



The nuclear industry has demonstrated that it can successfully dismantle nuclear power reactors, such as the Maine Yankee site, shown here following the completion of decommissioning work in 2005. (Photo courtesy of Maine Yankee)

The New Decommissioning Rules

The NRC is in the process of amending its regulations for decommissioning power reactors with the goal of having a new rule in the next two years.

By Tim Gregoire

Past efforts

Currently, the licensed owner of a commercial nuclear power reactor must seek exemptions and amendments to its operating license when the reactor is shut down and decommissioning work begins. That is because a permanently closed power reactor does not automatically transition to a new regulatory status as a decommissioned reactor, but instead continues to be regulated according to its operating license until the Nuclear Regulatory Commission approves the necessary license exemptions and amendments.

This can be a costly and time-consuming process that does little to protect the safety and health of the public and environment. According to the Nuclear Energy Institute, nuclear plant owners must now submit eight to 12 requests for license exemptions, and amendments take 12 to 18 months to complete, resulting in millions of dollars in unnecessary expenditures.

To make the transition from reactor operation to decommissioning more efficient and effective for both regulators and the licensee, as well as more open and transparent for the public, the NRC has taken up a rulemaking process to change its regulations related to reactor decommissioning.

Following a period of public discussion, the staff of the NRC is preparing a final regulatory basis for the new decommissioning rule. That regulatory basis, which was scheduled to be released before this publication goes to press, will be used in developing a proposed rule to be provided to the NRC commissioners in spring 2018 for their approval. The NRC staff expects to provide a draft final rule to the commission in fall 2019.

With a number of power reactors undergoing decommissioning at the time, it became apparent in the 1990s that additional rulemaking was needed to make the decommissioning process more efficient and effective. In a series of papers issued between 1997 and 2001, the NRC staff provided the commission with options and recommendations to improve regulations related to decommissioning nuclear power reactors.

In December 1999, the commission directed the NRC staff to proceed with a single, integrated, risk-informed decommissioning rule that would address the areas of emergency preparedness, insurance, safeguards, staffing and training, and backfitting (SRM-SECY-99-168). According to the NRC, the objective of the rulemaking was to clarify and remove certain regulations for decommissioning power reactors based on the reduction in radiological risk to public health and safety and the common defense and security compared to the radiological risk found in operating reactors.

In June 2000, the NRC staff submitted to the commission SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," which proposed an integrated decommissioning rulemaking plan. As requested by the commission, the plan addressed regulations concerning emergency planning, insurance, safeguards, staffing and training, and rule backfit protection.

The rulemaking plan also was contingent on the completion of a study on the risks of a zirconium fire in the reactor's spent fuel pool. Subsequent studies and additional mitigation strategies,

