



Protecting People and the Environment

SEMIANNUAL STATUS REPORT ON THE LICENSING
ACTIVITIES AND REGULATORY DUTIES OF THE
U.S. NUCLEAR REGULATORY COMMISSION

October 2020–March 2021

Note: The period of performance covered by this report includes activities that occurred from the first day of October 2020 to the last day of March 2021. The transmittal letter to Congress accompanying this report provides additional information to keep Congress fully informed of the current licensing and regulatory activities of the U.S. Nuclear Regulatory Commission.

Enclosure

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I. Reactor Oversight Process

The U.S. Nuclear Regulatory Commission (NRC) uses the Reactor Oversight Process (ROP) to assess the performance of operating power reactor licensees and to guide the assignment of inspection resources. Using inputs from both agency self-assessments and independent evaluations, the NRC adjusts the ROP on an ongoing basis to enhance its effectiveness and efficiency. The NRC staff meets with interested stakeholders periodically to collect feedback on the effectiveness of the process and considers this feedback when making improvements to the ROP.

The agency's most recent performance assessments indicate that all operating power reactor plants continue to operate safely. The NRC staff conducts assessment reviews, communicates changes in licensee performance quarterly, and issues end-of-cycle assessment letters. The NRC issued annual assessment letters to licensees in March 2021. The NRC website reflects the latest power reactor plant performance assessments as of March of calendar year (CY) 2021.

The ROP provides the NRC staff with the flexibility to adjust the baseline inspections, as needed, to focus on safety significant issues during the Coronavirus Disease 2019 (COVID-19) Pandemic. During this reporting period, the Office of Nuclear Reactor Regulation (NRR) issued a memorandum, "Calendar Year 2021 Inspection Guidance During COVID-19 Telework Restrictions," on February 1, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML21027A274](#)), to provide guidance for the regional offices to continue ROP inspection activities as COVID-19 restrictions continue to change in CY 2021. This memorandum superseded the May 28, 2020, memorandum, "Inspection Guidance During Transition from COVID-19 Mandatory Telework" (ADAMS Accession No. [ML20141L766](#)). The February 2021 memorandum restored the ROP completion goal for the CY 2021 ROP to complete the nominal inspection samples for the baseline inspection program for each site. The memorandum also reiterated that the regions should continue to consider risks to inspectors' health and safety—and that of licensees' employees—when making decisions about inspection completion. Additionally, the memorandum stated that the ROP guidance discussed in the enclosure of the May 28, 2020, memorandum remains in effect for regional execution of the inspection program for CY 2021.

The NRC continues to have a modified onsite inspection presence at the sites, while maintaining oversight that fulfills our mission. The NRC staff continues to implement the baseline inspection program and initial operator licensing examinations, while taking precautions recommended by the Centers for Disease Control and Prevention (CDC) to minimize exposure to COVID-19. Nationwide, the NRC staff completed more than the minimum number of baseline inspection samples for most inspection procedures in CY 2020. The staff collectively 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. A few inspection procedures, which included aspects of the refueling outage inspection and certain team inspections, were not completed (or were rescheduled for a later time) due to the impact of the COVID-19 restrictions on the required onsite components of the procedures. Although the NRC did not complete the baseline inspection program in accordance with Inspection Manual Chapter (IMC) 2515 (ADAMS Accession No. [ML19345F282](#)) for CY 2020, the NRC met our mission based on onsite resident inspector presence and monitoring of plant activities in accordance with IMC 2515, Appendix D, "Plant Status" (ADAMS Accession No. [ML20323A037](#)), as well as inspectors' discussions with plant personnel and review of plant records; the observation of overall plant performance, including findings, performance indicators, events, and equipment performance; and satisfactory completion of samples that were performed.

The NRC issued a 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,” on January 11, 2021 (ADAMS Accession No. [ML20308A389](#)). The report includes data from a 24-question survey and an evaluation of 248 survey responses and provided several near- and long-term recommendations for consideration as the NRC continues to implement the ROP during the COVID-19 pandemic. The recommendations address how the NRC might prepare for remote oversight in the future for normal, non-emergency conditions in addition to improving information technology capability and reliability, evaluating increased remote inspection activities, and telework for resident inspectors. The NRC staff is considering revisions to inspection program documents to include best practices and/or guidance that has been developed since the beginning of the COVID-19 pandemic. These recommendations were discussed with the Nuclear Energy Institute’s (NEI) ROP Task Force executives and other senior industry executives during the January 27, 2021, ROP public meeting (ADAMS Accession No. [ML21047A290](#)).

II. Implementing Risk-Informed and Performance-Based Regulations

In 1995, the NRC issued the Probabilistic Risk Assessment (PRA) Policy Statement (Volume 60 of the *Federal Register* (FR), page 42622; August 16, 1995), which formalized the Commission’s commitment to risk-informed regulation through the expanded use of PRA. The use of PRA in regulatory decisionmaking and licensing activities for U.S. light-water reactors (LWRs) has increased in recent years, and licensees continue to adopt many risk-informed initiatives. PRAs provide licensees with risk insights that allow increased flexibility in plant operations. They also enable both licensees and the NRC to better identify and focus on more safety-significant issues. The NRC staff continues to work with industry to support risk-informed and performance-based initiatives.

The industry has communicated plans to continue to submit applications for adoption of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.69, “Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors.” This would allow licensees to establish a more risk-informed program for the treatment of structures, systems, and components (SSCs). In 2014, the NRC approved the pilot application of 10 CFR 50.69 for Vogtle Electric Generating Plant. Since completion of the pilot, the industry has submitted 25 applications to adopt 10 CFR 50.69. The NRC staff has approved 18 applications and is currently reviewing the remaining 7 applications. The NRC anticipates receiving seven additional applications by the end of fiscal year (FY) 2021.

The industry has also communicated plans to submit applications to adopt the Risk-Informed Technical Specifications (RITS) Initiative 4b. This initiative allows licensees to temporarily extend certain technical specification completion times up to 30 days, based on plant configuration and a real-time risk calculation. This approach maintains and improves safety through the incorporation of risk assessment and management techniques into a plant’s technical specifications, while reducing unnecessary regulatory burden. To date, the industry has submitted 17 applications to adopt RITS Initiative 4b. The NRC staff has approved 10 applications, is currently reviewing the remaining 7 applications, and anticipates receiving an additional 16 applications by the end of FY 2021.

Following the March 2011 accident at the Fukushima Dai-ichi nuclear power plant in Japan, the NRC issued orders (now codified in 10 CFR 50.155, “Mitigation of beyond-design-basis events”) to require enhanced mitigation strategies for maintaining or restoring core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. While

initially designed to address extreme external events, those strategies (referred to as FLEX) could be effective in mitigating other risks, such as those which could be experienced during complex refueling outage operations. The NRC staff continues to interact with industry on ways that FLEX could be used in such applications through, for example, participation in several forums with NEI and other industry stakeholders. These interactions included discussion of several topics, including FLEX operating experience, the expanded use of FLEX to support plant operations, modeling FLEX in PRAs, and crediting of FLEX equipment in NRC licensing and oversight activities. The industry has indicated that it plans to incorporate lessons learned associated with the treatment of FLEX in licensing and oversight into appropriate guidance documents.

In addition, the NRC implemented the Very Low Safety Significance Issue Resolution (VLSSIR) process in January 2020. The process was developed based on suggestions from both internal and external stakeholders to improve NRC processes to promptly resolve issues pertaining to a facility's licensing basis that are of very low safety significance. The process is documented in revised inspection guidance, which allows inspectors to close very low safety significance issues early in the inspection process if there is a question as to whether an issue is within the licensing basis and if that question cannot be resolved without a significant level of effort. The revised guidance includes criteria for when the VLSSIR process may be used and the required documentation for the inspection reports. The NRC issued memorandum, "Results of a Calendar Year 2020 Reactor Oversight Process Self-Assessment Effectiveness Review of the Very Low Safety Significance Issue Resolution Process," on March 2, 2021 (ADAMS Accession No. [ML21070A334](#)), to document the results of CY 2020 VLSSIR self-assessment effectiveness review. The process was used to close seven issues in CY 2020. Two of these issues had been open for more than a year.

