

## **Reactor Oversight Process Program Area Evaluations**

The U.S. Nuclear Regulatory Commission (NRC) staff performed the Reactor Oversight Process (ROP) self-assessment for calendar year (CY) 2017 as governed by Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program," dated November 23, 2015, and its appendices (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML15307A023). The self-assessment approach consists of three distinct elements designed to: (1) measure the effectiveness of, and adherence to, the current ROP; (2) monitor ROP revisions and assess the effectiveness of recent program changes; and (3) perform focused assessments and peer reviews of regional offices.

The staff evaluated the key program areas of the ROP in accordance with Element 1 of the self-assessment process. This review is consistent with the scope given in Appendix C, "Planned Program Reviews," to NUREG-1614, Volume 7, "Strategic Plan: Fiscal Years 2018–2022," issued February 2018 (ADAMS Accession No. ML18032A561). The sections below describe assessments of: (1) the performance indicator (PI) program, reviewing the usefulness of current PIs for enhancing agency planning and response; (2) the inspection program, determining the efficiency of the agency's baseline inspection program; (3) the significance determination process (SDP), determining the effectiveness of the SDP; and (4) the ROP assessment program, reviewing the effectiveness of the assessment program in prescribing appropriate regulatory oversight to those plants with performance deficiencies.

The staff's evaluation used objective metrics and other relevant feedback from both internal and external stakeholders. The annual ROP performance metric report, which was also produced in accordance with Element 1 of the self-assessment process, provides data and analysis for all the objective performance metrics (ADAMS Package Accession No. ML18039A288). The program area evaluations also summarize changes to the program, current and future focus areas, and potential recommendations for improvement. The ROP evaluations met the scope and objectives described in Appendix C to NUREG-1614.

### **Performance Indicator Program**

The PI program continued to provide insights into plant safety and security performance in CY 2017. The staff and industry continue to improve the PI program guidance through ROP Working Group meetings and feedback from stakeholders. As noted in the annual ROP performance metric report referenced above, the ROP metrics related to the PI program met or exceeded performance expectations, including the timeliness of the reporting, dissemination, and accurate posting of the PI data to the NRC's external Web pages.

### **Update to Guidance on Critical Hours for Mitigating Systems Performance Index**

The industry's ROP Task Force submitted frequently asked question (FAQ) 17-03, "Baseline Unavailability Critical Hours," on March 23, 2017 (ADAMS Accession No. ML17291A258). In the FAQ, the industry sought to clarify guidance on how to update planned unavailability to reflect current maintenance practices instead of those from 2002-2004, which were initially used in the Mitigating Systems Performance Index (MSPI). The staff agreed that, since the intent of updating the baseline unavailability is to have the value reflect the current maintenance philosophy, revising the baseline critical hours to those of the most recent 3 years of operation would be appropriate. Planned unavailability is significantly different today because of evolving maintenance practices; therefore, it would be inappropriate to use data from 2002-2004. By

using the most recent 3-year period, inappropriate inflation of the baseline unavailability is avoided if the plant had an extended outage during the 2002–2004 period. Plants with extended outages during that historical time frame would be penalized today because the lower denominator in the calculation would inflate the allowance for planned unavailability during periods without the extended outage. The next revision of Nuclear Energy Institute (NEI) 99-02, “Regulatory Assessment Performance Indicator Guideline,” will reflect this resolution.

### Security Performance Indicator

Currently, the staff provides the Commission information related to the evaluation, assessment, and development of security PIs via two separate documents: 1) the Annual ROP Self-Assessment SECY, and 2) reporting to comply with direction in the staff requirements memorandum (SRM) to SECY-07-0136, “Recommendation to Discontinue Two of Three Performance Indicators Associated with the Security Reactor Oversight Process,” dated September 13, 2007 (ADAMS Accession No. ML072560811 (non-public)). The staff is currently exploring ways to synchronize these efforts to reduce redundant reporting.

Regarding the current year’s input, there is one PI for the security cornerstone, which is the Protected Area Security Equipment Performance Index. This PI serves as a measure of unavailability of security equipment to perform its intended function. The staff continues to evaluate the security cornerstone for possible development of new PIs. Moreover, the current security PI related to Intrusion Detection System availability continues to provide assurance, along with the conduct of the NRC Baseline Inspection Program, that regulatory oversight and performance assessment of power reactor licensees remains effective and efficient, ensuring safe and secure operations.

