

## Plant and System Operators

### Power Plant Operators, Distributors, and Dispatchers

(O\*NET 51-8011.00, 51-8012.00, 51-8013.01, 51-8013.02)

#### Significant Points

- Overall employment of operators, distributors, and dispatchers is expected to decline due to increasing industry competition.
- Opportunities will be best for operators with training in automated systems.
- Little or no change in employment and low turnover will result in few job opportunities.

#### 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 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* and *control room operator trainees or assistants*. In older plants, the controls for the equipment are not centralized, and *switchboard operators* control the flow of electricity from a central point, whereas *auxiliary equipment operators* work throughout the plant, operating and monitoring valves, switches, and gauges.

The Nuclear Regulatory Commission (NRC) licenses operators of nuclear power plants. *Reactor operators* are authorized to control equipment that affects the power of the reactor in a nuclear power plant. In addition, an NRC-licensed *senior reactor operator* must be on duty during each shift to act as the plant supervisor and supervise the operation of all controls in the control room.

*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 supply residential electric needs. They operate current converters, voltage transformers, and circuit breakers. Dispatchers monitor equipment and record readings at a pilot board, which is 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, to bring production into balance with



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needs. They handle emergencies such as transformer or transmission line failures and route current around affected areas. They also operate and monitor equipment in substations, which step up or step down voltage, and operate switchboard levers to control the flow of electricity in and out of substations.

#### Working Conditions

Because electricity is provided around the clock, operators, distributors, and dispatchers usually work one of three daily 8-hour shifts or one of two 12-hour shifts on a rotating basis. Shift assignments may change periodically, so that all operators can share duty on less desirable shifts. Work on rotating shifts can be stressful and fatiguing, because of the constant change in living and sleeping patterns. Operators, distributors, and dispatchers who work in control rooms generally sit or stand at a control station. This work is not physically strenuous but requires 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 nuclear power plants.

#### Employment

Power plant operators, distributors, and dispatchers held about 55,000 jobs in 2000. Jobs are located throughout the country. About 8 in 10 worked for utility companies and government agencies that produced electricity. Others worked for manufacturing establishments that produced electricity for their own use.

#### Training, Other Qualifications, and Advancement

Employers seek high school graduates for entry-level operator, distributor, and dispatcher positions. Candidates with strong math and science skills are preferred. College-level courses or prior experience in a mechanical or technical job may be helpful. Employers increasingly require computer proficiency, as computers are used to keep records, generate reports, and track maintenance. Most entry-level positions are helper or laborer jobs, such as in powerline construction. Depending on the results of aptitude tests, worker preferences, and availability of openings, workers may be assigned to train for one of many utility positions.

Workers selected for training as a fossil-fueled power plant operator or distributor undergo extensive on-the-job and classroom training. Several years of training and experience are required to become a fully qualified control room operator or power distributor. With further training and experience, workers may advance to shift supervisor. Utilities generally promote from within; therefore, opportunities to advance by moving to another employer are limited.

Extensive training and experience are necessary to pass the Nuclear Regulatory Commission (NRC) examinations for reactor operators and senior reactor operators. To maintain their license, licensed reactor operators must pass an annual practical plant operation exam and a biennial written exam administered by their employer. Training may include simulator and on-the-job training, classroom instruction, and individual study. Entrants to nuclear power plant operator trainee jobs must have strong math and science skills. Experience in other power plants or with Navy nuclear propulsion plants also is helpful. With further training and experience, reactor operators may advance to senior reactor operator positions.

In addition to preliminary training as a power plant operator, distributor, or dispatcher, most workers are given periodic refresher training. Nuclear power plant operators are given frequent refresher training. This training is usually taken on plant simulators designed specifically to replicate procedures and situations that might be encountered working at the trainee's plant.

### Job Outlook

Little or no change in employment of power plant operators, distributors, and dispatchers is expected through the year 2010, as the industry continues to restructure in response to deregulation and increasing competition. The Energy Policy Act of 1992 has had a tremendous impact on the organization of the utilities industry. This legislation has increased competition in power generating utilities by allowing independent power producers to sell power directly to industrial and other wholesale customers. Utilities, which historically operated as regulated local monopolies, are restructuring operations to reduce costs and compete effectively and, as a result, the number of jobs is decreasing.

People who want to become power plant operators, distributors, and dispatchers are expected to encounter keen competition for these high-paying jobs. Little or no change in employment and low turnover in this occupation will result in few job opportunities. The slow pace of new plant construction also will limit opportunities for power plant operators, distributors, and dispatchers. Increasing use of automatic controls and more efficient equipment should increase productivity and decrease the demand for operators. Individuals with training in computers and automated equipment will have the best job prospects.

### Earnings

Median annual earnings of power plant operators were \$46,090 in 2000. The middle 50 percent earned between \$37,320 and \$54,200 a year. The lowest 10 percent earned less than \$28,700, and the highest 10 percent earned more than \$62,020 a year. Median annual earnings of power plant operators in 2000 were \$48,350 in electric services and \$40,160 in local government.

Median annual earnings of nuclear power reactor operators were \$57,220 in 2000. The middle 50 percent earned between \$50,720 and \$67,320 a year. The lowest 10 percent earned less than \$46,890, and the highest 10 percent earned more than \$74,370 a year.

Median annual earnings of power distributors and dispatchers were \$48,570 in 2000. The middle 50 percent earned between \$39,880 and \$58,290 a year. The lowest 10 percent earned less than \$31,760, and the highest 10 percent earned more than \$69,260 a year. Median annual earnings in electric services, the industry

employing the largest numbers of power distributors and dispatchers, were \$49,070.

### Related Occupations

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

### Sources of Additional Information

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

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

- ▶ International Brotherhood of Electrical Workers, 1125 15th St. NW., Washington, DC 20005.
- ▶ Utility Workers Union of America, 815 16th St. NW., Suite 605, Washington, DC 20006.

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## Stationary Engineers and Boiler Operators

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### Significant Points

- Job opportunities will be best for workers with computer skills.
- Stationary engineers and boiler operators usually acquire their skills through a formal apprenticeship program or informal on-the-job training supplemented by courses at a trade or technical school.
- A license to operate boilers, ventilation, air conditioning, and other equipment is required in most States and cities.

### Nature of the Work

Heating, air-conditioning, and ventilation systems keep large buildings comfortable all year long. Industrial plants often have facilities to provide electrical power, steam, or other services. Stationary engineers and boiler operators control and maintain these systems, which include boilers, air-conditioning and refrigeration equipment, diesel engines, turbines, generators, pumps, condensers, and compressors. The equipment that stationary engineers and boiler operators control is similar to equipment operated by locomotive or marine engineers, except that it is not on a moving vehicle.

Stationary engineers and boiler operators start up, regulate, and shut down equipment. They ensure that it operates safely, economically, and within established limits by monitoring meters, gauges, and computerized controls. They manually control equipment and, if necessary, make adjustments. They use hand and power tools to perform repairs and maintenance ranging from a complete overhaul to replacing defective valves, gaskets, or bearings. They also record relevant events and facts concerning operation and maintenance in an equipment log. On steam boilers, for example, they observe, control, and record steam pressure, temperature, water level and chemistry, power output, fuel consumption, and emissions. They watch and listen to machinery and routinely check safety devices, identifying and correcting any trouble that develops.