ROP Program Area Evaluations

The staff of the U.S. Nuclear Regulatory Commission (NRC) performed program evaluations in each of the four key program areas of the Reactor Oversight Process (ROP), including performance indicators (PIs), the inspection program, the significance determination process (SDP), and the assessment program. The staff used self-assessment metrics, internal and external stakeholder feedback, and other information to provide insights regarding the effectiveness of the ROP in meeting its goals and intended outcomes as described in Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program." The goals of the ROP include fulfilling the regulatory principles of being predictable, understandable, objective, and risk-informed, and supporting the NRC's strategic goals of ensuring safety, openness, and effectiveness.

Based on the metric results, stakeholder insights, and other lessons learned through ongoing program monitoring, the staff identified certain issues and actions in each of the four key program areas. Enclosure 2 provides a summary of the status of these ongoing issues and actions, which are discussed in detail below. The annual ROP performance metric report, available through the Agencywide Documents Access and Management System (ADAMS) provides the data and staff analysis for each of the program area metrics (reference ADAMS Accession No. ML070720085). Enclosure 3, as well as applicable portions of the ROP performance metric report, provides more detail on the results and analysis of the internal and external stakeholder surveys.

Performance Indicator Program

The staff and many stakeholders remain concerned that the current set of PIs and thresholds do not provide adequate information to identify outliers and detect declining plant performance. The staff had concluded in the CY 2004 self-assessment (SECY-05-0070) that the PI Program had not contributed to the early identification of poorly performing plants to the degree envisioned by the staff. As a result, in a staff requirements memorandum (SRM) dated June 30, 2005, the Commission directed the staff to consider further improvements to PIs, in addition to efforts described in the ROP self-assessment, to give the NRC good indicators of performance in order to focus inspection resources. As committed to in SECY-06-0074, "Reactor Oversight Process Self-Assessment for Calendar Year 2005," and reemphasized by the Commission in an SRM dated June 14, 2006, the staff continued to work with stakeholders to improve the PI program in order to better identify those plants with declining safety performance. As a result, the staff is in the process of reviewing and revising several of the indicators as noted below.

The Mitigating Systems Performance Index (MSPI) was implemented as part of the ROP on April 1, 2006. As directed by the Commission in an SRM dated June 30, 2005, the staff has ensured that MSPI is as transparent as possible. The staff has continued to discuss MSPI during the routine public meetings and address the complexity inherent in MSPI. To further ensure transparency, the staff worked with industry to clarify and revise the guidance in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline;" trained regional inspection staff in the inspection guidance of the MSPI Temporary Instruction (TI); and developed a Web page to provide guidance and inspection-related documents, white

papers, and issues of public interest. The staff also issued a press release and Regulatory Issue Summary (RIS) 2006-07 to coincide with the April 2006 implementation of MSPI.

Since inception, the industry has reported three quarters of the MSPI data. Tabulation of industry MSPI data revealed an increase in the number of white PIs reported with MSPI when compared to its predecessor, the Safety System Unavailability (SSU) PI. The increased number of plants that crossed MSPI performance thresholds could be due to various reasons, and it is too early to draw conclusions on the MSPI impact and performance. The increase may result from simple differences between the two sets of indicators, not attributable to an actual change in plant performance, or the different technical guidance for MSPI and SSU.

A preliminary assessment of the effectiveness of MSPI has confirmed that the definition of component failures and the use of probabilistic risk assessment (PRA) are critical elements of MSPI. Additional guidance is needed in these areas to stabilize the technical guidance. The staff has recently completed TI 2515/169, "Mitigating Systems Performance Index Verification," which was conducted at all operating reactor facilities. Industry and the staff plan to prepare white papers to address specific issues as a result of lessons learned from the TI. These papers will address the continuing challenges in managing planned and unplanned unavailability, PRA updates, and actual engineered safety feature (ESF) demands. The staff plans to monitor MSPI over the course of CY 2007, continue to engage industry through the monthly ROP public meetings, and make any necessary changes to the MSPI based on lessons learned.

Late in CY 2005, the staff convened a working group composed of three representatives from the industry and three from the NRC to address the industry's concern with the Unplanned Scrams with Loss of Normal Heat Removal (SwLONHR) PI. The working group developed and defined a replacement PI entitled Unplanned Scrams with Complications (USwC). In CY 2006, the working group collected historical data to establish a green-white threshold. (There are no higher thresholds because this PI is not risk-informed.) A table top exercise was then completed to validate the PI. The staff expects to replace the SwLONHR PI with the USwC PI beginning July 1, 2007.

