

NRC Standards For Nuclear Regulation

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The Nuclear Regulatory Commission (NRC) licenses and regulates nuclear reactors; nuclear fuel cycle facilities; medical, academic and industrial uses of radioactive materials; and the transportation, storage and disposal of radioactive materials and waste. The primary mechanism for defining requirements or standards for these activities is through imposition of legally binding requirements in title 10 of the code of federal regulation (10CFR). These requirements are imposed through a rule-making process which conforms to the Administrative Procedures Act and includes full participation on the part of the public.

NRC regulations include detailed technical requirements governing the design, construction and operation of facilities. These requirements address a variety of topics including engineering standards, radiation protection and emergency preparedness. They also include overarching requirements related to quality assurance and other licensee programs. These requirements are derived from a variety of sources, including research results, operating experience and engineering practice. One important source of information is the industry consensus standards process. In accordance with the National Technology Transfer and Advancement Act (NTTAA), the NRC participates in numerous standards developments organizations (SDO), such as IEEE, to define codes and standards that can be incorporated into our requirements through the rule-making process.

NRC regulations also specify the processes to be followed for important decision, such as issuing or modifying a license, and taking enforcement action.

NRC requirements are implemented through the issuance of licenses. The licensing process involves extensive interaction between the applicant and the NRC staff to define the specific ways in which NRC requirements are to be satisfied. There is ample opportunity for public involvement. The conditions of the license constitute legally binding requirements. For example, the technical specifications for a nuclear reactor spell out the minimum conditions under which the facility may continue to operate. Failure to meet these conditions places a requirement on the facility to cease operation until the problem is resolved.

In order to promote efficiency in the licensing process, and to promote uniformity in the license requirements, the NRC has published extensive regulatory guidance covering every aspect of design and operation. As is the case for the regulations themselves, these Regulatory Guides and Standard Technical Specifications are derived from a variety of sources, including the consensus standards process. The development and modification of regulatory guidance follows a process that includes public participation. License applicants are not obligated to follow this guidance, and may define alternative methods of achieving compliance with NRC requirements.

NRC conducts an extensive inspection program and takes enforcement action in accordance with the agency's enforcement policy, which is spelled out in the code of federal regulation. For nuclear power reactors, the agency also conducts the Reactor Oversight Process (ROP), a program for assessing licensee performance. The performance of each licensed plant is monitored based on numerical performance indicators and the results of inspection findings which have been assessed using quantitative risk methods. If a licensee exhibits performance problems that exceed certain predetermined thresholds, the agency subjects the facility to augmented oversight, up to and including suspension of operation. The NRC also monitors overall industry performance to identify any potential adverse trends.

NRC licensees periodically encounter situations which are not adequately covered by existing requirements. In these cases, the regulations and/or licenses may need to be amended.

Because this process may take years to complete, interim compensatory measures are often required to assure continued safe operation. In the most significant cases, the NRC will impose interim requirements by issuing orders, either to individual plants or to groups of affected facilities. These orders place legally binding requirements on the licensees. In other cases, the NRC will use its authority to request that licensees address the issue and commit to voluntary interim actions, which are then evaluated by the NRC. These commitments are not legally binding, but the agency has not experienced problems with compliance by licensees.

Conversely, the industry often encounters circumstances in which literal compliance with NRC requirements is unduly burdensome to the licensee or even counterproductive to safety. The NRC has processes, such as exemptions, code reliefs and enforcement discretion, which allow the licensee to operate safely under an alternate set of requirements. The process steps associated with these actions vary depending on the type of regulatory relief being granted.

Under Section 274 of the Atomic Energy Act, the NRC may relinquish its regulatory authority to State governments which enter into satisfactory agreements with the NRC. The basic requirement is that the program for regulation of nuclear materials must be adequate and compatible with the regulatory program applicable to certain materials licensees. The NRC periodically evaluates the programs of individual States via the integrated materials performance evaluation program (IMPEP), which entails a comprehensive evaluation of the program implemented by the State. In no case does the agreement cover regulation of nuclear reactors.

The Institute for Nuclear Power Operation (INPO) is a non-governmental organization which works to identify and remedy performance problems and improve the operation of nuclear power reactors. INPO works independently of the NRC, and its program enhances the level of safety provided by NRC activities. While the NRC and INPO have an agreement which facilitates exchange of certain information, the NRC does not credit INPO activities in determining compliance with NRC requirements, nor does the NRC take enforcement action based on INPO findings.

The NRC program has been successful for over 30 years in preventing significant exposures to the public or the environment surrounding nuclear installations. The agency conducts an active program to collect and evaluate operational experience. When events occur which challenge the NRC's assumptions about the effectiveness of NRC requirements and licensee programs, the agency thoroughly investigates the root causes and takes timely action to 1) remedy the specific identified deficiency, 2) consider the need for generic action, and 3) examine the need for changes to the NRC's program of regulation. Some of the most significant changes in the requirements on licensees, as well as the NRC regulatory program, have resulted from events such as the Three Mile Island accident in March, 1979 and the reactor coolant boundary degradation discovered at the Davis-Besse plant in March, 2002. The NRC has recently instituted a corrective action tracking system to ensure that the lessons learned from these experiences are not lost, and the mistakes are not repeated, in subsequent years.