



Protecting People and the Environment

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

April 2021–September 2021

Note: The period of performance covered by this report includes activities that occurred from the first day of April 2021 to the last day of September 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 determine the most effective use 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 September 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. The staff is on track to complete the baseline inspection program for Calendar Year (CY) 2021 with the goal of completing the nominal inspection sample sizes at all units.

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 NRC staff has begun implementing the recommendations from that report, starting with a Comprehensive Baseline Inspection Program Review as part of the annual ROP self-assessment process. The objective of the Comprehensive Baseline Inspection Program Review is to recommend revisions to the inspection program based on lessons learned from the pandemic. Additional working groups are planned to address the other recommendations from the lessons learned report.

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 decision-making 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 32 applications to adopt 10 CFR 50.69. The NRC staff has approved 24 applications and is currently reviewing the remaining 8 applications. The NRC anticipates receiving six additional applications by the end of fiscal year (FY) 2022.

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 25 applications to adopt RITS Initiative 4b. The NRC staff has approved 17 applications, is currently reviewing the remaining 8 applications, and anticipates receiving an additional 13 applications by the end of FY 2022.

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. These interactions include discussion of topics such as 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 a 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 self-assessment results indicate that VLSSIR provides a predictable framework to review, assess, and disposition issues of very low safety significance that are not clearly within a plant's licensing basis. The process was used to close three issues in CY 2021.

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 issue, it would characterize the risk associated with the proposed exemption or amendment and submit a request to the NRC for approval. If the conditions described in the RIPE guidance are met, then the NRC would apply a streamlined process to review the request. In order to utilize RIPE, a licensee must

demonstrate that it has a robust process for assessing risk of the plant and evaluating the other key risk-informed decisionmaking principles of defense-in-depth and safety margins. Licensees can use the RIPE process to justify plant-specific licensing actions to address the issue without imposing undue burden. Most recently, on June 30, 2021, the RIPE process was expanded to allow licensees with additional approved risk-informed initiatives to use the process (ADAMS Accession No. [ML21180A011](#)). The NRC continues to conduct additional internal and external stakeholder outreach to successfully expand the implementation of RIPE initiatives.

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 issuing 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 March 2021, the NRC staff issued the results of an evaluation under LIC-504, “Integrated Risk-Informed Decisionmaking Process for Emergent Issues” (ADAMS Accession No. [ML19253D401](#)), for the derecho event that occurred at the Duane Arnold Energy Center Nuclear Power Plant on August 10, 2020, and led to the early retirement of the facility. The NRC staff conducted the evaluation to assess potential safety impacts on other nuclear power plants and confirmed that the potential increase in risk associated with the derecho event is below the value for which the NRC would consider taking immediate regulatory action. The LIC-504 analysis generated a set of risk insights using design, operational, and siting characteristics of eight nuclear power plants. These risk insights and recommendations were then shared with NRC inspectors and members of the regulated community to enhance public safety (ADAMS Accession No. [ML21078A127](#)). Subsequently, the NRC held a public webinar to discuss the NRC’s insights with external stakeholders. On August 11, 2021, the NRC also issued an Information Notice (ADAMS Accession No. [ML21139A091](#)) to power reactor licensees and applicants communicating NRC expectations that they review the risk insights for applicability to their facilities and consider actions, as appropriate, to avoid similar issues. The NRC used its Be RiskSMART framework (ADAMS Accession No. [ML21071A238](#)) to support communications and share lessons learned.

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

During this reporting period, the NRC staff closed one potential generic issue (GI).

High-Energy Arcing Faults

Regarding the potential GI related to the effects of high-energy arcing faults (HEAFs) involving electrical equipment with aluminum components at nuclear power plants, the staff concluded that there were several areas of long-term research needed to fully and accurately assess the risk posed by the issue. As such, the issue no longer meets all of the screening criteria for the GI program. The Director of the Office of Nuclear Regulatory Research issued a memorandum on August 31, 2021 (ADAMS Accession No. [ML21237A360](#)) closing PRE-GI-018. No further actions will be taken under the GI program. However, the staff will apply LIC-504, “Integrated Risk-Informed Decisionmaking Process for Emergent Issues” (ADAMS Accession No. [ML19253D401](#)), to make a risk-informed decision regarding the need for additional regulatory actions for HEAFs

involving aluminum in the near term.