During development of the ROP, the industry proposed the reactor coolant system (RCS) leakage PI. The RCS leakage PI would measure identified leakage with a green-white threshold of 50 percent of the allowable limit of the technical specifications (TS) and a white-yellow threshold of 100 percent of the allowable limit. There is no yellow-red limit since plants are required to shut down if RCS leakage exceeds the allowable limit. In response to the Davis-Besse event, the staff was tasked to evaluate certain PI improvements for RCS leakage. The staff convened an RCS leakage working group composed of three utility representatives and three NRC staff. The working group first agreed upon the need to monitor unidentified leakage rather than identified leakage. For a few months, the staff collected leakage data and explored options for the new RCS leakage PI. Shortly after that effort began, the Westinghouse Owners Group (WOG) began a similar project. The working group decided to hold its efforts and wait for the results of the WOG program. The results of the WOG effort have recently been released, and the staff has reconvened the working group. Using the data developed by the WOG, the staff will attempt to develop a new and improved RCS leakage PI in CY 2007 and CY 2008.

As part of the development of the ROP in the late 1990's, all of the proposed PIs were compared against the then existing measure of licensee performance, the Systematic Assessment of Licensee Performance, or SALP. By this measure, the Safety System Functional Failure (SSFF) PI was the best indicator of declining licensee performance. The SSFF PI counts all events or conditions that could have prevented the fulfillment of the safety function of structures or systems needed to shut down the reactor, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. It captured all 14 of the SALP watch list plants, 4 of the 7 declining trend plants, 2 of the 6 average plants, and none of the superior or excellent plants. It is also considered to be a leading indicator because it counts potential as well as actual failures of safety systems as a measure of how well licensees maintain their most risk-significant equipment. However, since the inception of the ROP, SSFF reporting has declined over 70% which has made the PI less effective in identifying declining performance. The staff has recently begun evaluating the SSFF PI to review why reporting is significantly down. The staff will coordinate with the industry in CY 2007 to make possible improvements to the SSFF PI.

The Emergency Preparedness (EP) cornerstone comprises three PIs: Drill/Exercise Performance (DEP), Drill Participation (DP), and Alert and Notification System (ANS). The staff has discovered situations in which the DEP PI can mask problems in one or more of its components, which include classification, notification, and protective action recommendations. The DEP PI is measured by a combined success rate of all three components. Since licensees are not required to perform a specific number (or minimum) of drills for each of the three components, this could result in inadequate indication of declining or deficient performance. Many stakeholders also believe that the ANS PI provides inadequate indication of declining or deficient performance. The staff will discuss these PI concerns with the industry during ROP monthly meetings in CY 2007.

As discussed in SECY-06-0074, the staff continues to believe that NEI 99-02, the PI guidance document, can be improved. This document has been revised 4 times since ROP implementation, mostly to incorporate new guidance in response to more than 425 frequently asked questions (FAQs) from licensees. The lack of clear, concise guidance has contributed to timeliness and efficiency problems, which were often due to differing interpretations of the PI guidance document by the staff and industry. Clearer and more concise guidance would significantly reduce the differing interpretations (e.g., the meaning of words, phrases, and paragraphs) and would expedite the resolution of FAQs. To address these concerns, the staff will work with industry to review each PI definition and supporting information in NEI 99-02.

The responses to the internal and external survey indicated that stakeholders have varying views on the efficiency and effectiveness of the PI program. The industry generally believed that the PI program was working well, while the public and many internal stakeholders remained concerned that the PIs do not provide an adequate indication of declining safety performance and do not effectively identify performance outliers. As a result of the internal and external survey responses, two of the PI self-assessment metrics were not met: whether the PI program provides useful insights to help ensure plant safety (PI-4) and whether the PI program identifies performance outliers in an objective and predictable manner (PI-8). The other six PI self-assessment metrics met their criteria and staff expectations for CY 2006.

Although the PI program provides objective indicators regarding plant performance and has focused licensee attention in some cases, the staff and some public stakeholders remain

concerned with the capability of the current PIs to contribute to the identification of declining performance. As a result, the staff is in the process of improving those PIs discussed above, and continues to work with the industry to revise and/or introduce other PIs to improve the program's effectiveness in contributing to the identification of declining performance.

