NRC Moves On Emergency Plans, Licensing For Advanced Nukes, SMRs – Federal Register Notice Issued

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Amidst a series of recent steps to smooth the way for licensing of advanced reactors, the Nuclear Regulatory Commission proposed rules today that would let operators of those reactors develop smaller, “scalable” emergency planning zones than those required at current nuclear plants in recognition of new reactors’ smaller size and safety advances.

The rulemaking would authorize use of emergency planning zones that are “performance-based, technology-inclusive, risk-informed, and consequence-oriented,” and likely significantly smaller than emergency planning zones (EPZ) for which current reactor operators must take safety measures. NRC rules require current plant operators to protect people living within a 10-mile radius around a nuclear plant from radioactive emissions released in an accident and prevent ingestion of radionuclides through deposition on plants and other food within 50 miles of a plant.

However, NRC suggested that such large, prescriptive requirements are not necessary for new reactors under development, which range in size from 1.5 megawatts to several hundred MW, many of which include new safety features such as underground siting. In contrast, current commercial reactors are above 650 MW and typically larger.

A smaller EPZ translates into less work coordinating with local entities, less paperwork and less expense. In Tuesday’s proposed rule, the commission said it expects the change would save NRC and the industry between $5.89 million and $9.71 million annually.

NRC’s proposed emergency planning changes come about two weeks after the agency unveiled its big-picture plan for licensing an expected wave of applications to license new small modular reactors, pebble-bed reactors, molten salt reactors, “fast” reactors, micro-reactors and other advanced designs.

The wide range of new technologies—under development by established reactor vendors, venture capital-backed startups and Silicon Valley firms—have one thing in common. They are designed to have cost, safety or dual-use advantages over nuclear plants in operation today, which are having difficulty competing with subsidized renewables and plants burning cheap shale gas.

Those financial difficulties have prompted several nuclear plants to close early in recent years, and forced cancellation of more than a dozen new nuclear plant projects over the last 15 years.
For that reason, the industry is keenly interested in the progress of advanced reactors and how NRC plans to license them.

In a memo to the agency’s commissioners released April 28, NRC Executive Director of Operations Margaret Doane asked NRC to vote and approve “a new proposed approach to a rulemaking to develop the regulatory infrastructure to support the licensing of advanced nuclear reactors.” In one sign of the level of interest in the subject, the April 14 memo was released two weeks after it was dated and is marked “official use only,” and “sensitive internal information,” although those lines are crossed out in the document eventually released.

Central to the new plan is the creation of an entirely new “risk-informed, technology-inclusive regulatory framework” for licensing a wide range of expected new reactor applications. Among other things, the system is designed to be more efficient, less prescriptive and include more milestones and “off-ramps” to help reactor vendors and their funders gauge progress.

In creating such a system, the NRC is responding to requirements in the Nuclear Energy Innovation and Modernization Act (NEIMA), which was signed into law by President Trump on January 14 and sponsored by pro-nuclear Sen. John Barrasso (R-Wyo.), chairman of the Senate Environment and Public Works Committee, which oversees NRC.

The only problem, according to some involved in the process, is NRC’s schedule for enacting the new system. While its licensing blueprint for advanced reactors matches requirements in NEIMA, NRC’s plan is to publish a proposed rule in April 2025 and a final rule in August 2027. That is “too late for the wave of advanced reactors that need to be licensed this decade,” said Morgan, Lewis & Bockius, a law firm with a long-standing NRC practice, in a May 5 alert to clients.

“We urge the NRC to issue the proposed rule in October 2021 and the final rule by October 2023,” said the Morgan Lewis attorneys. “Advanced reactor applications are already being submitted to the NRC, so the public and the nuclear community can provide comments well within a year’s time.”

Until NRC develops its new, risk-informed licensing approach for advanced reactors, the agency plans to make available the two licensing approaches that NRC has set up for the larger light-water reactors in use today.

Under one approach—known as “Part 50” after the relevant section of NRC regulations—companies must obtain both a construction and a separate operating license.

Alternatively, companies seeking to develop advanced reactors can use the “Part 52” process, which was developed in 1989 and designed to be more efficient and flexible. Under that approach, companies can obtain a combined construction and operating license. The Part 52 process also enables companies to obtain an early site permit (ESP), which allows them to clear
a site on environmental and certain safety grounds and thus speed the review of a combined construction and operating license.

Similarly, nuclear plant developers can speed either existing licensing process—and presumably the new one NRC is beginning to develop for advanced reactors—by obtaining a design certification, which approves a nuclear plant technology independent of a specific site.

Beyond regulatory-speak, companies’ choices in these regards can be crucial, because taking the right path can minimize time to market as well as costly review time at NRC.

NRC is currently reviewing a design certification application from Oregon-based NuScale for a 60-megawatt small modular reactor and is assessing whether to accept from Oklo, developer of a micro-reactor design, a Part 52 combined license application that does not reference a design certification.

The Tennessee Valley Authority has taken another approach, and is pursuing an ESP for its plans to build an unidentified SMR technology at its Clinch River site in Tennessee.

Sources say GE-Hitachi is eyeing a Part 50 application process for deployment of its first BWRX300, a 300-MW SMR that the company is developing with assistance from Dominion. The BWRX300 is a smaller derivative of GE’s ESBWR, which the company certified at significant cost at NRC and then was unable to sell in the United States, partly because of financial woes that hit the industry and because the few projects that did go forward picked Westinghouse reactors instead. A GE-Hitachi spokesman did not immediately respond to a request for comment Monday. As of January, NRC said six developers of non-light water reactors had formally notified the staff of their intent to begin “regulatory interactions,” and that it was in pre-application talks with X-Energy on a pebble bed high-temperature gas-cooled reactor and Kairos Power on a pebble-fueled, molten-salt-cooled reactor.

In another move to prepare for licensing advanced reactors, NRC is considering conducting a ‘generic’ environmental impact statement covering all new reactors, as opposed to the more costly site-specific reviews that the agency has done in the past with new plants.