



North Dakota Legislative Council

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FEDERAL NUCLEAR REGULATIONS

North Dakota has not adopted any policies relating to the regulation of nuclear reactors or nuclear power facilities. However, nuclear reactors and power facilities are highly regulated at the federal level. This memorandum provides an overview of federal nuclear regulations.

NUCLEAR REGULATORY COMMISSION

History and Purpose

The United States Nuclear Regulatory Commission (NRC) was established by Congress in 1974 as an independent regulatory agency. At the time of its formation, the NRC adopted all licensing and regulatory functions formerly assigned to the Atomic Energy Commission. The agency is tasked with regulating civilian use of nuclear energy and radioactive materials to protect public health and safety and the environment. The NRC has regulatory authority over the design, construction, and operation of nuclear power facilities, and over the handling, storage, and disposal of nuclear fuel and nuclear waste. The NRC exercises its oversight authority over commercial nuclear reactors through federal regulations regarding licensing, operational oversight, and incident response protocols.

Regulated Nuclear Facilities

The NRC is responsible for licensing, certifying, and decommissioning nuclear facilities. The NRC also reviews the designs of the following three categories of reactors:

- **Large Light Water Reactors (LWRs):** These reactors are traditional, 1,000 megawatt rated nuclear reactors that use water as a coolant. LWRs include boiling water reactors and pressurized water reactors and have been in operation worldwide since the 1950s, with more than 90 commercial reactors operating in the United States.
- **Small Modular Reactors (SMRs):** These reactors are a new, modernized class of LWRs, typically rated between 100 and 300 megawatt. SMRs rely on LWRs design concepts but include enhanced safety and operational components. SMRs often are fabricated using modular components and assembled onsite to streamline project development and reduce delays. NuScale Power is a manufacturer using this process.
- **Advanced Reactors:** Advanced reactors rely on new coolant and fuel technologies, including liquid metal, fluoride salt, or gas rather than water. These reactors often are small and modular, designed to be factory fabricated like SMRs, but using alternatives to the LWR's design. TerraPower, X-energy, and Oklo Inc., are examples of manufacturers using this process.

Licensing Process

Approximately 100 nuclear power plants are licensed to operate in the United States. These plants generate roughly 20 percent of the nation's electricity. Before a nuclear power plant may become operational, the plant must obtain a license from the NRC. The licensing process is intentionally burdensome, requiring substantial applicant information to justify the safety of the proposed facility in all phases of development, operation, and deactivation.

Nuclear power plants previously were licensed under a two-step process described in Title 10, Code of Federal Regulations (CFR), part 50. The two-step process required a construction permit application and an operating license application. In 1989, the NRC improved regulatory efficiency using an alternative licensing process, 10 CFR part 52, which combined a construction and operating license without conditions for plant operation.

Licensing options under 10 CFR part 52, prior to application, include preapproval of early site permits and certified standard plant designs. In both 10 CFR parts 50 and 52, NRC approval is required before a nuclear power plant may be built and operated. The NRC maintains lifetime oversight of the construction and operation of all nuclear facilities for public health and safety, common defense and security, and environmental protection.

Federal Regulations

All nuclear power plant applications must undergo NRC safety, environmental, and antitrust review. An applicant is required to submit a safety analysis report before constructing or operating a nuclear power plant. The report must contain the proposed reactor design and criteria and comprehensive data on the proposed site. The report also must address plant design safety features and how hypothetical accidents would be prevented. In addition, the application must contain a comprehensive assessment of the proposed plant's environmental impact. A prospective licensee also must submit information for antitrust review.

Application

When a company applies for permission to construct a nuclear plant, the NRC first determines whether the application contains sufficient information for a detailed review. If the NRC accepts the application, the agency holds a public meeting near the proposed site to impart safety and environmental aspects of the proposed application, including the planned location and type of plant, the regulatory process, and the terms for public participation in the licensing process. Several public meetings are held during the reactor licensing reviews.

