Calendar Year 2021 Reactor Oversight Process Program Area Evaluations

The staff of the U.S. Nuclear Regulatory Commission (NRC) completed calendar year (CY) 2021 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 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML19274B865). 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 2021 ROP performance metrics in a memorandum, "ROP Performance Metric Report for Calendar Year 2021," dated March 11, 2022 (ADAMS Package Accession No. ML22068A154). Each evaluation also summarizes any significant changes to that program area during CY 2021, 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 2021. 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 metric related to the PI program, O-4, met performance expectations, for the timeliness of the reporting, dissemination, and accurate posting of the PI data to the NRC's public Web site.

Emergency Preparedness Performance Indicator

The staff plans to develop a Commission paper in CY 2022 related to the efforts to replace the emergency preparedness alert and notification system (ANS) PI with an emergency response facility and equipment readiness (ERFER) PI. The staff engaged in numerous discussions with industry regarding the phase out of traditional siren-based ANS systems with the national implementation of the Integrated Public Alert & Warning System, which makes tracking siren maintenance less relevant. The Nuclear Energy Institute acknowledged the need to change this PI by developing a white paper, "Performance Indicators for Adjusting the Frequency of Emergency Preparedness Program Reviews," issued March 2018 (ADAMS Accession No. ML18114A049). Licensees that use a siren-based ANS will continue to be inspected under the baseline inspection program using Inspection Procedure (IP) 71114, Attachment 02, "Alert and Notification System Evaluation," dated July 21, 2016 (ADAMS Accession No. ML15253A596).

Security Performance Indicator

In CY 2021, the staff continued to assess the physical security program for enhancements and efficiencies by evaluating security IPs and IMCs for opportunities to incorporate lessons learned during the Coronavirus Disease 2019 (COVID-19) public health emergency (PHE). The staff determined that ongoing changes to, and the continuous evaluation of, the physical security inspection program did not result in the need for PI changes during this reporting period. The staff will continue to review any enhancements to the physical security inspection program to determine whether new PIs may be warranted.

The Protected Area Security Equipment Performance Index is currently the only PI for the security cornerstone. This PI serves as a measure of the unavailability of security equipment to perform its intended function. This current security cornerstone PI, along with the conduct of the security baseline inspection program, continues to provide assurance that regulatory oversight and performance assessment of power reactor licensee security remain effective and efficient, ensuring secure operations.

Inspection Program

Throughout CY 2021, NRC inspectors independently verified that commercial nuclear plants were operated safely and securely using the baseline inspection program.

Baseline Inspection Program Completion

Although challenged by the COVID-19 PHE, the staff successfully completed the baseline inspection program in CY 2021. To accomplish this, the regions and the Office of Nuclear Security and Incident Response (NSIR) performed inspection activities onsite, and in some cases, completed inspections using a hybrid method where some inspection activities were performed remotely. To mitigate staffing shortfalls caused, in part, by the COVID-19 PHE, inspectors from the Office of Nuclear Reactor Regulation, Division of Reactor Oversight, were used to staff team inspections and provide site coverage in support of baseline inspection completion. Each Region and NSIR documented in detail their implementation of the baseline inspection program for CY 2021 in several memoranda (ADAMS Accession Nos. ML22045A016 for Region I, ML22053A268 for Region II, ML22048B341 for Region III, ML22034A798 for Region IV, and Package ML22034A345 for NSIR).

Problem Identification and Resolution Inspection

In CY 2020, the staff completed a comprehensive review of the problem identification and resolution (PI&R) inspection program and identified several enhancements that could improve the overall effectiveness of the program. The report, charter, and other supporting documents are available (ADAMS Package Accession No. ML20247J590). With the withdrawal of SECY-19-0067, “Recommendations for Enhancing the Reactor Oversight Process,” dated June 28, 2019 (ADAMS Package Accession No. ML19070A036), the staff plans to provide the Commission with a vote paper in CY 2022 related to PI&R inspection frequency. The staff revised IP 71152, “Problem Identification and Resolution,” dated December 14, 2021, and effective January 1, 2022 (ADAMS Accession No. ML21281A181), to transfer inspector review of licensee PI&R documents to IMC 2515, Appendix D, “Plant Status,” dated December 14, 2021 (ADAMS Accession No. ML21281A180), as previously discussed in SECY-19-0067 and recommended by the PI&R comprehensive review (ADAMS Accession No. ML20247J590). In CY 2022, the staff will engage with the Commission on the periodicity of the PI&R team inspection, which is currently biennial; and following this, the staff will update the procedure again to incorporate both the Commission’s periodicity direction and also the recommendations of the comprehensive review report.