As part of the VLSSIR initiative, the NRC also developed the Risk-Informed Process for Evaluations (RIPE) to resolve very low safety significance compliance issues commensurate with their risk significance using existing regulations under 10 CFR 50.12 or 10 CFR 50.90 and risk information. The RIPE guidance was approved for use on January 7, 2021 (ADAMS Accession No. [ML21006A324](#)). If a licensee elects to use RIPE to resolve a non-compliance, it would characterize the risk associated with the proposed exemption or amendment and submit a request to the NRC for approval. Licensees can use the RIPE process to justify plant-specific licensing actions to address the issue without imposing undue burden.

In June 2020, the NRC staff issued enhanced guidance associated with the use of risk insights in the review of licensing actions, "Integrated Risk-Informed Decision-Making for Licensing Reviews" (ADAMS Accession No. [ML19263A645](#)). The objective of the enhanced guidance is to more effectively support the NRC staff in considering risk insights in licensing reviews through the establishment of integrated review teams, where risk analysts work together with traditional deterministic reviewers to complete these technical evaluations. Since the issuance of the guidance, the staff has been promoting greater awareness and use of this guidance and educating the staff on how to use it to risk-inform safety evaluations of licensing actions. These efforts are expected to result in greater consistency and transparency in the staff's use of risk insights as part of the basis for reaching regulatory decisions and making safety conclusions.

In addition, in November 2020, the NRC staff issued draft Revision 2 of Regulatory Guide (RG) 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," for public comment ([85 FR 73088](#) and ADAMS Accession No. [ML20231A856](#)). This proposed revision addresses new information identified since the last revision and updates previous staff positions and endorsements, including the NEI guidance document NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under

10 CFR 50.48(c),” Revision 3 (ADAMS Accession No. [ML19351D277](#)), and portions of NEI 00-01, “Guidance for Post Fire Safe Shutdown Circuit Analysis,” Revision 4 (ADAMS Accession No. [ML19351D276](#)). This proposed revision also includes guidance concerning fire-induced circuit failures.

In December 2020, the staff issued RG 1.200, Revision 3, “Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities” (ADAMS Accession No. [ML20238B871](#)). RG 1.200 provides guidance for determining whether a base PRA is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decisionmaking for LWRs. Revision 3 endorses portions of a Pressurized Water Reactor Owners Group (PWROG) guidance document, PWROG-19027-NP, Revision 2, “Newly Developed Method Requirements and Peer Review” (ADAMS Accession No. [ML20213C660](#)), and also endorses guidance document NEI 17-07, Revision 2, “Performance of PRA Peer Reviews Using the ASME/ANS PRA Standard” (ADAMS Accession No. [ML19241A615](#)). These documents provide guidance for licensees to use a peer review process to adopt newly developed PRA methods, thereby enhancing regulatory efficiency.

III. Status of Issues Tracked in the Reactor Generic Issues Program

During this reporting period, the NRC staff closed one generic issue (GI) and continued its evaluation of one potential GI.

In conjunction with efforts in response to the lessons learned from the Fukushima Dai-ichi accident, the NRC staff completed the evaluations on the impacts of seismic hazards on all nuclear power plants that will continue operation until their licenses expire. The NRC has determined that no additional regulatory actions related to the seismic hazards are needed. Upon receiving confirmation from NRR that all licensing activities were completed and verified by the NRC staff, the Director of the Office of Nuclear Regulatory Research (RES) issued a memorandum officially closing out GI-199, “Closure of Generic Issue 199 (GI-199), ‘Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants,’” on December 15, 2020 (ADAMS Accession No. [ML20344A277](#)).

High-Energy Arching Faults

For the potential GI related to the effects of High-Energy Arching Faults (HEAF) involving aluminum at nuclear power plants, the staff continued to assess whether the issue should proceed to the implementation stage of the GI process. To accomplish this, the NRC has established an expert working group with the Electric Power Research Institute (EPRI) under a memorandum of understanding to research the safety significance of the issue and make technical recommendations. The NRC and EPRI have assembled a group of experts and formed a working group to study this issue. The working group is currently reviewing operating experience and test data to develop improved aluminum HEAF Zones of Influence (ZOIs) and improved PRA methods needed to accurately analyze the potential hazard. EPRI has completed the industry survey and determined that aluminum is present in all nuclear power plants in the United States. The NRC is currently conducting small scale cable fragility testing at Sandia National Laboratories to determine target damage from HEAFs. This is the final data needed for the working group to develop new ZOIs. Analysis of the data and development of new ZOIs are expected to be completed by the working group in the summer/fall 2021. The NRC has established a HEAF website and is scheduling a public meeting for spring 2021 to keep all interested stakeholders informed of the progress of this issue.

The NRC provides information on the status of open GIs at <https://www.nrc.gov/about-nrc/regulatory/gen-issues/dashboard.html>.

IV. Licensing Actions and Other Licensing Tasks

Licensing actions related to operating power reactors include orders, license amendments, exemptions from regulations, relief from inspection or component testing, topical reports submitted on a plant-specific basis, or other actions requiring NRC review and approval before licensees can carry out certain activities.

Other licensing tasks for operating power reactors include the following:

- licensees' responses to NRC requests for information through generic letters or bulletins;
- NRC review of generic topical reports;
- updates to final safety analysis reports; and
- other licensee actions that do not require NRC review and approval before licensees can carry them out.

The NRC's "Congressional Budget Justification Fiscal Year 2021" incorporates three output measures (performance indicators) related to the age of the inventory of licensing actions, the age of the inventory of other licensing tasks, and the timely completion of final safety evaluations. Starting in FY 2020, the performance indicators for the number of licensing actions and other licensing tasks were discontinued. In addition, beginning in FY 2021, the indicators for the percentage of licensing actions and other licensing tasks completed in 1 year or less were discontinued and consolidated into the new FY 2021 indicator for timely completion of final safety evaluations.¹ The indicator for the percentage of licensing actions completed in 2 years or less was revised to only apply to licensing actions accepted or initiated prior to July 13, 2019. Also, for FY 2021, a new performance indicator was added for the percentage of timely completion of final safety evaluations by the Generic Milestone Date and replaces the discontinued 1-year indicators. This new performance indicator includes the timeliness of all "requested activities of the Commission," as defined by the Nuclear Energy Innovation and Modernization Act (NEIMA) in the Operating Reactor Business Line that involve a final safety evaluation for all actions accepted or initiated after July 13, 2019.

Table 1 shows the actual FY 2018 through FY 2021 results to date and the FY 2021 goal for NRC performance indicators for operating power reactor licensing actions and other licensing tasks.

The agency continues to communicate with licensees about planned licensing submittals. The NRC's senior management remains fully engaged in monitoring the licensing action workload to maintain both the staff's safety focus and target performance goals.

¹ Prior to FY 2021, the following four separate performance indicators were provided for the age of the inventory of licensing actions and age of the inventory of other licensing tasks: the percentage of licensing actions completed in 1 year or less, the percentage of other licensing tasks completed in 1 year or less, the percentage of licensing actions completed in 2 years or less, and the percentage of other licensing tasks completed in 2 years or less.