### Performance Indicators for New Reactors

In the SRM to SECY-13-0137, “Recommendations for Risk-Informing the Reactor Oversight Process for New Reactors,” dated June 30, 2014 (ADAMS Accession No. ML14181B398), the Commission approved the staff’s recommendation to develop appropriate PIs and thresholds for new reactors, specifically those PIs in the initiating events and mitigating systems cornerstones, or to develop additional inspection guidance to address any identified shortfalls to ensure that all cornerstone objectives are adequately met.

Consistent with this direction, the staff began discussions with internal and external stakeholders through the ROP Working Group to attempt to either develop new PIs within the mitigating systems cornerstone or modify the existing MSPI to be able to monitor new reactor designs. The industry developed white papers analyzing potential risk-informed indicators within the mitigating systems cornerstone (ADAMS Accession Nos. ML16189A414 and ML16189A418). The industry analysis indicated that the MSPI PI could not be effectively applied to new reactor designs, namely, the AP1000 reactors under construction. Specifically, sufficient performance data on passive systems and components are not available to develop meaningful industry-averaged performance baselines that are a key aspect of the MSPI formulation. Non-safety-related “front line” systems, including systems subject to regulatory treatment of non-safety systems, were considered; however, their risk worth is so low that it would take a large number of component failures to cross a threshold, and unavailability would most likely never cross a threshold.

The NRC staff’s own white paper, “Mitigating Systems Performance Indicators for New Reactor,” dated September 2, 2016 (ADAMS Accession No. ML16251A018), agreed with

industry conclusions about the use of the MSPI and evaluated possible new risk-informed indicators that could be applied to the passive safety systems. The staff did evaluate a new risk-informed valve unreliability indicator that would monitor explosive squib, air-operated, motor-operated, and solenoid-operated valves relied upon by the passive systems for successful operation. As observed by the industry papers, sufficient industry data on the active components within the passive safety systems do not currently exist. However, with the limited available data, the staff determined that, because of the low numbers of expected demands for these components and their variable risk worth, a risk-informed PI focused on unreliability could change by several orders of magnitude as a result of minimal effects, such as adding extra demands or changing the risk worth through plant modifications or probabilistic risk assessment updates. The staff concluded that the volatility of the resultant indicator would be inappropriate for licensee performance monitoring, in that it would be neither reliable nor predictable.

In its paper on recommendations for modifying the ROP for new reactors that is due to the Commission in CY 2018, the staff intends to provide a recommendation related to PIs for new reactors. Specifically, in that paper the staff plans to recommend that the MSPI indicators be eliminated for new reactors, while maintaining the other 12 PIs that were previously confirmed to be easily applicable to new reactor designs with minimal revisions to the NEI 99-02 PI guidelines. The staff is working to determine the adjustments to the baseline inspection program that are needed to ensure that cornerstone performance is fully monitored. Given the overall reduction in risk for new reactor designs, coupled with the anticipated reduction in the number of online surveillances and maintenance activities, the staff expects that there will be a minimal effect on inspections as a result of the lack of the MSPI.

## **Inspection Program**

NRC inspectors independently verified that plants were operated safely and securely. As documented in the annual ROP performance metric report, dated April 5, 2018 (ADAMS Accession No. ML18039A344), there were three metrics that were not met including: Performance Deficiency Determinations (E-4), Responsiveness to ROP Feedback Forms (E-6), and Performance of Lessons Learned Evaluations (R-1). All other inspection program metrics met or exceeded performance expectations for CY 2017, including the completion of the baseline inspection program and multiple metrics related to inspector objectivity, qualifications, and site staffing. Throughout the year, the staff made changes to various ROP IPs based on feedback and the CY 2017 engineering inspection focused assessment.

