A HYDROFATHOM SPECIAL LESSON PLAN

DRINKING WATER OPERATOR CAREER



FOREWARD

This special learning module describes how to seek a career as an operator in the drinking water industry. This lesson provides short concise instruction which encourages the learner to further independently explore the associated water topics. We welcome comments to our website listed at the bottom of this page.

The included information briefly explains how to begin a career in the water industry as a front-line water worker, an operator. We feature the initial steps to obtain an operator's license, using the state of California as an example. Other states follow similar procedures.

If used in a structured teaching environment, instructors should prescreen the subject matter to assure the appropriateness for the selected audience. The intended audience for this lesson is people wishing to explore a well-paying career that does not require a college degree. This lesson is provided for informational purposes only. No specific results are implied or guaranteed.

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SPECIAL MODULE WORKING IN THE DRINKING WATER INDUSTRY

ADVANTAGES OF WORKING AS A WATER OPERATOR

Many people find rewarding careers in the water industry. According to the California Department of Drinking Water approximately 35,000 people work as water treatment plant operators or water distribution operators throughout California. So, a relatively small workforce ensures a safe drinking water supply for tens of millions of state residents. Although private employers exist, most water operators work for government agencies: water districts, cities, counties, and special districts.

Many government operator jobs pay well, and the jobs come with substantial benefits that may include healthcare, pension, paid vacation, training and retirement savings plans. The water industry often provides stable employment since water usage varies little during economic cycles. Thus, the water industry does not suffer from the boom-bust cycles of many industries. Furthermore, the water industry allows a person to serve their fellow citizens by helping to assure a safe reliable supply of water for the public.

ROLE OF OPERATORS

This lesson covers drinking water operators as opposed to wastewater operators. In California, both water systems and wastewater systems must be staffed by licensed operators. For both system types, five levels of licenses exist from Level One to Level Five. California certifies water operators under the Drinking Water Operator Certification Program (DWOCP) and wastewater operators under the Wastewater Operator Certification Program (WWOCP). Depending on training, experience, and testing, an operator may be certified from level one to five. This lesson focuses on drinking water, but similar rules exist for wastewater. Additionally, other state certification programs also mirror California licensing practices.

Drinking water treatment licenses are usually designated with a "T" and drinking water distribution licenses with a "D". So, depending on license, an operator may be referred to using shorthand, for example, T2 for a level 2 treatment operator or D5 for a distribution level 5 operator.

Treatment operators treat water at stationary plants that receive large volumes of untreated water and then discharge the same volume as treated drinkable water. Treatment operators monitor the treatment plant and adjust the plant processes and equipment based on chemical analysis that they perform and instruments that they monitor. Treatment operators record data for regulatory reporting purposes and also interface with regulatory agencies.

Distribution operators deliver the water from the treatment plant to customers using a complex system of pipes, valves, tanks, and pumps which mainly route underground. Modern water systems have automated control systems that allow operators to remotely monitor the water flowing through the distribution system. Distribution operators adjust the distribution system to balance the variances in demand throughout the day and also perform regulatory duties.

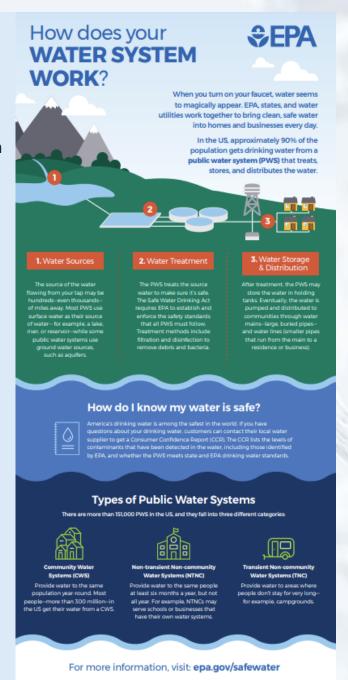
One may think of the treatment plant as a dairy and the distribution system as a milk truck. Both must integrate together for successful delivery to the customer. We include here a brief description of the licensing process one can easily obtain further information on the internet.

GOVERNMENT ADMINISTRATION

The United States government passed the Safe Drinking Water Act in 1974. This law established standards for drinking water and tasked the Environmental Protection Agency with establishing rules to protect water consumers. This law led to the establishment of state water agencies to oversee drinking water.

California enacted laws and regulations governing the certification of potable water treatment facility operation and water distribution system operation that complied with the federal standards. The California regulations dictate the staffing requirements of treatment plants and also specify qualifications for workers that operate distribution systems

Currently, the State Water Resources Control Board oversees the DWOCP and they are responsible for the testing and certification of all drinking water operators in the state.



https://www.waterboards.ca.gov/drinking_water/certlic/occupations/DWopcert.html

BACKGROUND REQUIREMENTS

Becoming a water operator requires no particular previous experience and a person only needs a high school diploma or GED. Some knowledge of math, ecology, and biology helps but a person may also learn most of the required expertise through coursework and later through work experience. Most government agencies perform limited background checks, and some may conduct drug testing. Usually, operators must possess a driver license.

Again, using California as an example, we have included two appendixes that show the requirements for each level, one to five, for both distribution and treatment plant operators. Distribution work often interests people that like a varied work location and people that enjoy outdoor work. Treatment plant work may attract people that enjoy reporting to the same location daily.