**Table 1 Results and FY 2021 Goal for the NRC’s Congressional Budget
Justification Performance Indicators**

Output Measure	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Current	FY 2021 Goal
Licensing Actions	861	847	Discontinued	Not Applicable	Not Applicable
Age of inventory of licensing actions	98% ≤1 year 100% ≤2 year	95% ≤1 year 100% ≤2 year	99% ≤1 year 100% ≤2 year	100% ≤2 year	100% ≤2 year
Other licensing tasks completed per year	362	337	Discontinued	Not Applicable	Not Applicable
Age of inventory of other licensing tasks	98% ≤1 year 100% ≤2 year	98% ≤1 year 100% ≤2 year	96% ≤1 year 100% ≤2 year	98% ≤2 year	100% ≤2 year
Timely completion of final safety evaluations	Not Applicable	Not Applicable	Not Applicable	100% ≤24 months	100% ≤24 months

The NRC has been actively responding to challenges facing licensees due to the COVID-19 pandemic. Through strong communication between the NRC staff and the licensees, negative impacts to NRC licensing activities and regulatory duties during this reporting period have been mitigated. To maintain transparency and openness, the NRC staff conducted nine virtual public meetings to engage stakeholders and discuss changes necessary due to the pandemic. There was a high level of public participation at these meetings, with over 600 participants at one of the meetings. The NRC leveraged these interactions to gain perspectives from the public as well as to communicate our planned actions. To address areas where regulatory relief was determined to be warranted, the NRC staff issued documents explaining when the agency would provide expedited reviews for certain pandemic-related exemptions and relief requests in the following topical areas:

- Work hour controls requirements specified in 10 CFR 26.205(d)(1) through (d)(7) (ADAMS Accession Nos. [ML20087P237](#) and [ML20098B333](#)).
- Deferral requests for submission of Owner’s Activity Reports consistent with 10 CFR 50.55a(z)(2) (ADAMS Accession No. [ML20098D975](#)).
- Requirements related to the 24-month requalification program, research and test reactors proficiency, and biennial medical examinations in 10 CFR Part 55 (ADAMS Accession No. [ML20104C071](#)).
- Security training requirements specified in 10 CFR Part 73, Appendix B, Section VI (ADAMS Accession No. [ML20105A483](#) and [ML20273A117](#)).
- Medical evaluation frequency and respirator fit-testing frequency requirements specified in 10 CFR 20.1703(c)(5)(iii) and 10 CFR 20.1703(c)(6) (ADAMS Accession No. [ML20099G757](#)).

- Fire brigade annual medical exams, quarterly drills, and annual live fire training requirement specified in 10 CFR 50.48 (ADAMS Accession No. [ML20122A022](#)).
- Biennial emergency plan exercise requirements specified in 10 CFR 30.32(i)(3)(xii), 10 CFR 40.31(j)(3)(xii), 10 CFR Part 50, Appendix E, Section IV.F, 10 CFR 70.22(i)(3)(xii), and 10 CFR 72.32(a)(12)(i) and (ii), in accordance with the NRC's regulations in 10 CFR 30.11, 10 CFR 40.14, 10 CFR 50.12(a), 10 CFR 52.7, 10 CFR 70.17, and 10 CFR 72.7 (ADAMS Accession Nos. [ML20120A003](#) and [ML20223A152](#)).
- Emergency plan requirements, particularly regarding emergency preparedness exercises and inspections, specified in several parts of 10 CFR (ADAMS Accession Nos. [ML20196M030](#) and [ML20288A523](#)).
- Physical inventory requirements for research, test, and training reactors specified in 10 CFR 74.13 (ADAMS Accession No. [ML20113F023](#)).

The NRC held a virtual public meeting on October 15, 2020, to discuss with stakeholders potential future licensing issues to address the COVID-19 pandemic beyond CY 2020. The NRC also issued a letter on November 10, 2020 (ADAMS Accession No. [ML20261H515](#)), to provide guidance to the nuclear industry on the continued use of expedited processes beyond December 31, 2020, with respect to the first seven topical areas identified in the bullets above. Enclosures to the letter address informational needs for each of the topical areas to facilitate licensees' continued use of the NRC's expedited review process, such as providing justifications for the hardships that have resulted from the COVID-19 pandemic and information related to the potential cumulative effects of these exemptions.

During this reporting period, the NRC staff completed 31 licensing actions for both power and non-power reactors related to the COVID-19 pandemic, with an average completion time of 28 days. As the pandemic progresses, and new and continuing challenges to NRC-licensed activities emerge, the NRC will continue to closely monitor the nuclear power industry to ensure adequate protection of public health and safety. The staff is in the process of developing an initial licensing lessons-learned report from the COVID-19 pandemic for operating power reactors to identify best practices for long-term adoption. The staff is also proactively discussing what the next 3 months to 1 year may look like and what actions will be needed to address COVID-19 pandemic challenges. Future reports will include additional actions the NRC has taken in response to the COVID-19 pandemic.

V. Status of License Renewal Activities

The staff did not review any initial license renewals during this reporting period. On November 16, 2020, NextEra Energy submitted a subsequent license renewal (SLR) application for Point Beach Nuclear Plant, Units 1 and 2 (ADAMS Accession No. [ML20329A292](#)). On January 15, 2021, the NRC staff accepted the SLR application, and it is now under review (ADAMS Accession No. [ML21006A417](#)).

Surry Power Station, Units 1 and 2

The NRC staff has completed the safety review, issuing the final safety evaluation report (SER) on March 9, 2020 (ADAMS Accession No. [ML20052F520](#)). The SER was discussed at an April 8, 2020, meeting with the Advisory Committee on Reactor Safeguards (ACRS) full committee.

On April 1, 2021, the Virginia Department of Environmental Quality informed the licensee of its concurrence that the SLR application “is consistent with the Virginia CZM program” (ADAMS Accession No. [ML21096A095](#)). This letter resolved a longstanding issue in the environmental review related to Dominion’s obligations under the Federal Coastal Zone Management Act (CZMA). Under the CZMA, Dominion must demonstrate that the proposed license renewal is consistent with and complies with enforceable policies of the Virginia Coastal Zone Management Program before the NRC can issue a renewed license. Now that Dominion has fulfilled its CZMA obligations, the NRC staff will proceed with its review of the application and anticipates being able to issue its decision on the SLR application in the near term.

The NRC staff completed its safety review within 18 months and estimated resources.

North Anna Power Station, Units 1 and 2

On August 24, 2020, Virginia Electric and Power Company (Dominion Energy or Dominion) submitted an SLR application for North Anna Power Station, Units 1 and 2 (ADAMS Accession No. ML20246G703). On October 13, 2020, the NRC staff accepted the SLR application (ADAMS Accession No. ML20258A284). On December 14, 2020, Beyond Nuclear, the Sierra Club, and Alliance for a Progressive Virginia filed a petition to intervene with one proposed contention that challenged the applicant’s treatment of the environmental significance of the 2011 Mineral, VA, earthquake. On March 29, 2021, the Atomic Safety and Licensing Board for this proceeding issued an order denying the petition to intervene and terminating the proceeding. The petitioners have until April 23, 2021, to file an appeal with the Commission. The application is currently under review with an established 18-month schedule.

Point Beach Nuclear Plant, Units 1 and 2

On November 16, 2020, NextEra submitted an SLR application for Point Beach, Units 1 and 2 (ADAMS Package Accession No. ML20329A292). On January 15, 2021, the NRC staff accepted the SLR application (ADAMS Accession No. ML21006A417). On March 23, 2021, Physicians for Social Responsibility Wisconsin petitioned for leave to intervene in the SLR application proceeding. The application is currently under review with an established 18-month schedule.

VI. Summary of Reactor Enforcement Actions

The reactor enforcement statistics in the following tables are arranged by region, half FY, FY, and two previous FYs for comparison. These tables provide the nonescalated and escalated reactor enforcement data, as well as the escalated enforcement data associated with traditional enforcement and the ROP. The severity level assigned to a violation (i.e., traditional enforcement) generally reflects the significance of a violation. However, for most violations, the significance is assessed using the significance determination process under the ROP, which uses risk insights, as appropriate, to assist the NRC staff in determining the safety or security significance of inspection findings identified within the ROP.

Brief descriptions of the escalated reactor enforcement actions associated with traditional enforcement and the ROP (as well as any other significant actions) taken during the applicable fiscal half-year follow the tables.

