
Power Plant Operators, Distributors, and Dispatchers

(O*NET 51-8011.00, 51-8012.00, 51-8013.00)

Significant Points

- Job prospects are expected to be good as many workers retire and new plants are built.
- Most entry-level workers start as helpers or laborers, and several years of training and experience are required to become fully qualified.
- Familiarity with computers and a basic understanding of science and math is helpful for those entering the field.

Nature of the Work

Electricity is vital for most everyday activities. From the moment you flip the first switch each morning, you are connecting to a huge network of people, electric lines, and generating equipment. Power plant operators control the machinery that generates electricity. Power plant distributors and dispatchers control the flow of electricity from the power plant, over a network of transmission lines, to industrial plants and substations, and, finally, over distribution lines to residential users.

Power plant operators control and monitor boilers, turbines, generators, and auxiliary equipment in power-generating plants. Operators distribute power demands among generators, combine the current from several generators, and monitor instruments to maintain voltage and regulate electricity flows from the plant. When power requirements change, these workers start or stop generators and connect or disconnect them from circuits. They often use computers to keep records of switching operations and loads on generators, lines, and transformers. Operators also may use computers to prepare reports of unusual incidents, malfunctioning equipment, or maintenance performed during their shift.

Operators in plants with automated control systems work mainly in a central control room and usually are called *control room operators* or *control room operator trainees* or *assistants*. In older plants, the controls for the equipment are not centralized; *switchboard operators* control the flow of electricity from a central point, while *auxiliary equipment operators* work throughout the plant, operating and monitoring valves, switches, and gauges.

In nuclear power plants, most operators start working as *equipment operators* or *auxiliary operators*. They help the more senior workers with equipment maintenance and operation while learning the basics of plant operation. With experience and training they may be licensed by the Nuclear Regulatory Commission as *reactor operators* and authorized to control equipment that affects the power of the reactor in a nuclear power plant. *Senior reactor operators* supervise the operation of all controls in the control room. At least one senior operator must be on duty during each shift to act as the plant supervisor.

Power distributors and dispatchers, also called *load dispatchers* or *systems operators*, control the flow of electricity through transmission lines to industrial plants and substations that sup-

ply residential needs for electricity. They monitor and operate current converters, voltage transformers, and circuit breakers. Dispatchers also monitor other distribution equipment and record readings at a pilot board—a map of the transmission grid system showing the status of transmission circuits and connections with substations and industrial plants.

Dispatchers also anticipate power needs, such as those caused by changes in the weather. They call control room operators to start or stop boilers and generators, in order to bring production into balance with needs. Dispatchers handle emergencies such as transformer or transmission line failures and route current around affected areas. In substations, they also operate and monitor equipment that increases or decreases voltage, and they operate switchboard levers to control the flow of electricity in and out of the substations.

Work environment. Operators, distributors, and dispatchers who work in control rooms generally sit or stand at a control station. This work is not physically strenuous, but it does require constant attention. Operators who work outside the control room may be exposed to danger from electric shock, falls, and burns.

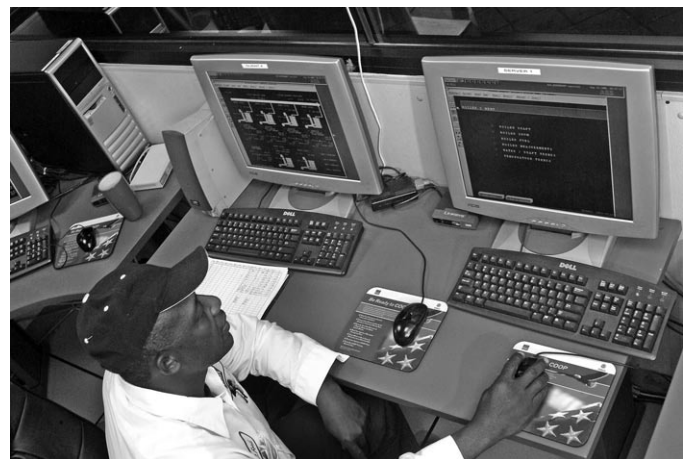
Nuclear power plant operators are subject to random drug and alcohol tests, as are most workers at such plants. Additionally, they have to pass a medical examination every two years and may be exposed to small amounts of ionizing radiation as part of their jobs.

Because electricity is provided around the clock, operators, distributors, and dispatchers usually work one of three 8-hour shifts or one of two 12-hour shifts on a rotating basis. Shift assignments may change periodically, so that all operators share less desirable shifts. Work on rotating shifts can be stressful and fatiguing because of the constant change in living and sleeping patterns.

Training, Other Qualifications, and Advancement

Power plant operators, dispatchers, and distributors generally need a combination of education, on-the-job training, and experience. Candidates with strong computer and technical skills are generally preferred.

Education and training. Employers often seek recent high school graduates for entry-level operator, distributor, and dispatcher positions. Workers with college or vocational school degrees will have more advancement opportunities, especially in nuclear power plants. Although it is not a prerequisite, many



Power plant operators spent most of their time monitoring systems for problems.

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Power plant operators, distributors, and dispatchers.....	51-8010	47,000	48,000	900	2
Nuclear power reactor operators.....	51-8011	3,800	4,200	400	11
Power distributors and dispatchers.....	51-8012	8,600	8,200	-400	-5
Power plant operators.....	51-8013	35,000	36,000	900	3

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

senior reactor operators have a bachelor's degree in engineering or the physical sciences.

