Microreactor Activities Integration Tables

The following tables list topics related to microreactor licensing and deployment considerations and related completed, ongoing, and planned actions to address them. The NRC staff complied the tables to provide a comprehensive view of microreactor activities and their integration and to support communication and engagement. The tables include descriptions of the topics, actions and planned timeframes, prioritization of the actions, dependencies on other topics, references related to addressing the actions, and the lead NRC organization. The list of topics and the NRC staff's prioritization of the actions consider feedback from interested and affect parties (e.g., industry stakeholders and the public), direction in legislation (e.g., the Nuclear Energy Innovation and Modernization Act of 2019 (NEIMA) and the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 (ADVANCE Act)), ongoing rulemakings and guidance development, preapplication engagement with individual microreactor developers, and others. The priorities also reflect the microreactor-specific importance of an action and may not align with the prioritization of the action for other purposes. For example, a proposed rulemaking might be a high priority for the NRC but be prioritized as "medium" as it relates to addressing a microreactor-specific topic.

Table 1: Staffing and Operations

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Staffing, Training, and Qualification Requirements Microreactors might be designed to require minimal operator actions and allow for single operators to operate multiple reactors. The proposed 10 CFR Part 53 rulemaking provides a performance-based, technology-inclusive framework for staffing requirements that will accommodate reductions in requirements and efficient licensing based on the unique considerations of microreactors. The guidance in NUREG-1220 provides direction to NRC staff for reviewing training programs at nuclear power plants to verify compliance with the requirements of 10 CFR 50.120 and 10 CFR Part 55 as applicable, and the NRC staff is planning a major update to improve the ability of the staff to review and inspect training programs for advanced reactors, including microreactors.	The 10 CFR Part 53 proposed rule includes draft requirements related to staffing for advanced reactors, including microreactors. 2027	Medium. This rulemaking is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants."	NRR/DRO
	The NRC staff plans to issue a revision to NUREG-1220 on training and qualification. Spring 2026 As part of the guidance revision process, the NRC staff plans to issue a draft for public comment. Summer 2025	High. This guidance update would, among other things, contribute to addressing related direction in Section 208 of the ADVANCE Act by improving the ability of the NRC staff to review training program inputs to tailored operator licensing programs for microreactors and by providing for Commission approval of non-accredited training programs for both plant staff and licensed operators.	N/A.	NUREG-1220, Rev 1, "Training Review Criteria and Procedures." (ML102571869) Draft Interim Staff Guidance DRO-ISG-2023-04, "Facility Training Programs." (ML23017A130)	NRR/DRO

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Remote Operation and Autonomous Operation Microreactor developers have expressed interest in pursuing remote operation or autonomous operation of microreactors as part of their deployment models. As discussed in SECY 24-0008, "autonomous" nuclear power plants would generally be capable of both operating and fulfilling safety functions without a human operator, including during conditions of limited or nonexistent communication, while also compensating for failures without external intervention. "Remote" operations generally implies that the place in which human operators would receive plant information and send control signals from would be located outside of the site boundary of the nuclear plant, with the potential for multiple such facilities to be monitored and controlled by operators from a common location.	The NRC staff plans to develop draft near-term guidance which adapts the "self-reliant-mitigation facility" screening methodology of the 10 CFR Part 53 proposed rule for use in reviewing remote and autonomous operational approaches proposed by 10 CFR Part 50 or 10 CFR Part 52 applicants, to include the evaluation of related exemption requests. Summer 2025	Medium. This guidance will support NRC staff review of license applications for microreactors under 10 CFR Part 50 or 10 CFR Part 52 which microreactor developers have indicated might be submitted in the next several years.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants." SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DRO
	The NRC staff plans to continue in-progress research into remote and autonomous operations to develop a long-term strategy for remote and autonomous operations. The NRC staff intends to also determine the need for additional research to address gaps, including any further resource allocations to ongoing guidance development efforts. Summer 2025	Medium. This action will support the NRC staff's longer-term efforts to address remote operation and autonomous operation.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252) Meeting Summary Workshop on Human Factors for Remote Operations 1-31-2024 (ML24061A181)	NRR/DRO
	Develop long-term guidance for the review of remote and autonomous operational approaches that addresses 10 CFR Part 50, 10 CFR Part 52, and 10 CFR Part 53 facility license applications. Summer 2027	Medium. This action will support the NRC staff's longer-term efforts to address remote operation and autonomous operation.	N/A.	Meeting Summary Workshop on Human Factors for Remote Operations 1-31-2024 (ML24061A181)	NRR/DRO

