Calendar Year 2020 Reactor Oversight Process Program Area Evaluations

The staff of the U.S. Nuclear Regulatory Commission (NRC) completed calendar year (CY) 2020 Reactor Oversight Process (ROP) program area evaluations in accordance with the ROP self-assessment program as described in Inspection Manual Chapter (IMC) 0307, "Reactor Oversight Process Self-Assessment Program," dated May 29, 2020. The staff evaluated the four ROP program areas: the performance indicator (PI) program, the inspection program, the significance determination process (SDP), and the assessment program. The staff used ROP performance metrics, ROP data trending, internal and external stakeholder feedback, and other relevant information to evaluate the effectiveness of each program area. The staff provided the data and analysis for the CY 2020 ROP performance metrics in a memorandum, "ROP Performance Metric Report for Calendar Year 2020," dated March 9, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21048A262). Each evaluation also summarizes any significant changes to that program area during CY 2020, any current or future focus areas, and any recommendations for improvement.

Performance Indicator Program

The PI program continued to provide insights into plant safety and security performance in CY 2020. The staff and industry continued to improve the PI program guidance through ROP working group public 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 public Web site. In CY 2020, the NRC granted a temporary extension for the Emergency Preparedness—Emergency Response Organization PI data submittal as a result of the Coronavirus Disease 2019 (COVID-19) public health emergency (PHE), as detailed in "FAQ 20-02 R1: EP ERO Performance Indicator—Final Approved," (ADAMS Accession No. ML20352A482) as approved at an NRC public meeting on December 29, 2020 (public meeting summary, ADAMS Accession No. ML21013A550). The section, "ROP for New Reactors," of the paper, "Reactor Oversight Process Self-Assessment for Calendar Year 2020," discusses PI updates for new reactors.

Security Performance Indicator

The Office of Nuclear Security and Incident Response (NSIR) staff provided the Commission COMSECY-20-0004, "Redundant Reporting of Security Performance Indicators to the Commission," dated January 23, 2020 (ADAMS Accession No. ML19302F645, nonpublic), which requested the consolidation of reporting related to security PIs into the annual ROP self-assessment paper. Based on the Commission's approval of this request, the staff consolidated its updates related to security PIs in this paper.

The staff routinely assesses whether planned changes to the physical security inspection program, or results of the continuous evaluation of the program, would warrant the need for PI changes. For 2020, the staff determined that no new PIs were needed and that the Protected Area Security Equipment Performance Index, which is currently the only PI for the security cornerstone, should be retained. The Protected Area Security Equipment Performance Index provides valuable information related to security equipment performance by monitoring the unavailability of security equipment to perform its intended function. This PI, along with the conduct of the NRC security baseline inspection program, continues to provide assurance that regulatory oversight and performance assessment of power reactor licensee security continues to ensure secure operations.

Inspection Program

Throughout CY 2020, NRC inspectors independently verified that commercial nuclear plants were operated safely and securely using the baseline inspection program as modified through the implementation of inspection guidance issued by the Office of Nuclear Reactor Regulation in a memorandum dated May 28, 2020.[1] As discussed in more detail in the paper, "Reactor Oversight Process Self-Assessment for Calendar Year 2020," under, "Status of the ROP and Lessons Learned during the COVID-19 PHE," the PHE had an impact on the inspection program. The staff determined four ROP metrics associated with completion of the baseline inspection program, inspector objectivity, and inspector qualifications to be red for CY 2020, primarily due to the impacts of the COVID-19 PHE.

Some inspection procedures (IPs) could not be completed due to the required onsite components of the IP, the timing of the activities to be inspected, and actions taken by the NRC to protect the health and safety of both NRC and licensee staff, which restricted both onsite time and inspector travel, due to the ongoing COVID-19 PHE. While some components of these IPs were completed, some inspectors were not able to complete the required walkdowns, verifications, or observations and thus, the IPs were incomplete.

Baseline Inspection Program Completion

Each region and NSIR documented in detail their implementation of the baseline inspection program for CY 2020 via memorandum (ADAMS Accession Nos. ML21040A367 for Region I, ML21056A249 for Region II, ML21050A236 for Region III, ML21054A269 for Region IV, and ML21068A145 for NSIR (nonpublic)). Region IV completed the baseline inspection program; Region I, Region II, and Region III did not complete the baseline inspection program, as defined in IMC 2515, Section 04.07 (ADAMS Accession No. ML20084F482). The baseline inspection program, although not fully completed, was still implemented by the regions and NSIR in CY 2020. The NRC completed nearly 150,000 baseline inspection hours in CY 2020 for all operating nuclear plants in the United States, with a two-unit site averaging about 2,700 hours. The ROP is a robust and mature program, and although the baseline inspection program was not fully completed in CY 2020, this is a relatively short-term impact to the inspection program, which is expected to resolve once the ongoing PHE impacts are no longer as significant.