Workers selected for training as power plant operators or distributors undergo extensive on-the-job and classroom instruction. Several years of training and experience are required for a worker to become a fully qualified control room operator or power plant distributor.

In addition to receiving initial training to become fully qualified as a power plant operator, distributor, or dispatcher, most workers are given periodic refresher training—especially the nuclear power plant operators. Refresher training usually is taken on plant simulators designed specifically to replicate procedures and situations that might be encountered at the trainee's plant.

Licensure. Power plant operators, distributors, and dispatchers may need licenses depending on jurisdiction and specific job function. Requirements vary greatly from place to place and may be administered by State, county, or local governments.

Extensive training and experience are necessary to pass the Nuclear Regulatory Commission (NRC) examinations required for nuclear reactor operators and senior nuclear reactor operators. Before beginning training, a nuclear power plant worker must have 3 years of power plant experience. At least 6 months of this must be on-site at the nuclear power plant where the operator is to be licensed. Training generally takes at least 1 year, after which the worker must take an NRC-administered examination. To maintain their licenses, reactor operators must pass an annual practical plant operation exam and a biennial written exam administered by their employers. Reactor operators can upgrade their licenses to the senior reactor operator level after a year of licensed experience at the plant by taking another examination given by the NRC. Training may include simulator and on-the-job training, classroom instruction, and individual study. Experience in other power plants or with Navy nuclear propulsion plants also is helpful.

Advancement. Most entry-level workers start as helpers or laborers and advance to more responsible positions as they become comfortable in the plant. In many cases, there are mandatory waiting times between starting a position and advancing to the next level due to licensing requirements. With sufficient training and experience, workers can become shift supervisors or, in nuclear power plants, senior reactor operators.

Because power plants have different systems and safety mechanisms, it is often very difficult to advance by changing companies or plants. Most utilities promote from within; most workers advance within a particular plant or by moving to another plant owned by the same utility.

Employment

Power plant operators, distributors, and dispatchers held about 47,000 jobs in 2006, of which 3,800 were nuclear power plant operators, 8,600 were power distributors and dispatchers, and 35,000 were other power plant operators. Jobs were located throughout the country. About 70 percent of jobs were in electric power generation, transmission, and distribution. About 16 percent worked in government, mainly in local government. Others worked for manufacturing establishments that produced electricity for their own use.

Job Outlook

Employment of power plant operators, distributors, and dispatchers is projected to experience little or no employment change, but job opportunities are expected to be very good due to the large number of retiring workers who must be replaced, increased demand for energy, and recent legislation which paves the way for a number of new plants.

Employment change. Between 2006 and 2016, employment of power plant operators, distributors, and dispatchers is projected to experience little or no employment change, growing by about 2 percent. Electric utilities are expected to build new power plants in response to the Energy Policy Act of 2005, which provides a number of subsidies. Growth will be tempered by a continued emphasis on cost reduction and automation. Although new power plants will require fewer workers than their older counterparts, the machinery in the new plants will be more technologically complex and environmental regulations will require much closer attention to emissions, so workers will be required to have higher skill levels.

Job prospects. Job opportunities are expected to be very good for people who are interested in becoming power plant operators, distributors, and dispatchers. During the 1990s, the emphasis on cost cutting among utilities led to hiring freezes and the laying off of younger workers. The result is an aging workforce, half of which is expected to retire within the next 10 years. Utilities have responded by setting up new education programs at community colleges and high schools throughout the country. Prospects should be especially good for people with computer skills and a basic understanding of science and mathematics.

Earnings

Median annual earnings of power plant operators were \$55,000 in May 2006. The middle 50 percent earned between \$45,110 and \$65,460. The lowest 10 percent earned less than \$35,590, and the highest 10 percent earned more than \$75,240.

Median annual earnings of nuclear power reactor operators were \$69,370 in May 2006. The middle 50 percent earned between \$61,590 and \$78,150. The lowest 10 percent earned less than \$54,180, and the highest 10 percent earned more than \$92,240.

Median annual earnings of power distributors and dispatchers were \$62,590 in May 2006. The middle 50 percent earned between \$52,510 and \$73,920. The lowest 10 percent earned less than \$42,370, and the highest 10 percent earned more than \$85,740.

Related Occupations

Other workers who monitor and operate plant and system equipment include chemical plant and system operators; petroleum pump system operators, refinery operators, and gaugers; stationary engineers and boiler operators; and water and liquid waste treatment plant and system operators.

Sources of Additional Information

For information about employment opportunities, contact local electric utility companies, local unions, and State employment service offices.

For general information about power plant operators, nuclear power reactor operators, and power plant distributors and dispatchers, contact:

➤ American Public Power Association, 2301 M St.NW., Washington, DC 20037-1484.

Internet: <http://www.appanet.org>

➤ International Brotherhood of Electrical Workers, 1125 15th St.NW., Washington, DC 20005.

Internet: <http://www.ibew.org>

➤ National Association of Power Engineers, Inc., 1 Springfield St., Chicopee, MA 01013.

Information on licensing for nuclear reactor operators and senior reactor operators is available from:

➤ Nuclear Regulatory Commission, Washington, DC 20555-0001. Internet: <http://www.nrc.gov>