

Is water operations ? the career for you •

Clean water is the most valuable resource on the planet, and keeping drinking water clean and safe is the job of water operators. This brochure describes:

- the benefits and opportunities for water-operations professionals.
- what water treatment and distribution are.
- the types of work that water operators perform.
- where to get the training necessary to perform this vital work.

Benefits of being a water-operations professional

Water operators are the first line of defense in public health. They deliver safe, plentiful drinking water to their customers and ensure that fire hydrants have enough water to fight fires. Being a water operator is a very meaningful career choice—you make a huge, positive difference in the health of your community.

The position of water operator has an average nationwide salary of \$40,000 per year, but experienced water operators can earn around \$80,000 per year in large communities—more in supervisory positions. Many utilities offer excellent benefits and opportunities for career advancement.

Many water operators are retiring, and there is expected to be an operator shortage in the near future. It's a great time to enter this industry, whether you're just starting your career or looking for a career change!

Training to be a water operator

Most states and some tribes require water operators to pass certification exams to show they are capable of overseeing aspects of water operations. Many have their own certification programs. Requirements typically include a combination of training and experience performing the duties of a water operator. Some utilities hire “trainees” who do not yet have the experience and training but are interested in acquiring them.

To learn more about this exciting career opportunity, visit the following websites:

- Rural Community Assistance Partnership
www.rcap.org
- SmallWaterSupply.org
www.smallwatersupply.org
- American Water Works Association
www.awwa.org
- Association of Boards of Certification
www.abccert.org

Or visit the regional RCAP website below for links to state websites.



www.map-inc.org

Water OPERATOR



a world of career opportunities

Jobs that offer:

- stability
- work in places all over the country
- advancement opportunities
- being part of a “green” industry
- a chance to make a difference in your community



Is wastewater operations? the career for you •

Clean water is the most valuable resource on the planet, and keeping water clean is the job of wastewater operators. This brochure describes:

- what wastewater collection and treatment are.
- the types of work that wastewater operators perform.
- what education is necessary to perform this vital work.

Becoming a wastewater operator is a very meaningful career choice. As an operator, you make a huge, positive difference in the life of your community by ensuring that the health of its residents is protected and that the environment is respected. It is one of the original “green” jobs.

The national average of salaries for wastewater operator positions is \$40,000 per year, but experienced wastewater operators can earn around \$80,000 per year in large communities.

Now is the time to start preparing for this career. Many wastewater operators are retiring, and there is expected to be an operator shortage in the near future. It's a great time to be entering this career area!

Training to be a wastewater operator

Most states and some tribes have a wastewater operator training and certification program. Exams are given to ensure operators are capable of overseeing all aspects of wastewater operations. Advancement in the profession requires a combination of education and experience.

To learn more about this exciting career opportunity, visit the following websites:

- Rural Community Assistance Partnership
www.rcap.org
- SmallWaterSupply.org
www.smallwatersupply.org
- Water Environment Federation
www.wef.org
- Association of Boards of Certification
www.abccert.org

Or visit the regional RCAP website below for links to state websites.



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Wastewater OPERATOR



a world of career opportunities

Jobs that offer:

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How is wastewater collected and treated?

Wastewater is the water used and discarded by residents in a community. It includes water that flows out of drains in homes and water used in businesses and industries.

Wastewater travels through pipes (either by gravity or with the use of pumps) to a wastewater treatment system. The treatment system is designed to remove contaminants that may be harmful to humans or the environment or that may damage the system's components.

Wastewater treatment can be either centralized, meaning that the wastewater is collected by pipes from its many sources in a community and delivered to one location for treatment (such as the plant on the outskirts of the community) or decentralized, meaning that wastewater is treated onsite, close to where it originated.

