety culture assessor qualification guidance. In addition, NSIR staff conducted two cyber-security training courses and issued a cyber-security TI. The NSIR staff is also in the process of issuing a qualification standard for cyber-security inspectors.

The responses to the internal ROP survey were mixed. Although survey respondents’ perception of the inspection program still remained relatively high and was generally positive, several areas for improvement were noted. Some respondents commented on the need to allow additional inspection samples in areas where licensees’ programs have weaknesses. Some stakeholders suggested improving the clarity of some baseline inspection procedures and reducing over-reliance on licensees’ corrective action programs to resolve issues of very low safety significance (Green). The staff will respond to these and other comments in the consolidated response to the survey.

Significance Determination Process

The SDP continues to be an effective tool for determining the safety and security significance of inspection findings. In CY 2012, the staff implemented several improvements to the SDP guidance and made significant progress on other initiatives. All SDP performance metrics were met for CY 2012, including the SDP timeliness metric for a seventh consecutive year.

In July 2012, the staff issued substantial revisions to SDP guidance documents that govern the significance determination of inspection findings during power operations. IMC 0609, Appendix A, “Significance Determination Process for At-Power Findings,” was revised to transition from

using the pre-solved tables and site-specific, risk-informed notebooks to Systems Analysis Programs for Hands-On Integrated Reliability Evaluations (SAPHIRE) and the site-specific Standardized Plant Analysis Risk (SPAR) models. As part of this new transition, two new tools were developed to support the inspection staff. First, the SDP workspace, a module within the SAPHIRE program, is a tool that allows inspectors to roughly estimate the risk significance of a degraded condition. Secondly, the Plant Risk Information eBook (PRIB), an automatically generated file from the site-specific SPAR model, provides inspectors with a variety of risk insights to support inspection planning. The regional inspection staff was trained in the use of the SDP workspace and PRIB in June 2012.

NRR staff made significant improvements to IMC 0609, Appendix F, "Fire Protection Significance Determination Process," to expand the qualitative screening approach to very low risk fire issues. In this process, more qualitative screening questions were added, and there are now screening questions for each of the fire issue categories. The initial quantitative screening section also has been updated and expanded with initiating event frequency values from NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities." The NRC is scheduled to issue the revised IMC 0609, Appendix F, in the summer of 2013.

A project team was created in September 2012 consisting of headquarters staff from NRR and the Office of the Executive Director for Operations, as well as all four regions, to review SDP resource and timeliness data and identify efficiencies to improve the overall effectiveness of the process. The project is structured and implemented using a business process improvement approach that leverages the principles of Lean Six Sigma. Successful completion of the project will balance the goal of having reliable SDP outcomes against the need for efficient and timely regulatory decision-making. The project team is scheduled to provide conclusions and recommendations to senior level management by summer 2013.

The staff continued to develop and refine a new SDP for spent fuel pool (SFP) findings. The draft SDP focuses on findings involving SFP cooling and water inventory, fuel handling errors, and maintenance of subcritical conditions. The draft SFP guidance documents, IMC 0609, Appendix N, "Spent Fuel Pool Significance Determination Process," and IMC 0308, Attachment 3, Appendix N, "Technical Basis for the Spent Fuel Pool Significance Determination Process," were distributed to internal stakeholders in May 2012 for a formal 30-day review and comment period. Since several of the comments questioned the bases for the proposed thresholds, NRR and the Office of Research (RES) are working together to address the comments and revise the guidance as necessary.

The staff continued to evaluate the best approach for estimating the safety significance of licensed operator performance issues. The NRC considered a new SDP that focused on licensed operator performance; however, the staff believes that the most effective approach is to revise IMC 0609, Appendix M, "Significance Determination Process using Qualitative Criteria," to include a new table of qualitative attributes, based on defense-in-depth and safety margin principles, that apply to licensed operator performance issues. The proposed draft to IMC 0609, Appendix M, will be issued for review and comment in CY 2013.

NSIR staff, with (1) support from NRR, NRO, and all four regions; and (2) input from industry and the Federal Energy Regulatory Commission, developed a cyber-security SDP for findings identified in cyber-security inspections. The cyber-security SDP supports the significance determination of inspection findings associated with the licensee's protection of emergency

preparedness, physical protection, and reactor safety functions against cyber attacks. In addition, NSIR staff made significant changes to IMC 0609, "Significance Determination Process," Appendix E, "Physical Protection Significance Determination Process for Power Reactors," Part II, "Force-on-Force Significance Determination Process." After a multiyear effort to enhance the force-on-force (FOF) SDP, which began in September 2008 and involved both internal and external stakeholder interactions, the staff completed the revision to the FOF SDP in July 2012.

NSIR staff revised IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," and the associated technical basis document, IMC 0609, Attachment 3, Appendix B, "Technical Basis for the Emergency Preparedness Significance Determination Process." These revisions incorporated changes to reflect the new EP rule, a new assessment protocol for 10 CFR 50.47(b)(4) findings, a basis for treatment of ineffective emergency action levels and over-classification of an emergency classification, and a newly defined term, "degraded planning standard function."

The responses to the internal survey indicated that the SDP results in an appropriate regulatory response to performance issues. Of the 13 survey items related to the SDP, 11 were stable in comparison to previous years, and two decreased by more than 10 percent from the previous internal survey in CY 2010. There was a noticeable decline in stakeholder agreement that SDP training is effective in understanding and using the SDPs. The staff is currently identifying specific training deficiencies in the use and understanding of the SDP guidance and will revise or develop new training tools as appropriate. In addition, there was a noticeable decline in stakeholder agreement on the correct use of the SDP by managers to make risk-informed decisions. Staff and management will be encouraged to attend the training course "Assessing the Adequacy of Models for Risk-Informed Decisions (P-109)" to improve awareness of the factors that contribute to uncertainty in predictive models and the need to identify, characterize, and communicate the uncertainties to the risk-informed decision-maker.