### Baseline Inspection Program Completion

For CY 2017, all regions and the Office of Nuclear Security and Incident Response (NSIR) completed the baseline inspections within the allocated resources. Two regions missed samples related to two procedures at three sites, but because the missed samples were completed in the first quarter of CY 2018, the regions met the completion criteria outlined in IMC 2515, Section 04.07. Each region documented completion of the baseline inspection program (ADAMS Accession Nos. ML18052A730 for Region I, ML18044A838 for Region II, ML18053A239 for Region III, and ML18057B084 for Region IV) and NSIR documented completion of all its security baseline inspections (ADAMS Accession No. ML18011A830 (non-public)).

### Inspection Technology Upgrade

The Revised Reactor Program System (RRPS) Inspections module went live on October 2, 2017. This module replaced the majority of legacy Reactor Program System (RPS) features for scheduling inspections and tracking inspection reports and inspection findings. While legacy RPS was primarily used to schedule inspections at power reactor facilities, RRPS was expanded to allow scheduling inspection activities for fuel facilities, materials licensees, and vendors. RRPS is a web-based application that is now used by all inspectors to facilitate inspection scheduling, documenting samples completed, tracking issues identified during inspections, and data analysis. RRPS was integrated into the Master Data Management Program, a comprehensive restructuring of legacy data systems, which will ultimately result in more open and transparent fee billing, and has the potential for enabling better sharing of resources across the regions and headquarters (e.g., operator licensing exams). RRPS is currently being updated to incorporate a new module to automate the creation and processing of inspection reports in order to reduce the administrative burden for inspectors and other NRC staff, and to improve standardization of inspection reports across the regions. This new module will also improve sample documentation, issue tracking and documentation, and data analysis.

### Dispositioning of Feedback from CY 2016 Region II Peer Review

At the 2017 Commission Meeting following the Agency Action Review Meeting (AARM) and in the associated SRM, the Commission authorized a periodicity change for the baseline IP assessments, regional peer reviews, and the focused assessments to have them alternated biennially. As such, in CY 2017 the staff did not conduct a regional peer review or baseline IP assessment. However, during this time, the staff evaluated regional strengths, areas for improvement, and best practices discussed in the CY 2016 Region II peer review (ADAMS Accession No. ML17047A602 (non-public)). The results of these evaluations were documented by Region I (ADAMS Accession No. ML17156A773 (non-public)), Region III (ADAMS Accession No. ML17144A219 (non-public)), and Region IV (ADAMS Accession No. ML17293A502 (non-public)).

### Security Baseline Inspection Program

In 2017, NSIR, Cyber Security Branch, issued IP 71130.10 Pilot (P), "Cyber Security." The objective of this IP is to inspect operating nuclear power plants which have completed full implementation of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 73.54, "Protection of Digital Computer and Communication Systems and Networks." Using this IP, the first two cyber security inspections were completed in CY 2017 at South Texas Project and Monticello. Lessons learned from these inspections have been incorporated into guidance for future inspections.

In conjunction with the staff's normal process of assessing the security baseline inspection program, the staff conducted a review based on Commission direction in "Staff Requirements –SECY-16-0073 – Options and Recommendations for the Force-on-Force Inspection Program in Response to SRM-SECY-14-0088," dated October 5, 2016 (ADAMS Accession No. ML16279A345). During this review, the staff identified potential efficiencies and improvements that can be applied throughout the program, to include force-on-force. The staff outlined these efficiencies in SECY-17-0100, "Security Baseline Inspection Program Assessment Results and Recommendations for Program Efficiencies," dated October 4, 2017 (ADAMS Accession No. ML17223A279). The staff is currently working on revising portions of

the security baseline inspection program to incorporate the efficiencies identified and is awaiting feedback from the Commission on the recommendations provided in SECY-17-0100.