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

For FY 2022, the indicators related to the age of the inventory of licensing actions and the age of the inventory of other licensing tasks were discontinued, but the new FY 2021 indicator for timely completion of final safety evaluations was retained. In FY 2022, two new performance indicators were also added, specifically the percentage of reviews completed within resource estimates and the average percentage of time allotted used in the established schedule. These performance indicators are applicable to 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.

Table 1 shows the actual FY 2018 through FY 2021 results to date and the FY 2022 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.

**Table 1 Results and FY 2022 Goals for the NRC's Congressional Budget
Justification Performance Indicators**

Output Measure	FY 2018 Actual	FY 2019 Actual	FY 2020 Actual	FY 2021 Actual	FY 2022 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	Discontinued
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	97% ≤2 year	Discontinued
Timely completion of final safety evaluations	Not Applicable	Not Applicable	Not Applicable	100% ≤24 months	100% ≤24 months
Average Percentage of Time Allotted Used in the Established Schedule	Not Applicable	Not Applicable	Not Applicable	Not Applicable	≤115% or ≥75%
Percentage of Reviews Completed within Resource Estimates	Not Applicable	Not Applicable	Not Applicable	Not Applicable	80%

During this reporting period, the NRC staff completed 13 licensing actions for both power and non-power reactors related to the COVID-19 pandemic, with an average completion time of 37 days; this is a significant reduction in the number of COVID-related licensing actions for reactors compared to the last reporting period. 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 provide reasonable assurance of 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. 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 renewal applications during this reporting period. The staff completed its review of one subsequent license renewal (SLR) application for Surry Power Station, Units 1 and 2, and issued the renewed licenses. The staff also continued to review an SLR application for North Anna Power Station, Units 1 and 2 and Point Beach Nuclear Plant, Units 1 and 2. The NRC received and accepted two additional SLR applications for Oconee Nuclear Station, Units 1, 2, and 3, and St. Lucie Plant, Units 1 and

2.

Surry Power Station, Units 1 and 2

The NRC staff completed the safety review and issued 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 full Advisory Committee on Reactor Safeguards (ACRS).

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. After Dominion fulfilled its CZMA obligations, the NRC completed its review of the application and issued the renewed licenses on May 4, 2021.

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 (ASLB) for this proceeding issued an order denying the petition to intervene and terminating the proceeding (ADAMS Accession No. [ML21088A364](#)). On April 23, 2021, the petitioners filled an appeal to the Commission (ADAMS Accession No. [ML21113A315](#)). Also, on September 29, 2021, Beyond Nuclear, the Sierra Club, and Alliance for a Progressive Virginia filed a motion to amend a contention and a motion to reopen the record in the proceeding (ADAMS Accession No. [ML21272A386](#)) based on a statement in the staff’s Draft Environmental Impact Statement (DEIS), which was issued for public comment on August 19, 2021 (ADAMS Accession No. [ML21228A084](#)). The public comment period on the DEIS closed on October 12, 2021. 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 Nuclear Plant, Units 1 and 2 (ADAMS Package Accession No. [ML20329A292](#)). On January 15, 2021, the NRC staff accepted the SLR application (ADAMS Accession No. [ML21006A417](#)). Physicians for Social Responsibility Wisconsin filed a petition to intervene (ADAMS Accession No. [ML21082A529](#)) with four contentions (relating to mitigation of thermal pollution, biotic impingement, and entrainment; reactor coolant pressure boundary; alternatives in the environmental report; and turbine missile accidents). On June 22, 2021, an oral argument was held before the ASLB for this proceeding. On July 26, 2021, the ASLB issued an order denying the petition to intervene and terminating the proceeding (ADAMS Accession No. [ML21207A075](#)). On August 20, 2021, the petitioners filled an appeal to the Commission (ADAMS Accession No. [ML21232A700](#)). The application is currently under review with an established 18-month schedule.

Oconee Nuclear Station, Units 1, 2, and 3

On June 22, 2021, Duke Energy Carolinas submitted an SLR application for Oconee Nuclear Station, Units 1, 2, and 3 (ADAMS Accession No. [ML21158A193](#)). On July 22, 2021, the NRC staff accepted the SLR application (ADAMS Accession No. [ML21194A231](#)). On September 27, 2021, Beyond Nuclear and Sierra Club filed a petition to intervene (ADAMS Accession No. [ML21270A249](#)), in which they proposed three contentions. The application is currently under review with an established 18-month schedule.