Security Baseline Inspection Program

The staff sought to leverage remote inspections to continue to conduct key oversight activities in the security program area during the ongoing COVID-19 PHE. Specifically, the staff implemented measures to conduct interviews, entrance meetings, and exit meetings remotely to protect against the potential spread and transmission of COVID-19. The staff also rescheduled some inspection activities to later in the ROP inspection cycle. Through these efforts, the staff was able to conduct all security baseline inspection activities scheduled during CY 2020, with the exception of force-on-force (FOF) and cyber security inspections.

Because fully integrated FOF inspections require a large number of participants, the NRC staff postponed these inspections until it could determine an appropriate approach for conducting performance-based FOF inspections. On August 7, 2020, the staff implemented IP 92707, "Security Inspection of Facilities Impacted by a Local, State or Federal Emergency where the

[1] Letter from Ho K. Nieh to Regional Administrators and Director, NSIR "Inspection Guidance During Transition from COVID-19 Mandatory Telework," dated May 28, 2020 (ADAMS Accession No. ML20141L766).

NRC's Ability to Conduct Triennial Force-on-Force Exercises is Limited" (ADAMS Accession No. ML20182A668, nonpublic).[2] The IP enabled the staff to assess licensee protective strategies through, among other things, tabletop exercises and limited-scope tactical response drills. During CY 2020, the staff used IP 92707 to inspect 16 sites previously scheduled for IP 71130.03 inspections. The licensees inspected using IP 92707 will not receive a FOF inspection under IP 71130.03 in this inspection cycle due to the unknown duration of special circumstances related to COVID-19 PHE and the resultant number of sites that would need to be rescheduled later in the cycle.[3] Based on the unique circumstances of the PHE, staff determined that IP 92707 allowed continued opportunities for oversight of performance-based evolutions, and in combination with the results of the remaining security baseline inspection procedures, appropriately balanced risks associated with the PHE to NRC and licensee personnel and protection of public health and safety. Since inspectors using IP 92707 only evaluated key elements of the licensee's protective strategy and did not conduct fully integrated FOF exercises, the staff could not make a determination associated with an exercise outcome in the manner that is typically achieved under IP 71130.03.

Building on the information gained from the implementation of IP 92707, the staff revised IP 92707 (ADAMS Accession No. ML21019A452, nonpublic) to add further assessment elements such that the inspection, if used during CY 2021, will be considered substantive enough to satisfy the FOF contingency response attributes of the baseline inspection program during the COVID-19 PHE. More holistically, staff engaged stakeholders in formulating plans for conducting FOF inspections in CY 2021.[4] Based on these engagements, staff issued a revision to IP 71130.03 (ADAMS Accession No. ML21012A329, nonpublic) to provide guidance for conducting integrated FOF inspection activities in a manner that protects against the spread of COVID-19. The guidance places an emphasis on safety protocols related to COVID-19 mitigation and involves only the minimum personnel for both the licensee and the NRC staff in conducting the inspection activity. If the staff cannot use IP 71130.03 as planned due to conditions associated with COVID-19, it will use the updated IP 92707 as a contingency tool.

While the staff has generated new inspection tools to facilitate implementation of the FOF program under the special circumstances associated with the COVID-19 PHE, the staff maintains readiness to implement program enhancements identified in COMSECY-19-0006, "Revised Security Inspection Program Framework (Option 3) in Response to [Staff Requirements Memorandum] SRM-17-0100," dated May 21, 2019 (ADAMS Accession No. ML19038A485), upon Commission direction. This COMSECY responded to (SRM)-SECY-17-0100, "Staff Requirements—SECY-17-0100—Security Baseline Inspection Program Assessment Results and Recommendations for Program Efficiencies," dated October 9, 2018 (ADAMS Accession

[2] IP 92707 was issued under IMC 2201, Appendix C, "Generic, Special, and Infrequent Inspections," dated August 7, 2020, and used in lieu of IP 71130.03, "Contingency Response—Force-on-Force Testing" (ADAMS Accession No. ML16348A408, nonpublic).