### Focused Assessment of the Engineering Inspection Program

The Director of the Office of Nuclear Reactor Regulation formed a working group in February 2017 consisting of experienced supervisors and inspectors to assess NRC engineering inspections that verify the adequacy of facility design, operations, and testing and to recommend improvements for both the effectiveness and efficiency of the suite of engineering inspections within the ROP. Under its charter (ADAMS Accession No. ML17172A620), the working group was tasked to review NRC engineering IPs. The scope of the review included the following IPs:

- IP 71111.05T, "Fire Protection (Triennial)," dated January 13, 2013, and IP 71111.05XT, "Fire Protection-NFPA 805 (Triennial)," dated September 30, 2010;
- IP 71111.07, "Heat Sink Performance," dated December 8, 2016;
- IP 71111.08, "Inservice Inspection Activities," dated December 22, 2016;
- IP 71111.12, "Maintenance Effectiveness," dated February 3, 2016;
- IP 71111.17T, "Evaluations of Changes, Tests, and Experiments," dated December 8, 2016;
- IP 71111.18, "Plant Modifications," dated November 17, 2016;
- IP 71111.21M, "Design Bases Assurance Inspection (Team)," dated December 8, 2016; and
- IP 71111.21N, "Design Bases Assurance Inspection (Programs)," dated December 8, 2016.

The review of these IPs included the following specific considerations:

- overlap areas between the IPs;
- gaps in the IPs; and
- inspection structure, including team composition and expertise, team size, schedule and duration, and inspection frequency.

The NRC staff conducted Category 2 public meetings with the nuclear industry in June, October, and December 2017 to discuss this review. During the June 2017 meeting, the staff expressed the desire to improve the focus of its baseline inspections by examining current licensee performance and the unique challenges posed as plants age and enter a period of extended operation (i.e., operation beyond their initial 40-year operating license). The nuclear industry, through NEI and other public stakeholders, provided feedback on ways to improve the current suite of engineering inspections. NEI, the Union of Concerned Scientists, the Nuclear Utility Group on Environmental Qualification, Pilgrim Watch, and private citizens all provided feedback. The staff posted all of the comments that it received associated with this initiative on the agency's public Web site at <https://www.nrc.gov/reactors/operating/oversight/rop-design-insp-review.html>. NRC management and staff communicated their recommended changes to the suite of engineering inspections to the nuclear industry during a Category 2 public meeting on February 22, 2018, and at the 2018 Regulatory Information Conference session. In order to obtain approval for updates and potential changes to the ROP, the staff plans to forward a SECY paper to the Commission in CY 2018 with recommendations of changes to include evaluating the effectiveness of changes through the self-assessment program, expansion to a

greater than 3 year inspection cycle, and identifications of efficiencies gained through combination of like efforts of the engineering inspections.

### Inspection Program Readiness for AP1000 Reactors

The new reactor transition working group developed an integrated plan that identified all regulatory functions necessary to support the transition of new reactors from construction to operation. The working group also identified several readiness issues related to the ROP to ensure that the staff is prepared for the transition. The transition plan was finalized and documented in a report titled, "Implementation Plan to Ensure NRC Staff Readiness for AP1000 Operations," dated November 16, 2017 (ADAMS Accession No. ML17215B585).

In addition, the staff developed a Charter for the Vogtle Readiness Group, titled "Charter for Instituting the Vogtle Readiness Group To Oversee the Vogtle Units 3 and 4 Transition to Operations." This charter was issued on March 12, 2018 (ADAMS Accession No. ML18059A273).

Additional information on activities related to AP1000 inspection program readiness will be provided in the staff's annual paper on the construction ROP self-assessment.

### **Significance Determination Process**

The SDP continued to be an effective, risk-informed process for determining the safety and security significance of inspection findings identified in the ROP. In 2017, the NRC identified hundreds of inspection findings nationwide, with over 95 percent determined to be of very low safety or security significance (Green). In this respect, the SDP is an effective and efficient risk-informed process for focusing staff resources on issues that are potentially more risk-significant. Nevertheless, the staff is always open to opportunities to further improve the SDP, and a number of such efforts are underway that will be discussed in further detail in this section.

### Significance Determination Process Metrics

Two ROP metrics track implementation of the SDP: (1) the percentage of findings that are finalized within 90 days from the date the licensee was notified of the preliminary significance and (2) the repeatability and predictability of greater-than-Green (GTG) inspection findings. In 2017, the NRC finalized 93 percent of GTG inspection findings in 90 days or fewer, with one GTG finding that required several days beyond 90 for the staff to consider substantial additional information provided by the licensee before the staff determined the final significance. This metric, which requires more than 90 percent of SDP determinations to be finalized within 90 days, was met, although it was in the Yellow performance range (the threshold for the metric to be Green is 95 percent, while the threshold for Yellow is 90 percent). In addition, 100 percent of the GTG findings issued in 2017 were determined to be repeatable and predictable, meaning an independent auditor was able to conclude that the significance determination was reasonable and justifiable.