St. Lucie Plant, Units 1 and 2

On August 3, 2021, NextEra Energy submitted an SLR application for St. Lucie Plant, Units 1 and 2 (ADAMS Accession No. [ML21215A314](#)). On September 24, 2021, the NRC staff accepted the SLR application (ADAMS Accession No. [ML21246A091](#)). Due to resource constraints resulting from receiving more SLR applications than budgeted, the NRC staff coordinated with the applicant and established a mutually acceptable 21-month review schedule. Although the schedule is slightly longer, the staff remains committed to completing the review within the typical resource allocations for prior SLR application reviews.

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 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	3	0	2	5
	FY 21 Total	0	6	0	4	10
	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	24	28	20	38	110
	FY 21 Total	48	53	39	78	218
	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	24	31	20	40	115
	FY 21 Total	48	59	39	82	228
	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 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 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	1	0	4	5
	FY 21 Total	0	4	0	4	8
	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	1	0	4	5
	FY 21 Total	0	5	0	4	9
	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 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 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	1	0	0	0	1
	FY 21 Total	1	0	0	0	1
	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	1	0	0	0	1
	FY 21 Total	1	0	0	0	1
	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

Entergy Operations, Inc. (River Bend Station) EA-21-017; EA-21-030; EA-21-050

On September 30, 2021, the NRC issued a notice of violation and proposed imposition of a civil penalty in the amount of \$150,000 to Entergy Operations, Inc. for a Severity Level III violation involving the unauthorized exchange of a critical digital asset key at River Bend Station, contrary to the requirements of 10 CFR 73.54(b)(2). In addition, the NRC issued two Severity Level III violations of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," involving incomplete operator rounds and the creation of an unauthorized copy of an exam with

falsified answers by an exam proctor. No civil penalty was proposed for these additional violations. All three violations were determined to be willful based on three separate investigations completed by the NRC's Office of Investigations.

Exelon Generation Company, LLC (James A. FitzPatrick Nuclear Power Plant) EA-20-138

On September 3, 2021, the NRC revised the notice of violation issued on April 20, 2021, to Exelon Generation Company, LLC, associated with a White Significance Determination Process finding. The NRC confirmed the validity of the issued Technical Specification violation and recommended a revised performance deficiency concerning the FitzPatrick staff's failure to adequately follow its procurement and receipt procedures. Specifically, the circumstances of the performance deficiency were determined to constitute violations of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," and Criterion XV, "Nonconforming Materials, Parts, or Components." The noncompliance with Criterion V is newly identified, and the noncompliance with Criterion XV, with changes, was confirmed.

Tennessee Valley Authority (Watts Bar Nuclear Plant, Unit 1) EA-19-092

On July 23, 2021, the NRC issued a revised notice of violation and proposed imposition of a civil penalty to the Tennessee Valley Authority (TVA) for multiple violations of NRC requirements, replacing an earlier notice of violation and proposed imposition of a civil penalty issued on November 6, 2020. The NRC reevaluated the original violations, severity levels, and associated civil penalties, and the NRC concluded that: 1) the willfulness factor should be removed from the Severity Level III Problem and the improper change process violation, resulting in removal of the associated portions of the originally proposed civil penalty; 2) the Severity Level III Problem violations should be separated and reevaluated as a Green noncited violation for failure to follow procedures and a Severity Level III violation without a civil penalty for failure to make log entries; and 3) the improper change process violation should be dispositioned as a Green noncited violation. There was no change to the November 2020 notice of violation with respect to the Severity Level II violation of 10 CFR 50.9(a), "Completeness and Accuracy of Information," and the associated proposed civil penalty of \$303,471.

South Texas Project Nuclear Operating Company (South Texas Project) EA-20-122

On May 24, 2021, a notice of violation was issued to South Texas Project Nuclear Operating Company for violations associated with an escalated enforcement finding at the South Texas Project Electric Generating Station. The details of the finding are official use only – security-related information.

Entergy Operations, Inc. (Waterford Steam Electric Station, Unit 3) EA-20-114

On May 18, 2021, the NRC issued a Severity Level III notice of violation to Entergy Operations, Inc. (licensee), for a violation of 10 CFR Part 50, Appendix B, Criterion V at Waterford Steam Electric Station, Unit 3. Specifically, the licensee contract employees, at the direction of their superintendent, disconnected an equipment protective device and drilled through embedded structural steel reinforcing bar in a safety-related wall without first obtaining the required approval.