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Operational Programs The applicability, scope, and implementation of operational programs for microreactors might be significantly different than for existing large light water reactors or larger advanced reactors. In addition, for microreactors fabricated in a factory there may be considerations related to establishing operational programs before the manufactured reactor is deployed, especially in cases where the reactor would be loaded with fuel.	The 10 CFR Part 53 proposed rule includes draft requirements related to operational programs for advanced reactors, including microreactors. 2027	Medium. This rulemaking is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants."	NRR/DANU
	The NRC staff plans to provide a SECY paper on "Licensing and Deployment Considerations for Nth-of-a-Kind Microreactors," to the Commission that includes information on operational programs for microreactors, including standardized operational programs. March 2025	Medium. Microreactor developers have indicated that applications for licenses microreactors may be submitted in the next several years and information on operational programs may affect development of their deployment models.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU
Approval of Standardized Operational Programs Several developers have expressed interest in obtaining NRC approval of standardized operational programs in connection with the review of a standard microreactor design proposed in an application for a design certification or manufacturing license. Pre-approved standardized operational programs (or parts of programs, as appropriate) have the potential to reduce the scope of review for individual license applications for "nth-of-a-kind" microreactors and facilitate shorter licensing timeframes.	The NRC staff plans to provide a SECY paper on "Licensing and Deployment Considerations for Nth-of-a-Kind Microreactors," to the Commission to request policy direction on options for approval of standardized operational programs for "nth-of-a-kind" microreactors. March 2025	High. Microreactor developers have indicated that applications for design approvals (e.g., through design certifications or manufacturing licenses) may be submitted in the near-term and clarity on approval of standardized operational programs may affect development of their deployment models.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU

Table 2: Oversight and Inspections

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead Organization
Oversight and Inspections during Construction Given the anticipated diversity of advanced reactor projects and the anticipated increase in offsite fabrication and assembly of safety significant structures, systems, and components, the NRC staff intends to develop the Advanced Reactor Construction Oversight Program (ARCOP). The staff communicated to the Commission its plan for developing the ARCOP in SECY-23-0048, including the vision for ARCOP to build on the NRC's construction oversight experience while remaining adaptable to future advancements in reactor technologies. This program was built considering characteristics of non-light-water reactors, small modular reactors, and microreactors and was based on the guiding principles of being risk-informed, performance-based, technology-inclusive, scalable, informed by experience, and comprehensive.	The NRC staff plans to develop a SECY paper that will provide information on the details of ARCOP, including considerations related to microreactors. 2025	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	SECY-23-0048, "Vision for the Nuclear Regulatory Commission's Advanced Reactor Construction Oversight Program." (ML23061A086) Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU
	The NRC staff plans to issue appropriate inspection manual chapters and inspection procedures for construction inspections for microreactors. 2026	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	SECY-23-0048, "Vision for the Nuclear Regulatory Commission's Advanced Reactor Construction Oversight Program." (ML23061A086)	NRR/DANU
Oversight and Inspections during Operation The NRC's oversight and inspection activities for microreactors that will be necessary to verify compliance during operation might be significantly different than for large light-water reactors or other advanced reactors. The NRC staff is considering unique aspects of microreactors, such as their designs, operational characteristics, operational programs, staffing requirements, and others to determine how to develop and implement commensurate inspection and oversight programs.	The NRC staff is developing a SECY paper on advanced reactor oversight and inspections during the operations phase that addresses microreactors and considers their unique design and operational characteristics. 2025	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	N/A.	NRR/DRO
	The NRC staff plans to issue appropriate guidance for operations phase inspections for microreactors. 2027	Medium. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	N/A.	NRR/DRO

Table 3: Security and Safeguards

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Physical Security As the nuclear industry is exploring new reactor designs, the NRC is developing rulemakings to address the technological advancements associated with those designs. Two proposed rules are "Alternative Physical Security Requirements for Advanced Reactors; Proposed Rule," issued August 9, 2024, which would allow small modular reactor and advanced reactor applicants to implement alternative approaches to physical security, and "Risk Informed, Technology Inclusive Regulatory Framework for Advanced Reactors; Proposed Rule," issued October 31, 2024, would create an optional licensing framework for all new reactor applicants under the proposed 10 CFR Part 53.	Proposed rulemaking, "Alternative Physical Security Requirements for Advanced Reactors." As specified in the rulemaking plan.	High. This rulemaking would provide alternative approaches for physical security that would be better suited to microreactor designs and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, "Alternative Physical Security Requirements for Advanced Reactors; Proposed Rule." DG-5072, "Guidance for Alternative Physical Security Requirements for Small Modular Reactors and Non-Light-Water Reactors" (ML23263A997)	NSIR/DPCP
	The 10 CFR Part 53 proposed rule includes draft requirements related to physical security for advanced reactors, including microreactors. 2027	Medium. This rulemaking and associated guidance development is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants." DG-5076, "Guidance for Technology Inclusive Requirements for Physical Protection of Licensed Activities at Commercial Nuclear Plants." (ML23286A282)	NSIR/DPCP
Materials Physical Security The physical security regulations for CAT II material have not been updated since 1979 and do not address the current threat environment. Therefore, the NRC has dealt with CAT II physical security on a case-by-case basis The staff will continue its practice of evaluating the need for additional security requirements for SNM using a risk-informed analysis.	N/A.	N/A.	N/A.	N/A.	NSIR/DPCP