### Inspection Finding Resolution Management

The staff completed the trial period of an initiative to improve the efficiency and effectiveness of the SDP, known as Inspection Finding Resolution Management (IFRM). The NRC began this initiative in part as a result of the Commission's direction to the staff to develop a plan to

streamline the SDP (ADAMS Accession No. ML14262A078), subsequent Commission direction to pilot proposed revisions to the SDP by holding public meetings or workshops on the recommended changes (ADAMS Accession No. ML15231A108), and recommendations from an internal business process improvement initiative (ADAMS Accession No. ML14318A512). The IFRM initiative focused on: (1) improved management oversight and project planning of GTG inspection findings; (2) improved interactions with licensees as potentially GTG inspection findings are identified; (3) a more efficient Significance and Enforcement Review Panel (SERP) process; and (4) improved metrics to track the timeliness of inspection findings once they are identified as an issue of concern until a final decision is made on the safety significance of the finding.

During the IFRM trial period, the agency implemented IMC 0609, Attachment 05TP, "Inspection Finding Review Board," effective November 15, 2016 (ADAMS Accession No. ML16103A405). The Inspection Finding Review Board (IFRB) is a regional activity through which the involved inspectors, a branch chief, senior reactor analyst, enforcement specialist, division director, and others, reach alignment on the performance deficiency and the scope and schedule for completing the preliminary safety significance determination before the inspection finding is presented to the SERP for resolution. The involved division director is the designated IFRB chairman. The IFRB also promotes improved interactions with licensees. After each IFRB meeting, the IFRB chairman is required to communicate with licensee senior management at the involved plant to ensure that the licensee understands the staff's preliminary position as early as possible in the decision-making process to facilitate a more effective and efficient dialogue.

The IFRM effort also included staff tracking of IFRM milestones, which are a 120-day inspection metric, tracking the time from identification of an issue of concern until the start date used for consideration of inspection findings in the assessment process (as defined by IMC 0305), a 45-day metric to issue the inspection report, and a 90-day SDP timeliness metric (from inspection report to final significance determination), which in total create a new IFRM metric of issuing the final significance of an inspection finding within 255 days of issue identification. From CY 2000 to the beginning of the IFRM trial period, for findings under the initiating events, mitigating systems, and barrier integrity cornerstones, roughly 60% of GTG inspection findings were finalized within 255 days and 70% within 1 year. These numbers improved in CY 2017 to 75% finalized within 255 days and 100% finalized within 1 year.

The IFRM trial period ended in December 2017 and the staff has begun an effectiveness review to determine whether and how permanent procedures should be revised to incorporate some or all of the trial elements. Preliminary review of the data appears to show an improvement in processing and transmitting final significance determinations over prior years, though the staff will more fully assess the data as part of the ongoing effectiveness review. The staff will provide the results of the effectiveness review to the Inspector General as a follow-up to the Office of the Inspector General audit OIG-16-A-21, "Audit of NRC's Significance Determination Process for Reactor Safety," dated September 26, 2016 (ADAMS Accession No. ML16270A359). Based on generally positive feedback from stakeholders on the pilot, the staff will keep the IFRB process in effect until changes are made based on the effectiveness reviews. After the completion of the effectiveness review, the staff plans to expand the pilot to other cornerstones to aid in timely processing and transmission of decisions.

### Training for Significance and Enforcement Review Panel Members

The staff developed SERP training as a result of ROP self-assessment activities and recommendations from the review of Differing Professional Opinion 2014-002 (ADAMS Accession No. ML14344A291). The SERP training is available in the NRC online training catalog (iLearn). This training enables members of the SERP to better understand their roles and responsibilities as decision-makers in the SERP process. The online training also consists of short refreshers on the use of risk information in decision-making, as well as probabilistic risk assessment basic modeling concepts. The goal of the training, which includes a knowledge check, is to enable SERP decision-makers to make more effective and efficient risk-informed decisions by better understanding the influential assumptions made in detailed risk evaluations. The online training is required for all new SERP members and is available for on-demand refresher training. In addition, the staff implemented a means to have SERP members continually share lessons learned on decision making for GTG inspection findings at periodic division director counterpart meetings.

