



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 5, 2021

MEMORANDUM TO: Andrea Veil, Director  
Office of Nuclear Reactor Regulation

FROM: Christopher Regan, Acting Director  
Division of Reactor Oversight  
Office of Nuclear Reactor Regulation

A handwritten signature in black ink, appearing to read "Chris Regan".

Signed by Regan, Christopher  
on 11/05/21

SUBJECT: COMPREHENSIVE BASELINE INSPECTION PROGRAM  
REVIEW - CALENDAR YEAR 2021

In a charter, dated March 16, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21060B600), the Director, Division of Reactor Oversight assembled a working group to conduct a Comprehensive Baseline Inspection Program Review as part of the annual Reactor Oversight Program (ROP) self-assessment program, described in Inspection Manual Chapter (IMC) 0307, Appendix B, "Reactor Oversight Process Self-Assessment Baseline Inspection Program Monitoring and Comprehensive Review," dated May 29, 2020. The charter was subsequently revised on August 18, 2021 (ADAMS Accession No. ML21211A574). The purpose of the review was to develop recommendations to revise the inspection program based on lessons learned from the COVID-19 public health emergency (PHE). Another objective was to provide flexibilities for inspectors to complete the baseline inspection program should another PHE arise, or other emergent circumstances precluding onsite access.

The staff has completed that review and documented their findings and recommendations in Enclosure 1.

Enclosure 1: Comprehensive Baseline Inspection  
Program Review Report

SUBJECT: COMPREHENSIVE BASELINE INSPECTION PROGRAM REVIEW - CALENDAR YEAR 2021 DATED: NOVEMBER 5, 2021.

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## **Comprehensive Baseline Inspection Program Review Report**

### **Background**

As described in Inspection Manual Chapter (IMC) 0307, Appendix B, "Reactor Oversight Process Self-Assessment Baseline Inspection Program Monitoring and Comprehensive Review," dated May 29, 2020, the staff is to conduct a comprehensive baseline inspection program review every fifth year (the year after the Office of Nuclear Reactor Regulation (NRR) has completed Reactor Oversight Process (ROP) implementation audits for all four regions). This review is normally intended to holistically evaluate the entire baseline inspection program. However, in CY 2019, the staff completed a comprehensive review of every baseline inspection procedure as part of the ROP enhancement initiative. The staff made several recommendations to revise inspection procedures (IPs) that were documented in SECY-19-0067, "Recommendations for Enhancing the Reactor Oversight Process," dated June 28, 2019 (Agency Documents Access and Management System (ADAMS) Accession No. ML19070A036)<sup>1</sup>. Therefore, the staff focused this review on lessons learned from the COVID-19 public health emergency (PHE).

In CY 2020, the staff completed a comprehensive review of the impacts to the ROP due to the COVID-19 PHE and documented the results in a report titled, "Initial Report on Challenges, Lessons Learned and Best Practices from the 2020 COVID-19 Public Health Emergency; Focus on Regulatory Oversight of Operating Nuclear Reactors," dated January 2021 (ADAMS Accession No. ML20308A389). A 17-member team was established to identify lessons learned and best practices and to make recommendations to improve NRC readiness for future emergencies and non-emergency conditions. Recommendations included:

- consider revisions to inspection procedures or guidance to indicate activities and inspection requirements that can be performed either fully remotely, partially remotely, or must be completed onsite; and
- revise ROP program documents to include best practices and guidance developed since the COVID-19 PHE began.

On August 4, 2021, the Office of the Inspector General (OIG) issued their final report titled, "Audit of the NRC's Pandemic Oversight of Nuclear Power Plants," (ADAMS Accession No. ML21214A042). In that report, the OIG recommended that the staff conduct an assessment that presents agency management with options for modifying inspection program documents and procedures to give staff flexibility for conducting inspections under irregular conditions. While the baseline inspection program review began in March 2021, the results of this review, in combination with a follow-on COVID-19 lessons learned review, is intended to address this OIG recommendation.

The baseline inspection program is a vital input into providing reasonable assurance of adequate protection of public health and safety. Other inputs include defense-in-depth; plant design features; safety margins; probabilistic risk assessment (PRA) insights, if available; NRC licensing programs; compliance with NRC regulations; and expert judgment. In SECY- 21-0038, "Reactor Oversight Process Self-Assessment for Calendar Year 2020," dated April 1, 2021 (ADAMS Accession No. ML21057A169), the staff reported to the Commission that the

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<sup>1</sup> Although this SECY was withdrawn by the staff in 2021, the NRC staff considers the evaluation performed to support the recommendations in the SECY to still be valid for the period reviewed. Accordingly, the focus of this current staff effort was on lessons from the COVID-19 PHE.

baseline inspection program was not completed in CY 2020, primarily due to challenges presented by the PHE. One of the objectives of the review was to identify alternatives to completing inspection samples if direct observation was not possible with the intent of increasing flexibilities for inspectors to complete the baseline inspection program in the future should access to licensee facilities be challenged by a similar PHE or other circumstances.