All documents and correspondence related to the application are placed in the agency document database and in the NRC public document room in Rockville, Maryland. The NRC uses press releases and social media to inform relevant federal, state, and local officials, as well as news outlets near the proposed plant, about receipt of the application. The NRC also publishes a notice of receipt in the federal register.

Design Review

The NRC reviews applications to determine whether the nuclear plant design meets all applicable regulations (10 CFR parts 20, 50, 73, and 100). The review includes:

- Site characteristics, such as surrounding population, seismology, meteorology, geology and hydrology;
- The design of the plant;
- The plant's anticipated response to hypothetical accidents;
- Plant operations, including the applicant's technical qualifications to operate the plant;
- Discharges from the plant into the environment, known as radiological effluents; and
- The plant's emergency plans.

The NRC prepares a safety evaluation report summarizing the proposed facility's anticipated effect on public health and safety.

The Advisory Committee on Reactor Safeguards (ACRS), an independent group that provides advice on reactor safety, also reviews each application for the construction or operation of a nuclear power plant. The ACRS review begins early in the licensing process and includes a series of meetings with the applicant and the NRC. When the review is complete, the ACRS submits a final report to the NRC.

Environmental Review

The NRC follows the National Environmental Policy Act by reviewing and evaluating the potential environmental impacts and benefits of the proposed plant. The NRC summarizes this review in a draft environmental impact statement for comment by the appropriate federal, state, and local agencies as well as the public. After the comment period, the NRC issues a final environmental impact statement that addresses all comments received.

The Atomic Energy Act requires a public hearing before a construction permit is issued for a nuclear power plant. This hearing is conducted by a three-member Atomic Safety and Licensing Board comprised of one lawyer, who acts as chairperson, and two technically-qualified individuals. Members of the public may submit written or oral statements to the licensing board, which are entered in the record of the hearing, or petition to intervene as full parties in the hearing.

The NRC may allow the licensee to conduct approved activities at the site before the issuance of a construction permit. This limited work authorization excludes any nuclear safety-related activities, and the licensee must restore the site if the permit is rejected. The authorization may be granted only after the licensing board acknowledges the National Environmental Policy Act findings as required by NRC regulations for authorizing construction. The licensing board also must determine there is reasonable assurance the proposed site is a suitable location for a nuclear power reactor of the general size and type proposed.

Final Safety Analysis Report

The applicant must submit a final safety analysis report to support its application for an operating license. This report describes the final design of the facility, as well as its operational and emergency procedures. The NRC prepares a final safety evaluation report for each operating license, and the ACRS makes an independent evaluation and presents its advice to the NRC.