Florida Power & Light Company (Turkey Point Nuclear Generating Station) EA-20-043; EA-20-150

On April 6, 2021, the NRC issued a notice of violation and proposed imposition of a civil penalty in

the amount of \$150,000 to the Florida Power & Light Company for a Severity Level III problem at Turkey Point Nuclear Generating Station. The enforcement action is the result of two separate investigations completed by the NRC's Office of Investigations. The first investigation determined that three mechanics willfully falsified records associated with required inspection and maintenance of a safety-related check valve in the auxiliary feedwater system. This event occurred in January 2019. The second investigation determined that two technicians willfully falsified maintenance records and their supervisor and another manager willfully failed to inform control room staff that work had been performed on the wrong unit's Chemical and Volume Control System charging pump. This second event occurred in July 2019. As a result of these two investigations, the staff identified two violations of 10 CFR 50.9(a), and a violation of 10 CFR Part 50, Appendix B, Criterion V.

VII. Security and Emergency Preparedness and Incident Response Activities

The NRC continues to maintain an appropriate regulatory infrastructure to provide reasonable assurance of adequate protection of public health and safety and to 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](#)).¹ 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.

For CY 2021, the NRC developed another option that modified the pre-pandemic FOF procedure to minimize COVID-19 exposure by adding interim guidance to IP 71130.03, "Contingency Response - Force-on-Force Testing (ADAMS Accession No. [ML21012A329](#)).² The NRC has been implementing this interim guidance since its issuance on February 8, 2021. This interim guidance 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

¹ This document is not publicly available.

² This document is not publicly available.

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. The NRC staff used the temporary staff guidance to approve four hardship requests for IP 92707 inspections in July and August 2021 because of surges in COVID-19 infection rates.

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.

In June 2021, the agency completed the cyber security program full implementation inspections of all operating nuclear power plant licensees. The program included 58 inspections. The NRC has developed a further performance-based cyber security inspection program that will be implemented in CY 2022.

Emergency Preparedness and Incident Response

On May 12, 2020, the NRC staff published for public comment a proposed rule and draft regulatory guidance on emergency preparedness (EP) for small modular reactors and other new technologies ([92 FR 28436](#)). The public comment period closed on September 25, 2020. The NRC staff received over 2,000 public comments and anticipates providing the draft final rule to the Commission for its consideration in December 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. From April 2021 to September 2021, the NRC staff granted three exemptions to defer both onsite and offsite biennial EP exercises. The NRC anticipates that licensees will continue to request exemptions during the pandemic.

During this reporting period, the NRC granted three significant EP-related license amendment requests (LAR) using the 2019 risk-informed guidance in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 2. Specifically, on August 26, 2021, the NRC granted an 11-unit LAR (ADAMS Accession No. [ML21155A213](#)) to Duke Energy to replace the site-specific emergency plans with a Duke Energy Common Emergency Plan with site-specific

annexes. On September 21, 2021, the NRC granted a six-unit LAR (ADAMS Accession No. [ML21217A091](#)) to Southern Nuclear Corporation to risk inform the emergency response organization (ERO) staffing composition and increase the staff augmentation response time of certain ERO positions. On September 27, 2021, the NRC granted an LAR (ADAMS Accession No. [ML21217A021](#)) to Vogtle Electric Generating Plant, Units 3 and 4, to change the ERO staffing composition and extend staff augmentation time from 75 to 90 minutes.

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, no power upgrades were approved by the NRC staff. The NRC is currently reviewing one measurement uncertainty recapture power upgrade for Millstone Power Station, Unit 3.

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.

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. On May 6, 2021, the Commission approved the publication of the proposed rule (ADAMS Package No. [ML21126A153](#)). The NRC published the proposed rule on July 1, 2021 ([86 FR 34999](#)), for public comment. During the public comment period, the staff received a request, submitted on behalf of two public interest groups, to extend the public comment period for the proposed rule by an additional 90 days (ADAMS Accession No. [ML21209A763](#)). The NRC evaluated this request and decided to extend the public comment period by an additional 45 days to allow more time for members of the public to develop and submit their comments; the public comment period closed on October 14, 2021 ([86 FR 47251](#)). The staff anticipates providing the draft final rule to the Commission for its consideration in March 2022.

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](#)). On May 17, 2021, the Commission approved the publication of the direct final rule and companion proposed rule (ADAMS Package No. [ML21137A056](#)). The NRC published the direct final rule ([86 FR 34905](#)), with the companion proposed rule ([86 FR 35023](#)) for public comment, on July 1, 2021. The public comment period ended on August 2, 2021, with no public comments received. The NRC subsequently published a confirmation *Federal Register* notice ([86 FR 44262](#)) on August 12, 2021, that confirmed the ABWR design certification renewal rule would become effective on September 29, 2021. The renewal extended the duration of the U.S. ABWR design certification for an additional 15 years.