Inspection Program

The inspection program met all of its established goals during CY 2006 while continuing to incorporate program improvements. The staff's annual evaluation of the inspection program indicated that the inspection program verified that plants were operated safely, appropriately identified performance issues, and ensured the adequacy of licensee corrective actions to address the noted performance issues. As committed to in SECY-06-0074, the staff refined and formalized the process to realign inspection resources to include consideration of industry performance. This ROP realignment process, a biennial detailed analysis of the scope and level of effort of each baseline inspection procedure, has been incorporated into the formal self-assessment program as Appendix B to IMC 0307. The staff plans to perform the second ROP realignment effort in CY 2007, and any changes resulting from this review will be reflected in the baseline inspection program for CY 2008.

All four regions completed their baseline inspections in CY 2006 in accordance with IMC 2515, "Light-Water Reactor Inspection Program — Operations Phase." Each region documented its CY 2006 completion of the baseline inspection program in a memorandum. These memoranda can be found in ADAMS under ML070430041 (Region I), ML070330047 (Region II), ML070470661 (Region III), and ML070470659 (Region IV).

In CY 2006, the staff made substantive changes to numerous inspection program documents to incorporate safety culture improvements, including IMC 0612, "Power Reactor Inspection Reports," and its appendices; IMC 0305, "Operating Reactor Assessment Program;" Inspection Procedure (IP) 71152, "Identification and Resolution of Problems;" all three supplemental inspection procedures; and other inspection procedures as noted in Change Notice 06-015 dated June 22, 2006. The staff plans to review the effectiveness of these changes during CY 2007 and report the results in the annual ROP Self-Assessment Commission paper.

Component Design Bases Inspections (CDBIs) were developed to improve the effectiveness of NRC design/engineering inspections based on lessons learned from past inspections and events. The intent of these inspections, as described in IP 71111.21, is to focus on risk-significant, low-margin components and operator actions that could potentially affect risk-significant structures, systems, and components. Thirty-seven CDBIs have been completed or are underway, and 29 remain for the current ROP cycle. There have been 89 Green inspection findings to date. These CDBI findings are being evaluated to identify generic issues and areas of emphasis for future ROP inspections. In addition, the staff plans to evaluate potential revisions to the scope and frequency of the CDBI during CY 2007.

The staff completed the remaining two effectiveness reviews of the Davis-Besse Lessons Learned Task Force (DBLLTF) action items in CY 2006. The staff found that the changes made to Appendix D to IMC 2515 were effective for assessing potential adverse trends and action levels in response to increasing levels of reactor coolant system (RCS) unidentified leakage. The staff also found that the results of TI 2515/150, "Reactor Pressure Vessel Head

and Vessel Head Penetration Nozzles," and the revised IP 71111.08, "Inservice Inspection Activities," were effective for oversight of boric acid corrosion control programs based on feedback from the regions and evaluations of the inspection results from 2 years of implementation of the revised guidance.

In CY 2006, the staff successfully incorporated the remaining three recommendations made by the Office of the Inspector General (OIG) as a result of its audit of the baseline inspection program (OIG-05-A-06, issued December 22, 2004). These recommendations involved (1) the development of guidance on identifying human performance trends and integrating that information into the ROP, (2) the development and implementation of guidance for documenting, tracking, and trending informal inspection issues, and (3) the need to define "effectiveness" as it pertains to the ROP and the subsequent establishment of performance measures and targets to demonstrate that the baseline inspection program meets that definition. All recommendations from the OIG audit of the baseline inspection program have been closed.

The staff continued to improve the initial and continuing inspector training programs in order to produce and maintain well-qualified, competent inspectors. The staff administered an inspector training effectiveness survey during CY 2005, and again solicited inspector feedback regarding training effectiveness by incorporating relevant training questions into the biennial internal staff survey conducted in CY 2006.

While the overall biennial survey results indicated that respondents generally agreed that training was effective, the relatively new and broad area of evaluating safety culture received the most negative comments. This was the first time that the internal survey has included a question related to safety culture training as the implementing documents had been effective only as of July 1, 2006. Although 59 percent of the respondents agreed that safety culture training was adequate, a number of respondents expressed concerns about the quality and quantity of safety culture training.

To support the safety culture initiative, the staff prepared computer-based training for all inspectors and performed training at the regional counterpart meetings. In addition, the staff took several steps to augment the initial safety culture training in parallel with the implementation of the safety culture initiative. Because many of the training aspects have been enhanced only recently, the staff needs additional time to assess the adequacy of all of the safety culture related training and qualification activities. The staff will assess the lessons learned during the initial 18-month implementation phase to identify how to further enhance the ROP program and the supporting safety culture training elements.