[3] Commissioners' Assistants Note, "Notification of Staff's Development of a Procedure for a Security Inspection of Facilities Impacted by a National Emergency or other Public Health Emergency where the U.S. Nuclear Regulatory Commission's Ability to Conduct Triennial Force-on-Force Exercises is Limited," dated August 3, 2020 (ADAMS Accession No. ML20197A009, nonpublic).

[4] Staff held both open and closed meetings on FOF inspection planning for CY 2021: "Meeting Summary for the Public Meeting Between the U.S. Nuclear Regulatory Commission Staff, Nuclear Energy Institute, Entergy, Nextera, and Industry Stakeholders on Force-On-Force Inspection Activities in 2021 During the COVID-19 Public Health Emergency," dated November 23, 2020 (ADAMS Accession No. ML20308A706); "Meeting Summary for the Closed Meeting Between the U.S. Nuclear Regulatory Commission Staff, Nuclear Energy Institute, Entergy, Nextera, and Industry Stakeholders Concerning the 2021 Force-On-Force Inspection Activities," dated February 1, 2021 (ADAMS Accession No. ML21028A113, nonpublic); "Meeting Summary for the Public Meeting Between the U.S. Nuclear Regulatory Commission Staff, Nuclear Energy Institute, Entergy, Nextera, And Industry Stakeholders Concerning the 2021 Force-On-Force Inspection Hardship Criteria," dated February 8, 2021 (ADAMS Accession No. ML21036A029).

No. ML18283A072), in which the Commission approved the staff's recommendation to modify the FOF inspection program to include one NRC-conducted FOF exercise and an enhanced NRC inspection of a licensee-conducted annual FOF exercise.

Regarding the cyber security inspection program, the NSIR staff continued to implement IP 71130.10P, "Cyber Security" (ADAMS Accession No. ML20189A032, nonpublic), to inspect operating nuclear power plants that have fully implemented the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) 73.54, "Protection of digital computer and communication systems and networks." NSIR intended to complete these pilot inspections in CY 2020; however, the inability to conduct onsite inspections due to the COVID-19 PHE delayed their completion. NSIR plans to complete these inspections in CY 2021. In parallel, NSIR is developing a revision to IP 71130.10P to incorporate into the baseline inspection program. The revised IP will include performance-based enhancements, incorporate risk-informed implementation guidance, and reflect lessons learned from the inspections conducted in CY 2018 through CY 2020. The staff intends to implement the new IP at the beginning of the next biennial ROP cycle in January 2022.

Significance Determination Process

The SDP continued to be effective by providing inspectors with a risk-informed method for determining the safety and security significance of inspection findings. The NRC issued approximately 248 inspection findings nationwide for CY 2020 inspections that were determined to be of very low safety or security significance (green). The NRC also finalized four greater-than-green (GTG) findings in CY 2020. In this respect, the risk-informed SDP continues to focus staff resources on those issues that are potentially more risk significant. Nevertheless, the staff remains open to opportunities to further improve the SDP.

Finalized, Ongoing, and Planned Revisions to the Significance Determination Process Guidance

This section provides the status of revisions to IMC 0609, "Significance Determination Process," dated November 9, 2020 (ADAMS Accession No. ML20267A146), and its attachments and appendices.

The staff revised IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," dated November 30, 2020 (ADAMS Accession No. ML20226A093). This revision combined and revised the Diverse and Flexible Mitigation Capability (FLEX) screening questions to clarify when a detailed risk evaluation should be performed and included additional background information to incorporate the issuance of 10 CFR 50.155, "Mitigation of beyond-design-basis events." In parallel, the staff revised IMC 0308, Attachment 3, Appendix A, "Technical Basis for the At-Power SDP," dated November 30, 2020 (ADAMS Accession No. ML20226A074), to include a more complete technical basis for each screening question in IMC 0609, Appendix A.

During CY 2020, the staff continued to assess the significance of findings in accordance with IMC 0609, Appendix E, Part I, "Baseline Security Significance Determination Process for Power Reactors," (ADAMS Accession No. ML18164A326) and IMC 0609, Appendix E, Part II, "Force-on-Force Significance Determination Process" (ADAMS Accession No. ML13350A408, nonpublic). COMSECY-19-0006 included a proposed revision to IMC 0609, Appendix E, Part II, in Enclosure 3. The proposed revision provides a simplified FOF SDP model that includes an assessment framework for one NRC-conducted FOF exercise and guidance for addressing an indeterminate exercise outcome.