Construction Oversight under 10 CFR Part 52

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 July 22, 2021, to the first quarter 2022 and no later than May 2022. The licensee has indicated that the initial fuel loading date for Vogtle Unit 4 is now August 2022. 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.

Successful application of technology for telework and remote access to licensee information enabled the NRC to continue construction inspections and licensing activities with only minor interruptions due to the COVID-19 pandemic. 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.

During this reporting period, the NRC staff focused on the licensee's response to quality issues. On July 12, 2021, the NRC completed a reactive special inspection, which assessed nonconformances with electrical cable separation requirements. The NRC released its initial conclusions in an inspection report on August 26, 2021 (ADAMS Accession No. [ML21236A057](#)). The NRC found that Southern Nuclear Operating Company did not adequately separate safety and non-safety-related cables for reactor coolant pumps and equipment designed to safely shut down the reactor. The NRC also found instances where the company did not identify construction quality issues related to the safety-related electrical raceway system and enter them into its corrective action program. The NRC will document the final significance determination of its findings within 90 days of the inspection report's issuance date.

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. Plant assessments and the latest cROP information are publicly available on the NRC's website at

<https://www.nrc.gov/reactors/new-reactors/oversight/crop.html>.

Other highlights related to licensing and construction activities at Vogtle Units 3 and 4 during the reporting period include:

- The NRC completed a LAR review related to emergency plan changes (ADAMS Accession No. [ML21217A021](#)). In addition, the NRC completed two requests to use alternatives to certain American Society of Mechanical Engineers (ASME) requirements (ADAMS Accession Nos. [ML21203A317](#) and [ML21090A245](#)).
- The NRC staff conducted mission critical onsite ITAAC, initial test program, and operational program inspections, including inspections related to hot functional testing, cold hydrostatic testing, spent fuel pool construction, electrical raceway installation, equipment qualification, and fire protection.
- On April 28, 2021, the NRC staff conducted a public meeting to discuss VRG activities and the annual assessment of licensee performance (ADAMS Accession No. [ML21130A017](#)).
- The NRC started an initiative to capture 10 CFR Part 52 lessons learned from the construction of Vogtle Units 3 and 4 and Virgil C. Summer Nuclear Station, Units 2 and 3 (ADAMS Accession No. [ML21160A031](#)).

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 include replacement components, commercial-grade dedication, reverse engineering, software, and fuel fabrication.

For FY 2021, the NRC met its goal of completing 20 vendor inspections. During this reporting period, the NRC continued to perform vendor inspections both virtually and onsite based on local 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 transmission rate at the vendor facility, changes in component 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 need to technically validate onsite activities. For FY 2022, the NRC plans to perform approximately 20 vendor inspections.

In addition to conducting vendor inspections, the NRC staff conducted its first virtual Town Hall Meeting on Vendor Oversight on June 24, 2021 (ADAMS Accession No. [ML21208A131](#)). The purpose of this meeting was 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 meeting included three presentations by the NRC staff on the importance of adhering to procurement specifications, regulatory alternatives for supplier oversight during exigent conditions, and an update on the NRC's recognition of the International Laboratory Accreditation Cooperation accreditation process. The meeting also provided 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. The audience included approximately 220 attendees representing companies and organizations from 10 countries, including vendors, industry groups, and government regulatory agencies, both foreign and domestic.

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.

In September 2021, the staff issued Revision 12 to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors" (ADAMS Accession No. [ML21256A276](#)). Additional information can be found in the "Regulatory Infrastructure" section within Section IX of this report.

Additionally, the staff is developing a proposed rule to align licensing processes and lessons learned from new reactor licensing (RIN 3150-AI66, Docket [NRC-2009-0196](#)). This rule would amend the NRC's regulations for the licensing of new nuclear power reactors and include improvements to 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. The staff anticipates providing the draft proposed rule to the Commission for its consideration in May 2022.

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. Additional information on the status of advanced reactor readiness and activities is available on the NRC's website at <https://www.nrc.gov/reactors/new-reactors/advanced.html>.

