

Licensing Steps and Estimated Timeframes for Nth-of-a-Kind Microreactors

Licenses for nth-of-a-kind (NOAK) microreactors may be issued in accordance with the regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities,” or 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants.”¹ Both licensing pathways include certain elements, such as U.S. Nuclear Regulatory Commission (NRC) staff safety and security reviews, environmental reviews, reviews by the Advisory Committee on Reactor Safeguards, mandatory hearings, opportunities for contested hearings, requirements to obtain a license before beginning construction, inspections during construction, and requirements that must be satisfied before facility operation begins. There are also differences between the two pathways that could affect the overall timeframe for deployment of a microreactor of a particular design. These differences include the two-step construction permit (CP) and operating license (OL) process under 10 CFR Part 50, as opposed to the one-step process for issuing a combined license (COL) under 10 CFR Part 52; the scope of contested hearings in an OL hearing as opposed to that of a COL hearing in which the application references a design certification rule (DCR), an early site permit (ESP), or both; and processes that take place immediately prior to operation (i.e., for the NRC to issue an OL under 10 CFR Part 50 or to find that the acceptance criteria in the inspections, tests, analyses, and acceptance criteria (ITAAC) are met under 10 CFR Part 52).

Tables 1 and 2 show the steps involved in NOAK licensing under 10 CFR Part 50 and 10 CFR Part 52, respectively, assuming that the design has already been approved in another proceeding. The NOAK licensing timeframe begins with the submission of a COL or CP application and ends with an NRC decision on whether to issue an OL or find under 10 CFR 52.103(g) that the acceptance criteria in the ITAAC of a COL have been met.² Each step listed in the tables accounts for the activities and processes under the control of the applicant and the NRC and the opportunities for public involvement afforded by the relevant regulations.

The estimated timeframes in the tables are provided for illustrative purposes and reflect the recommended option in this paper for approval of standardized operational programs and the alternative environmental reviews described in enclosure 2. The tables below and the statements here indicate schedules that may be reasonably achievable if the proposals stated in this SECY are implemented; the tables and this SECY, however, are not committing the NRC staff to completion of licensing reviews on the schedules stated therein. In practice, the timeframe for each step will depend on the circumstances of each licensing review.

¹ The regulations in the 10 CFR Part 53 proposed rule, “Risk Informed, Technology Inclusive Regulatory Framework for Advanced Reactors,” published in Volume 89 of the Federal Register (FR), page 86918 (89 FR 86918) on October 31, 2024, would provide an additional licensing pathway for NOAK microreactors, but this paper does not discuss that topic in detail because those regulations are in development. However, the NRC staff anticipates that the NOAK approach would provide efficiencies for licensing under 10 CFR Part 53 that would be similar to those described in this paper for licensing under 10 CFR Part 50 or 10 CFR Part 52.

² The tables do not reflect any time necessary to consider requests for limited work authorizations and associated hearings because the NRC staff anticipates that limited work authorizations would not decrease deployment timeframes for microreactor designs with short construction timelines.

Table 1 NOAK Licensing under 10 CFR Part 50

Licensing Process Step	Nominal Timeframe(s) and Notes	Total Days
Construction Permit Review Stage		
- Preapplication engagement - Site characterization	Dependent on the applicant's licensing strategy and necessary site characterization activities (considering the information in enclosure 3)	N/A
- Submission of the CP application	Beginning of the timeframe for NOAK licensing	0
- Acceptance review, docketing, and notice of availability of the application in the <i>Federal Register</i> (FR) - Notice of hearing in the FR (notice of mandatory hearing under 10 CFR 2.104, including notice of opportunity to intervene and request a hearing)	8 days (considering the streamlined processing of applications and NRC licensing documents described in enclosure 3) 8 days (notice allows 60 days to submit intervention petitions and contentions; notice indicates the presiding officers will issue further notices to govern any hearings; this fits within the timeframe for the next 2 steps)	8
- NRC staff safety evaluation - NRC staff environmental review	60 to 120 days 60 to 180 days	68 to 188
- Contested hearing	0 days to many months. See explanation below	68 to 188
- Mandatory hearing	56 days (nominally) (see SECY-24-0032)	124 to 244
- Issuance of the CP and notice in the FR	10 days	134 to 254
- Construction begins - Construction inspection begins	0 days (dependent on the CP holder) Performed during construction, consistent with the status of construction activities	134 to 254
Operating License Review Stage		
- Submission of the OL application	0 days (this timeframe presumes submission of the OL application after issuance of the CP; however, the OL application may be submitted before the issuance of the CP, or even at the same time as submission of the CP application, at the applicant's risk, provided that the final safety analysis report is complete)	134 to 254
- Acceptance review, docketing, and notice of availability of the application in the FR - Notice of opportunity for a contested hearing in the FR - Notices required by the Atomic Energy Act of 1954, as amended (AEA), section 182c in the FR	8 days (considering the streamlined processing of applications and NRC licensing documents described in enclosure 3) At least 60 days before the hearing (this fits within the timeframe for the next step) Beginning at least 56 days before OL issuance (this fits within the timeframe for the next step)	142 to 262
- NRC staff safety evaluation - NRC staff supplemental environmental review	60 to 120 days 60 to 120 days	202 to 382
- Contested hearing	0 days to many months. See explanation below	202 to 382
- Verification of substantial completion of construction	0 days (provided the CP holder completes construction and the NRC performs this verification in parallel with the previous steps in the OL review stage) ³	202 to 382
- Issuance of the OL and notice in the FR	10 days End of the NOAK licensing timeframe	212 to 572

