



# Decommissioning of Nuclear Power Reactors

The decommissioning of commercial nuclear power reactors is performed safely in the United States (U.S.), with appropriate measures taken to protect communities and the environment. Because the approach to decommissioning necessarily considers the site-specific facility design and operating history, site characteristics, financial considerations, and future site uses, including whether there is a need to promptly return the site to the owner or community for future use, the preferred schedule of activities and business model may differ across sites.

To support a safe and efficient decommissioning process, the American Nuclear Society (ANS) believes that:

- The issuance of a final rule by the Nuclear Regulatory Commission (NRC) on production and utilization facilities transitioning to decommissioning will reduce delays that have been encountered during the transition from operations to decommissioning status and will lead to improved efficiency for future decommissioning projects.<sup>1</sup>
- The option for reactor restart should be allowed after permanent shutdown—if the economics or other factors warrant it, subject to applicable licensing activities to authorize renewed operation.
- In accordance with NRC’s Interim Staff Guidance, the NRC should allow the use of Nuclear Decommissioning Trust Funds (NDT) funds during the operational phase to dispose of major used radioactive components that have accumulated and are being temporarily stored at nuclear sites.<sup>2</sup>
- NRC should adopt detailed guidance around license termination planning and execution that provides sufficient detail on emerging technical areas such as survey plans for subsurface soils and below grade structures, surveying and accounting

for discrete radioactive particles, and consideration of hard-to-detect radionuclides. Clarity in guidance will increase the efficiency of the license termination process by improving the quality and consistency of license termination plans and will support timely license termination after completion of confirmatory radiological surveys at the site.<sup>3</sup>

## Background

At the end of the life of the commercial nuclear reactor, the facility is decommissioned so that the site can be made available for other uses. By regulation, decommissioning is required to be completed within 60 years from the cessation of operations, although staff examine site-specific considerations when evaluating requests for alternative decommissioning schedules beyond 60 years.<sup>4,5</sup> In the U.S. there are two common approaches for decommissioning power reactors: DECON (Immediate Dismantling) and SAFSTOR (Safe Enclosure), or a combination of these approaches.<sup>6</sup> As of February 2025, thirteen commercial power reactor sites have been safely decommissioned and, of those, three sites have no fuel onsite while 10 have only the independent spent fuel storage installation (ISFSI) remaining on the site.<sup>7,8</sup> Another eleven sites are undergoing active decommissioning and five shutdown reactors are in SAFSTOR. As of May 2025, three reactors are pursuing resumption of operation: Palisades, Crane Energy Center (formerly Three Mile Island 1), and Duane Arnold.<sup>8,9</sup>

The approach to decommissioning in the U.S. has evolved towards a preference for DECON (i.e., prompt decommissioning to permit termination of the license as soon as possible after cessation of operations), supported by the emergence of decommissioning-specialty companies. Two new decommissioning business models, “License Stewardship” and “Asset Transfer”, have become

prevalent in addition to the more traditional “Self-Perform” and “General Contractor” business models. In the License Stewardship model, the decommissioning specialty company assumes responsibility for completing the project as the custodian of the reactor license and achieving NRC approval to terminate the license—at which time the site is turned back over to the original owner. In the Asset Transfer model, the decommissioning specialty company becomes the new site owner and licensee and therefore assumes responsibility for the decommissioning trust fund. These business models reflect the desire of original owners to remain focused on their area of expertise—the generation of dependable electricity.

The rules for decommissioning a nuclear power plant are set out in several NRC regulations (10 CFR, Part 20 Subpart E, and Parts 50.75, 50.82, 51.53, and 51.95).<sup>10</sup> There are established NRC regulations and regulatory guidance documents for terminating a nuclear reactor’s license when decommissioning is complete (RG 1.179,<sup>11</sup> RG 1.184,<sup>12</sup> RG 1.185,<sup>13</sup> NUREG-1700,<sup>14</sup> NUREG-1575,<sup>15</sup> and NUREG-1757<sup>16</sup>). Until recently, a regulatory framework had not been fully developed for the period of transition between cessation of operations and completion of decommissioning. The issuance of a final rule on the transition period—currently pending with

the Commission—resolves this concern. This new rule establishes a risk-informed approach to allow changes to site operations, emergency planning, and security programs as the site transitions through decommissioning, without the need for prior review and approval by the NRC. ANS supports the issuance of this rule and associated guidance for implementation as it will significantly improve the efficiency of the transition process for future decommissioning projects.

The license termination process has emerged as one of the most technically challenging, costly, and time-consuming phases of a decommissioning project. License termination plans (LTP) require prior NRC review and approval. The development of LTPs and the associated radiological remediation program and survey plans are time and resource intensive. LTP development, review/approval, and execution have led to significant delays in the completion of decommissioning projects. ANS supports efforts by NRC and industry to better define and achieve alignment on the objectives and methods for license termination using the guidance provided by the NRC and NEI 22-01.<sup>3</sup> Furthermore, the Electric Power Research Institute program to collect and document decommissioning project experiences and lessons learned provides important insights.<sup>17</sup>

## References

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