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Cybersecurity Currently, cybersecurity requirements for large light-water reactors are in 10 CFR 73.54 and supported by RG 5.71, "Cyber Security Programs for Nuclear Power Reactors." This security approach is focused on protecting important plant functions and associated critical digital assets for light-water reactor technologies. The 10 CFR Part 53 proposed rule includes draft regulations in 10 CFR 73.110 that specify an alternative regulatory framework for licensing other technologies in addition to light-water reactor technologies. This section provides technology-inclusive requirements for protecting digital computer and communications systems and networks.	The 10 CFR Part 53 proposed rule includes draft requirements related to cybersecurity for advanced reactors, including microreactors. 2027	Medium. This rulemaking and associated guidance development is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	DG-5075, "Establishing Cybersecurity Programs for Commercial Nuclear Plants Licensed Under 10 CFR Part 53." (ML23286A278)	NSIR/DPCP

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Access Authorization and Fitness for Duty The existing regulatory framework for access authorization under 10 CFR 73.55, 10 CFR 73.56, and 10 CFR 73.57 is sufficient to provide reasonable assurance that individuals subject to the program are trustworthy and reliable, so as not to constitute an unreasonable risk to public health and safety or the common defense and security, regardless of the reactor technology. The 10 CFR Part 53 proposed rule includes draft regulations in 10 CFR 73.120 that provide flexibility by making available an alternate approach, commensurate with risk and consequence to public health and safety, for 10 CFR Part 53 applicants that can demonstrate in an analysis that the offsite consequences of a postulated event will meet certain criteria. The 10 CFR Part 53 proposed rulemaking would also create 10 CFR Part 26, Subpart M, that includes requirements for fitness for duty that are performance based and risk-informed.	The 10 CFR Part 53 proposed rulemaking includes draft requirements related to access authorization and fitness for duty for advanced reactors, including microreactors. 2027	Medium. This rulemaking and associated guidance development is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	DG-5074, “Access Authorization Program for Commercial Nuclear Plants.” (ML23286A268) DG-5073, “Fitness-For-Duty Programs for Commercial Nuclear Plants and Manufacturing Facilities Licensed Under 10 CFR Part 53.” (ML23286A251) DG-5078, “Fatigue Management for Nuclear Power Plant Personnel at Commercial Nuclear Plants Licensed Under 10 CFR Part 53.” (ML23286A286)	NSIR/DPCP

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Materials Control and Accounting Generally Material Control and Accounting for microreactors will be similar to the current requirements for nuclear power plants. Both are considered item facilities (depending on the microreactor design) and the principal method for physical inventory is to verify that the items are intact and identified in the correct location. Measurement of the material content is not normally required at the microreactor site as the item, either the core or an individual fuel element, is shipped with manufactures certification of content and loss or theft is able to be detected through verification of item integrity. If this verification is not sufficient to detect loss or theft other methods may be required. Reports and records will be required. Use of HALEU fuel may require adjustment of the physical inventory periodicity. Early engagement with the NRC staff is encouraged.	No planned actions.	N/A.	N/A.	N/A.	NMSS/DFM

Table 4: Emergency Preparedness

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Emergency Preparedness The final rule in 10 CFR 50.160, published in November 2023, provides a risk-informed, performance-based approach to emergency preparedness (EP). The regulations in 50.160 provide an alternative technology-inclusive EP framework that microreactor applicants could use under Part 50 or Part 52 to develop appropriate emergency plans considering the unique characteristics of microreactors. The proposed 10 CFR Part 53 framework incorporates this alternative approach to EP. In addition, NRC staff are conducting research to support guidance updates so that the guidance could be used by microreactor applicants to enable efficient EP licensing reviews and emergency planning zone determinations.	The 10 CFR Part 53 proposed rule includes draft requirements related to emergency preparedness for advanced reactors, including microreactors. The NRC staff plans to update Regulatory Guide 1.242 to incorporate the use of 10 CFR Part 53 to support 10 CFR 50.160. 2027	Medium. This rulemaking and associated guidance development is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants." RG 1.242, "Performance-Based Emergency Preparedness for Small Modular Reactors, Non-Light-Water Reactors, and Non-Power Production or Utilization Facilities." (ML23226A036)	NSIR/DPR
	The NRC staff plans to conduct research to support the update to Regulatory Guide 1.242 so that it could be used by microreactor applicants to enable efficient emergency preparedness licensing reviews, including emergency planning zone determinations. 2025	Medium. This update would revise the guidance for emergency preparedness so that it could be used by microreactor applicants and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	RG 1.242, "Performance-Based Emergency Preparedness for Small Modular Reactors, Non-Light-Water Reactors, and Non-Power Production or Utilization Facilities." (ML23226A036)	NSIR/DPR