³ The timeframe for this step depends on whether the CP holder completes construction during the previous steps in the OL review phase (i.e., during the time between CP issuance and completion of the contested hearing), with some margin for the NRC to complete the necessary inspections.

Table 2 NOAK Licensing under 10 CFR Part 52

Licensing Process Step	Nominal Timeframe(s) and Notes	Total Days
Combined License Review Stage		
- Preapplication engagement - Site characterization	Dependent on the applicant's licensing strategy and necessary site characterization activities (considering the information in enclosure 3)	N/A
- Submission of the COL application	Beginning of the timeframe for NOAK licensing	0
- Acceptance review, docketing, and notice of availability of the application in the FR - Notice of hearing in the FR (notice of mandatory hearing under 10 CFR 2.104, including notice of opportunity to intervene and request a hearing) - Notices required by AEA section 182c in the FR	8 days (considering the streamlined processing of applications and NRC licensing documents described in enclosure 3) 8 days (notice allows 60 days to submit intervention petitions and contentions; notice indicates the presiding officers will issue further notices to govern any hearings; this fits within the timeframe for the next 3 steps) Beginning at least 56 days before OL issuance (this fits within the timeframe for the next step)	8
- NRC staff safety evaluation - NRC staff environmental review	60 to 120 days 60 to 180 days	68 to 188
- Contested hearing	0 days to many months. See explanation below	68 to 188
- Mandatory hearing	56 days (nominally) (see SECY-24-0032)	124 to 244
- Issuance of the COL and notice in the FR	10 days	134 to 254
- Construction begins - Construction inspection begins	0 days (dependent on the COL holder) Performed during construction, as supported by construction activities	134 to 254
Post-COL Review Stage		
- Submission of scheduled date for initial fuel load (10 CFR 52.103(a)) - Submission of ITAAC closure notification or uncompleted ITAAC notification (10 CFR 52.99(c)) - Publication of the notice of intended operation and opportunity to request a contested hearing in the FR (10 CFR 52.103(a))	0 days (the applicant may submit this notification upon receipt of the COL) 0 days (the applicant may submit this notification upon receipt of the COL) 75 days (15 days after receipt of the above notices from the COL holder, with at least 60 days provided to request the hearing)	209 to 329
- Contested hearing on ITAAC	0 to 149 days (See the enclosure to SECY-24-0008 for a discussion of ITAAC hearing timeframes)	209 to 478
- Completion of construction - Notification that all ITAAC are complete (10 CFR 52.99(c)) - NRC inspection to confirm that prescribed inspections, tests, and analyses have been performed, and acceptance criteria are met	0 days (provided the COL holder has completed construction and ITAAC during the previous steps in the post-COL stage)	209 to 478
- If acceptance criteria are met, issuance of the 10 CFR 52.103(g) finding and notice in the FR	5 days End of the timeframe for NOAK licensing	214 to 483

The NRC staff's safety evaluation and environmental review, contested hearings, and construction timelines account for the greatest uncertainty and variability in the NOAK licensing timeframe and will be affected by factors including the following:

- the deployment model and licensing pathway for the approval of the standard design (i.e., design certification (DC), manufacturing license (ML), COL, or CP/OL) (see enclosure 3)
- whether the design is maximally standardized (see enclosure 3)⁴
- the existence and extent of departures from the standard design, including the approved site parameter envelope, in the COL or CP/OL application (see enclosure 3)
- the extent to which the COL or CP/OL application references preapproved standardized operational programs (Commission direction on the options in this SECY paper may also affect the timeframe for approval of operational programs in a COL, CP, or OL application, with Commission approval of Option 2 likely resulting in shorter timeframes)
- the scope and complexity of site characterization by the applicant and site-specific confirmations by the NRC staff (see enclosure 3)
- the extent to which the environmental review for a particular design can be completed on a generic basis before the submission of a CP/OL or COL application, and the type and scope of the site-specific environmental review necessary in connection with CP/OL or COL proceedings for deployment of a reactor of that design (e.g., the suitability of the various alternatives described in enclosure 2 for a particular microreactor design will affect the timeframe for the environmental review)
- the time needed by the licensee to substantially complete construction (for an OL) or complete ITAAC (for a COL) (see enclosure 3)