Table 2 Nonescalated Reactor Enforcement Actions*

NONESCALATED REACTOR ENFORCEMENT ACTIONS						
		Region I	Region II	Region III	Region IV	TOTAL
Cited Severity Level IV or Green	1 st Half FY 21	0	3	0	2	5
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	3	0	2	5
	FY 20 Total	2	4	0	1	7
	FY 19 Total	1	0	0	1	2
Noncited Severity Level IV or Green	1 st Half FY 21	24	25	19	40	108
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	24	25	19	40	108
	FY 20 Total	52	46	62	108	268
	FY 19 Total	88	76	86	112	362
TOTAL Cited and Noncited Severity Level IV or Green	1 st Half FY 21	24	28	19	42	113
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	24	28	19	42	113
	FY 20 Total	54	50	62	109	275
	FY 19 Total	89	76	86	113	364

* The nonescalated enforcement data reflect the cited and noncited violations either categorized at Severity Level IV (the lowest level) or associated with Green findings during the indicated time periods. The numbers of cited violations are based on Enforcement Action Tracking System data that may be subject to minor changes following verification. These data do not include Green findings that do not have associated violations.

Table 3 Escalated Reactor Enforcement Actions Associated with Traditional Enforcement*

ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH TRADITIONAL ENFORCEMENT						
		Region I	Region II	Region III	Region IV	TOTAL
Severity Level I	1 st Half FY 21	0	0	0	0	0
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	0	0	0	0
	FY 20 Total	0	2	0	0	2
	FY 19 Total	0	0	0	0	0
Severity Level II	1 st Half FY 21	0	1	0	0	1
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	1	0	0	1
	FY 20 Total	0	2	0	0	2
	FY 19 Total	0	1	0	2	3
Severity Level III	1 st Half FY 21	0	3	0	0	3
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	3	0	0	3
	FY 20 Total	0	1	0	1	2
	FY 19 Total	0	0	0	4	4
TOTAL Violations Cited at Severity Level I, II, or III	1 st Half FY 21	0	4	0	0	4
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	4	0	0	4
	FY 20 Total	0	5	0	1	6
	FY 19 Total	0	1	0	6	7

* The escalated enforcement data reflect the Severity Level I, II, or III violations or problems cited during the indicated time periods.

Table 4 Escalated Reactor Enforcement Actions Associated with the Reactor Oversight Process*

ESCALATED REACTOR ENFORCEMENT ACTIONS ASSOCIATED WITH THE REACTOR OVERSIGHT PROCESS						
		Region I	Region II	Region III	Region IV	TOTAL
Violations Related to Red Findings	1 st Half FY 21	0	0	0	0	0
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	0	0	0	0
	FY 20 Total	0	0	0	0	0
	FY 19 Total	0	0	0	0	0
Violations Related to Yellow Findings	1 st Half FY 21	0	0	0	0	0
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	0	0	0	0
	FY 20 Total	0	0	0	0	0
	FY 19 Total	0	0	0	0	0
Violations Related to White Findings	1 st Half FY 21	0	0	0	0	0
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	0	0	0	0
	FY 20 Total	0	2	0	0	2
	FY 19 Total	1	1	1	0	3
TOTAL Related to Red, Yellow, or White Findings	1 st Half FY 21	0	0	0	0	0
	2 nd Half FY 21	0	0	0	0	0
	FY 21 YTD Total	0	0	0	0	0
	FY 20 Total	0	2	0	0	2
	FY 19 Total	1	1	1	0	3

* The escalated enforcement data reflect the violations or problems cited during the indicated time periods that were associated with either Red, Yellow, or White findings. These data do not include Red, Yellow, or White findings that do not have associated violations.

Reactor Escalated Enforcement Actions and Other Significant Actions

Exelon Generation Company, LLC (Clinton Power Station) EA-20-004

On March 2, 2021, the NRC issued a notice of violation to Exelon Generation Company, LLC, for a violation associated with a greater than green Significance Determination Process finding at the Clinton Power Station. The details of the finding are official use only – security-related information.

Purdue University (Purdue University Research Reactor) EA-20-144

On February 16, 2021, the NRC issued a notice of violation to Purdue University for a Severity Level III problem involving two violations. The first violation involves the Purdue University Research Reactor operating at steady state power levels in excess of 12 kilowatts (thermal) on several occasions between October 31, 2019, and September 15, 2020, contrary to Purdue University Research Reactor License Condition 2.C.1. Specifically, the reactor was inadvertently operated at power levels greater than 12 kW(t) during this time due to nuclear instrument (NI) calibration calculation errors that caused the NIs to indicate reactor power levels that were approximately three times lower than actual reactor power. Therefore, when the licensee operated the reactor above 4 kW(t) (indicated power) several times between October 31, 2019, and September 15, 2020, the actual reactor power exceeded the maximum authorized power level of 12 kW(t). The second violation involves Purdue University's failure to perform appropriate surveillance testing before considering the NI system operable following replacement of the NI system and detectors in 2019, contrary to Purdue University Research Reactor Technical Specification 4.2.g.

Tennessee Valley Authority (Browns Ferry Nuclear Plant) EA-20-048

On January 21, 2021, the NRC issued a notice of violation to Tennessee Valley Authority (TVA) for a violation associated with an escalated enforcement finding at the Browns Ferry Nuclear Plant. The details of the finding are official use only – security-related information.

Armed Forces Radiobiological Research Institute EA-20-056

On November 19, 2020, the NRC issued a confirmatory order to Armed Forces Radiobiological Research Institute (AFRRI) memorializing commitments reached during an alternative dispute resolution (ADR) mediation session held on September 18, 2020. The commitments were made as part of the settlement agreement between AFRRI and the NRC based on evidence gathered during an investigation in which the NRC had identified an apparent violation of 10 CFR 50.7, "Employee protection," at the AFRRI Bethesda, MD, facility. The apparent violation involved the discrimination (2-day suspension) against an AFRRI employee for engaging in protected activities. As a result of the confirmatory order, AFRRI committed to a number of corrective actions, including enhancements to its safety culture program, establishment of a Safety Conscious Work Environment program, as well as independent third-party support. In consideration of the corrective actions and commitments outlined in the confirmatory order, the NRC will not cite the apparent violation and will not issue an associated civil penalty.

Arizona Public Service Company (Palo Verde Nuclear Generating Station) EA-20-054

On November 17, 2020, the NRC issued a confirmatory order to Arizona Public Service Company memorializing commitments reached during an ADR mediation session held on September 16, 2020. The ADR session was associated with apparent violations that involved Arizona Public Service Company's failure to (1) perform a written evaluation for a change to the NAC MAGNASTOR dry cask storage system and obtain a license amendment for a change in methodology for performing tip-over calculations; and (2) adequately analyze the consequences of a hypothetical MAGNASTOR CC5 spent fuel cask tip-over accident on the independent spent fuel storage installation pad. As a result of the confirmatory order, the NRC will not cite the apparent violations.

On November 6, 2020, the NRC issued a notice of violation and proposed imposition of civil penalty in the amount of \$903,471 to TVA for multiple violations of NRC requirements. The first violation, a Severity Level III violation of 10 CFR Part 50, Appendix B, Criterion V, involved the failure to follow procedures. Specifically, main control room staff failed to ensure shift operations were conducted in a safe and conservative manner, did not stop when unsure and proceed in a deliberate and controlled manner, did not validate available information, allowed production to override safety, and proceeded in the face of uncertainty. The second violation was a Severity Level II violation of 10 CFR 50.9(a) with a proposed civil penalty of \$303,471. Specifically, a TVA employee failed to provide complete and accurate information during an interview with the NRC Office of Investigations regarding the startup on November 11, 2015. The third violation was a Severity Level III violation of 10 CFR Part 50, Appendix B, Criterion V, with a proposed civil penalty of \$300,000. Specifically, a TVA manager and procedure writer changed a step in the Watts Bar Nuclear Plant, Unit 1 startup procedure by using an improper change process. This change altered the technical intent of the procedure and allowed the startup to continue without first achieving a specific reactor temperature. Finally, a Severity Level III problem was issued to TVA for violations of 10 CFR Part 50, Appendix B, Criterion V, and 10 CFR Part 50, Appendix B, Criterion XVII, with a proposed civil penalty of \$300,000. Specifically, during a November 11, 2015, startup, with only excess letdown available for pressurizer level control, pressurizer level rose uncontrollably until main control room operators placed another system in service to abate the pressurizer water level rise. However, the operators failed to follow approved plant procedures when doing so, and also failed to make control room log entries to accurately depict the event and associated equipment manipulations.

