DECOMMISSIONING FUNDS

Before a nuclear power plant begins operations, the licensee must establish or obtain a financial mechanism—such as a trust fund or a guarantee from its parent company—to ensure there will be sufficient money to pay for the ultimate decommissioning of the facility.

Each nuclear power plant licensee must report to the NRC every two years the status of its decommissioning funding for each reactor or share of a reactor that it owns. The report must estimate the minimum amount needed for decommissioning by using the formulas found in NRC regulations. Licensees may alternatively determine a site-specific funding estimate, provided that amount is greater than the generic decommissioning estimate. Although there are many factors that affect reactor decommissioning costs, generally they range from $300 million to $400 million. The staff performs an independent analysis of each of these reports to determine whether licensees are providing reasonable "decommissioning funding assurance" for radiological decommissioning of the reactor at the permanent termination of operation. These reports are required annually during decommissioning so the NRC can ensure the funds are being used appropriately.

DECOMMISSIONING PROGRAM RESOURCES

Decommissioning Fund

10CFR 50.75–Reporting and recordkeeping for decommissioning planning

http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0075.html

License Termination Activities

NUREG–1700, Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans

http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1700/

YouTube

NRC Q&A Series: Five Minutes with an NRC Expert on Decommissioning

https://www.youtube.com/watch?v=GifRku-N7_Q

NUREG/BR–0521, Rev. 1
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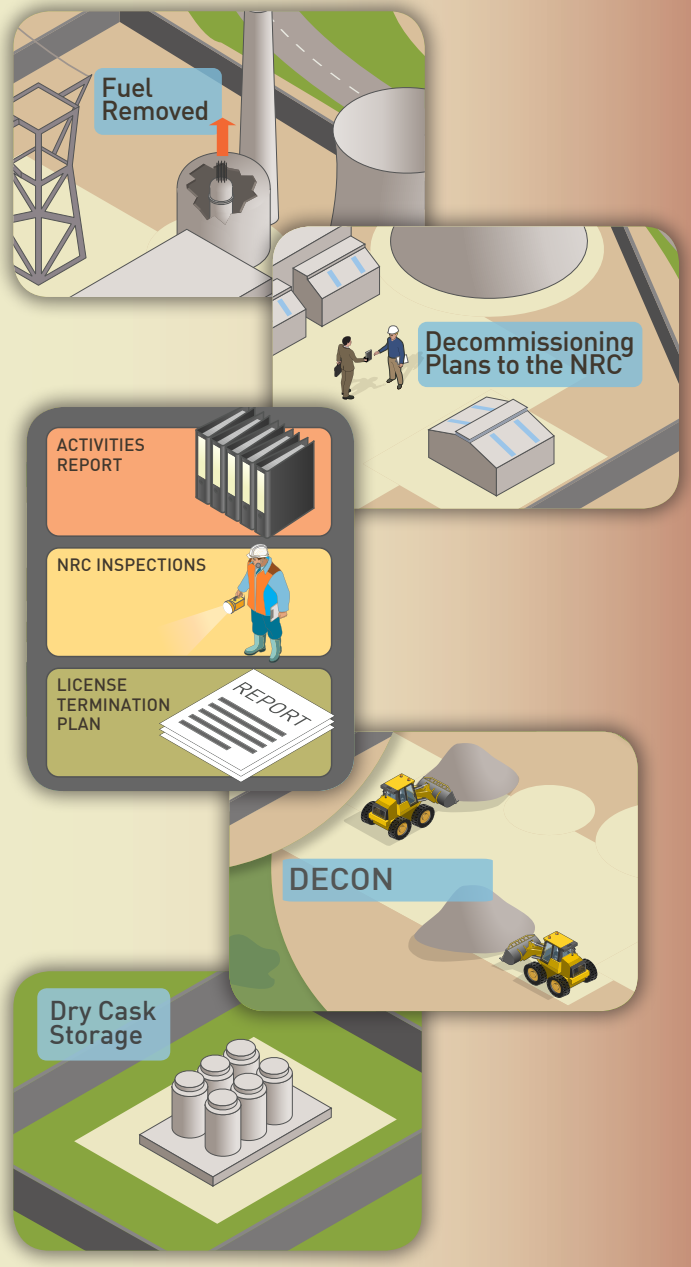
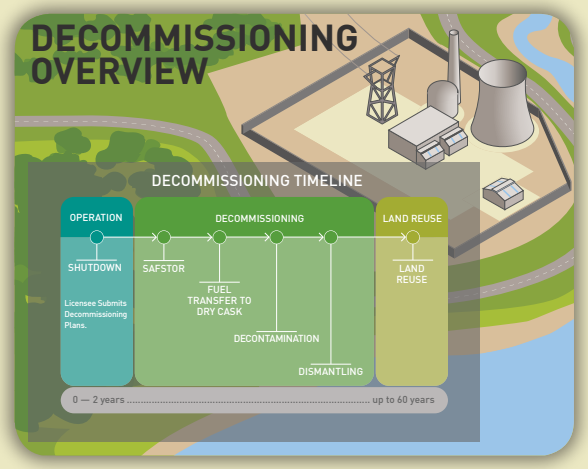
Protecting People and the Environment