### Discussion

The NRC staff established a working group consisting of staff from NRR, the Office of Nuclear Security and Incident Response (NSIR) and all four regions to conduct the review under a charter that can be found at ADAMS Accession No. ML21211A574. The purpose of the review was to recommend revisions to inspection program guidance to standardize implementation of the baseline inspection program in the event of another PHE or if other circumstances restricted inspector access to licensee facilities. The identification of best practices was intended as a knowledge management/knowledge transfer initiative based on lessons learned from the COVID-19 PHE. Members of the working group had extensive experience as senior resident inspectors or as region-based inspectors. The working group interviewed a broad group of inspectors from all regions to gather inspection practices that have been implemented to complete the baseline inspection program during the PHE to identify what can be completed remotely and what requirements must be completed onsite, as well as to identify best practices. Every inspection requirement and activity described under the specific guidance sections of each IP was considered. The working group did not fully align on all inspection activities as to whether the activity could be done remotely. For example, IP 71111.22, "Surveillance Testing," states "verify by witnessing surveillance tests and/or reviewing the test data..." This should be interpreted to mean that direct observation is not required to complete the sample. Some inspectors felt that some activities should only be completed through direct observation, and document reviews are insufficient. There may be some surveillance tests for which an inspector might feel compelled to witness, but that determination should be based on risk-significance, system or component history, licensee performance, etc. If working group members disagreed with the option to not observe the activity, they were advised to submit a feedback form to recommend revising the inspection requirements.

The working group focused the review on the baseline inspection activities that must be completed by an inspector onsite through direct observation and identifying any compensatory actions or alternatives that could be credited toward inspection procedure completion if inspector travel or site access were restricted for any reason.

There was universal agreement within the working group that the preferred option for all inspection activities is direct observation onsite, if possible. The team fully endorses guidance in IMC 2515, "Light Water Reactor Inspection Program Operations Phase," which states, "performance-based inspection emphasizes observing activities and the results of licensee programs over reviewing procedures or records. Discussions with plant personnel and reviewing documents should be used to enhance or verify performance-based observations." Nevertheless, the review assumed that inspectors were unable to be onsite to directly observe licensee activities because of travel restrictions or if the risk to inspector or licensee personnel health outweighs the benefit of being onsite.

### Alternatives to Direct Observation Onsite

The working group members agreed that one vital tool that supports remote inspection is continuous access to plant parameters, procedures, and documents through the licensee

computer network. During the CY 2020 PHE, all resident inspectors had digital access to the plant networks through laptops provided by the licensee or through Virtual Private Network (VPN) connections. The working group agreed with the conclusion in the “Initial Report on Challenges, Lessons Learned and Best Practices from the 2020 COVID-19 Public Health Emergency; Focus on Regulatory Oversight of Operating Nuclear Reactors,” that agreements with licensees should be updated to include remote access to plant processes.

While many inspection activities described in the IPs could be completed remotely, described by phrases such as “observe and/or review,” most IPs have some component that requires direct observation. Based on improved technologies available, the working group identified general alternatives to direct observation that included, in order of preference:

- Streaming video with direct communication with personnel onsite
- Streaming video
- Recorded video
- Photographs

Although review of video or photographs is not a perfect substitute for direct observation, it may be adequate to provide the verification that inspectors need to meet the IP objectives. IP 71111.20, “Refueling and Other Outage Activities,” was recently revised to provide inspectors with additional flexibility to complete walkdowns of containment after shutdown and prior to restart through increased use of technology. Specifically, the guidance now states, “Review information gathered by videos and photographs and other technologies (such as data collecting-drones, robots) to evaluate inaccessible containment/drywell areas. At the discretion of the inspectors, the use of this information may be used in lieu of a walkdown.” This flexibility may better position inspectors to complete the inspection, particularly if the inspector is unable to physically be onsite and may be extended to other IPs.