The staff issued several editions of the inspector newsletter to share inspection tips and lessons learned. The newsletter continued to serve as an effective communication and knowledge transfer tool. The NRC also monitored the Inspector Community Forum (ICF), an electronic web-based knowledge management tool, as an information resource for inspection preparation and to broaden inspector communication networks. The ICF was designed to enhance the depth and efficiency of inspection preparation by storing current IPs, related generic communications, and other useful inspection-related information. The ICF also functions as a messaging board to facilitate communications between inspectors. At the end of CY 2005, the ICF had 109 registered users and 86 posted messages. At the end of CY 2006, the ICF had 119 registered users and 100 posted messages, and forum use had noticeably diminished

since August 2005. Only 15 messages were posted in CY 2006, and 12 messages were associated with the introduction of the Operating Experience Smart Sample (OpESS) pilot program. The OpESS pilot program was recently initiated to support integration of operating experience with the ROP. The OpESS program provides inspectors with concise information related to selected industry operating events that have generic applicability and potential risk-significance, and can be readily inspected utilizing the baseline inspection program. Although it is a voluntary program, inspectors are encouraged to review and utilize OpESS information for planning future inspection activities. The staff plans to monitor implementation of the ICF and OpESS in CY 2007 and continue to look for ways to incorporate insights gained from the operating experience program.

All of the 10 inspection program metrics met their established criteria in CY 2006. Timeliness in completing TIs (metric IP-5) improved in CY 2006 as all were completed on time. The staff reviewed an integrated inspection report from each regional branch and team inspection reports from each region. About 97 percent of the inspection reports reviewed were documented in accordance with IMC 0612 requirements, and 99 percent of the inspection reports were issued within timeliness goals. The staff received 99 feedback forms during CY 2006, comparable to previous years, and has revised the process to improve the timeliness of feedback resolution.

The staff also performed its annual analysis of resident inspector demographics and concluded that the program continues to attract and retain quality inspectors. In addition, the staff collected and analyzed data in order to measure the permanent inspector staffing levels at each of the reactor sites for both resident and senior resident inspectors in order to evaluate the agency's ability to provide continuity of regulatory oversight. Both of these metrics met expectations, and no programmatic changes are planned at this time.

The internal and external survey resulted in favorable feedback regarding whether information contained in inspection reports was relevant, useful, and written in plain English. Additionally, most internal and external stakeholders believed that the inspection program adequately covers areas that are important to safety and is effective in identifying and ensuring the prompt correction of performance deficiencies. Although internal and external comments were generally favorable, there were specific recommendations for improvements, such as the ability to complete the inspections within the resources estimated in inspection procedures, inspection report length and format, and how cross-cutting aspects are being documented. The staff will review and address these recommendations in CY 2007.

The inspection program met the goals and intended outcomes of the ROP based on the metric results, stakeholder feedback, and other lessons learned. The inspection program verified that plants were operated safely, appropriately identified performance issues, and ensured the adequacy of licensee corrective actions to address the noted performance issues. Focus areas for CY 2007 include monitoring the changes made to incorporate safety culture and successfully implementing the ROP realignment process.

Significance Determination Process

Process improvements in the SDP resulted in efficiency gains in determining the safety significance of identified performance issues. The SDP continues to mature and is now considered a fully developed process that meets the objectives outlined in SECY-99-007,

"Recommendations for Reactor Oversight Process Improvements," and SECY-99-007A, "Recommendations for Reactor Oversight Process Improvements (Follow-up to SECY-99-007)." Since implementation in April 2000, the SDP has gone through several significant changes based on feedback from internal and external stakeholders and the recommendations of two independent audits. As a result, SDP timeliness has improved significantly, meeting its goal for the first time since the implementation of the ROP.

Enhancements to the process continue, such as the current implementation of the SDP Phase 2 pre-solved tables (from here on referred to as the Tables) to complement the plant specific risk-informed inspection notebooks (from here on referred to as the Notebooks). The staff has addressed several significant issues during this assessment period, including implementing the Tables; issuing Appendix M to IMC 0609, "Significance Determination Process Using Qualitative Attributes;" and addressing the need for risk-informing findings that do not fit a previously developed SDP.

The staff streamlined the process and simplified the procedure for inspectors to implement the Phase 2 tools by benchmarking and updating the Notebooks and developing the associated Tables. The Tables were added to the SDP Phase 2 process for Appendix A to IMC 0609, "Determining the Significance of Inspection Findings for At-Power Situations." Training of inspectors in the use of the revised Notebooks and Tables is being accomplished in two steps. The staff completed training of the Senior Reactor Analysts (SRAs) at the two SRA counterpart meetings held during the assessment period. In turn, the SRAs will train the inspectors at the inspector counterpart meetings. Once this training is completed, the Phase 2 tools with the increased use of the Tables will reduce the burden on inspectors, allowing for additional improvement in the timely assessment of SDP findings.