VII. Security and Emergency Preparedness and Incident Response Activities

The NRC continues to maintain an appropriate regulatory infrastructure to ensure adequate protection of public health and safety and promote the common defense and security while implementing risk-informed strategies and improving the realism of NRC licensing and oversight activities. The NRC's security and emergency preparedness and incident response programs contribute to these goals.

Physical Security

Under normal circumstances, the NRC conducts force-on-force (FOF) inspections at each nuclear power reactor and Category I fuel cycle facility on a regular 3-year cycle. Each FOF inspection at a nuclear power reactor includes both tabletop drills and exercises that simulate combat between a mock adversary force and the licensee's security force. These inspections assess the ability of power reactor and Category I fuel cycle facility licensees to defend against the design-basis threat (DBT) for radiological sabotage. For Category I fuel cycle facilities, the NRC uses FOF inspections to evaluate the effectiveness of licensees' protective strategies against an additional DBT—theft or diversion of special nuclear material. FOF inspections, along with the other inspections that comprise the NRC's security baseline inspection program, provide valuable insights that enable the NRC to evaluate the effectiveness of licensees' security programs.

Due to the health and safety concerns related to conducting full FOF exercises during the COVID-19 pandemic, the NRC developed a new Inspection Procedure (IP), IP 92707, "Security Inspection of Facilities Impacted by a Local, State, or Federal Emergency Where the NRC's Ability to Conduct Triennial Force-on-Force Exercises is Limited" (ADAMS Accession No.

ML20182A668).² The NRC implemented this IP during CY 2020 to allow the conduct of limited-scope inspections of operating reactor licensees during the special circumstances associated with the pandemic.

In CY 2021, the NRC is implementing interim guidance for conducting FOF inspection activities using IP 71130.03, “Contingency Response – Force-on-Force Testing” (ADAMS Accession No. ML21012A329).³ The interim guidance, which was issued on February 8, 2021, places an emphasis on safety protocols related to COVID-19 mitigation measures and involves only the minimum resources for both the licensee and the NRC in conducting the inspection activity. Building on the information gained from the implementation of IP 92707 in CY 2020, the staff revised IP 92707 to add elements that allow the inspection, if used during CY 2021, to satisfy the contingency response attributes of the baseline inspection program. The NRC developed temporary staff guidance, TSG-NSIR-2021-01, “Additional Guidance for Force-on-Force Inspections During the Public Health Emergency,” issued on February 26, 2021 (ADAMS Accession No. [ML21043A259](#)), to provide a consistent methodology to evaluate hardship conditions associated with COVID-19 at licensee sites. For sites at which IP 71130.03 cannot be completed as planned due to substantiated hardship conditions, the staff will use the updated IP 92707.

In response to Commission direction, the staff submitted SECY-20-0070, “Technical Evaluation of the Security Bounding Time Concept for Operating Nuclear Power Plants,” on July 20, 2020 (ADAMS Accession No. ML20126G265).⁴ This paper recommends an approach for crediting operator actions, including the use of FLEX equipment, and law enforcement response that recognizes the existing layers of protection (both security and safety) available to sites, and presents two risk-informed concepts for how the NRC and licensees can apply these layered protections. This staff proposal is currently under review by the Commission.

Cyber Security

Under 10 CFR 73.54, “Protection of digital computer and communication systems and networks,” the NRC requires nuclear power plant licensees and new license applicants to provide high assurance that digital computer and communication systems and networks are adequately protected against cyber attacks. These licensees must implement a cyber security program to ensure that safety, important-to-safety, security, and emergency preparedness functions are protected from cyber attacks. In conjunction, the NRC has developed an oversight program for power reactor cyber security that includes an inspection program, inspector training, and a process for evaluating the significance of inspection findings.

As of the end of March 2021, the agency had completed 54 cyber security program full implementation inspections. The initial round of full implementation inspections is planned to be completed by June 2021. The NRC is developing a further performance-informed inspection program that is currently scheduled to be implemented in CY 2022 following completion of the full implementation inspection program.

Emergency Preparedness and Incident Response

As discussed further in Section IX of this report, on May 12, 2020, the NRC staff published for public comment a proposed rule and draft regulatory guidance on emergency preparedness (EP)

² This document is not publicly available.

³ This document is not publicly available.

⁴ This document is not publicly available.

for small modular reactors and other new technologies ([92 FR 28436](#)). The public comment period closed on September 25, 2020. The staff anticipates providing the draft final rule to the Commission for its consideration in September 2021.

The NRC continued to work with the U.S. Department of Health and Human Services to provide States a replenishment of potassium iodide supplies for use as a supplement to public protective actions within the 10-mile emergency planning zones around nuclear power plants. By December 2020, the NRC had provided 10.6 million potassium iodide tablets to replenish the expiring supplies for 15 States. This completed all the requests for replenishment; the next round of replenishments is planned to occur in FY 2025.

During the COVID-19 pandemic, the NRC issued guidance and granted exemptions from certain EP regulations. In March 2020, the NRC and the Federal Emergency Management Agency issued a joint letter (ADAMS Accession No. [ML20085F705](#)) to licensees and offsite response organizations to provide guidance on the postponement of required radiological EP exercises in CY 2020. On May 14, 2020, the NRC staff issued a letter (ADAMS Accession No. [ML20120A003](#)) indicating that the NRC was prepared to provide an expedited review of exemption requests from the biennial emergency plan exercise requirements for licensees that have a radiological emergency plan. On September 2, 2020, the NRC staff issued an addendum (ADAMS Accession No. [ML20223A152](#)) to provide clarification and additional information to power reactor licensees submitting exemption requests from the conduct of the CY 2020 offsite biennial exercises. Additionally, the NRC staff issued two guidance documents related to dispositioning a licensee's use of temporary compensatory actions or contingency plans that maintained the effectiveness of its emergency response readiness and the conduct of EP exercises during the COVID-19 pandemic (ADAMS Accession Nos. [ML20143A066](#) and [ML20223A152](#)). From October 2020 to April 2021, the NRC staff has granted 14 exemptions to defer onsite biennial EP exercises and 17 exemptions to defer offsite biennial EP exercises. The NRC anticipates that licensees will continue to request exemptions during the pandemic.

In October 2020, the NRC staff issued its third acceptance review of a licensee alert and notification system (ANS) design report change to include the Integrated Public Alert and Warning System (IPAWS) as either a primary or secondary ANS. The Beaver Valley Nuclear Power Station was the first applicant to make IPAWS its backup ANS system by activating the Wireless Emergency Alert (WEA) system. In January 2021, the NRC staff issued its fourth acceptance review for Point Beach Nuclear Plant, which uses IPAWS as its primary ANS. In March 2021, the NRC staff received its fifth ANS-related request from the Federal Emergency Management Agency for formal review of the Donald C. Cook Nuclear Plant design report; the licensee for this plant intends to use IPAWS-WEA and the IPAWS-Emergency Alert System as the primary ANS system.

VIII. Power Upgrades

Since the 1970s, licensees have applied for and implemented power upgrades as a way to increase the output of their plants. The NRC staff has reviewed and approved 170 power upgrades to date. Existing plants have gained approximately 24,030 megawatts thermal (MWth) or 8,010 megawatts electric in electric generating capacity (the equivalent of about seven large nuclear power plant units) through power upgrades. During this reporting period, the NRC staff approved measurement uncertainty recapture power upgrades to Joseph M. Farley Nuclear Plant, Units 1 and 2, Watts Bar Nuclear Plant, Unit 2, and Oconee Nuclear Station, Units 1, 2, and 3. Currently, the NRC does not have any power upgrades under review.