As discussed in the enclosure to SECY-24-0008, the timeframe to complete the contested hearing process follows the model milestones in Appendix B to 10 CFR Part 2, "Model Milestones To Be Used By a Presiding Officer as a Guideline in Developing a Hearing Schedule for the Conduct of an Adjudicatory Proceeding in Accordance With 10 CFR 2.332." However, the timeframe to complete the contested hearing process can vary widely depending on whether contentions are submitted, whether contentions are admitted, and their number and complexity.⁵

⁴ A maximally standardized design has the following attributes and characteristics (see enclosure 3 for a more detailed description):

- The design is a standard design as defined in 10 CFR 52.1, "Definitions."
- The complete plant design is approved in a DCR, an ML, or a combination of the two.
- The design uses bounding site parameters.
- The design minimizes site-specific design features.
- The design of an individual reactor does not include departures from the approved design.

⁵ If no intervention petitions and contentions are submitted within the 60-day period, then the contested hearing process ends and it would not affect the minimum estimated timeframes in tables 1 and 2, above. If intervention petitions and contentions are submitted and the presiding officer decides not to admit them, then it would nominally add 80 days to the process (not including any time needed to resolve an appeal of the decision). If intervention petitions and contentions are submitted and the presiding officer decides to admit any contentions and conduct a hearing, the process could take many months as described in Appendix B to 10 CFR Part 2.

In addition, within the contested hearing process there are opportunities for parties to the proceeding to appeal decisions of the presiding officer that could affect the time to complete the contested hearing process. Further, a Commission decision in litigation that is final agency action with respect to a party, e.g., a decision granting or denying an application, can be appealed to a U.S. Court of Appeals. For these reasons, the NRC staff has not included the timeframe for the contested hearing process (other than the ITAAC hearing under 10 CFR Part 52) in the estimated timeframes in tables 1 and 2.

The NRC staff notes that the shorter timeframes within the estimated ranges for the staff safety reviews in tables 1 and 2 may not be achievable if an applicant departs from the standard design, or if streamlined administrative processes are not in place. Similarly, the shorter timeframes for environmental reviews may be difficult to achieve without the use of categorical exclusions, as described in enclosure 2. The NRC staff anticipates that the timeframes will likely decrease (to some extent) as the number of licensing proceedings for a reactor of a particular design increases. However, the shorter timeframes in the tables might not be feasible for more complex facility designs or deployment models that include significant onsite construction.

The NRC staff also notes that gains in regulatory efficiency and cumulative resource savings will depend on the costs associated with the approval in Phase 1 of the approach described in this paper and the number of reactors of a common standard design subject to NOAK licensing. For example, NRC staff review of standardized operational programs in connection with the review of a standard design (under Option 2) would increase the review costs. These costs might not be completely offset if only a few CP/OL or COL applications reference those standardized operational programs. Similar considerations apply to certain aspects of the proposed approaches for environmental reviews. The recommended option to include a pathway for approval of operational programs aims to increase the flexibility of the regulatory framework for microreactors, recognizing that developers' deployment models are diverse and continue to evolve. It will be up to each developer to decide which approach best fits its deployment model, including consideration of trade-offs among flexibility, standardization, and COL or CP/OL licensing costs and timeframes.

The NRC staff will consider the need to develop guidance for applicants and the staff on implementing the two-phase licensing approach described in this paper. As applicants and the staff gain experience with this approach and related oversight, it may be possible to reduce NOAK licensing timeframes and further increase efficiency through additional guidance, rulemaking, or other Commission engagement. For example, the overall timeframes could be reduced by changing the Commission's procedures for contested hearings or by conducting rulemaking to shorten the 60-day minimum period specified in 10 CFR 2.309(b)(3) for submission of hearing requests (except for the time for requesting a hearing on ITAAC, which is set by AEA section 189a.(1)(B) at 60 days).⁶ If the timeframes for NRC staff safety evaluations and environmental reviews can be shortened to 30 days and the timeframe for submission of hearing requests in 10 CFR 2.309(b)(3) shortened to the statutory minimum of 30 days set in AEA section 189a.(1)(A), it might be possible to reduce the overall schedules in tables 1 and 2 by 60 days and 30 days, respectively.

⁶ Separately, OGC is considering options for rulemaking to revise 10 CFR Part 2 in order to gain efficiencies in the contested hearing process and plans to propose options to the Commission in the near term.