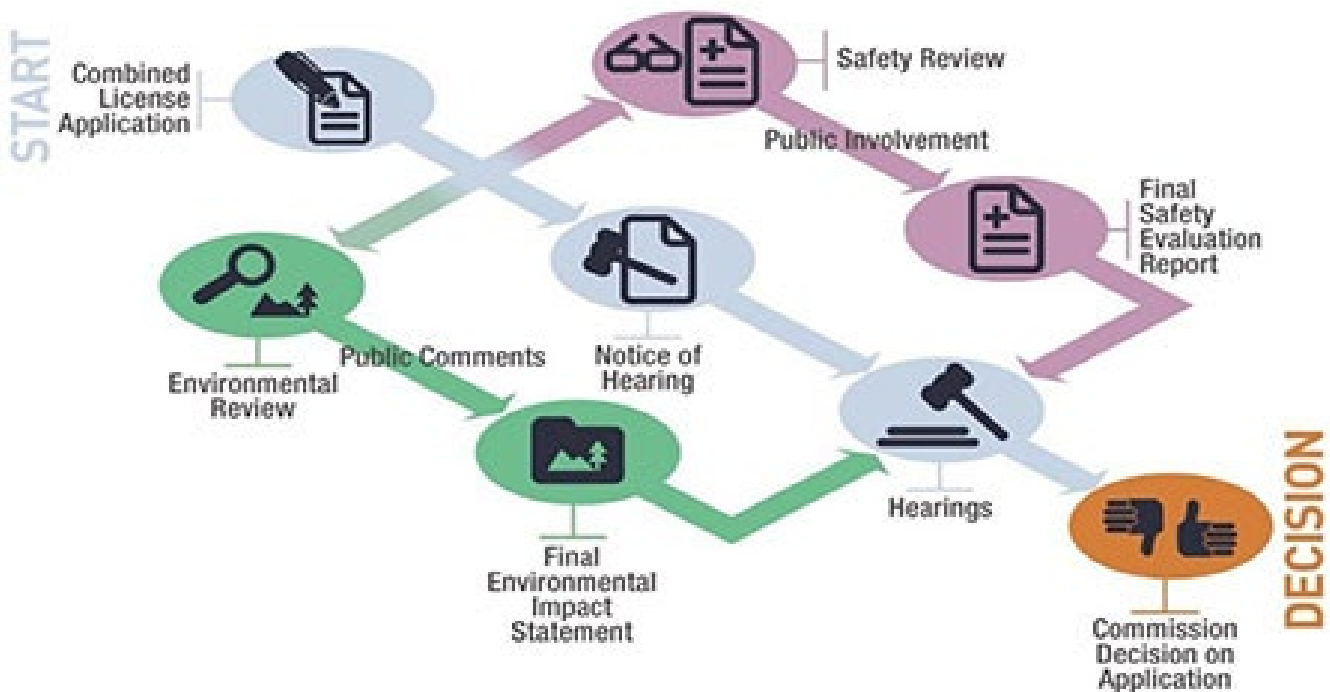
A public hearing is not mandatory or automatic for operating license applications. However, the NRC's publication of a federal register notice on accepting an application for an operating license provides the affected public an opportunity to request a hearing.

Combined License

A combined license under 10 CFR part 52 authorizes construction of the facility, similar to a construction permit under the two-step process in 10 CFR part 50. A combined license application must contain the same information required in an application for an operating license issued under 10 CFR part 50, and specify the inspections, tests, and analyses the applicant must perform. The application also specifies the criteria for reasonable assurance the facility will be constructed and operated in agreement with the license and applicable regulations. If the application does not reference an early site permit or design certification, the NRC will review the technical and environmental information described for the two-step licensing process. A mandatory hearing also is held for a combined license.

After issuing a combined license, the NRC authorizes operation of the facility only after verifying the licensee completed required inspections, tests, analyses, and acceptance criteria. The NRC publishes notices of these completions in the Federal Register. At least 180 days before the date scheduled for initial loading of fuel, the NRC will publish a notice in the Federal Register for intended operation of the facility. There is a limited opportunity for a hearing at this time, restricted to petitions that demonstrate the licensee has not met or will not meet the acceptance criteria.

New Reactor Licensing Process



Source: U.S. Nuclear Regulatory Commission

An application for a combined license under 10 CFR part 52 may incorporate by reference a design certification and an early site permit. Incorporation of a design certification and early site permit by reference allows issues resolved during the design certification rulemaking and early site permit hearing processes to be precluded from reconsideration later at the combined license stage. The issues resolved in a design certification are more difficult to change than issues resolved under other licensing processes. The NRC cannot modify a certified design unless it finds the design does not meet applicable regulations in effect at the time of the design certification, or it is necessary to modify the design to assure adequate protection of public health and safety.

The process for a design certification is an informal process involving the public. The NRC meets publicly with a prospective license applicant to provide early feedback on licensing issues associated with the proposed design. Early public interactions between the NRC and applicants, vendors, and other government agencies facilitate the application review process.

Reactor Oversight Process

An initial reactor operating license is valid for 40 years and can be extended in 20-year increments. The NRC regularly inspects the nation's commercial reactors through the reactor oversight process. The reactor oversight process is designed to inspect, measure, and assess the safety and security performance of operating nuclear power plants in the United States. Each quarter, NRC inspectors review the performance of all nuclear power plants through a variety of performance indicators and inspection findings. Annual reports are published on the NRC website for public viewing, and the NRC holds public meetings to discuss the performance of each facility. The process allows the NRC to issue enforcement decisions in response to violations.