Oversight of Open Phase Condition Initiative

Effective July 1, 2021, the staff revised four baseline IPs to provide guidance for periodic monitoring of the industry’s continued implementation of the Open Phase Condition (OPC) initiative in accordance with the direction provided in Staff Requirements Memorandum (SRM)-SECY-16-0068, “Staff Requirements—SECY-16-0068—Interim Enforcement Policy for

Open Phase Conditions in Electric Power Systems for Operating Reactors," dated March 9, 2017 (ADAMS Accession No. ML17068A297). The revisions provide the resident inspectors guidance on sample selection within the scope of the IPs and background information on licensee OPC resolution. No additional samples or hours were added to the IPs. The staff revised the following four IPs:

- IP 71111.04, "Equipment Alignment," dated March 29, 2021 (ADAMS Accession No. ML21032A255);

- IP 71111.12, "Maintenance Effectiveness," dated March 31, 2021 (ADAMS Accession No. ML21040A148);

- IP 71111.18, "Plant Modifications," dated March 31, 2021 (ADAMS Accession No. ML21040A185); and

- IP 71111.22, "Surveillance Testing," dated March 29, 2021 (ADAMS Accession No. ML21033A557).

Completion of Temporary Instruction 2515/193

The staff completed the final inspection associated with Temporary Instruction (TI) 2515/193, "Inspection of the Implementation of EA-13-109: Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," dated October 10, 2017 (ADAMS Accession No. ML17249A105), in October 2021. Inspectors did not identify any significant safety issues associated with this TI. The staff documented the overall completion of TI 2515/193 in a memorandum titled, "Completion of Temporary Instruction 2515/193 and Associated Cross-Regional Panel Activities," dated November 10, 2021 (ADAMS Accession No. ML21306A345), and communicated the TI completion to the Commission in a Note to Commissioners' Assistants (CA Note) (ADAMS Accession No. ML21308A378, nonpublic).

Radiation Safety Inspection Program

Effective January 1, 2022, the staff revised the radiation safety baseline IPs to relocate essential activities from IP 71124, Attachment 02, "Occupational ALARA Planning and Controls," dated December 23, 2019 (ADAMS Accession No. ML19253D144), to IP 71124, Attachment 01, "Radiological Hazard Assessment and Exposure Controls," dated December 29, 2021 (ADAMS Accession No. ML21330A044), and retired IP 71124, Attachment 02. The staff also added inspection hours to IP 71124, Attachment 01, to perform these transferred inspection activities. The staff implemented these changes to improve the effectiveness and efficiency of the radiation safety baseline inspection program by adjusting the level of inspection effort based on the staff's assessment of operating experience and the radiological risk significance of licensee as low as reasonably achievable (ALARA) programs. The changes were made following extensive internal and external stakeholder engagement, and the staff notified the Commission of these changes in a CA Note (ADAMS Accession No. ML21327A460, nonpublic).

Emergency Preparedness Inspection Program

In addition to developing a Commission paper to replace the ANS PI with an ERFER PI, the staff also plans to prepare a Commission paper to implement a change to the ROP to

incorporate a Be riskSMART approach to regulatory planning standards, Title 10 of the *Code of Federal Regulations* (10 CFR) 50.47(b)(1) through 10 CFR 50.47(b)(16), that will risk inform and focus resources on the most significant inspection findings. Both of these proposed changes would also require significant conforming changes to ROP procedures.

Security Baseline Inspection Program

Throughout CY 2021, the staff continued to engage stakeholders in scheduling security inspections; this increased coordination was necessary to account for changing conditions associated with COVID-19 variants and the impacts those variants had across the country. The staff continued to leverage remote inspections associated with key oversight activities in the security program area during the ongoing COVID-19 PHE, as necessary. Specifically, the staff continued to implement measures to conduct interviews, entrance meetings, and exit meetings remotely to protect against the potential spread and transmission of COVID-19, where feasible. Through these efforts, the staff was able to conduct all security baseline inspection activities scheduled during CY 2021 and also completed the one Force-On-Force (FOF) inspection that was rescheduled from CY 2020.