Table 5: Risk Analysis Methods

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Risk Analysis Methods, including Alternatives to Probabilistic Risk Assessments Alternative risk analysis methods, including alternatives to probabilistic risk assessments, might be appropriate for microreactor licensing based on consideration of anticipated microreactor designs and operational characteristics. The NRC staff is considering whether approaches such as those used for non-power reactor licensing or alternative approaches might be adequate.	The NRC staff plans to develop a SECY paper on options for risk analysis methods, including alternatives to probabilistic risk assessment, for advanced reactors that would also cover microreactors. Spring 2025	High. This activity would contribute to addressing related direction in Section 208 of the ADVANCE Act. Stakeholders have also expressed interest in the development of a framework that allows an approach to advanced reactor licensing where risk analyses are used in a supporting or confirmatory role during the licensing process.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants."	NRR/DANU
Aircraft Impact Assessment In 10 CFR 50.150, "Aircraft impact assessment," the NRC requires that each new power reactor applicant perform a design-specific assessment using realistic analyses of the effects on the facility of the impact of a large, commercial aircraft and show that, with reduced use of operator actions, the reactor core remains cooled or the containment remains intact and spent fuel cooling or spent fuel pool integrity is maintained. The NRC staff anticipates that micro-reactors will more closely resemble nonpower reactors than large LWRs and have characteristics (such as small site footprints, low radionuclide inventories, increased reliance on passive safety features, and decreased reliance on direct operator actions) that might support alternatives to the regulations in 10 CFR 50.150.	The NRC staff plans to develop an information paper on options for aircraft impact assessment for microreactors, including potential criteria for excluding microreactors from the aircraft impact assessment requirements in 10 CFR 50.150. 2025	Medium. Stakeholders have expressed interest in addressing aircraft impact assessment requirements specifically for microreactors to inform their deployment models.	N/A.	SECY-20-0093, "Policy and Licensing Considerations Related to Micro-Reactors." (ML20254A363)	NRR/DANU

Table 6: Decommissioning

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Decommissioning Process Decommissioning microreactors may involve independent regulated decommissioning of power plant sites as well as the reactor modules upon removal. Facility licensing and decommissioning licensing requirements may apply to developers who seek to use a centralized facility located away from power plant sites for decommissioning microreactors (or for refurbishing or refueling microreactors for redeployment).	As stated in SECY-24-0008, the NRC staff plans to continue to engage with stakeholders on considerations related to decommissioning, refurbishment, and refueling of microreactors to better understand post-operation aspects of microreactor deployment models. TBD (developer strategy needed)	Low. Developers have not yet provided enough information on post-operation aspects of microreactor deployment for the NRC staff to develop new guidance.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NMSS/DUWP NRR/DANU
Decommissioning Funding Assurance As described in SECY-24-0008, the resources needed for decommissioning of microreactors might be significantly different than for decommissioning of large LWRs based on their size, complexity, extent of permanent structures at the deployment site, and whether a microreactor would be decommissioned at the power plant site or at a centralized facility. Site-specific decommissioning cost estimates, as opposed to decommissioning cost estimates based on the regulations in 10 CFR Part 50 for LWRs, would provide flexibility for various potential microreactor decommissioning strategies.	The 10 CFR Part 53 proposed rule includes draft requirements related to site-specific decommissioning cost estimates that would provide flexibility for various potential microreactor decommissioning strategies. 2027	Medium. This rulemaking is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants." SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Storage of Fuel after Irradiation in a Power Reactor The definition of spent fuel (10 CFR Parts 71 and 72) includes criteria that fuel has been withdrawn from a nuclear reactor following irradiation and has undergone at least one year's decay since being used as a source of energy in a power reactor. Depending on how long it has been since the final reactor shutdown of a micro-reactor, different regulations may apply to the storage and transport of the reactor fuel or the fueled micro-reactor module.	As stated in SECY-24-0008, the NRC staff intends to engage with stakeholders as they further develop their strategies for handling and storage of irradiated and spent fuel generated in microreactors. The NRC staff plans to conduct a public workshop on microreactor deployment models, including post-operation aspects. 2025	Medium. The NRC staff needs additional information on post-operation aspects of microreactor deployment models to determine whether additional guidance or changes to regulations are needed.	N/A	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NMSS/DFM