However, there are limitations associated with video and photographs such that they may not be acceptable in all cases. Viewing structures, systems, and components (SSCs) in two dimensions is much more challenging than seeing these same SSCs in three dimensions. It is easier to overlook something when reviewing it digitally than through direct observation. Also, an inspector onsite uses all their senses, including hearing and smell, which allow them to identify something that doesn’t seem right. Inspectors only have their eyes to identify something possibly amiss when reviewing digital media. The quality and resolution of the media is a prime factor in determining whether it provides sufficient detail for the inspector to conclude that it meets the requirements or objectives of the IP to declare the inspection complete. Another factor in the acceptability of the media is how thorough the coverage is. Does it capture all the necessary elements to give the inspector confidence that the inspection activity has been verified? Does it capture all areas where an inspector would look? If an inspector requests video or photographs, they should be very specific as to what they need to see for the inspection requirement to be complete.

Acceptability of the digital media as an alternative to direct observation will be subjective. Other factors that will impact the acceptability include inspector experience, familiarity with the site, licensee performance, etc. One inspector may find the media acceptable based on their knowledge and experience; another inspector may not have the same confidence and be reluctant to accept it. While the goal of this effort is to promote consistency in conducting the baseline inspection program under adverse conditions, there is a risk that there will be inconsistencies among inspectors in accepting the alternatives. However, providing inspectors

with the option to accept digital media in lieu of direct observation will increase flexibility and likely improve the ability to complete the baseline inspection program even under adverse conditions.

There are some inspection activities for which these alternatives may not be a suitable substitute to being onsite. Completion of IP 71111.11, "Licensed Operator Requalification Program and Licensed Operator Performance," in most cases will likely require onsite presence to observe crew performance, especially during requalification exams. There are exceptions where licensees have wired simulators with cameras and microphones. Also, any IP that requires inspectors to review medical records, records with personally identifiable information (PII), and for some licensees, records associated with the Employee Concerns Program will require inspectors to travel to the site. It may be possible to review some of these records remotely, but it will likely require a substantial effort. There are options for securely collaborating and sharing files with external stakeholders that have been approved by the NRC, including PKWARE SecureZIP software and BOX – Enterprise File Sharing and Synchronization (BOX-EFSS).

#### Recommendation 1

The working group recommends revising inspection program guidance to provide inspectors with the opportunity to credit the review of digital media, in the form of streaming video, recorded video, and photographs, in lieu of direct observation when conditions preclude inspectors from traveling or accessing the location. Acceptability of such digital media depends on the quality and thoroughness of the submission. Additional consideration should be given to the dispositioning of that digital media in accordance with IMC 0620, "Inspection Documents and Records." It should be treated the same as any other information provided to inspectors during their inspection.

The working group recommends adding guidance on acceptability of digital media in lieu of direct observation to IMC 2515, Appendix E, "Inspection Program Modifications During Pandemics, Epidemics, or Other Widespread Illnesses or Diseases." Because the guidance would pertain to any circumstances besides a PHE where inspector travel or site access were restricted, the working group recommends revising the title of Appendix E to "Inspection Program Modifications During Public Health Emergencies or Other Conditions Restricting Inspector Onsite Presence," or something similar.

The working group recognizes that the Office of Nuclear Material Safety and Safeguards (NMSS) recently revised IMC 2690, "Inspection Program for Storage of Spent Reactor Fuel and Reactor-Related Greater-Than-Class C Waste at Independent Spent Fuel Storage Installations and for 10 CFR PART 71 Transportation Packagings," Appendix F, "Inspection Program Modifications During Pandemics, Epidemics, or Other Widespread Illnesses or Diseases," to provide guidance for inspections of Independent Spent Fuel Storage Installations (ISFSIs) and transportation packaging during a pandemic. That guidance includes evaluating if an IP can be postponed or performed remotely, assessing the potential to perform inspection activities through remote/virtual means, and identifying opportunities to leverage technology to inspect remotely. These options are consistent with NRR's inspection practices during the current pandemic and the recommendation from this working group.

#### Best Practices

The working group considered several issues characterized as best practices that should be captured as knowledge management/knowledge transfer. Some of these practices were previously documented in the CY 2020 lessons learned report, "Initial Report on Challenges, Lessons Learned and Best Practices from the 2020 COVID-19 Public Health Emergency; Focus on Regulatory Oversight of Operating Nuclear Reactors," and are reiterated here. They should be documented as durable lessons learned and may be considered for a weekly knowledge management topic.