Decommissioning Nuclear Power Plants



When a power company decides to close a nuclear power plant permanently, the facility must be decommissioned by safely removing it from service and reducing residual radioactivity to a level that permits release of the property and termination of the operating license. The U.S. Nuclear Regulatory Commission's rules govern nuclear power plant decommissioning to ensure cleanup of radioactively contaminated plant systems and structures and removal of the radioactive fuel. These requirements protect workers, the public and the environment during the entire decommissioning process and after the license is terminated.



REGULATIONS

The requirements for decommissioning a nuclear power plant are set out in several NRC regulations.[1] In August 1996, a revised rule went into effect that redefined the decommissioning process and required owners to provide the NRC with early notification of planned decommissioning activities. The rule restricts licensees from undertaking any major decommissioning activities to be undertaken until after certain information has been provided to the NRC and the public.

DECOMMISSIONING STRATEGIES

Decommissioning involves active cleanup and decontamination, called DECON for short, or a combination of DECON and deferred dismantling, or SAFSTOR.

D Under DECON, equipment, structures and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license.

S Under SAFSTOR, a nuclear power plant is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, the plant shifts to DECON as the facility is dismantled and the property decontaminated.

A licensee may combine these two strategies, leaving parts of the facility in SAFSTOR while actively dismantling and decontaminating other parts of the facility. The decision may be based on factors other than radioactive decay, such as the availability of waste disposal sites.

A third strategy, known as ENTOMB, would encase contaminated facilities in concrete. No U.S. commercial nuclear power plant has chosen this option.

Once DECON is complete and the site meets the NRC's cleanup standards, the NRC will terminate the license and release the property for unrestricted use. A portion of the site may remain under NRC license to store the spent fuel. The licensee is responsible for maintaining and protecting the spent fuel storage facility.

Decommissioning must be completed within 60 years of the plant ceasing operations.

IMPROVING THE DECOMMISSIONING PROGRAM

Several nuclear power plants completed decommissioning in the 1990s without a viable option for disposing of their spent nuclear fuel because the Federal Government did not construct a geologic repository as planned. Accordingly, the NRC implemented regulations allowing licensees to sell off part of their land once it meets NRC release criteria, while maintaining a small parcel under license for storing the spent fuel. These stand-alone facilities, called "independent spent fuel storage installations," remain under license and NRC regulation. Licensees are responsible for security and for maintaining insurance and funding for eventual decommissioning.