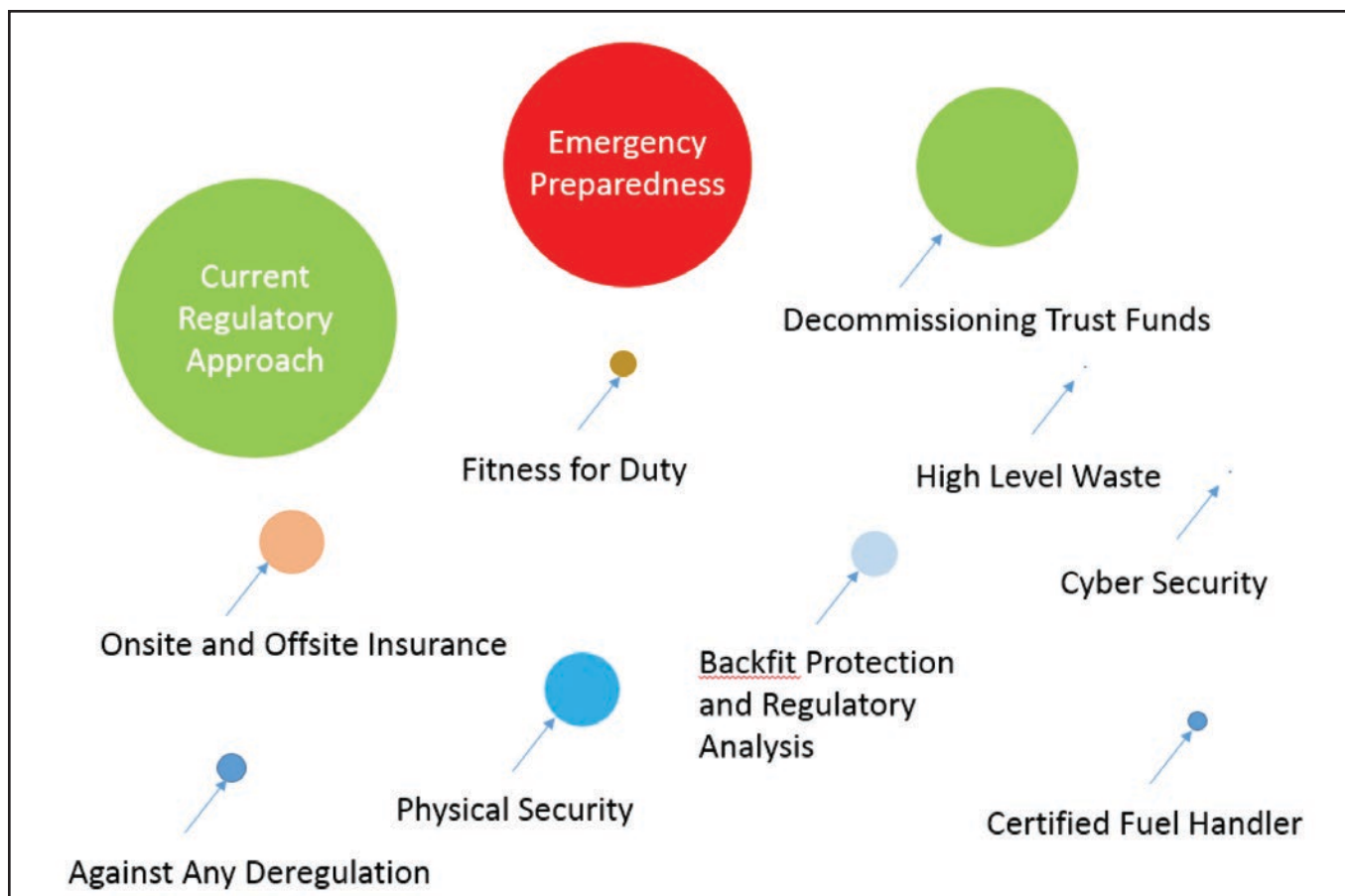


Fig. 1. Regulatory areas of interest to external stakeholders. Source: NRC

however, have shown that the probability of a pool fire is lower than previously reported. The NRC said it is using much of the information from those later studies in developing the current decommissioning rules.

The NRC, however, discontinued its work on the decommissioning rulemaking after the terrorist attacks of Sept. 11, 2001. The agency then redirected its resources toward higher-priority work related to safeguards and security.

At the time it suspended the rulemaking process, there were no power reactors being shut down, and the NRC saw no immediate need to proceed with work improving the existing decommissioning regulations. In 2013, however, four reactor units permanently shut down and defueled without significant advance notice or preplanning. This included Duke's Crystal River-3 in Florida, Dominion's single-unit Kewaunee plant in Wisconsin, and Southern California Edison's San Onofre-2 and -3. Likewise, the Vermont Yankee nuclear power plant was shut down in December 2014, and Nebraska's Fort Calhoun was closed in 2016. Several more nuclear power stations are expected to cease operations by 2019.

In a December 2014 staff requirements memorandum to SECY-14-0118, "Request by Duke Energy Florida, Inc., for Exemptions from Certain Emergency Planning Requirements," the NRC commissioners again directed the agency staff to proceed with a new decommissioning rulemaking and set an objective of early 2019 for its completion. The commissioners also stated that this rulemaking should address the following:

- Issues discussed in SECY-00-0145, such as the graded approach to emergency preparedness;
- Lessons learned from the plants that have already gone (or are currently going) through the decommissioning process;
- The advisability of requiring a licensee's post-shutdown decommissioning activity report (PSDAR) to be approved by the NRC;

- The appropriateness of maintaining the three existing options (DECON, SAFSTOR, and ENTOMB 1) for decommissioning and the timeframes associated with those options;
- The appropriate role of state and local governments and nongovernmental stakeholders in the decommissioning process;
- Any other issues deemed relevant by the NRC staff.

The NRC announced its intention to develop a draft regulatory basis to support a new decommissioning rule by publishing an advance notice of proposed rulemaking in the *Federal Register* on Nov. 19, 2015. According to the NRC, the new rule would establish clear requirements for decommissioning reactors in the areas of emergency preparedness, physical security, and fitness for duty, among other areas, thereby reducing the need for exemptions from current requirements designed for operating reactors. It would also address the timeliness of decommissioning and the role of state and local governments and other organizations.

In publishing the advance notice of proposed rulemaking, the NRC opened the new rule to public comment in order to obtain input from stakeholders on the development of the rule's regulatory basis. According to the NRC, most of the feedback offered during the public comment period pertained to the level of public involvement in the decommissioning process, the 60-year limit for power reactor decommissioning, whether the NRC should approve the PSDAR, emergency planning considerations, and the use of decommissioning trust funds.

In all, the NRC received 162 comments from stakeholders on the proposed rulemaking. The distribution of public comments received in each regulatory area is shown in Fig. 1, with the size of the circles normalized to the number of comments received regarding the current regulatory approach for decommissioning, which received the largest volume of comments. The current regulatory approach includes issues related to the 60-year decommissioning limit, options for decommissioning, and the role of state and local governments in the decommissioning process.