Table 7: Transportation of Fueled Microreactors

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead Organization
Transportation of Fueled Microreactors Microreactor deployment strategies might include transportation of fueled microreactors prior to initial operation, between sites of operation, or after final shutdown. Shipment of a fueled microreactor would be subject to the radioactive material transportation requirements in 10 CFR Part 71, which contain performance-based requirements for packaging and transportation of radioactive material, and in Department of Transportation regulations in 49 CFR. As described in SECY-24-0008, the NRC staff intends to use the existing regulatory framework in 10 CFR Part 71 (potentially with some exemptions) to review transportation of commercial fueled microreactors in the near term. In August 2020, the NRC updated the guidance in NUREG-2216 used by the staff to perform reviews of applications for transportation package designs, which provides a basis for consistent regulatory review, acceptable approaches to meet regulatory requirements, and guidance for making the findings documented in the safety evaluation report.	The NRC staff provided SECY-24-0008 to the Commission which included information on the NRC staff's near-term strategy to use the existing regulatory framework in 10 CFR Part 71 (potentially with some exemptions) to review transport of fueled microreactors. January 2024	N/A. This action is complete.	The near-term strategy for the transportation of fueled microreactors relies on the use of features to preclude criticality, which is currently under Commission consideration (in the options in SECY-24-0008 and in the proposed 10 CFR Part 53 rulemaking).	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NMSS/DFM
	The NRC staff provided SECY-24-0062, "Risk-Informed Methodology for a Future Transportable Triso-Based Micro-Reactor Package Application," to the Commission describing the risk-informed methodology as an appropriate approach for use in developing the safety basis for 10 CFR Part 71 applications for transportable microreactors. July 2024	N/A. This action is complete.	N/A.	SECY-24-0062, "Risk-Informed Methodology for a Future Transportable Triso-Based Micro-Reactor Package Application." (ML23320A124)	NMSS/DFM
	The NRC staff intends to continue to engage with stakeholders and other interested or affected parties to determine whether there is a need for rulemaking or additional guidance development associated with the transportation of fueled microreactors. Fall 2025	High. This action is needed to maintain a mutual understanding of developers' deployment models and inform the need for further NRC staff activities to respond to related direction in Section 208 of the ADVANCE Act.	Strategies to enable the safe transportation of fueled microreactors rely on the use of features to preclude criticality, which is currently under Commission consideration (in the options in SECY-24-0008 and in the proposed 10 CFR Part 53 rulemaking).	NUREG-2216, "Review Plan for Transportation Packages for Spent Fuel and Radioactive Material." (ML20234A651)	NMSS/DFM
	Develop transport guidance for the use of new or nonnuclear technologies to provide greater manufacturing flexibility in package designs. 2028	Medium. This action is included in the report to Congress related to Section 401 of the ADVANCE Act.	Actions depicted in the report to Congress on Section 401 of the ADVANCE Act and other initiatives related to processes for improving licensing processes.	Enclosure to the Report to Congress on Section 401 of the ADAVANCE Act, "Advanced Methods of Manufacturing and Construction for Nuclear Energy Projects – Enclosure." (ML24292A171)	NMSS/DFM