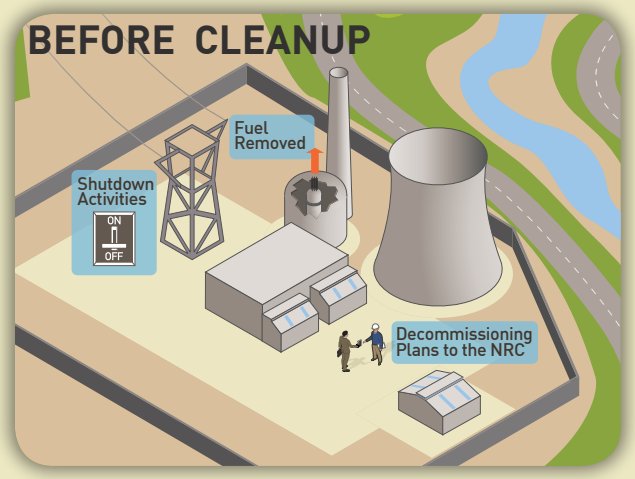
The NRC has taken several steps to improve the decommissioning process. New reactors must be designed to minimize potential contamination. Plant operators must take steps to prevent contamination during operations, and to clean up and monitor any contamination that does occur. The NRC is currently developing regulations to make a plant's transition from operating status to decommissioning more efficient by modifying certain licensing requirements for reactors after they permanently cease operations.

Images of decommission job at San Onofre Unit 1 in California.

1. Title 10 CFR Part 20, Subpart E, and 10 CFR 50.75, 50.82, 51.53, and 51.95

PHASES OF DECOMMISSIONING

The requirements for power reactor decommissioning activities may be divided into three phases:

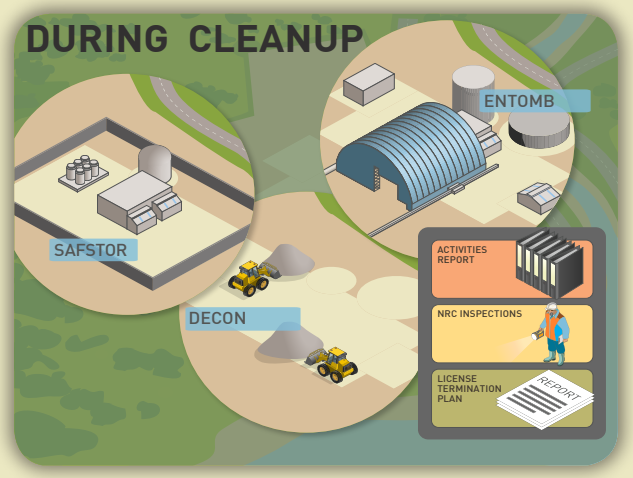


1. Initial Activities

When a nuclear power plant licensee shuts down a plant permanently, it must submit a written certification of permanent cessation of operations to the NRC within 30 days. When radioactive nuclear fuel is permanently removed from the reactor vessel, the owner must submit another written certification to the NRC, surrendering its authority to operate the reactor or load fuel into a reactor vessel. This eliminates the obligation to adhere to certain requirements needed only during reactor operation.

Within 2 years after submitting the certification of permanent closure, the licensee must submit a post-shutdown decommissioning activities report to the NRC. This report provides a description of the planned decommissioning activities, a schedule for accomplishing them, and an estimate of the expected costs. The report must discuss the reasons for concluding that environmental impacts associated with the site-specific decommissioning activities have already been addressed in previous environmental analyses.

After receiving the report, the NRC will publish a notice of receipt in the *Federal Register,* make the report available for public review and comment, and hold a public meeting in the vicinity of the plant to discuss the licensee's intentions.