Assessment Program

Staff implementation of the assessment program ensured that the staff and licensees took appropriate actions to address performance issues in CY 2012, commensurate with their safety significance. In CY 2012, the staff successfully reintegrated the Security Cornerstone into the assessment program governed by IMC 0305, "Operating Reactor Assessment Program." Five of eight of the assessment metrics met their established criteria in CY 2012, and the responses to the internal ROP survey were generally positive.

The staff opened two new deviations in CY 2012: one at Seabrook and the other at Palisades nuclear plant. Both of these deviations were requested to provide additional inspection resources to address issues that were not directly related to the licensee's performance in the ROP Action Matrix. The staff evaluated these deviations and noted that IMC 2515, "Light-Water Reactor Inspection Program -- Operations Phase," dated November 19, 2012, allows for additional focused inspection for special or infrequently performed activities. However, there is no provision for making these adjustments transparent to the public. This aspect of using deviations to obtain program office agreement on use of additional resources has been an important tool in communicating the purpose of the deviation to the public. As a result, the staff has generated a feedback form to augment applicable program guidance to allow the regions to publicly document the application of additional inspection resources within the baseline

inspection program and thereby reserve the Action Matrix deviation process solely for regulatory action that is inconsistent with the range of actions described in the pertinent column of the Action Matrix. Feedback forms are the mechanism staff uses to track desired changes to program guidance pending regularly scheduled revisions to the documents.

The staff completed its effort to reintegrate the Security Cornerstone into the assessment program as described in SECY-11-0073, "Staff Proposal to Reintegrate Security into the Action Matrix of the Reactor Oversight Process Assessment Program." As required by the SRM to SECY-11-0073 dated July 20, 2011, the staff closely monitored this reintegration to ensure reliable regulatory response outcomes and effectively interfaced with internal and external stakeholders to ensure those outcomes were appropriate. The staff issued a revised IMC 0305 on June 16, 2012, and it was effective July 1, 2012. The staff updated the ROP web site to reflect this reintegration on August 6, 2012. Before the web site update, the staff issued publicly available letters to licensees with outstanding security findings, explaining their apparent shift in the Action Matrix; and a press release accompanied the issuance of these letters. The staff conducted the 2012 mid-cycle performance reviews using the new IMC 0305 guidance. The staff continues to perform integrated assessments of licensee's performance while ensuring that security-related information is not publicly released.

During CY 2012, Browns Ferry 1 remained in the Multiple/Repetitive Degraded Cornerstone Column (Column 4), and Fort Calhoun remained under the oversight process of IMC 0350, "Oversight of Reactor Facilities in a Shutdown Condition Due to Significant Performance and/or Operational Concerns," dated December 15, 2006. The staff will discuss their performance status during the Agency Action Review Meeting (AARM) in April 2013 and the subsequent Commission meeting on the results of the AARM, and will continue to monitor licensee performance at these two sites in CY 2013.

The staff continues to be actively engaged with the Institute for Nuclear Power Operations (INPO), NEI, and external stakeholders in developing a common safety culture language. This initiative will better align the industry's and the NRC's language to allow for a shared characterization of licensee performance. A series of public workshops were held in CY 2012 to work toward finalizing the language. Once this language has been finalized and documented, the NRC will incorporate the new terminology into applicable ROP inspection manual chapters and procedures and revise inspector training accordingly. In 2012, the staff incorporated safety culture assessor qualification guidance into IMC 1245 to prepare staff to review and conduct safety culture assessments, such as those required by IP 95002 and IP 95003. In addition, the staff has been working with the NRC Technical Training Center to enhance and update existing training courses with information about safety culture and how to assess it.

Based on the results from the 2012 internal survey, the perception of the assessment program was generally positive. Most respondents indicated that the assessment program is objective and predictable, and the information contained in the assessment reports is relevant and useful. Several respondents noted that assessment language could be made clearer, which affected metric AS-6 as discussed below.

Three of eight of the assessment metrics did not meet their established criteria in CY 2012. Metric AS-4 was missed based on an increase of the average number of days from issuance of the assessment letter to the completion of the supplemental inspection. However, delays in completing supplemental inspections often are a result of licensees not completing the

necessary corrective actions and, thus, not being ready for inspection in a timely manner. The staff had identified supplemental inspection timeliness as a potential improvement area to ensure a timely regulatory response to declines in performance, and will be exploring options as part of the ROP enhancement effort. Additionally, Metric AS-6 was missed because internal stakeholders' perceptions that assessment letters are written in plain language decreased across several of the survey questions. The staff intends to leverage the newly formed Operating Reactor Assessment Working Group to examine ways to make assessment letters clearer. Lastly, Metric AS-7 was missed because the number of plants that moved more than one column in the Action Matrix increased to six. The staff had previously questioned the basis of this metric and revised it to more accurately reflect the ROP's goal to provide adequate margin in the assessment of licensee performance so that appropriate licensee and NRC actions are taken before unacceptable performance occurs. As such, the new metric will measure the number of plants that move from Column 1 or 2 to Column 5 or IMC 0350. The metric criterion is for no instances to occur in which significant degradations in plant performance cause a prompt change in Agency response. This will ensure staff focuses on situations in which earlier indications existed that should have been acted upon, but were not, and not on situations where a plant is issued a significant inspection finding that is not indicative of a licensee programmatic breakdown. Given this criteria, the new metric would have been met using 2012 data. The revised AS-7 metric will be used for the CY 2013 metric analysis.