IX. New Reactor Licensing

The NRC's new reactor program is (1) focusing on licensing and construction oversight activities for large LWRs and small modular LWRs and (2) continuing to develop the specific regulatory framework and infrastructure for advanced reactors (non-LWRs). In addition, the NRC is actively engaged in several international cooperative initiatives to improve safety reviews of new reactor designs and improve the effectiveness and efficiency of inspections and the collection and sharing of construction experience.

Reviews of Applications for Large and Small Modular Light-Water Reactors

During this reporting period, the NRC staff provided to the Commission for its consideration a draft proposed rule as discussed in the next paragraph associated with a design certification application for a small modular LWR submitted under 10 CFR Part 52, "Licenses, certifications, and approvals for nuclear power plants."

Design Certification Reviews

NuScale Power, LLC, Small Modular Reactor Design Certification Application

The NRC staff completed the final SER on August 28, 2020 (ADAMS Accession No. [ML20023A318](#)), and issued a standard design approval to NuScale Power, LLC, on September 11, 2020 (ADAMS Accession No. [ML20247J564](#)). On January 14, 2021 (ADAMS Accession No. [ML19353A003](#)), the staff provided to the Commission for its consideration a draft proposed rule that would propose certifying the design. The NRC anticipates publishing the proposed rule by July 2, 2021, for public comment.

Design Certification Renewals

Advanced Boiling-Water Reactor Renewal (General Electric-Hitachi)

On March 30, 2020, the NRC staff completed its technical review of the General Electric-Hitachi Advanced Boiling-Water Reactor design certification renewal application. The NRC staff started rulemaking activities to certify the design renewal in November 2019. On December 9, 2020, the staff provided SECY-20-0112, "Direct Final Rule: Advanced Boiling Water Reactor Design Certification Renewal," to the Commission for its consideration (ADAMS Accession No. [ML20170A489](#)). The NRC anticipates publishing the direct final rule, with the companion proposed rule for public comment, by August 18, 2021.

Construction Oversight under 10 CFR Part 52

During the reporting period, the NRC continued with primarily remote operations in response to the COVID-19 pandemic. Construction inspections and licensing activities continued with only minor interruptions due to the successful application of technology for telework and remote access to licensee information. The NRC continues to closely monitor COVID-19 cases and perform mission-critical inspections through a combination of remote inspections and targeted onsite inspections based on safety significance and the uniqueness or complexity of the construction activity.

As a result of the COVID-19 pandemic and the dynamic nature of the Vogtle construction project, the licensee altered its public milestone for initial fuel loading of Vogtle Unit 3 from April 30, 2021,

to July 22, 2021. The NRC staff continues to engage in construction oversight and licensing activities, and the revised schedule has not impacted the agency's ability to conduct timely inspections or licensing reviews. Consistent with its plan to make a 10 CFR 52.103(g) finding (i.e., the finding to confirm whether all inspections, tests, analyses, and acceptance criteria (ITAAC) have been successfully completed), the NRC's Vogtle Readiness Group (VRG) continues to meet monthly to assess NRC activities and schedule changes and to proactively identify any regulatory challenges that may impact this decision to allow the transition to operations. VRG meetings ensure that all NRC organizations are coordinating on issues related to the new units at Vogtle, that NRC senior management is aware of any significant issues, and that there are consistent communications with the licensee's management.

The NRC continues to implement activities necessary to oversee the construction and operational readiness of the two AP1000® units under construction at the Vogtle site to ensure safety. The NRC's Region II office implements the construction inspection program to verify compliance with the agency's regulations and to ensure that the new plants are built in accordance with their combined licenses (COLs).

Construction oversight at Vogtle is performed within the regulatory framework of the Construction Reactor Oversight Process (cROP). The cROP ensures safety and security through objective, risk-informed, transparent, and predictable NRC oversight during new reactor construction. The agency's most recent performance assessments demonstrate that the reactors are being constructed safely and both units are performing well against the cROP criteria. Plant assessments and the latest cROP information are publicly available on the NRC website: <https://www.nrc.gov/reactors/new-reactors/oversight/crop.html>.

The Vogtle Project Office (VPO) within NRR is charged with coordination of the licensing and oversight activities for Vogtle Units 3 and 4, including facilitation of the safe transition of these units from construction to operation. Focusing solely on the Vogtle Units 3 and 4 project, VPO has demonstrated agility in decisionmaking and responding to technical and programmatic issues.

Highlights of the licensing and construction activities at Vogtle Units 3 and 4 during the reporting period include:

- The NRC completed the final two license amendment requests related to the staff's ongoing work towards the 10 CFR 52.103(g) finding.
- The NRC conducted table-top exercises involving different NRC organizations and a variety of scenarios that could occur during the later stages of construction. These are a part of additional steps to ensure that the staff is ready to support a potential Unit 3 10 CFR 52.103(g) finding.
- The NRC's Region II staff conducted mission critical onsite ITAAC, initial test program, and operational program inspections, including inspections related to the nuclear island structure, the uninterruptible power supply system, seismic requirements for electrical and mechanical components, the Unit 3 reactor coolant system cold hydrostatic test, and first fuel receipt. The staff also completed the first cyber security inspection, all targeted inspections for the Unit 3 Emergency Preparedness program, and, with the support of the Technical Training Center, the review of all startup procedures.

- During this reporting period, all construction inspection findings for Vogtle Units 3 and 4 were of very low safety significance, and the licensee has addressed these issues.

Vendor Inspections

The NRC staff uses the Vendor Inspection Program to confirm that reactor applicants and licensees are fulfilling their regulatory obligations to oversee the supply chain. The NRC staff conducts inspections to verify the implementation of vendor quality assurance programs to ensure the quality of materials, equipment, and services supplied to the commercial nuclear industry. These inspections ensure that vendors maintain an effective system for reporting defects under 10 CFR Part 21, "Reporting of defects and noncompliance," and verify the use of commercial-grade dedication programs for safety-related materials, equipment, and services. Other activities conducted by the vendor inspection staff include ensuring that counterfeit items are removed and prevented from use in safety-related applications, and participating in international cooperation efforts and the development of industry consensus standards. Focus areas for new reactors include integrated system validation for the control room simulators, digital instrumentation and control systems, modular fabrication, safety-related valves, and reactor coolant pumps. Focus areas for operating reactors includes replacement components, commercial-grade dedication, reverse engineering, software, and fuel fabrication.

For FY 2021, the NRC plans to perform approximately 20 vendor inspections. During this reporting period, the NRC continued to perform vendor inspections both virtually and onsite based on local travel conditions and vendor facility access restrictions while taking precautions recommended by the CDC to minimize exposure to COVID-19. As such, the NRC uses a vendor inspection modification strategy to plan upcoming inspection activities that consider the safety significance of the vendor activities to be inspected. Additionally, the strategy considers the COVID-19 cases and exposure at the vendor facility, changes in testing schedules due to availability of vendor staff, availability of vendors to support inspections at their facility, social distancing controls in place at the vendor facility, an evaluation of the feasibility for a remote inspection, and the absolute need to technically validate onsite activities.

During the next reporting period, the NRC staff will be hosting its first virtual Town Hall Meeting on Vendor Oversight on June 24, 2021. The purpose of this meeting is to allow the NRC staff to engage in an open dialogue with external stakeholders to discuss any current issues of importance to the nuclear industry and to provide guidance and clarification on those concerns. The NRC staff will use this meeting to inform external stakeholders about activities related to vendor inspection, quality assurance, and other relevant topics. Most of the meeting will be dedicated to an open question and answer session for attendees to ask the NRC staff questions on topics such as commercial-grade dedication and 10 CFR Part 21.

Operator Licensing

During the reporting period, the NRC staff continued preparations for operator licensing activities involving advanced reactors. The preparations included activities to support the development of the risk-informed, technology-inclusive regulatory framework for advanced reactors associated with 10 CFR Part 53 rulemaking.