Table 8: Siting

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Population Density Criterion for Siting The NRC has a longstanding policy of siting nuclear power reactors away from densely populated centers and preferring areas of low population density for reactor sites. SRM-SECY-20-0045 directed the NRC staff to maintain the existing population density siting criteria in 10 CFR Part 100, but to revise the related guidance in Regulatory Guide 4.7 to provide technology-inclusive, risk-informed, and performance-based criteria to assess population-related issues in siting advanced reactors. Section 208 of the ADVANCE Act directs the NRC staff to develop strategies and guidance specifically for microreactors related to population density siting criteria.	The NRC staff is considering preparing a white paper on population density related siting criteria specifically for microreactors. Summer 2025	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	SECY-20-0045, "Population Related Siting Considerations for Advanced Reactors." (ML19262H055) SRM-SECY-20-0045, "Population Related Siting Considerations for Advanced Reactors." (ML22194A885) RG 4.7 Rev 4, "General Site Suitability Criteria for Nuclear Power Stations." (ML23348A082) SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU
Licensing Mobile Deployment of Microreactors Siting for licensing mobile microreactors, including for rapid deployment and operation for disaster relief, might involve pre-approval of many deployment sites or very large deployment areas, or other strategies that would satisfy NRC requirements for lengthier aspects of licensing and deployment, such as site characterization, hearings, and environmental reviews.	The NRC staff is considering developing a white paper on strategies for siting considerations for licensing mobile microreactors. Summer 2025	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	Features to Preclude Criticality Graded Site Characterization Transportation of Fueled Reactors Security Emergency Preparedness	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Environmental Reviews The staff is developing alternatives to current NRC approaches to satisfying the requirements of the National Environmental Policy Act to prepare for the environmental evaluation of microreactor applications. The alternatives are not mutually exclusive, and the staff may combine elements of multiple alternatives to meet emerging conditions as plans for microreactor development progress through, for example, design finalization, creation of a supply chain, or manufacturing plans. Certain environmental review alternatives might be best suited either to specific microreactor designs or to a large number of microreactor designs that can be considered generically because of their common features, such as size and power levels.	The NRC staff plans to provide a SECY paper on nth-of-a-kind microreactor licensing that includes information on alternative approaches for environmental reviews for microreactors. Spring 2025	High. This action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206) Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations - Enclosure 2 (ML24302A292) NUREG-2249, Draft for Comment, "Generic Environmental Impact Statement for Licensing of New Nuclear Reactors." (ML24176A220) SECY-24-0046, “Implementation of the Fiscal Responsibility Act of 2023 National Environmental Policy Act Amendments.” (ML24078A013) Modernization of Nuclear Reactor Environmental Reviews Report (ML24290A159)	NMSS/REFS
Graded Site Characterization Site characterization information for applications for nuclear power reactors includes considerations related to human-induced external hazards, meteorology, hydrology, geology, seismology, and geotechnical engineering for a proposed site. Microreactors are anticipated to have relatively simple designs, enhanced safety characteristics, and small site footprints, and the NRC staff has determined that it might be appropriate to apply a graded approach to the extent of data developed for site characterization for a microreactor compared to a large light-water reactor.	The NRC staff plans to develop guidance on grading the level of site characterization for microreactors. 2025	Medium. When justified, graded site characterization for microreactors of standard designs would support shorter licensing and deployment timeframes consistent with the NRC staff’s strategy for licensing nth-of-a-kind microreactors.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU

Table 9: Regulatory Processes

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Streamlined Processing of Applications and Licensing Documents The NRC staff plans to develop an online portal for microreactor licensing that would allow applicants to submit electronic applications for nth-of-a-kind microreactors and the NRC staff to conduct their reviews and issue licensing documents, as described in the draft white paper on nth-of-a-kind microreactor licensing and deployment considerations. The online portal would facilitate streamlined processing of both the safety and environmental portions of an application.	The NRC staff plans to develop an online portal for microreactor licensing that would allow applicants to submit electronic applications for nth-of-a-kind microreactors and the NRC staff to conduct their reviews and issue license documents, as described in the NRC staff draft white paper (and planned SECY paper) on nth-of-a-kind microreactor licensing and deployment considerations. 2027	Medium. The NRC staff does not anticipate receiving applications for nth-of-a-kind microreactors in the near term. However, this action would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU
Mandatory Hearings In SRM-SECY-24-0032, The Commission approved the use of simplified procedures for mandatory hearings based on written materials without oral hearing. The simplified procedures are applicable to all proceedings falling under the provisions of 189a. of the Atomic Energy Act of 1954, as amended, which include microreactor license applications, regardless of whether the application is considered “first-of-a-kind.”	This topic has been addressed in SRM-SECY-24-0032. July 2024	N/A.	N/A.	SECY-24-0032, “Revisiting the Mandatory Hearing Process at the U.S. Nuclear Regulatory Commission.” (ML24103A090) SRM-SECY-24-0032, “Revisiting the Mandatory Hearing Process at the U.S. Nuclear Regulatory Commission.” (ML24200A044)	

