

## Reactor Operator Licensing

### Background

The Nuclear Regulatory Commission licenses the individuals who operate the controls of a nuclear power plant. There are two categories of licenses: a reactor operator and a senior reactor operator. A senior reactor operator supervises the reactor operators. The license is issued after the individual passes both a written exam and an operating test. The senior reactor operator exam also measures the individual's ability to direct licensed operators.

Section 107 of the Atomic Energy Act of 1954, as amended, requires the NRC to determine the qualifications of prospective operators, to prescribe uniform conditions for licensing them, and to issue licenses, as appropriate. Additionally, Section 306 of the Nuclear Waste Policy Act of 1982 directed the NRC to set forth regulations and other guidance for training and qualifying nuclear power plant operators. This includes requirements for administering the requalification exams and operating tests at nuclear power plant simulators. These statutory requirements are implemented by the NRC's regulations in Part 55, "Operators' Licenses," in Title 10 of the Code of Federal Regulations. Detailed NRC policies, procedures and guidelines regarding those regulations are published in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors."

### Initial Licensing Process

Before the NRC licenses an individual to operate or supervise the controls of a nuclear power reactor, the applicant must have several years of related experience. The applicant also needs extensive classroom, simulator and on-the-job training. This training covers reactor theory, thermodynamics, power plant components, system design and operation, integrated plant operations, and emergency response. Reactor licensees develop and implement the licensed operator training programs at power reactors using an approach to training that:

- analyzes the jobs to be performed,
- derives learning objectives based on job requirements,
- develops training materials to implement the learning objectives,
- evaluates the operators' mastery of those learning objectives, and
- uses feedback based on the operator's job performance to revise the training.

The National Nuclear Accrediting Board reviews and accredits the operator training programs. The board operates under the Institute of Nuclear Power Operations, an industry group created to promote safety in reactor operations. The NRC monitors the board's activities.

When prospective operators finish their training, they must complete an application describing their qualifications. The reactor licensee must certify that the applicant satisfies the licensee's training and experience requirements. Applicants must also undergo a physical exam, and be certified physically and mentally fit to be an operator. If the NRC approves the application, the applicant is scheduled to take the NRC licensing exam.

The exam process begins with a written test covering reactor theory, thermodynamics, and mechanical components. An applicant must pass this exam before taking the site-specific exam. The site-specific exam consists of two parts: a written test covering the nuclear power plant systems, procedures, and administrative requirements; and an operating test that includes a plant walk-through and a performance demonstration on the licensee's reactor simulator. The written exams and operating tests are prepared, administered, and graded using the guidance in NUREG-1021.

The NRC allows facility licensees to draft the site-specific exam. They must submit the exam to the NRC for review and approval. Licensees can also ask the NRC to prepare the tests. Typically, about three out of four site-specific exams are drafted by facility licensees. NRC examiners continue to administer all of the operating tests.

If the applicant passes the written exams and the operating test, the NRC issues a license. The license contains any conditions that the NRC considers necessary.

## **License Conditions**

The operator and senior operator licenses are only valid at the facility where the applicant was trained and tested. Each license is also subject to a number of conditions. For example, all licensed operators and senior operators are required to:

- observe all applicable rules, regulations and orders of the NRC;
- maintain their proficiency and complete their facility licensee's requalification training and exam program;
- be examined by a physician every two years; and
- notify the NRC if they develop a permanent physical or mental condition that could affect their job performance.

Moreover, all licensed operators and senior operators are required to participate in their reactor licensee's drug and alcohol testing programs. Licensed operators are prohibited from using, possessing, or selling illegal drugs. They may not perform licensed duties while under the influence of alcohol or illegal substances, or while adversely affected by prescription or over-the-counter medication.

Licensed operators must complete requalification training every 24 months. Each operator must complete the program and pass a written exam and an annual operating test developed and administered

by the reactor licensee. The NRC monitors the operator requalification programs as part of its Reactor Oversight Process. Each program receives a standard inspection every other year. The inspection:

- verifies that the program evaluates how well the operators and crews have mastered the training objectives;
- assesses the facility licensee's ability to evaluate and revise the program based on the operator's performance;
- assesses whether the operators at the facility satisfy the conditions of their licenses;
- assesses the adequacy of the reactor simulation facility; and
- determines the need for additional inspections or NRC-conducted requalification exams at the facility.

## **License Renewal**

Licenses expire six years after they are issued. They also expire when the employee leaves the job. If an operator or senior operator submits a renewal application to the NRC at least 30 days before the existing license expires, the license is valid until the NRC decides on the renewal. The renewal process requires the applicant to provide written evidence of his or her experience under the existing license, a certification from the reactor licensee that the applicant is a competent performer who has completed the facility's requalification program, and certification that the applicant's health is satisfactory. The NRC will renew the license if it finds that the applicant continues to meet the regulatory requirements based on the application and certifications.

For additional information, see the [Operator Licensing web site](#).

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