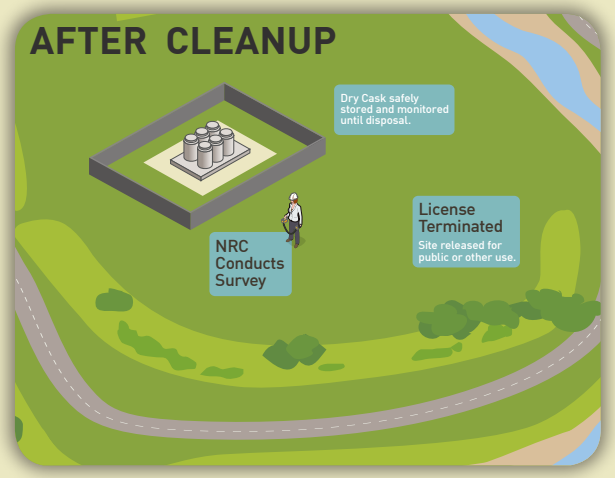


2. Major Decommissioning Activities

Ninety days after the NRC receives the planning report, the owner can begin major decommissioning activities without specific NRC approval. These include permanent removal of such major components as the reactor vessel, steam generators, large piping systems, pumps, and valves.

However, decommissioning activities conducted without specific prior NRC approval must ensure that the release of the site will allow for possible unrestricted use, result in reasonable assurance that adequate funds will be available for decommissioning, or cause any significant environmental impact not previously reviewed. If any decommissioning activity does not meet these terms, the licensee is required to submit a license amendment request, which would provide an opportunity for a public hearing.

Initially, the owner can use up to 3 percent of its set-aside funds for decommissioning planning. The remainder will become available 90 days after submittal of the planning report unless the NRC staff has raised objections.



3. License Termination Activities

The owner is required to submit a license termination plan within 2 years of the expected license termination. The plan addresses each of the following: site characterization, remaining site dismantlement activities, plans for site remediation, detailed plans for final radiation surveys for release of the site, updated estimates of remaining decommissioning costs, and a supplement to the environmental report describing any new information or significant environmental changes associated with the final cleanup. Most plans envision releasing the site to the public for unrestricted use, meaning any residual radiation would be below the NRC's limits of 25 millirem annual exposure and there would be no further regulatory controls by the NRC. Any plan proposing release of a site for restricted use must describe the site's end use, public consultation, institutional controls, and financial assurance needed to comply with the requirements for license termination for restricted release.

The license termination report (LTP) requires NRC approval of a license amendment. Before approval can be given, an opportunity for hearing is published and a public meeting is held near the plant site.

If the remaining dismantlement has been performed in accordance with the approved LTP and the NRC's final survey demonstrates that the facility and site are suitable for release, the NRC will issue a letter terminating the operating license.

S SAFSTOR

D DECON

Decommissioning Completed

I ISFSI (Independent Spent Fuel Storage Installation only)

T License Terminated

Notes: GE Bonus, Hallam, and Piqua decommissioned reactor sites are part of the DOE nuclear legacy. For more information, visit DOE's Office of Legacy Management LM Sites Web page at https://www.energy.gov/lm/sites/lm-sites. CVTR, Elk River, and Shippingport decommissioned reactor sites were either decommissioned before the formation of the NRC or were not licensed by the NRC. Licensees have announced intention to permanently cease operations for the following: – Palisades (2018), Pilgrim (2018) Three Mile Island (2019), Indian Point (2020 and 2021), Oyster Creek (2019) and Diablo Canyon (2025). NRC-abbreviated reactor names are listed. For the most recent information, go to the Dataset Index Web page *https://www.nrc.gov/reading-rm/doc-collections/datasets/*

PUBLIC INVOLVEMENT

The public has several opportunities to participate in the decommissioning process. A public meeting is held in the vicinity of the facility after submittal of a post-shutdown decommissioning activities report to the NRC. Another public meeting is held when the NRC receives the license termination plan. An opportunity for a public hearing is provided before the NRC issues a license amendment approving the plan or any other license amendment request. In addition, when the NRC holds a meeting with the licensee, members of the public may observe the meeting (except when the discussion involves proprietary, sensitive, safeguards, or classified information).