Table 10: Licensing

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Features to Preclude Criticality The NRC staff has proposed that a microreactor with features to preclude criticality would not be "in operation" when loaded with fuel. This would allow for near-term approaches to authorizing fuel loading at a factory without the need for a facility operating license or a combined license and facilitate regulation of safe transportation of fueled microreactors.	The NRC staff provided SECY-24-0008 to the Commission in January 2024, which included options for the use of features to preclude criticality. Based on Commission direction, the NRC staff will consider the need to develop related guidance. TBD depending on Commission direction on the options in SECY-24-0008.	High. Features to preclude criticality are integral part to potential strategies for loading fuel at a factory and transportation of fueled microreactors, both of which are part of several microreactor developers' planned deployment models.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU
	The 10 CFR Part 53 proposed rule includes draft requirements related to features to preclude criticality. 2027	Medium. This rulemaking is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	N/A.	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants."	NRR/DANU
Loading Fuel at a Factory Several microreactor deployment models include loading fuel into reactors at the manufacturing facility either during or after the manufacturing process. Under the current regulatory framework, loading fuel at a factory would also require a facility operating license issued pursuant to 10 CFR Part 50 or a combined license issued pursuant to 10 CFR Part 52 for a power reactor. The NRC staff has developed an option for Commission consideration in which fuel could be loaded into a reactor under a license issued pursuant to 10 CFR Part 70 without a 10 CFR Part 50 operating license or a 10 CFR Part 52 combined license if the reactor includes features to preclude criticality.	The NRC provided SECY-24-0008 to the Commission in January 2024, which included options for licensing fuel loading at a factory. Based on Commission direction, the NRC staff will consider the need to develop related guidance. TBD depending on Commission direction on the options in SECY-24-0008.	High. Loading fuel into microreactors at a factory is included in several microreactor developers' deployment models.	Features to Preclude Criticality	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU
	The proposed 10 CFR Part 53 rulemaking includes draft requirements related to loading fuel in manufactured reactors before their deployment. 2027	Medium. This rulemaking is in process and would contribute to addressing related direction in Section 208 of the ADVANCE Act.	Features to Preclude Criticality	Proposed Rule, 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants."	NRR/DANU NMSS/DFM

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Operational Testing at a Factory Some microreactor developers are considering deployment models where manufactured reactors would be loaded with fuel and operated at low power levels in the manufacturing facility for the purpose of operational testing. The NRC staff has developed an option for Commission consideration in which it would apply most of the safety (and possibly the environmental) regulations for non-power reactors to authorize operational testing at a factory under a facility operating license issued pursuant to 10 CFR Part 50 or a combined license issued pursuant to 10 CFR Part 52 for a power reactor.	The NRC staff provided SECY-24-0008 to the Commission in January 2024, which included options for licensing operational testing at a factory. Based on Commission direction, the NRC staff will consider the need to develop related guidance. TBD depending on Commission direction on the options in SECY-24-0008.	High. Operational testing of microreactors at a factory is included in several microreactor developers' deployment models.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU
Nth-of-a-Kind Microreactor Licensing and Deployment Several microreactor developers are pursuing licensing and deployment of large numbers of microreactors of standard designs. The NRC staff has developed a strategy for licensing nth-of-a-kind microreactors that would leverage maximal design standardization, standardized operational programs, alternative approaches to environmental reviews, a graded approach to site characterization, an online licensing portal, and construction inspections to enable the safe and secure deployment of microreactors on shorter timeframes than for large nuclear power reactors. The strategy aims to increase the flexibility of the regulatory framework to support the diverse technologies and deployment models being considered by microreactor developers and potential applicants.	The NRC staff plans to provide a SECY paper on nth-of-a-kind microreactor licensing and deployment to the Commission that includes options for Commission considerations for review and approval of standardized operational programs at the design stage. The paper will also include information on alternatives for environmental reviews, maximal design standardization, grading the level of site characterization, security, emergency preparedness, streamlined processing of license applications, and construction inspection. Spring 2025	High. Stakeholders have indicated that additional regulatory clarity is needed in the near term to proceed with deployment models for large numbers of microreactors of standard designs.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206) Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations - Enclosure 2 (ML24302A292)	NRR/DANU NMSS/REFS