Initially, the Notebooks did not provide guidance on how to account for risk contributions from fire, seismic, flood, severe weather, or other external events evaluated in the licensee's Individual Plant Examination for External Events (IPEEE) analysis. Therefore, the increase in risk significance of inspection findings due to external event contribution was not routinely accounted for in the reactor safety Phase 2 SDP results. To address this concern, the staff completed SDP guidance in 2006 that allows inspectors to screen external event contribution. This guidance will be issued as part of the next revision of IMC 0609 as an attachment to the Notebooks. Additionally, the Office of Nuclear Regulatory Research (RES) issued guidance as part of Risk Assessment Standardization Project (RASP) for evaluating the risk contribution from external events for SDP Phase 3 evaluations.

The RASP is an interoffice effort designed to provide improved methods and formats to standardize risk analyses performed by the NRC. These methods for risk assessment should result in more consistent outcomes, improve internal and external risk communications, reduce the time required to perform risk analyses, and provide guidelines for resolving technical issues. The first product of the RASP is a handbook, "Risk Assessment of Operating Events Handbook," currently available only to NRC staff. The handbook provides supplemental Phase 3 guidance for use by NRC risk analysts and SRAs, and is applicable to plant conditions and events occurring during full power operations. The RASP is in the process of incorporating external initiating events into the Revision 3 Standardized Plant Analysis Risk (SPAR) models. Thirteen of the 72 SPAR models have had the external initiating events incorporated. The staff is also developing methods and guidelines applicable to the assessment of risk contribution during low power and shutdown operation and large early release frequency.

Other enhancements to Revision 3 SPAR models are also in process. A total of 41 out of 72 plant models have been enhanced. This effort involves a detailed individual accident scenario level (i.e., cutset) review against the respective licensee's plant probabilistic risk assessment (PRA). In addition, the SPAR model enhancement includes the resolution of the PRA modeling issues that were previously identified during the onsite quality reviews of the SPAR models as part of MSPI implementation.

Licensee PRA quality continues to be enhanced through the benchmarking of the Notebooks, by the improvements of the SPAR models, and by the availability of additional guidance (e.g., Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities;" NUREG CR-6823, "The Handbook of Parameter Estimation for Probabilistic Risk Assessment;" and NUREG-1792, "HRA Good Practices").

As noted in an SRM dated June 14, 2006, the Commission directed the staff to continue to focus on improving the timeliness and efficiency of the SDP. In addition, the staff committed in SECY-06-0074 to monitor and make planned SDP improvements through the SDP Improvement Plan. All objectives of the SDP Improvement Plan have been completed. The staff closed the following SDP Improvement Plan Objectives during the assessment period:

- Objective 3.3.f, the Spent Fuel Storage SDP, was determined not to be essential to the SDP. However, the staff continues to evaluate potential issues for both wet and dry spent fuel storage to determine if any would rise above the minor or very low safety significance level. No such examples have been identified thus far. In addition, Appendix M to IMC 0609 provides guidance for evaluating spent fuel storage issues.

- Objective 3.4, to improve the physical protection SDP, was completed. In October 2006, NEI agreed to accept the NRC proposed security SDP, Part 1, "Baseline Inspection Program," and Part 2, "Force on Force Assessment." In a Commission paper issued January 22, 2007, the staff summarizes the history of the development of the process, including the results of the pilot period.

- Objective 5.3, to provide guidance to management for risk-informing findings where no other SDP is applicable, was addressed by a new methodology identified in Appendix M to IMC 0609, issued in December 2006. Additional guidance may be generated based on lessons learned during implementation.

Objectives 1.2 and 1.8, involving the managing of SDP timeliness, have been addressed through a Region IV effort. The region conducted a detailed evaluation of the existing process, developed a list of "Best Practices," and made seven recommendations to improve SDP timeliness. Once completed, the staff will have addressed all relevant recommendations by the Office of the Inspector General (OIG-02-A-15, issued August 21, 2002) and the SDP Task Group.

As stated in an SRM dated December 23, 2004, the Commission directed the staff to evaluate the effectiveness of the changes made to improve the timeliness of the fire protection SDP. Since these changes were implemented, all findings related to fire protection have been finalized within the SDP timeliness goals.