Additionally, on January 29, 2021, the NRC issued a *Federal Register* Notice ([86 FR 7513](#)) requesting comments on "Regulatory Basis for Rulemaking to Align Licensing Processes and Lessons Learned from New Reactor Licensing" (ADAMS Accession No. [ML20149K680](#)). The regulatory basis supports a proposed rule that would amend the NRC's regulations for the

licensing of new nuclear power reactors. Appendix E of the regulatory basis discusses alternatives for improving the efficiency and effectiveness of the operator licensing program at new reactors under construction based on lessons learned from licensing operators at Vogtle Units 3 and 4.

Non-Light-Water Reactors

The staff continues to make significant progress executing its vision and strategy for advanced reactor readiness and meeting the requirements in Section 103 of NEIMA. The staff issued SECY-21-0010, “Advanced Reactor Program Status,” on February 1, 2021 (ADAMS Accession No. [ML20345A239](#)). This information paper provides the status of the staff’s activities related to advanced reactors and describes the path forward on its advanced reactor licensing and readiness activities such as the resolution of key technology-inclusive policy issues, development of risk-informed and performance-based licensing approaches, and interactions with prospective applicants and other stakeholders.

The staff is also continuing its readiness activities in FY 2021 by prioritizing a rulemaking to establish a technology-inclusive, risk-informed, and performance-based regulatory framework and associated guidance for advanced reactors. This rulemaking would create 10 CFR Part 53, “Licensing and Regulation of Advanced Nuclear Reactors,” in keeping with the NRC’s vision and strategy report and the requirements in NEIMA Section 103(a)(4). The staff initiated extensive stakeholder engagement in September 2020 and is continuing a series of public meetings to engage stakeholders and the ACRS in the development of a draft proposed rule. As part of these interactions, the staff is implementing a novel approach of releasing preliminary proposed rule language to facilitate public discussion. The proposed rule is due to the Commission in May 2022 and the final rule in March 2024.

Other recent accomplishments include:

- The NRC hosted an NRC Standards Forum to facilitate the identification of needed consensus codes and standards and explore collaboration to accelerate their development with a focus on non-LWR (ADAMS Accession No. [ML20337A122](#)).
- The NRC staff issued SECY-20-0093, “Policy and Licensing Considerations Related to Micro-Reactors,” discussing potential licensing and policy issues specific to micro-reactors (ADAMS Accession No. [ML20254A363](#)).
- Technical input reports were issued by NUMARK Associates, Inc. and Argonne National Laboratory for the NRC’s review of American Society of Mechanical Engineers Boiler and Pressure Vessel Code Section III, “Rules for Construction of Nuclear Facility Components,” Division 5, “High-Temperature Reactors” (ADAMS Accession Nos. [ML20349A001](#), [ML20358A145](#), and [ML21090A033](#)).
- The NRC staff issued a memorandum to the Commission providing a schedule with milestones and resource requirements to achieve publication of the final 10 CFR Part 53 rule by October 2024 (ADAMS Accession No. [ML20288A251](#)).
- The NRC staff published Final Interim Staff Guidance, COL-ISG-029, “Environmental Considerations Associated with Micro-reactors” (ADAMS Accession No. [ML20252A075](#)).

- The NRC staff issued a draft white paper with NRC staff views on demonstrating the acceptability of PRAs used to support non-LWR plant licensing (ADAMS Accession No. [ML21015A434](#)).
- Seven technical reports were issued by the Center for Nuclear Waste Regulatory Analyses regarding operating experience and potential challenges for the transportation, storage, and disposal of advanced reactor fuel types (ADAMS Accession No. [ML20184A143](#)).
- The NRC staff published a final technology-inclusive, risk-informed, and performance-based design review guide for instrumentation and controls systems for non-LWR reactors (ADAMS Accession No. [ML21011A140](#)).
- The NRC held multiple public meetings with stakeholders on non-LWR topics.
- The NRC held multiple public meetings regarding the rulemaking for development of a technology-inclusive regulatory framework for optional use by applicants for new commercial advanced reactor licenses required by NEIMA.
- The NRC participated in and helped moderate a Department of Energy led public forum on developing a regulatory framework for commercial fusion reactors, along with the Fusion Industry Association. The NRC held an additional public meeting on development of a regulatory framework for fusion reactor applications.
- The NRC continued to develop the draft generic environmental impact statement (GEIS) for advanced nuclear reactors. The NRC staff issued a Scoping Summary Report that summarizes the comments received during the public scoping period and the staff's responses (ADAMS Accession No. [ML20260H180](#)). In response to stakeholder feedback, the NRC staff is developing a plant parameter envelope that would better maximize the range of technologies that could reference the GEIS and largely eliminate explicit reliance on power level for many areas within the environmental evaluation.
- The NRC chaired one meeting of the Nuclear Energy Agency's Working Group on the Safety of Advanced Reactors.

With regard to non-LWR licensing activities, on March 11, 2020, Oklo Power LLC, a subsidiary of Oklo Inc., submitted a COL application for the Aurora reactor design proposed to be constructed and operated at the Idaho National Laboratory (ADAMS Accession No. [ML20075A000](#)). This is the first COL application for a non-LWR submitted to the NRC. The design is a non-LWR micro-reactor using metallic fuel to produce about 1.5 megawatts of electrical power. On June 5, 2020, the NRC issued a letter to Oklo (ADAMS Accession No. [ML20149K616](#)) indicating that the staff plans to complete the review in a two-step process. In Step 1, the staff is focusing on four key safety and design aspects of the Aurora application critical to demonstrating the applicant's safety case before initiating a detailed review of all aspects of the design. These include: 1) the maximum credible accident analyses; 2) the classification of SSCs; 3) the applicability of particular NRC regulations to the Aurora design; and 4) the Quality Assurance Program scope. At the conclusion of Step 1, the NRC staff will have defined the scope of the full, detailed technical review and will develop a schedule to efficiently perform the remainder of the review (Step 2). Successful completion of Step 2 will involve the NRC staff issuing its final SER and environmental impact statement after the ACRS completes its review.

Step 1 was scheduled to be completed by November 5, 2020, but since the purpose of Step 1 was not fully satisfied, it was extended. On November 17, 2020, the NRC staff issued a letter (ADAMS Accession No. [ML20308A677](#)) informing Oklo of the extension of the Step 1 review in the areas of maximum credible accident methodology, safety classification of SSCs, and scope of the quality assurance program. Because Oklo's quality assurance program is closely tied to its safety classification of SSCs, these issues have been combined and are no longer being tracked separately. In the letter, the NRC stated that Oklo's responses to requests for additional information, audit documents, and audit discussions enhanced the staff's understanding of Oklo's novel approach to the Aurora safety case but did not provide sufficient information to define the scope of the full technical review.

The NRC staff completed its review of one of the key aspects of the licensing basis, the applicability of regulations, and issued a letter documenting Step 1 closure on this topic on November 17, 2020 (ADAMS Accession No. [ML20300A593](#)). On December 22, 2020, Oklo provided two letters (ADAMS Accession Nos. [ML20357A001](#) and [ML20357A002](#)) responding to the letters received from the NRC staff. In the letters, Oklo expressed concerns with the NRC staff's observations on the technical sufficiency of their application and the overall project management of the review. Previously projected activities have been deferred to dates to be determined pending engagement with the applicant on the path forward. The NRC staff holds periodic public meetings to discuss the review of the COL application for the Oklo Aurora design. A list of the meetings can be found on the NRC's public website (<https://www.nrc.gov/reactors/new-reactors/col/aurora-oklo/public-meetings.html>).