### Ongoing and Planned Revisions to the Significance Determination Process

As noted previously, although the staff views the SDP as an effective and efficient risk-informed process to focus staff resources on issues that are potentially more risk-significant, several initiatives are underway to further improve existing SDP tools and procedures. The SDP is described in IMC 0609, "Significance Determination Process," with various attachments and appendices providing guidance for dispositioning issues in specific technical areas. The staff continued to engage external stakeholders on SDP issues through monthly public meetings intended to discuss ROP matters. The industry gave feedback on several IMC 0609 appendices in a letter dated October 12, 2017 (ADAMS Accession No. ML17338A031). The staff discussed with the industry the perspectives in the letter at a November 16, 2017, ROP public meeting and will continue to discuss and consider stakeholder perspectives when evaluating and prioritizing updates to SDP guidance.

The status of updates to the various SDP appendices is provided below. The staff will use the guidance in the recently revised Management Directive 8.13, "Reactor Oversight Process," dated January 16, 2018 (ADAMS Accession No. ML17347B670), to either notify the Commission or obtain Commission approval before implementing the changes described below.

#### Appendix B – Emergency Preparedness

In a letter dated December 12, 2017 (ADAMS Accession No. ML17354A094), the industry made recommendations on improving IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 22, 2015 (ADAMS Accession No. ML15128A462). The staff is reviewing the letter and plans to discuss the recommendations and the emergency preparedness SDP in general during an upcoming public meeting.



## Appendices C and D – Occupational and Public Radiation Safety

In 2017, the staff began to update the radiation protection-related SDPs and their associated technical basis documents: IMC 0609, Appendix C, “Occupational Radiation Safety Significance Determination Process”; IMC 0609, Appendix D, “Public Radiation Safety Significance Determination Process”; IMC 0308, Attachment 3, Appendix C, “Technical Basis for Occupational Radiation Safety Significance Determination Process”; and IMC 0308, Attachment 3, Appendix D, “Technical Basis for Public Radiation Safety Significance Determination Process.”

The staff will update Appendix C to IMC 0609 to incorporate feedback obtained through the ROP feedback form process and through verbal interaction with inspectors during counterpart meetings. Specifically, it will update the as low as is reasonably achievable sections of the SDP to clarify the difference between a violation of NRC requirements, as described in Title 10 of the *Code of Federal Regulations* Section 20.1101, “Radiation Protection Programs,” and an inspection finding that involves a licensee failing to meet its own procedures (i.e., a self-imposed standard). The staff will clarify the basis for using the 3-year rolling average collective dose. Finally, it will explain certain terms used in Section IV to facilitate common understanding and efficiency in the application of the SDP.

The staff will update Appendix D of IMC 0609 to address situations in which licensees incorrectly package radioactive material for shipment. In its current form, using Appendix D does not address the possibility that a licensee would ship radioactive material in incorrect packaging; however, this occurred twice recently (EA-14-158 on March 25, 2015 (ADAMS Accession No. ML15084A187), and EA-17-028 on July 6, 2017 (ADAMS Accession No. ML17187A364)). In dispositioning the two GTG inspection findings that resulted from these two events, the staff applied the qualitative methods provided in IMC 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria,” dated April 12, 2012 (ADAMS Accession No. ML101550365). For EA-14-158 and EA-17-028, the staff did not meet the timeliness metrics for finalizing inspection findings within 255 days of issue identification, largely because of the lack of an established SDP for issues of this type. For EA-17-028, the staff met the 90-day metric from initial notification of preliminary significance to final significance determination; however, the lack of an established SDP resulted in inefficiency, a lack of predictability, and increased resource expenditures in finalizing the significance determination. Without establishing an SDP that applies to these types of issues, similar future inspection findings will most likely require the same level of effort to achieve final significance determinations.