In SECY-18-0091, "Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety Systems Such as the AP1000 (Generation III+ Reactor

Designs)," dated September 12, 2018 (ADAMS Accession No. ML17166A238), the staff identified five SDP guidance documents requiring revisions to support new reactor designs. In CY 2020, the NRC revised both IMC 0609 and IMC 0609, Appendix H, "Containment Integrity SDP," dated March 23, 2020 (ADAMS Accession No. ML20078L336). The staff has now revised all five SDP guidance documents to accommodate new reactor designs.

The staff also revised the following IMCs in CY 2020 to address ROP feedback forms in a timely manner and to adhere to the 5-year periodic revision requirement:

- IMC 0609, Attachment 3, "SRA Support Expectations," dated October 9, 2020 (ADAMS Accession No. ML20218A88);

- IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process," dated January 8, 2020 (ADAMS Accession No. ML19101A289);

- IMC 0609, Appendix J, "Steam Generator Tube Integrity Findings SDP," dated October 16, 2020 (ADAMS Accession No. ML20169A502);

- IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management SDP," dated October 16, 2020 (ADAMS Accession No. ML20202A459);

- IMC 0308, Attachment 3, Appendix H, "Technical Basis for Containment Integrity Significance Determination Process," dated October 27, 2020 (ADAMS Accession No. ML20191A308); and

- IMC 0308, Attachment 3, Appendix K, "Technical Basis for Maintenance Risk Assessment and Risk Management SDP," dated October 16, 2020 (ADAMS Accession No. ML20202A478).

The staff is currently revising several SDP guidance documents, with issuance planned for CY 2021. The staff is revising IMC 0609, Appendix D, "Public Radiation Safety SDP," to potentially include guidance to address inspection findings involving licensees under 10 CFR Part 37, "Physical protection of Category 1 and Category 2 quantities of radioactive material," and 10 CFR Part 50, "Domestic licensing of production and utilization facilities." IMC 0609, Attachment 1, "Significance and Enforcement Review Panel (SERP) Process," is in the early stages of revision to potentially improve the efficiency of SERP decision-making. Finally, IMC 0609, Attachment 2, "Process for Appealing NRC Characterization of Inspection Findings," dated January 25, 2021, included minor changes to formalize the required management concurrences on responses to appeal requests from licensees.

The NRC staff continued its engagement with both internal and external stakeholders. Internally, SDP guidance revisions aim to address ROP feedback forms submitted by the NRC staff. In CY 2020, newly revised SDP guidance addressed 28 ROP feedback forms. Additionally, draft SDP-related Inspection Manual documents circulate for a 30-day internal comment period, after which the staff resolves any received comments before issuance. The staff's external engagement activities included communicating proposed SDP changes and revisions to the public, industry, and other external organizations through monthly ROP public meetings.

Significance Determination Process Metrics

Two ROP metrics are associated with the SDP and apply to GTG inspection findings. Efficiency performance metric E-3, "SDP Completion Timeliness for Potentially Greater-than-Green Findings," measures whether the staff reaches a final significance determination for potentially GTG findings within 255 days from the date the issue was first identified. Reliability performance metric R-1, "Predictability and Repeatability of Significance Determination Results," measures the repeatability and predictability of the SDP in processing GTG inspection findings. In CY 2020, metric R-1 was evaluated as green. Metric E-3 was determined to be yellow because the timeliness threshold for the final significance determination was exceeded in the following three potentially GTG findings: Browns Ferry Nuclear Plant EA-19-130 (ADAMS Accession No. ML20076A950), Vogtle Electric Generating Plant EA-19-112 (ADAMS Accession No. ML20091L428), and Clinton Power Station EA-20-004 (ADAMS Accession No. ML20307A569). The "ROP Performance Metrics" section of the paper, "Reactor Oversight Process Self-Assessment for Calendar Year 2020," includes more information on this yellow metric.

Assessment Program

The staff's implementation of the assessment program ensures that the staff and licensees took appropriate actions to address performance issues in CY 2020, commensurate with their safety significance. All applicable assessment ROP metrics met their established criteria in CY 2020, including timely issuance of assessment letters (ROP metric O-2) and the conduct of annual assessment meetings (ROP metric O-3). There were no new ROP Action Matrix deviations in CY 2020 (ROP metric R-2). There were no plants in Column 4 of the Action Matrix during the year.