The results of the internal survey were generally favorable for the SDP. The level of satisfaction notably increased from previous years, as shown in the multiple choice responses. However, in addition to the multiple choice responses, there were over 100 comments on the SDP, primarily focused in the following areas:

- Complexity and training. Survey comments noted that SDPs in general, and the fire protection SDP in particular, remain complicated requiring the investment of extensive resources to arrive mostly at Green findings. Lack of effective training and limited usage of the revised Phase 2 process were noted as contributors to the frustration experienced by the commenting inspectors. The additional scheduled training and increased use of the Phase 2 tools should reduce the burden on inspectors and further improve SDP effectiveness.

- The management of SDP timeliness. Several comments expressed concerns with managing the inspection process to meet SDP timeliness goals. According to the comments this included timing of exit meetings, carrying findings as unresolved items (URIs), extending the inspection process, and other means. These concerns should be addressed by the recommendations from the recently completed "Regional Best Practices for Managing SDP Timeliness," scheduled to be implemented during the 2007 assessment period. In addition, the staff will continue to monitor SDP timeliness and make any necessary changes to the timeliness metric to address these concerns.

The responses to the external survey were generally unfavorable for the SDP, but appeared to be less critical than in previous years. Several respondents stated that the SDP is too complex, is inconsistent, and did not yield equivalent results for issues of similar significance in all ROP cornerstones.

The staff maintains seven performance metrics to monitor the effectiveness of the SDP. Overall, the metrics indicated the implementation of the SDP had improved over the previous assessment period. Most notably, the SDP timeliness metric (SDP-6a) increased from 68 percent in FY 2005 to 96 percent in FY 2006. This is the first time since the implementation of the ROP that the timeliness metric met its 90-day goal.

During this assessment period the staff introduced a new metric (SDP-6b), on a trial basis, that also examined the timely issuance of final SDP results. This metric addressed all issues that were brought to the Significance Determination Process/Enforcement Review Panel (SERP), not just issues finalized as white, yellow, or red. The criteria are that 90 percent of all SDP results be finalized within 90 days on average and 100 percent in 180 days. The average age of all the SDP findings that were presented to the SERP during FY 2006 was 119 days, exceeding the 90-day goal. Of the 35 findings (1 yellow, 24 whites, and 10 greens), 4 took more than 180 days to finalize. The staff will continue to monitor this metric during the CY 2007 assessment period to evaluate future enhancements to the timeliness metric.

One of the seven SDP metrics evaluated during this assessment period failed to meet program expectations. For metric SDP-4, "Results of the Same Color are Perceived by the Public to Warrant the Same Level of Regulatory Attention for All Cornerstones," many of the stakeholders expressed a negative perception that the SDP did not yield an appropriate and consistent regulatory response across all seven ROP cornerstones. In particular, stakeholders believed that SDPs for emergency preparedness and public radiation safety were deterministic

and not appropriately characterized by risk insights. Stakeholders have expressed concern about this issue since the inception of the ROP. However, the staff continues to believe that relative parity has been achieved among the cornerstones, based on the potential impact on public health and safety and the designated NRC response to specific findings. The staff continuously reviews findings to determine the need for adjustments to the SDPs in this area. For example, based on a finding identified during this assessment period, the staff is scrutinizing the outcome of the Public Radiation Safety SDP to confirm that the SDP results reflect the expected outcome in terms of licensee assessment and staff response. This review will also consider the results of the Liquid Radioactive Release Lessons Learned Task Force.

Further improvements in the SDP resulted in improved staff efficiency and effectiveness in determining the safety significance of identified performance issues. The SDP continues to serve as an essential component of the ROP, although ongoing enhancements are still warranted and will be incorporated into the program based on lessons learned and feedback.

Assessment Program

Implementation of the assessment program ensured that staff and licensees took necessary actions to address performance issues and adjusted resources to focus on significant performance issues. The most significant changes in the assessment program in CY 2006 resulted from the Commission SRM dated December 21, 2005, which directed the staff to work extensively with internal and external stakeholders to enhance the ROP to more fully address safety culture. The staff's efforts are described in SECY-06-0122, "Safety Culture Initiative Activities to Enhance the Reactor Oversight Process and Outcomes of the Initiatives," and RIS 2006-13, "Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture." The staff implemented the enhanced inspection procedures and inspection manual chapters on July 1, 2006, and implemented the revised guidance during the CY 2006 mid-cycle plant assessments. The final supplemental inspection procedure (IP) that was enhanced as part of the safety culture initiative, IP 95003, "Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or One Red Input," was issued on October 26, 2006. The staff will compile lessons learned during the initial 18-month implementation phase of the enhanced ROP. The staff plans to report to the Commission on the program enhancements in the CY 2007 ROP self-assessment.