Consistent with NEIMA Section 103(a)(4), the staff is 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." The staff is continuing extensive

stakeholder engagement and is conducting a series of public meetings to engage stakeholders and the ACRS in the development of a draft proposed rule. The staff is implementing a novel approach of releasing preliminary proposed rule language to facilitate public discussion. The staff has received over 140 individual public comments representing a diverse set of stakeholder views that are being considered in the development of the proposed rule. The staff is planning to provide the proposed and final rules to the Commission on a schedule that would allow for publication of the final rule significantly ahead of the NEIMA deadline of December 2027.

Other recent accomplishments include:

- The NRC continued to hold periodic public meetings with stakeholders on numerous 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.
- In April 2021, the NRC staff issued a white paper titled “Preliminary Options for a Regulatory Framework for Fusion Energy Systems” (ADAMS Accession No. [ML21118A081](#)). The purpose of this white paper was to support interactions with the ACRS and to summarize the information previously shared with stakeholders during public meetings. The NRC staff briefed the ACRS on May 6, 2021, and held a public meeting with external stakeholders on development of a regulatory framework for fusion reactor applications on September 16, 2021.
- The NRC staff published a draft NUREG for public comment with proposed fuel qualification methodology to provide guidance for non-LWR developers on qualification of fuel under NEIMA (available at [86 FR 34794](#) and ADAMS Accession No. [ML21168A063](#)).
- NUMARK Associates, Inc. and Oak Ridge National Laboratory issued a series of technical reports regarding materials, chemistry, and component integrity addressing molten salt chemistry, salt compatibility with high temperature materials, high temperature corrosion, and graphite (ADAMS Accession Nos. [ML21116A231](#) and [ML21109A123](#)).
- The NRC staff issued a draft white paper to provide information to advanced reactor developers on the benefits of robust preapplication engagement in order to optimize both safety and environmental application reviews (ADAMS Accession No. [ML21145A106](#)).
- The NRC provided a report to the appropriate congressional committees for (1) completing a rulemaking to establish a technology-inclusive regulatory framework for optional use by applicants in licensing commercial advanced nuclear reactor technologies in new reactor license applications and (2) ensuring that the agency has adequate expertise, modeling, and simulation capabilities, or access to those capabilities, to support the evaluation of commercial advanced reactor license applications, in accordance with Section 103(e) of NEIMA (ADAMS Accession No. [ML21109A263](#)).
- The NRC staff published a draft regulatory guide (RG) for endorsement of the ASME Section III, Division 5 Standard for public comment (ADAMS Accession No. [ML21091A230](#)).
- The NRC staff issued a draft white paper to provide information to advanced reactor

applicants regarding the applicability of existing regulations to non-LWRs (ADAMS Accession No. [ML21175A287](#)).

- The NRC staff issued draft material control and accounting guidance for Category II facilities (NUREG-2159) for public comment (ADAMS Accession No. [ML21263A119](#)).
- Brookhaven National Laboratory, under contract with the NRC, issued a report regarding scalable human factors engineering technical review strategy (ADAMS Accession No. [ML21266A192](#)).
- The NRC staff published a draft RG for endorsement of the ASME Boiler and Pressure Vessel Code Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” Division 2, “Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Power Plants,” for public comment (ADAMS Package Accession No. [ML21120A180](#)).
- 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-LWRs (ADAMS Accession No. [ML21229A263](#)).
- The NRC continued to develop the draft generic environmental impact statement (GEIS) for advanced nuclear reactors. The staff plans to issue a paper to the Commission providing the draft GEIS and the associated draft proposed rule for its consideration in November 2021.
- 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 combined license (COL) application for the Aurora micro-reactor design proposed to be constructed and operated at the Idaho National Laboratory site (ADAMS Accession No. [ML20075A000](#)). This is the first COL application for a non-LWR submitted to the NRC. The design uses metallic fuel to produce about 1.5 megawatts of electrical power. On June 5, 2020, the NRC informed Oklo of the staff’s plans to complete the review in a two-step process (ADAMS Accession No. [ML20149K616](#)). The NRC staff is engaging Oklo in public meetings, conducting regulatory audits, and issuing requests for additional information to reach a full understanding of four key safety and design aspects of the Aurora licensing basis: (1) the maximum credible accident analyses, (2) the classification of systems, structures, and components, (3) the applicability of particular NRC regulations to the Aurora design, and (4) the scope of the quality assurance program. On November 17, 2020, the staff issued two letters informing Oklo of the closure of the key focus area relating to applicability of regulations and the consolidation of the key focus areas relating to the scope of the quality assurance program and classification of structures, systems, and components, and identifying information needed for the two remaining key focus areas (ADAMS Accession No. [ML20300A593](#) and [ML20308A677](#)).