The staff has collaborated internally in developing the draft SDP updates and has interacted with industry on this topic during several public meetings. The staff will continue to pursue opportunities for all interested stakeholders to participate in the revision process. For example, it will make the final draft of the SDP available for a 45-day public comment period, with the announcement made at an ROP monthly public meeting in spring 2018. The staff will consider additional opportunities for public interaction based on the feedback received during the public comment period.

## Appendix E – Security

During 2017 NSIR, Cyber Security Branch, issued a revised IMC 0609, Appendix E, Part IV, “Cyber Security Significance Determination Process for Power Reactors” (non-public). This revision reflected lessons learned from interim milestone inspections, as well as input received from internal and external stakeholders to ensure that the SDP process continues to provide appropriate regulatory oversight for licensee cybersecurity issues and programs. This paper serves as notification to the Commission as the staff determined the changes to the SDP did not meet the criteria of “significant” changes requiring Commission approval.

The staff also continued to review and update the physical security SDP, as appropriate. As a result of the Commission direction in the SRM to SECY-16-0073, the staff developed a taskforce that is focused on ensuring that the concept of “high assurance” of adequate protection found in security regulations is equivalent to “reasonable assurance” when it comes to determining the appropriate level of regulation.

## Appendix F – Fire Protection

The staff is working on enhancements to IMC 0609, Appendix F, “Fire Protection Significance Determination Process,” dated September 20, 2013, that focus on simplifying the qualitative and quantitative screening processes and updating the fire-protection-related information in the IMC to improve the staff’s ability to make significance determinations in a timely manner. In CY 2017, the staff developed draft revisions of the document and its attachments, using the feedback gathered from regional inspectors in CY 2016 on areas for improvement. Internal stakeholders reviewed and approved the draft revisions. The staff expects to issue the revisions to IMC 0609, Appendix F, and its associated technical basis document in mid-CY 2018, after addressing industry comments and completing inspector training on the new documents.

## Appendix G – Shutdown Operations

The update of IMC 0609, Appendix G, “Shutdown Operations Significance Determination Process,” dated May 9, 2014, will improve the usability of Attachment 2, “Phase 2 Significance Determination Process Template for PWR during Shutdown,” and Attachment 3, “Phase 2 Significance Determination Process Template for BWR during Shutdown,” both dated February 28, 2005, and incorporate suggestions from ROP feedback forms that had been submitted. The update will also include revisions to provide guidance for AP1000 plants. Completed actions include development of a project plan, review of all open ROP feedback items, and discussion of the planned update with internal stakeholders.

## Appendix M – Use of Qualitative Criteria

Information on the staff’s plans for updating IMC 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria,” is provided in Enclosure 2.

## Appendix O – Mitigating Strategies and Spent Fuel Pool Instrumentation

The NRC issued IMC 0609, Appendix O, “Significance Determination Process for Mitigating Strategies and Spent Fuel Pool Instrumentation,” on October 7, 2016 (ADAMS Accession No. ML16277A415). This SDP evaluates the significance of inspection findings related to NRC Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation

Strategies for Beyond-Design-Basis External Events” (ADAMS Accession No. ML12056A045), and Order EA-12-051, “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation” (ADAMS Accession No. ML12056A044), both dated March 12, 2012. The procedure uses a qualitative approach to screen inspection findings to Green if functions to cool the reactor core, the spent fuel pool, and the containment are not lost. The procedure also addresses operator training, procedure quality, and the effectiveness of program attributes (e.g., equipment design, equipment storage, maintenance and testing, configuration control) for mitigating strategies and spent fuel pool instrumentation. If inspection findings do not screen to Green, IMC 0609, Appendix M, is used to determine the significance.

During much of 2017, the NRC used Appendix O with Appendix M during performance of Temporary Instruction 2515/191, “Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans,” Revision 1, dated December 23, 2015 (ADAMS Accession No. ML15257A188). In 2017, the NRC performed Temporary Instruction 2515/191 a total of 28 times, with 6 inspection findings identified. None of these findings were determined to be of GTG significance. Feedback from the staff indicated that the new Appendix O might have the potential to unnecessarily screen findings to Appendix M that would otherwise screen to Green. As such, the staff has reviewed Appendix O and is revising it to clarify and streamline the screening criteria in order to enhance its efficacy as an SDP screening tool.