The NRC staff also continues to implement flexible and staged non-LWR regulatory review processes to engage with developers, including X-energy, LLC, on its pebble bed, high-temperature gas-cooled reactor; Kairos Power on its pebble-fueled, molten-fluoride-cooled reactor and its Hermes test reactor; Terrestrial Energy on its molten salt, molten fuel reactor; and TerraPower on its sodium-cooled fast reactor. The NRC staff also continued preapplication engagement with X-energy, LLC, for a planned fuel fabrication facility to produce TRISO fuel as well as review of the Centrus license amendment request to demonstrate the production of high assay low enriched uranium (HALEU)⁵ at its Piketon, OH, facility. The NRC staff is also engaged in preapplication efforts related to Abilene Christian University's plan to submit an application for a molten salt (liquid fueled) non-power research reactor. The NRC staff expects the level of preapplication engagement to increase in CY 2021.

Regulatory Infrastructure

The NRC continues to enhance its regulatory infrastructure to meet its goals of improving the planning, licensing, and oversight of future new reactor applications; making timely and effective policy decisions; and updating regulatory guidance for large LWRs, small modular reactors, and non-LWRs. The NRC also continues to review its internal processes to ensure that the safety and environmental reviews are effective and efficient. As part of the NRC's commitment to openness, the staff continues to provide opportunities for external stakeholder input as part of the agency's processes. The agency also rigorously assesses licensing and oversight performance and uses the results to inform these regulatory infrastructure activities.

The previous section discussed infrastructure activities that are largely for non-LWRs. The sections below describe other infrastructure activities conducted during the reporting period.

⁵ HALEU is uranium enriched up to 20 percent and is used in several advanced reactor fuel designs.

Guidance for Changes During Construction (Regulatory Guide 1.237)

The NRC staff issued RG 1.237 (formerly Draft Regulatory Guide (DG) 1321), “Guidance for Changes During Construction for New Nuclear Power Plants Being Constructed Under a Combined License Referencing a Certified Design Under 10 CFR Part 52,” in February 2021 (ADAMS Accession No. [ML20349A335](#)). This RG reiterates 10 CFR 52.98(c) requirements for the implementation of changes to the design of a facility under construction⁶ under a COL. This regulatory guide describes a process the NRC staff considers acceptable for implementation of changes to the design of SSCs constructed under a COL and provides a list of regulatory requirements that licensees must meet before placing any SSCs into operation. To the extent feasible, this guidance harmonizes the treatment of changes to or departures from the design of a facility under construction pursuant to a COL that references a certified design, as described in the final safety analysis report and as updated, under 10 CFR Part 52 with the treatment of changes to the design of a facility operating under 10 CFR Part 50, “Domestic licensing of production and utilization facilities.”

This update will be the last for RG 1.237, as it is now issued.

Standard Review Plan Modernization (NUREG-0800)

The NRC staff began an effort to modernize NUREG-0800⁷, “Standard Review Plan [SRP] for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition.” Although the SRP originally focused on large LWR design reviews, the SRP is currently used to support the staff’s reviews of various Part 50 and Part 52 applications, including applications for COLs, design certifications, and early site permits; limited work authorization requests; and license amendment requests. The NRC staff recognized the need to incorporate future small and large LWR applications into the NRC’s licensing process. The SRP modernization effort will focus the staff’s review on the regulatory requirements and associated acceptance criteria that determine whether there is reasonable assurance of adequate protection. In addition, the updated SRP will leverage the improved use of risk insights to inform the staff’s review. During this reporting period, the NRC staff held a public meeting on March 31, 2021 (ADAMS Accession No. [ML21077A161](#)), to obtain external stakeholder feedback on the SRP modernization effort and to keep all interested stakeholders informed on the progress of this effort.

Operating Licensing Examination Standards (NUREG-1021)

The NRC issued a *Federal Register* Notice ([85 FR 77280](#)) on December 1, 2020, requesting public comments on draft Revision 12 of NUREG-1021, “Operator Licensing Examination Standards for Power Reactors” (ADAMS Accession No. [ML20329A326](#)). NUREG-1021 establishes the policies, procedures, and guidance for the development, administration, and grading of written examinations and operating tests used for examining licensees and applicants for reactor operator and senior reactor operator licenses at power reactor facilities in accordance with 10 CFR Part 55, “Operators’ licenses.” The draft revision would (1) streamline information into topic-based sections for ease of use; (2) clarify instructions for the identification and grading of performance deficiencies on the operating test; and (3) introduce new instructions for the

⁶ Construction, as defined in 10 CFR 50.10, “License required; limited work authorization,” is, in part, the in-place assembly, erection, fabrication, or testing for specified SSCs.

⁷ The SRP is best viewed online at <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800/index.html>.

treatment of critical tasks and critical and significant performance deficiencies. The public comment period closed on February 16, 2021. The NRC staff intends to issue Revision 12 of NUREG-1021 by September 30, 2021.

Environmental Guidance Updates

The NRC staff noticed issuance of Revision 3 of RG 4.2, "Preparation of Environmental Reports for Nuclear Power Stations," in the *Federal Register* on September 24, 2018, ([83 FR 48346](#)) (ADAMS Accession No. [ML18071A400](#)). This was the first update to RG 4.2 since July 1976. The staff is currently evaluating a path forward for updating NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan," last revised in July 2007⁸. The proposed update will reflect changes in NRC policy and regulations and will incorporate streamlined processes based on experience gained through completed environmental reviews. The update will also reflect statutory requirements, applicable Executive Orders, judicial developments, and agency administrative decisions and will consider, as appropriate and in coordination with a potential NRC rulemaking, any new environmental regulations issued by the Council on Environmental Quality.

Given the extensive changes in the environmental review area, the NRC has paused its plan to publish a draft of the revised NUREG-1555 for public comment. In the interim, the NRC continues to conduct environmental reviews in accordance with current NRC regulations and applicable existing and interim staff guidance, while still considering best practices and lessons learned from past reviews.

X. Response to Lessons Learned from the Fukushima Dai-ichi Accident in Japan throughout the First Half of Fiscal Year 2021

The NRC staff continues to make progress toward completing the regulatory actions undertaken after the accident at Fukushima Dai-ichi. All applicable licensees have completed the safety improvements associated with the orders for mitigating strategies, spent fuel pool instrumentation, and severe-accident-capable hardened containment vent systems (HCVSs). All applicable operating power reactors have reported compliance with these orders. The NRC has completed all the onsite inspections to verify licensees' compliance with the orders for mitigating strategies and spent fuel pool instrumentation. The NRC has completed 14⁹ onsite HCVS inspections to date to verify compliance with the HCVS order.

Because of challenges presented by the ongoing COVID-19 pandemic, the final three HCVS inspections were postponed from CY 2020 and are expected to be completed in CY 2021.

As noted in the last report, the NRC has completed its review of the seismic and flooding hazard information and determined that no additional regulatory action related to the seismic and flooding hazards are needed. One flooding and two seismic evaluations are associated with two sites that have approved due date deferrals beyond their announced permanent shutdown dates, and therefore, are not expected to complete the evaluations.

⁸ The SRP is best viewed online at <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1555/updates.html>.

⁹ This order only applies to boiling-water reactors with Mark I or Mark II containment designs, for which there are 17 sites total.

XI. Planned Rulemaking Activities

The attached report lists the status of NRC rulemaking activities as of April 2, 2021, including their priorities and schedules. Of the 84 rulemaking activities, 70 rulemakings are planned activities. The NRC is also reviewing 14 petitions for rulemaking. The 70 planned rulemaking activities include 9 proposals in response to industry requests, 16 that could reduce or clarify existing requirements, 25 that are required by statute or are needed to conform NRC regulations to other agency requirements or to international treaties or agreements, and 20 that could establish new requirements. The NRC uses a single tracking and reporting system to provide real-time updates on all NRC rulemaking activities. Members of the public can access the NRC's rulemaking activity information at <https://www.nrc.gov/about-nrc/regulatory/rulemaking/rules-petitions.html>.

At the time of publication, each proposed and final rule includes a statement that addresses actions taken to meet applicable backfitting and issue finality requirements, including which, if any, backfitting and issue finality requirements apply and how the NRC staff evaluated the rule with respect to those requirements.