To address these areas, Oklo submitted two topical reports titled “Maximum Credible Accident Methodology” (ADAMS Accession No. [ML21184A002](#)), and “Performance-Based Licensing Methodology” (ADAMS Accession No. [ML21187A001](#)), on July 2, 2021. The NRC staff performed a completeness review and determined that Oklo’s topical reports lacked sufficient information to initiate the detailed technical review. On August 5, 2021, the staff provided Oklo with a description of the needed supplemental information and requested that Oklo submit it

within 60 days (ADAMS Accession Nos. [ML21201A111](#) and [ML21201A113](#) for the “Performance-Based Licensing Methodology” topical report and ADAMS Accession Nos. [ML21201A079](#) and [ML21201A094](#) for the “Maximum Credible Accident Methodology” topical report). The staff held public meetings with Oklo on September 1 (ADAMS Accession No. [ML21259A260](#)), September 16 (ADAMS Accession No. [ML21266A428](#)), and September 28, 2021 (ADAMS Accession No. [ML21236A236](#)), to discuss the completeness determinations and supplemental information. Oklo submitted additional information for the topical reports on October 5 and October 19, 2021 (ADAMS Package Accession No. [ML21278B096](#) and [ML21292A325](#), respectively). The staff is currently evaluating the sufficiency of the technical information in these submittals.

On September 29, 2021, Kairos Power, LLC, submitted part 1 (the Preliminary Safety Analysis Report and supporting technical reports) of a construction permit application for the Hermes test reactor, a 35 MW thermal fluoride salt-cooled high-temperature reactor (FHR) to be built at its East Tennessee Technology Park site near Oak Ridge, TN. The NRC staff is reviewing the application for completeness to support a detailed review and will expeditiously inform the applicant of the results and the associated docketing decision. Kairos intends to submit the environmental report as the second part of the application by the end of November 2021. The Hermes reactor will use a high-temperature graphite-matrix coated tri-structural isotropic (TRISO) particle fuel and a chemically stable, low-pressure molten fluoride salt coolant and is an integral part of Kairos Power’s technology development in support of a commercial nuclear power reactor.

The staff continues to implement flexible and staged non-LWR regulatory review processes and preapplication engagement with potential applicants and vendors, including X-energy, LLC, on its pebble-bed, high-temperature gas-cooled reactor; Kairos Power on its pebble-fueled, molten-fluoride-cooled reactor; Terrestrial Energy on its molten salt coolant, molten salt fuel reactor; and TerraPower on its sodium-cooled fast reactor. The staff is engaged in the preapplication efforts related to Abilene Christian University’s plan to submit an application for a molten salt (liquid fueled) non-power research reactor. The staff continues preapplication engagement with X-energy, LLC, for a planned fuel fabrication facility to produce TRISO fuel. The staff completed its review and approved the Centrus license amendment request to demonstrate the production of high assay low enriched uranium at its Piketon, OH, facility (ADAMS Accession No. [ML21138A826](#)).

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.

Environmental Reviews for Advanced Nuclear Reactors

The staff developed the interim staff guidance COL-ISG--029, “Environmental Considerations Associated with Micro-reactors” (ADAMS Accession No. [ML20290A519](#)), issued in October 2020,

to help the NRC staff in determining the appropriate scale and scope of environmental reviews of micro-reactor applications. The staff is currently developing a GEIS to streamline the environmental review process for the construction and operation of advanced nuclear reactors as described in SECY-20-0020, “Results of Exploratory Process for Developing a Generic Environmental Impact Statement for the Construction and Operation of Advanced Nuclear Reactors” (ADAMS Accession No. [ML20052D029](#)). This GEIS would use a technology-neutral regulatory framework and performance-based assumptions to determine generic environmental impacts for new commercial advanced nuclear reactors. On September 21, 2020, in [SRM-SECY-20-0020](#), the Commission directed the staff to initiate rulemaking to codify the GEIS. The staff is developing the draft proposed rule while continuing to prepare the GEIS and plans to provide the draft proposed rule to the Commission for its consideration in November 2021. This rulemaking would amend the regulations that govern the NRC’s National Environmental Policy Act reviews.