#### Update to the Risk Assessment Standardization Project Handbook

In CY 2017, the staff completed an update to the Risk Assessment Standardization Project Handbook as part of ongoing efforts to improve guidance on probabilistic risk assessment methods and best practices for assessing the significance of inspection findings and reactor incidents. Specifically, the staff changed Volume 1, Section 6, “Modeling Recovery and Repair,” to give guidance on the use of diverse and flexible coping strategies (FLEX) equipment in recovery events. The staff also began an update to the Risk Assessment Standardization Project Handbook to provide guidance on estimating the risk metric of large early release frequency resulting from a consequential steam generator tube rupture event (i.e., events in which steam generator tubes leak or fail because of the high differential pressures or elevated temperatures during accident sequences for steam generators with the U-tube design). The staff expects to complete the revision by summer 2018.

#### Application of the Significance Determination Process to New Reactors

In the SRM to SECY-13-0137, the Commission directed the staff to enhance the SDP to accommodate new reactor designs by developing a structured qualitative assessment for events or conditions that are not evaluated in the supporting plant risk models. The Commission further noted that the SDP should continue to emphasize the use of existing quantitative measures of the change in plant risk, and the staff should develop guidance to address circumstances that are unique to new reactors. With this direction, the staff has begun discussions with internal and external stakeholders about the ROP for new reactors, to include necessary changes to the PIs and inspection programs, as well as to the SDP.

The staff has completed a preliminary review of IMC 0609, and its appendices and attachments, and the associated technical basis found in IMC 0308, “Reactor Oversight Process Basis Document,” dated September 4, 2014, to determine whether they will address the AP1000 design appropriately. This preliminary review revealed that some SDP program documents and

several IMC 0609 appendices will require updates. The staff will submit its proposed approach for SDP updates to the Commission in a SECY paper planned for CY 2018. The staff will update guidance to incorporate consideration of the design features found in the AP1000, including its passive ones.

## **Assessment Program**

The staff's implementation of the assessment program ensured that the staff and licensees took appropriate actions to address performance issues in CY 2017, commensurate with their safety significance. All applicable assessment metrics met their established criteria in CY 2017. There were no new Action Matrix deviations in CY 2017.

### Assessment Program Changes

The staff continued to monitor the impact of recent changes to the ROP. No licensees met the revised definition of a degraded cornerstone requiring three White inputs in a single cornerstone or one Yellow input, which was implemented in CY 2016. No licensees met the previous criterion for a degraded cornerstone of two White inputs in the same cornerstone during the year; therefore, the staff concluded that the change to the definition had no impact on the oversight of licensee performance for CY 2017.

The staff eliminated formal mid-cycle assessment meetings from the program in accordance with Commission direction in the SRM to SECY-16-0009, "Recommendations Resulting from the Integrated Prioritization and Re-Baselining of Agency Activities," dated April 13, 2016 (ADAMS Accession No. ML16104A158). Informal quarterly assessment meetings replaced the formal mid-cycle assessment meetings. The staff reviewed licensee performance for cross-cutting themes during these assessment meetings and issued updated inspection plans as part of those activities.

The staff also issued interim guidance to the regions eliminating the requirement for a separate non-public correspondence to transmit updated security inspection plans to licensees. The staff concluded that those security inspection plans do not contain sensitive unclassified non-safeguards information and therefore can be included in the publicly-available baseline inspection plans.

The staff did not make any other revisions to the assessment program during CY 2017. The program has undergone several significant changes during the past 3 years, and the staff is allowing sufficient time to pass before assessing the impact and effectiveness of those changes before making further revisions to the program. The staff will include the results of those effectiveness reviews in subsequent annual ROP self-assessments within the next 3 years.

### Plants in Column 4 During the Self-Assessment Period

During CY 2017, Arkansas Nuclear One, Units 1 and 2, and Pilgrim Nuclear Power Station remained in the Multiple/Repetitive Degraded Cornerstone (Column 4) of the ROP Action Matrix. The staff will discuss the status of Arkansas Nuclear One's and Pilgrim's performance during the AARM in May 2018 and the subsequent Commission meeting on the results of the AARM.