In centralized systems, wastewater is first generally screened in a physical process to remove plastics, leaves, rags, large items, and other debris that could damage the equipment in the plant. This debris is usually sent to a landfill. Primary treatment is the first step in removing contaminants. Dense solids sink to the bottom of primary clarifier tanks by gravity, where they are removed by bottom scrapers, and floatable solids rise to the top, where they

are removed by skimming. The solids move on to the sludge treatment step, while the liquid moves on to secondary treatment.

Secondary treatment is the removal of organic contaminants left in the wastewater after primary treatment. There are several types of secondary treatment, but they generally rely on a biological process in which microorganisms consume the organic contaminants in the wastewater as food.

The primary and secondary treatment steps both produce sludge. Sludge consists of the contaminants removed from the water, plus any chemicals and microorganisms used to remove them. Sludge receives its own treatment and is then disposed of in a landfill or reused as a soil conditioner.

The wastewater is then disinfected to kill any biological contaminants still remaining. Disinfection can be done with chlorine, ozone, or ultraviolet light. If disinfection uses chlorine (a chemical process), the wastewater must be dechlorinated before being released back into a river, lake, or ocean.

Decentralized systems usually use septic tanks for primary treatment. Wastewater flows into a septic tank, where heavier solids sink to the bottom by gravity. The leftover water then flows into a drainfield and is released slowly into the ground, where the soil and microorganisms physically, chemically, and biologically break down the remaining contaminants.



What would I be doing?

Wastewater operators are the first line of defense in public health. They make sure the water used by their communities is cleaned before it is returned to the environment.

Operators run the equipment and control the physical, biological, and chemical processes that clean water. They maintain and repair the pipes, valves, pumps, controls, gates, engines, generators, and other equipment used to collect and treat wastewater. They sample and test the wastewater at various points during treatment to ensure the cleaning processes are working correctly.

Want to see the process in action?

View an animation of the wastewater treatment process and videos explaining each of the steps at www.rcap.org/dwwwtreatment

How is water *treated and distributed?*

Have you ever wondered how drinking water gets to your home's faucets? Drinking water originates in lakes, rivers, or streams (surface water) or comes from formations under the ground (groundwater).

Surface water travels through pipes (usually by gravity) to a water-treatment system. Groundwater is pumped up from the ground to the treatment system. The treatment system is designed to remove contaminants that may be harmful to human health or to the system's components. Contaminants may be:

- biological, such as algae or microscopic organisms.
- non-organic metals, radionuclides, and minerals.
- organic chemicals that come from fertilizers, pesticides, or other sources.



The first step in drinking water treatment is contaminant removal. For surface water, this step consists of:

1. coagulation and flocculation: causing contaminants to clump together
2. sedimentation: where the heavier particles settle out of the water
3. filtration: where the water passes through a filter to remove particles remaining in the water

Groundwater usually has fewer of the contaminants requiring clumping and settling, and so it often does not require these steps. In some cases, however, groundwater may have naturally occurring minerals or industrial contaminants that require specific treatment processes to remove them.

After treatment to remove contaminants, all drinking water—whether from surface or ground sources—is disinfected to kill any biological contaminants still remaining. Disinfection can be done with chlorine, ozone, or ultraviolet light, and regulations require additions of a small amount of chlorine chemical to ensure the water stays free of disease-causing organisms while it's being transmitted from the treatment plant to customers' taps. Once water leaves the treatment plant, it may be stored in a tank or distributed directly to customers through the distribution system, a network of pipes and pumps that carries water from the treatment system to homes, businesses, schools, hospitals, and other customers.



What would I be *doing?*

Water operators run the equipment and control the processes that clean drinking water. They maintain and repair the pipes, valves, pumps, controls, gates, engines, generators, and other equipment used to produce drinking water. They sample and test the water at various points during treatment and distribution to ensure the treatment processes are working correctly to maintain drinking water quality.

Water operators also protect the security of the water supply, treatment, and distribution system before, during, and after natural or human-caused emergencies.

Want to see the *process in action?*

View an animation of the drinking water treatment process and videos explaining each of the steps at www.rcap.org/dwwwtreatment