With regard to the security baseline inspections associated with cybersecurity, the staff completed initial inspections with IP 71130.10P, "Cyber Security," dated July 15, 2020 (ADAMS Accession No. ML20189A032, nonpublic), in CY 2021. The purpose of the initial inspection at each operating nuclear power plant was to assess if licensees had appropriately implemented the requirements in 10 CFR 73.54, "Protection of digital computer and communication systems and networks." Based on lessons learned from the initial inspections, the staff developed the newly revised cybersecurity baseline IP 71130.10, "Cybersecurity," dated December 14, 2021 (ADAMS Accession No. ML21271A106), and effective January 1, 2022. This new IP includes performance-based enhancements, incorporates risk-informed implementation guidance, and reflects lessons learned from the inspections conducted in CY 2018 through CY 2021. The staff implemented the new IP for the biennial ROP cycle that began January 2022.

With regard to the NRC-conducted triennial FOF inspection program, the staff's two main priorities during FOF inspections in CY 2021 were to conduct a holistic assessment of the licensee's integrated protective strategy and to minimize the potential for the spread of COVID-19. The staff continued to use IP 71130, Attachment 03, "Contingency Response – Force-On-Force Testing," dated February 8, 2021 (ADAMS Accession No. ML21012A329, nonpublic), which provides guidance for conducting integrated FOF inspection activities in a manner that mitigates the spread of COVID-19. Additionally, in January 2021, the staff provided a CA Note, "Notification of Staff's Plan to Implement the Power Reactor Force-on-Force Inspection Program in CY 2021, with Accommodations for the COVID-19 Public Health Emergency" (ADAMS Package Accession No. ML21019A450, nonpublic), that notified the Commission of the staff's plans to conduct FOF inspection activities during the PHE.

The guidance in IP 71130, Attachment 03, emphasizes safety protocols related to COVID-19 mitigation and uses only the minimum number of personnel for both the licensee and the NRC staff during the conduct of inspection activities during the COVID-19 PHE. If the staff cannot use IP 71130, Attachment 03, as planned due to conditions associated with COVID-19, the staff will use IP 92707, "Security Inspection of Facilities Impacted by a Local, State, or Federal Emergency where the U.S. Nuclear Regulatory Commission's Ability to Conduct Triennial Force-On-Force Exercises is Limited," dated February 8, 2021 (ADAMS Accession No. ML21019A452, nonpublic), as a contingency tool. During CY 2021, the staff used IP 71130, Attachment 03, to inspect 12 sites, including 1 site that was rescheduled from CY 2020 due to

COVID-19 PHE conditions at the site, and the staff used the updated IP 92707 to inspect 6 sites previously scheduled for inspections under IP 71130, Attachment 03. The use of the updated IP 92707 allowed for the assessment of additional elements, which in concert with the remaining security baseline inspections were substantive enough to satisfy the FOF contingency response attributes of the security baseline inspection program.

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 289 inspection findings nationwide for CY 2021 inspections that were determined to be of very low safety or security significance (Green). The NRC also finalized one Greater-Than-Green (GTG) finding in CY 2021. In this respect, the risk-informed SDP continues to focus staff resources on those issues that are potentially more risk significant.

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, Attachment 1, "Significance and Enforcement Review Panel (SERP) Process," effective August 19, 2021 (ADAMS Accession No. ML21148A149), to (1) emphasize the available option of using a modified SERP to improve timeliness, (2) improve the description of the roles and responsibilities for the SERP voting members, (3) change the escalation to the Deputy Office Director level from the Office Director level for those significance determinations that do not reach consensus at the SERP, and (4) require more detailed documentation and visualization of uncertainty in the SERP form and subsequently more discussion of uncertainties during the SERP panel.

The staff is developing a Commission vote paper to request approval to revise the emergency preparedness portion of the ROP, which includes IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 22, 2015 (ADAMS Accession No. ML15128A462), such that only inspection findings for planning standard functions from 10 CFR 50.47, "Emergency plans," that may have the potential to directly impact public health and safety, or directly impact effective implementation of the licensee's emergency plan, may be assessed as GTG. This vote paper is an outgrowth of the emergency preparedness recommendations in the now withdrawn SECY-19-0067.