#### *Resident Inspector Assistance*

One practice during the PHE was to utilize one of the resident inspectors for inspection verification requirements when regional inspectors were not able to travel, since the residents were able to access the site at least once every three business days in most cases. In some cases, the local conditions of the PHE near the sites was elevated such that those residents were allowed to forego the three-day requirement for weeks at a time. However, reliance on resident inspectors to complete inspections typically performed by regional inspectors is not practical. The resident inspectors are responsible for completing specific baseline inspection requirements and may not have time to assist other inspections. In addition, resident inspectors traveling to the site put their own health and safety at risk, as well as that of their families. The risk must be weighed against the benefits of completing inspection requirements, especially if those requirements can be met through crediting of alternatives to being onsite, such as digital media. That being said, as the PHE progressed and inspectors better understood the risks and minimized those risks by complying with the Centers for Disease Control (CDC) guidelines, appropriate personal protective equipment was available, and the vaccines were available to resident inspectors, most resident inspectors were willing to assist other inspectors who were unable to travel. The resident inspectors can be considered an asset for direct observation or verification, but consideration should be given to their availability and personal risk with conducting the inspection activity based on local conditions in and around the licensee facility.

#### *Maximizing Digital Media Quality*

Providing guidance to licensee personnel or NRC staff prior to having them record video or take photographs can maximize the probability that the media will be acceptable to credit for inspection completion in lieu of being onsite. Inspectors should be very specific as to what they need to see to complete the inspection. Live video with direct communication with onsite staff would be most effective as the inspector can direct the person with the camera. However, that may not always be feasible considering that licensees may have their own onsite staffing limitations. Guidance to consider when requesting video or photographs includes using highest resolution possible, ensuring equipment ID tags are clearly visible, maximizing lighting being mindful of areas where camera flashes can affect equipment sensors, and capturing surrounding areas.

#### *Interfacing with the Licensee*

During the PHE, nearly all meetings were conducted remotely. This included interviews with licensee personnel when inspectors had questions during their inspections. Face-to-face communications help establish rapport with the licensee, and inspectors should be attuned to facial expressions and body language as a non-verbal form of communication. Inspectors should request that both parties use their video cameras during interviews unless limited bandwidth is an issue. Other best practices when meeting with licensee personnel include

screen-sharing to ensure clarity, providing written questions to licensee staff for efficiency and to avoid confusion, and establishing a cloud-based file exchange system for exchanging information.

### *Team Inspections*

The PHE caused the staff to rethink how to conduct team inspections. The strategy has typically been to have the inspection team onsite for one week, with the following week offsite conducting in-office reviews, and the final week back onsite to complete the inspection. Because travel during the PHE was restricted, inspectors assigned to team inspections were either not allowed to travel or opted not to travel because of the risk to their health. Each of the team inspections consists of document reviews which can be completed remotely. They also each have activities that must be completed onsite, such as system walkdowns, verification of operator manual actions, verification of corrective actions, etc. Team inspections have become a hybrid of remote and onsite inspection. In some cases, the team leader is onsite for the traditional onsite weeks, while team members may work remotely one week, and onsite the other week. In some cases where a team member is unable or unwilling to travel because of risk tolerance, another team member can complete their onsite verification activities such that the inspection can still be completed. Team leaders should be flexible and work with team members to ensure all inspection requirements can be met when all team members can't be onsite for the entire inspection.

### Recommendation 2

The working group recommends documenting these best practices and any others that become known as part of a knowledge management initiative. Most are not appropriate to add to inspection program guidance documents, so they should be captured using a more informal tool, such as Nuclepedia. Another option would be to capture them in a lessons learned document stored in ADAMS and referenced in IMC 2515 Appendix E. In addition, this topic should be considered for presentation at a weekly knowledge management seminar.

### Conclusion

In summary, the PHE caused the NRC to consider new approaches for completing the baseline inspection program when inspectors were unable to be onsite. There have been many lessons learned that should be documented for future events when inspectors are unable to travel to or access licensee facilities. While the staff was still able to conclude that there was reasonable assurance of public health and safety despite not completing the baseline inspection program during this CY 2020 PHE, additional flexibilities can be added to the program to increase the likelihood of completing the inspection program in the future should conditions such as these occur again. While reliance on digital media in lieu of direct observation is not an ideal alternative, in some cases, it may provide the verification inspectors require to meet the inspection objectives. Inspection program guidance should be revised to accept digital media in lieu of direct observation if inspectors are unable to be onsite, subject to its acceptability based on quality, thoroughness, and licensee performance. Documenting best practices as part of knowledge management will improve standardized implementation of the baseline inspection program during a future PHE or similar event.