In CY 2006, the staff issued revised guidance regarding substantive cross-cutting issues in IMC 0305 to incorporate recommended improvements by internal and external stakeholders. Implementation of the revised guidance for the mid and end-of-cycle assessments, as compared to previous assessment results, did not result in any unintended consequences or overall change in the number or types of substantive cross-cutting issues. The staff will closely couple future revisions regarding cross-cutting issues with the efforts of the safety culture working group.

The Commission directed the staff, in an SRM dated June 14, 2006, to reconsider and recommend the point at which licensee senior management should be requested to meet with the Commission to discuss actions being taken to improve performance (e.g., plants remaining in Column IV for a protracted period). The staff prepared COMSECY-07-0005, “Discussion of Plants in the Multiple Repetitive Degraded Cornerstone Column of the Reactor Oversight Process Action Matrix,” to provide its recommendation to the Commission for consideration.

The staff will implement necessary program improvements to address Commission direction as noted in their pending response to the COMSECY.

In a recent report, GAO-06-1029, “Nuclear Regulatory Commission: Oversight of Nuclear Power Plant Safety Has Improved, but Refinements are Needed," GAO made three recommendations for the NRC to improve its ability to identify declining plant safety performance. The first recommendation was for the NRC to evaluate and implement additional methods to assess nuclear plant safety culture, if needed. The second recommendation was that the NRC consider developing PIs for safety culture. The staff will evaluate these recommendations and the lessons learned during the initial 18-month implementation period of the enhanced ROP, and will implement additional methods as warranted. In addition, the staff believes the annual ROP self-assessment process and performance metric report are effective tools for gathering and assessing feedback on the safety culture enhancements. After completing the 18-month implementation period and evaluating the lessons learned, the staff plans to consider additional performance metrics in the annual ROP self-assessment process. The third recommendation was for the staff to provide more information about plant safety culture on the ROP Web site. The staff considers this recommendation closed as more detailed information on plants with substantive cross-cutting issues, with links to the related plant assessment letters, is now available on the ROP Web site.

Based on feedback from internal stakeholders, the staff has begun evaluating potential program changes that would enhance the level of integration between the ROP and the traditional enforcement program regarding the inspection, assessment, and enforcement of findings and violations. Once completed, the staff plans to recommend proposed changes to the Enforcement Policy and ROP program documents that would provide a single integrated Agency assessment of licensee performance that may more directly incorporate traditional enforcement issues into the ROP Action Matrix.

As requested by the Commission and incorporated into the self-assessment program, the staff reviewed the causes of the three Action Matrix deviations during CY 2006 and evaluated them for potential improvements to the program. The following summarizes these evaluations.

- The NRC issued a deviation for Indian Point in December 2006 to allow for an increased level of oversight for two issues: groundwater contamination from cracks in the Unit 2 spent fuel pool and problems with the alert and notification system. The Indian Point deviation was an extension of the previous deviation in CY 2005. To date, Entergy has completed well drilling and testing, is in the process of evaluating groundwater contamination and migration hydrology, and is testing a mitigation strategy. Region I continues to monitor Entergy's activities on this issue to ensure NRC regulations are satisfied. With respect to Indian Point’s alert and notification system, the NRC granted Entergy's request for an extension for completing a project at the Indian Point Energy Center that was required by a January 2006 confirmatory Order to meet specifications in the 2005 Energy Policy Act. Entergy now has until April 15, 2007, to complete installation of back-up power for its alert and notification system. As noted in last year’s self-assessment, the staff does not anticipate any programmatic changes to the assessment program as a result of this deviation.

- The NRC issued a deviation for Davis-Besse in August 2006 in order to continue heightened NRC oversight for the time period of August 2006 through July 2007. The

Davis-Besse deviation was an extension of the previous deviation in CY 2005. Davis-Besse was placed under the IMC 0350 process for about 3 years. While the plant transitioned from the IMC 0350 process, the NRC authorized a deviation from the ROP on May 16, 2005, for the period of July 2005 through June 2006. The extension is necessary for continued monitoring of the licensee's efforts to sustain improved plant performance following resolution of the long-standing underlying problems that culminated in a Red finding associated with the severe wastage that was discovered on the reactor vessel head. As noted in last year's self-assessment, the staff revised IMC 0305 to allow the regional offices to use additional followup actions for plants that are exiting the IMC 0350 process. The programmatic changes made as a result of this deviation will prevent the need for similar deviations in the future.