The San Onofre Nuclear Generating Station permanently ceased operations in 2013, and Southern California Edison intends to complete decommissioning within 20 years. (Photo courtesy of Edison International)

Draft regulatory basis

The NRC used input received from the comments on the proposed rulemaking to develop the options presented in the draft regulatory basis document, *Regulatory Improvements for Reactors Transitioning to Decommissioning*, which was released for public comment with notice in the *Federal Register* on March 15, 2017.

In the draft regulatory basis, NRC staff concluded that there was sufficient justification to proceed with rulemaking in the areas of emergency preparedness, physical security, decommissioning trust fund, off-site and on-site financial protection requirements and indemnity agreements, and application of the backfit rule. The NRC staff further recommended rulemaking to clarify requirements for spent fuel management and the environmental requirements contained in Title 10 of the *U.S. Code of Federal Regulations* (10 CFR) Parts 50 and 51.

Conversely, the draft regulatory basis concludes that regulatory activities other than rulemaking, such as the development of regulatory guidance, should be used to address stakeholder concerns regarding the appropriate role of state and local governments in the decommissioning process, the level of NRC review and approval of the reactor's PSDAR, and the 60-year limit for reactor decommissioning. The NRC also determined that additional input is needed prior to finalizing recommendations related to cybersecurity, drug and alcohol testing, certified fuel handler training and minimum staffing, aging management, and fatigue management.

Following the publication of the draft regulatory basis, the NRC published a preliminary draft regulatory analysis with notice in the May 9, 2017, *Federal Register*. The costs, benefits, and other impacts of the decommissioning rulemaking are presented in the regulatory analysis in order to determine the economic impact to industry, government, and society from the

recommendations considered in the proposed decommissioning rulemaking. The analysis also serves to assist the NRC staff in completing the decommissioning regulatory basis and in deciding which alternative of each area of decommissioning to pursue for regulatory action.

With the release of the draft regulatory basis, the NRC provided 90 calendar days for public comment. The NRC asked that commenters consider the following five general questions:

- 1) Is the NRC considering appropriate options for each regulatory area described in the preliminary draft regulatory basis?
- 2) Are there additional factors that the NRC should consider in each regulatory area? What are these factors?
- 3) Are there any additional options that the NRC should consider during development of the proposed rule?
- 4) Is there additional information concerning regulatory impacts that the NRC should include in its regulatory basis for this rulemaking?
- 5) Should the NRC address the exemption to 10 CFR Part 50.38 for licensees of facilities in decommissioning on a generic basis as a part of this rulemaking? If so, why, and how should the NRC address this issue?

Industry response

In a June 13 letter, the Nuclear Energy Institute, which represents the nuclear industry, responded to the NRC's request for comments on the draft regulatory basis. The NEI strongly urged the NRC to continue its work to complete the decommissioning rulemaking as expeditiously as possible and encouraged the agency to use a proposal the NEI submitted in response to the 2015 advance notice of proposed rulemaking in developing the final rule language. The NEI also responded to the five general

questions the NRC posed in the March 15 *Federal Register* notice on the draft regulatory basis document.

In regard to the first question, the NEI agreed that the NRC is *considering* [emphasis NEI] the correct options for each regulatory area described in the draft regulatory basis. The NEI, however, cautioned that the NRC not further pursue changes in regulatory areas that do not advance the rulemaking's primary objective of reducing the number of licensing actions needed during decommissioning. The organization said that the new rule should align regulations for reactors undergoing decommissioning with the reduced risk associated with such facilities.

Similarly, in response to the second question on factors the NRC should consider in each regulatory area, NEI said that, consistent with the new rule's primary objective, "the rulemaking should remain largely focused on areas where exemptions and other licensing actions have been necessary to modify the regulatory framework to correspond to changes in the risk profile of facilities that have permanently shut down and defueled."

As for the question of the regulatory impacts of the rulemaking, the NEI said that it is important that the NRC address more fully the backfitting implications of the specific regulatory changes that are discussed in the draft regulatory basis. According to the NEI, some amendments to the NRC's regulations discussed in several sections of the draft regulatory basis would require backfitting as defined by 10 CFR Part 50.109. This includes amendments to the NRC's cybersecurity and decommissioning fund rules. The NEI added that the proposed amendments are described in mandatory terms, rather than as being "optional" or "voluntary" alternatives to existing requirements.

Finally, in response to the question of exemption from 10 CFR Part 50.38, "Ineligibility of certain applicants," the NEI said that the NRC "should, at a minimum, amend the regulation to make clear that it does not apply to licensees that have completed the

decommissioning process and removed all spent fuel to an independent spent fuel storage installation." NEI added that Part 50.38 could be revised to clearly state that the rule's foreign ownership, control, or domination requirements do not apply to any nuclear power plant that is undergoing decommissioning where operations have officially ceased and the nuclear fuel has been removed from the reactor core.

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