Alignment of Licensing Processes and Lessons Learned from New Reactor Licensing

The NRC staff is working on a rulemaking to address the alignment of licensing requirements of 10 CFR Part 50 and 10 CFR Part 52. The Commission directed the NRC staff to pursue rulemaking to incorporate lessons learned from recent new power reactor licensing reviews. This rulemaking would help ensure consistency in new reactor licensing reviews, regardless of whether an applicant chooses to use the Part 50 or Part 52 licensing process.

The NRC published the regulatory basis for initiating the rulemaking effort in the *Federal Register* on January 29, 2021 ([86 FR 7513](#)). The NRC has requested public comment on the recommendations made in the regulatory basis and asked specific questions about other possible revisions of the NRC’s requirements. The NRC staff received seven public comment submissions on the regulatory basis, which are being considered in the formulation of the draft proposed rule. The NRC staff anticipates providing the draft proposed rule to the Commission for its consideration in May 2022.

Draft Interim Staff Guidance for New Reactor Construction Permit Reviews

The draft interim staff guidance focuses on the safety review of power reactor construction permit applications for any LWR design, including designs similar to those reviewed recently under 10 CFR Part 52. This guidance is being developed because the existing guidance for LWR construction permit applications, contained in RG 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” dates from the 1970s (ADAMS Accession No. [ML011340122](#)). This document, and the more recent LWR application guidance in RG 1.206, “Applications for Nuclear Power Plants” (ADAMS Accession No. [ML18131A181](#)), for 10 CFR Part 52 applications (which does not include construction permit applications), provides additional insights on the level of detail needed to support an LWR construction permit application review. The draft interim staff guidance will discuss the regulatory requirements for a construction permit and insights on the level of detail required for a preliminary safety analysis report. It includes an appendix that provides clarifying and supplemental guidance to the Standard Review Plan ([NUREG-0800](#)) for those sections that combined construction permit and operating license review guidance, or where more information on the approach for reviewing preliminary design information is needed. The staff anticipates issuing the draft interim staff guidance before the end of CY 2021 in a *Federal Register* notice requesting public comment.

Standard Review Plan Modernization (NUREG-0800)

The NRC staff began an effort to modernize NUREG-0800³, “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 LARs. 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. 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. During this reporting period, the staff developed a schedule for modernizing the SRP and is currently modernizing 66 sections. The first batch of sections (approximately 10 sections) is expected to be issued by December 2021 for public comment.

Operating Licensing Examination Standards (NUREG-1021)

On September 17, 2021, the NRC issued Revision 12 to NUREG-1021 (ADAMS Accession No. [ML21256A276](#)). NUREG-1021 establishes the policies, procedures, and practices for examining licensees and applicants for reactor operator and senior reactor operator licenses at nuclear power reactor facilities under 10 CFR Part 55, “Operators’ Licenses.” This revision to NUREG-1021: (1) streamlines information into topic-based sections for ease of use; (2) clarifies instructions for the identification and grading of performance deficiencies on the operating test; (3) introduces revised instructions for the selection of critical tasks and the assessment of critical and significant performance deficiencies; and (4) implements changes to support the testing of fundamentals on the site-specific initial licensing examination, rather than via a separate generic fundamentals examination.

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 2007.⁴ 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. Further, as directed by the Commission in an April 23, 2021, Staff Requirements Memorandum M210218B (ADAMS Accession No. [ML21113A070](#)), the staff is conducting a systematic review of how the agency’s programs, policies, and activities address environmental justice. Depending on the results of this review, additional updates to environmental review guidance documents may be identified.

Given the extensive changes in the environmental review area, the NRC has paused its plan

³ The SRP is best viewed online at <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0800/index.html>.

⁴ The SRP is best viewed online at <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1555/updates.html>.

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 Second Half of Fiscal Year 2021

The NRC staff has completed 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, spent fuel pool instrumentation, and HCVSs.⁵

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 seismic evaluation is associated with a site that has an approved due date deferral beyond its announced permanent shutdown date, and therefore, is not expected to complete the evaluation.

XI. Planned Rulemaking Activities

The attached report lists the status of NRC rulemaking activities as of October 1, 2021, including their priorities and schedules. Of the 73 rulemaking activities, 65 rulemakings are planned activities. The NRC is also reviewing 8 petitions for rulemaking. The 65 planned rulemaking activities include 8 proposals in response to industry requests, 16 that could reduce or clarify existing requirements, 23 that are required by statute or are needed to conform NRC regulations to other agency requirements or to international treaties or agreements, and 18 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.

⁵ This order only applies to boiling-water reactors with Mark I or Mark II containment designs, for which there are 17 sites total.