- The NRC issued a one-time deviation for Waterford Unit 3 in June 2006 from the multiple/repetitive degraded cornerstone column for a red SSU PI for high-pressure safety injection (HPSI) and a yellow PI for residual heat removal (RHR). The staff determined that these PIs were red and yellow following the conduct of a discrepant PI inspection due to excessive fault exposure hours. However, using the same set of circumstances applied to the MSPI PIs would have resulted in a green outcome due to the differences in the way fault exposure is treated. The deviation was requested because the actions outlined in the licensee response column of the Action Matrix are more appropriate for the situation at Waterford 3 than those of the multiple/repetitive degraded cornerstone column. This situation is not likely to recur because the SSU PIs were replaced by MSPI in April 2006.

As noted in last year's self-assessment, the staff revised program guidance to address the inclusion of independent reviews, such as the Institute of Nuclear Power Operations (INPO) and the International Atomic Energy Agency (IAEA) Operational Safety Review Team inspections, during the mid-cycle and end-of-cycle review meetings in order to self-assess the NRC's inspection and assessment processes. This was first implemented in CY 2006 during the end-of-cycle and mid-cycle assessment meetings and was deemed to be insightful into plant performance. The staff will continue to consider independent assessments in future end-of-cycle and mid-cycle assessment meetings.

In CY 2006, all 11 of the performance metrics in the assessment program were met. The metric regarding the number of Action Matrix deviations failed to meet its criteria in CY 2005; however, the trend was reversed in CY 2006 and the metric was met. The staff established a new performance metric for safety culture in parallel with the implementation of the enhanced ROP in CY 2006. This was the first time that the internal and external surveys have included safety culture questions. A trend has not yet been established given the relatively short period of time that the enhanced ROP has been in effect.

Participants in the external survey were asked (1) if the ROP takes appropriate actions to address performance issues for those licensees that are outside of the licensee response column of the Action Matrix, (2) if the information contained in assessment reports is relevant, useful, and written in plain language, and (3) whether the ROP safety culture enhancements help identify licensee safety culture weaknesses and focus licensee and NRC attention appropriately. While responses were generally favorable, some stakeholders expressed concerns that the ROP lacks clear exit criteria for plants in columns other than the licensee response column of the Action Matrix, that NRC actions are too narrow in scope to ensure that

larger issues are corrected, and that the ROP does not effectively deal with plants with long-standing issues. External stakeholders generally agreed that the information contained in assessment reports is relevant, useful, and written in plain English, but some expressed concern that the excessive use of boilerplate language in the assessment letters provides little substantive insights about performance at individual sites, and others that the substantive cross cutting issue decisions are not transparent. Most participants noted that it is too soon to tell whether the safety culture changes have been effective given the short time that the revised ROP has been in place.

In the 2006 internal survey, the perception of the assessment program was generally positive, though some stakeholders noted that cross-cutting issues and safety culture guidance were too complex and not worth the effort expended. Internal stakeholders expressed a diversity of opinions as to whether the program changes made as a result of the safety culture initiative were beneficial or not. Notwithstanding the written comments, even at this early point in the implementation of the enhanced program, more than one-half of the internal respondents indicated that the changes to the ROP will help to identify licensee safety culture weaknesses and to focus both licensee and NRC resources accordingly. Responses to related questions about the adequacy of the supporting ROP infrastructure (process, procedures and training) again indicate that more than one-half of the respondents consider that an adequate infrastructure is currently in place.

The assessment program met the goals and intended outcomes of the ROP based on the metric results, stakeholder feedback, and other lessons learned through ongoing program monitoring. Implementation of the assessment program ensured that staff and licensees took necessary actions to address performance issues and adjusted resources to focus on significant performance issues. The most significant work for the assessment program in CY 2007 will include monitoring the changes associated with substantive cross-cutting issues and the Commission's direction on enhancing the ROP to more fully address safety culture.

Overall Conclusions

Each of the four program areas of the ROP has contributed to the ROP's success in meeting the seven program goals of being objective, risk-informed, understandable, and predictable, and in ensuring safety, openness, and effectiveness. The ROP achieved its intended outcomes as demonstrated by the successful implementation of the various ROP processes. Stakeholder feedback and several independent evaluations have resulted in significant program enhancements, but the staff continues to experience challenges in certain areas and recognizes the need for further improvement.