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Licensing Replacement Reactors Microreactor deployment models might include periodically removing modules from the deployment site at the end of their operational lives or fuel cycles and replacing them with modules of the same design. The NRC staff previously addressed licensing options for multimodule facilities in SECY-11-0079, "License Structure for Multi-module Facilities Related to Small Modular Nuclear Power Reactors," dated June 12, 2011. As described in the enclosure to SECY-24-0008, similar strategies could be used for licensing replacement of microreactors at a deployment site.	The NRC staff is considering conducting a workshop on microreactor deployment models that would include licensing strategies for replacement reactors. 2025	Medium. Stakeholders have indicated that clarity on available strategies for licensing replacement reactors, including strategies not considered in SECY-24-0008 and SECY-11-0079, would be beneficial to inform development of microreactor deployment models.	Features to Preclude Criticality Loading Fuel at a Factory Operational Testing at a Factory Transportation of Fueled Microreactors	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252) SECY-11-0079, "License Structure for Multi-Module Facilities Related to Small Modular Nuclear Power Reactors." (ML110620459)	NRR/DANU
Timeframe for Authorization to Operate at the Deployment Site Microreactors may have significantly simpler and shorter duration construction activities at the deployment site than large light-water reactors. A key aspect of microreactor deployment models is the ability to move a reactor from the factory to the deployment site and place it into operation as a nuclear power plant in a much shorter time than it takes to construct a large light-water reactor at the intended site of operation. As discussed in SECY-24-0008 options for the use of features to preclude criticality, loading fuel at a factory, and operational testing at a factory may affect the timeframe for authorization to operate at the deployment site.	Based on Commission direction on the options in SECY-24-0008, the NRC staff will consider the need to develop guidance and to reexamine the processes and procedures (e.g., ITAAC, notifications, hearings, inspections, and NRC findings) related to obtaining authorization to operate at the deployment site. TBD depending on Commission direction on the options in SECY-24-0008.	Medium. Stakeholders have requested clarification on various regulatory processes that might affect the timeframe to obtain authorization to operate at the deployment site to support further development of microreactor deployment models.	Features to Preclude Criticality Loading Fuel at a Factory Operational Testing at a Factory Nth-of-a-Kind Microreactor Licensing and Deployment	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Maximal Design Standardization Microreactor developers and potential applicants have indicated that they intend to pursue deployment of many microreactors of standard designs. Maximizing the standardization of these microreactor designs could play a significant role in shortening the schedules for and reducing the costs of reviewing applications for such reactors.	The NRC staff is considering whether additional guidance is needed related to maximal design standardization for nth-of-a-kind microreactor licensing and deployment. 2025	Low. The existing regulations in 10 CFR Part 52 provide several frameworks for approval of standard designs and for referencing them in license applications under 10 CFR Part 50 and 10 CFR Part 52.	N/A.	Draft White Paper on Nth-of-a-Kind Micro-Reactor Licensing and Deployment Considerations (ML24270A206)	NRR/DANU
Alternative Licensing Strategies (e.g., General Licenses, Services Provider Licenses, Construction Authorization Upon Docketing, Site Licenses, Licensing without Predetermined Sites) The NRC currently licenses commercial nuclear reactors in accordance with the Atomic Energy Act of 1954 (as amended), the regulations in 10 CFR Part 50 and 10 CFR Part 52, and other applicable laws and regulations. Stakeholders have expressed interest in alternative licensing strategies for microreactors than the traditional approaches that have been used for other reactor technologies.	The NRC staff plans to engage with stakeholders on alternative licensing strategies. 2025	TBD	TBD	N/A.	NRR/DANU
Use of Contractors by Manufacturing License Holders Stakeholders have expressed interest in using contractors to support various aspects of microreactor licensing and deployment models, including activities that would be conducted under manufacturing licenses, licenses for special nuclear material, and facility operating licenses issued pursuant to 10 CFR Part 50 and 10 CFR Part 52.	The NRC staff plans to engage with stakeholders on their plans for the use of contractors in microreactor deployment models. TBD	TBD	TBD	N/A.	NRR/DANU

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Dependencies on other Topics	References	Lead NRC Organization
Commercial Maritime Applications of Microreactors The NRC staff is aware of growing interest in commercial maritime applications of microreactors and other reactor technologies for stationary power production, marine vessel propulsion, production of decarbonized fuels, and other uses. Stationary reactors might be located in ports or other coastal locations or further out from the shore in domestic waters.	The NRC staff plans to continue to monitor developments related to commercial maritime applications and assess the need for future Commission direction and coordination with other Federal agencies related to deployment of commercial maritime reactors. 2025	Medium. Microreactor developers and developers of other reactor technologies have expressed growing interest in maritime applications.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU
Commercial Space Applications of Microreactors The NRC staff is aware that developers are considering space applications of microreactors. Government agencies such as the National Aeronautics and Space Administration and the DOE are encouraging development of the technology, primarily for Government projects. The NRC staff is not aware of any fully commercial ventures that plan to use microreactors for space applications, whether for power generation for space vehicles, extraterrestrial installations, or propulsion systems.	The NRC staff plans to continue to monitor developments related to commercial space applications and assess the need for future Commission direction and coordination with other Federal agencies related to deployment of commercial space reactors. TBD	Low. The NRC staff is not aware of any developers planning for fully commercial space applications of microreactors.	N/A.	SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory." (ML23207A252)	NRR/DANU

Table 11: Fees

Topic and Description	Actions and Planned Timeframes	Priority of the Action	Relationship to other Topics	References	Lead Organization
Annual Fees The regulations in 10 CFR 171.15(d) specify the annual fee structure for microreactors and account for the bundled unit(s) thermal power rating.	Annual fees will be as specified in the annual fee rule. Annually.	N/A.	N/A.	10 CFR Part 171, "Annual Fees for Reactor Licenses and Fuel Cycle Licenses and Materials Licenses, Including Holders of Certificates of Compliance, Registrations, and Quality Assurance Program Approvals and Government Agencies Licensed by the NRC."	