The staff revised IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," (ADAMS Accession No. ML20346A515), and the corresponding basis document, IMC 0308, Attachment 3, Appendix D, "Technical Basis for Public Radiation Safety Significance Determination Process," (ADAMS Accession No. ML20346A502), both dated September 24, 2021, to incorporate guidance for dispositioning inspection findings under 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material," and to update guidance for dispositioning findings associated with the transportation of radioactive materials. In COMSECY-21-0010, "Revision of the Reactor Oversight Process

Public Radiation Safety Significance Determination Process," dated July 16, 2021 (ADAMS Accession No. ML21144A140), the staff previously requested Commission approval or provided the Commission notification of these specific changes. The Commission approved the staff's recommendation in SRM-COMSECY-21-0010, dated August 19, 2021 (ADAMS Accession No. ML21231A250).

During CY 2021, the staff continued to assess the significance of security findings in accordance with IMC 0609, Appendix E, "Security Significance Determination Process for Power Reactors," dated April 2, 2021 (ADAMS Accession No. ML20295A356), and its security-specific parts. The staff did not recommend any changes to this IMC and did not complete any revisions to the program.

The staff continued to engage regularly with both internal and external stakeholders. Internally, the staff revised SDP guidance to address ROP feedback forms submitted by the NRC staff. The staff revised the following IMCs in CY 2021 to address the suggestions in ROP feedback forms in a timely manner and to adhere to the 5-year periodic revision requirement:

- IMC 0308, Attachment 3, "Technical Basis for Significance Determination Process," dated November 5, 2021 (ADAMS Accession No. ML21271A120);

- IMC 0609, Appendix E, "Security Significance Determination Process for Power Reactors," dated April 2, 2021 (ADAMS Accession No. ML20295A356);

- IMC 0609, Appendix L, "Extensive Damage Mitigation Guidelines Significance Determination Process," dated December 7, 2021 (ADAMS Accession No. ML21311A003); and

- IMC 0308, Attachment 3, Appendix L, "Technical Basis for Extensive Damage Mitigation Guidelines Significant Determination Process," dated December 7, 2021 (ADAMS Accession No. ML21311A002).

The staff's external engagement activities included communicating proposed SDP changes and revisions to the public, industry, and any other interested 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 2021, 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 findings: Point Beach Nuclear Plant EA-20-081, dated February 9, 2021 (ADAMS Accession No. ML21039A709), and James A. FitzPatrick Nuclear Power Plant EA-20-138, dated April 20, 2021 (ADAMS Accession No. ML21105A543). The "ROP Performance Metrics" section of the paper "Reactor Oversight Process Self-Assessment for Calendar Year 2021" 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 2021, commensurate with their safety significance. All applicable assessment ROP metrics met their established criteria in CY 2021, including the timely issuance of assessment letters (ROP metric O-2) and the conduct of annual assessment meetings (ROP metric O-3). There were no ROP Action Matrix deviations during CY 2021 (ROP metric R-2). There were no reactor units in Column 4 of the ROP Action Matrix during the year.

Cross-Cutting Issues Program

In CY 2020, the staff completed the cross-cutting issues (CCI) effectiveness review effort. The staff issued the final CCI effectiveness review report on September 21, 2020 (ADAMS Package Accession No. ML20239A806). The staff found that the CCI program continues to have value by focusing on patterns of safety culture behaviors, but that the changes implemented in 2015 resulted in a program that appears to be less responsive to cross-cutting behavior indicators and thus introduced concerns about whether the program would proactively identify cross-cutting concerns consistent with the program objective.

The report documented recommendations categorized in two groups: Group 1 recommendations, that could be implemented with a lower level of resources and could lead to small improvements, and Group 2 recommendations, that would make significant improvements but would come at a higher resource cost. On September 17, 2021, the Office of Nuclear Reactor Regulation management dispositioned the recommendations in a memorandum (ADAMS Accession No. ML21209A993). Therefore, the staff plans to move forward with the implementation of two recommendations from Group 1: provide more detailed discussion of Cross-Cutting Issues insights and decisions in assessment letters (report recommendation 3.d) and Cross-Cutting Issues should not be able to be closed solely based on a reduction in inspection findings (report recommendation 4.d).