The state of California provides guidelines for the expected range of knowledge for water operators, and we have attached a resource sheet to this lesson. Furthermore, an organization called the American Water Works Association (AWWA), a non-profit, makes free reference material available.

PATHWAY TO CERTIFICATION AND EMPLOYMENT

To become a licensed level one operator only requires a person to pass a test after applying for a license. The application fee currently costs sixty-five dollars. Some organizations even hire workers prior to passing the test in a "operator-in-training" role and will later pay for education and licensing fees. Yet, most people who want to pursue a long-term water career, apply not for a level one but for a level two operator license. To receive a level two certificate a person must also complete one 36-hour instructional course and most pay for their initial coursework themselves. Numerous in-person and on-line resources exist for certification courses. However, one must confirm that the state approves the selected course for certification applications prior to enrollment. HydroFathom does not endorse any commercial products, but one can expect to pay about \$400 for an approved on-line course.

After completion of an approved course, one can apply to the state to take a certification exam. The state will review the completed course certificate and if acceptable, an exam date will be scheduled. After successfully passing the exam, the applicant is granted a license, whether they are currently working in the industry or not. Subsequent advancements to levels higher than level two require more schooling and work experience. Still, with a level two operator license, an individual can begin exploring employment opportunities. Standard internet job websites can provide connections to employers looking for water workers. Recent searches of these sites uncovered numerous opportunities throughout the state.

CONCLUSION

HydroFathom provides water education to the public. As part of that effort, we prepared this guide for people interested in a career in the water industry. We hope that it provides a concise guide to all who may pursue a career in the water industry, and we wish luck to all prospects in pursuit of their future careers.



Drinking Water Distribution Minimum Requirements

Grade	Minimum Qualifications for Examination	Eligibility Criteria for Certification
D1	High School Diploma / GED Equivalency*	 Pass the Grade D1 operator examination within the three years prior to submitting the application for certification.
D2	 High School Diploma / GED Equivalency* One 36-hour OR 3.6-continuing-education-unit (CEU) OR 3-college-semester-unit course of specialized training** in water supply principles. 	Pass the Grade D2 operator examination within the three years prior to submitting the application for certification.
D3	 Valid D2 certification Two 36-hour OR 3.6-continuing-education-unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least one course in water supply principles. 	 Pass the Grade D3 operator examination within the three years prior to submitting the application for certification. One year of operator experience working as a certified D2 operator at a D2 system or higher. One additional year of operator experience working as a certified distribution operator. This may be substituted with (1) or (2) in the chart on page 3.

Grade	Minimum Qualifications for Examination	Eligibility Criteria for Certification
	Valid D3 certification	 Pass the Grade D4 operator examination within the three years prior to submitting the application for certification.
D4	 Three 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least two courses in water supply 	 One year of operator experience working as a certified D3 operator at a D3 system or higher.
	principles.	 Three additional years of operator experience working as a certified distribution operator. This may be substituted with (1) in the chart on page 3.
	Valid D4 certification	 Pass the Grade D5 operator examination within the three years prior to submitting the application for certification.
D5	 Four 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least two courses in water supply 	 Two years of operator experience working as a certified D4 operator at a D4 or D5 system.
	principles.	 Three additional years of operator experience working as a certified distribution operator. This may be substituted with (1) in the chart on page 3.

^{*}This requirement may also be fulfilled with either the successful completion of the State Water Board's Basic Small Water Systems Operations course or 1 year as an operator of a facility that required an understanding of piping systems that include pumps, valves, and storage tanks. For more information on the State Water Board's Basic Small Water Systems Operations course, contact the Office of Operator Certification.

^{**}College level courses providing at least 36 contact hours of training each in drinking water or wastewater quality, drinking water or wastewater treatment, drinking water distribution, or drinking water or wastewater facility operation, offered by an accredited academic institution or an organization either accredited by the international Association of Continuing Education Training (IACET) or an authorized provider of IACET, or courses completed and deemed acceptable by the Department prior to January 1, 2001 for the purpose of operator certification.

Drinking Water Distribution Certification Experience Substitutions

- (1) A degree earned at an accredited academic institution:
 - (A) An associate degree, or certificate, in water or wastewater technology or distribution that includes at least 15 units of physical, chemical, or biological sciences **may be used to fulfill 1 year of additional operator experience**.
 - (B) A bachelors degree in engineering or in physical, chemical, or biological sciences **may be used to fulfill 1.5** years of additional operator experience.
 - (C) A masters degree in engineering or in physical, chemical, or biological sciences may be used to fulfill 2 years of additional operator experience.
- (2) Experience gained while working as a certified distribution operator with lead responsibility for water quality or quantity related projects or research **may be used to substitute 1 year of additional operator experience**, on a day-for-day basis.



Drinking Water Treatment Minimum Requirements

Grade		Minimum Qualifications for Examination		Eligibility Criteria for Certification
T1	•	High School Diploma / GED Equivalency*	•	Pass the Grade T1 operator examination within the three years prior to submitting the application for certification.
Т2	•	High School Diploma / GED Equivalency* One 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit course of specialized training** covering the fundamentals of drinking water treatment.	•	Passed the Grade T2 or Grade T3 operator examination within the three years prior to submitting the application for certification.
Т3	•	Two 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least one course covering the fundamentals of drinking water treatment.	•	Pass the Grade T3 operator examination within the three years prior to submitting the application for certification. One year of operator experience working as a certified T2 operator at a T2 facility or higher. This may be substituted with (1) in the chart on page 3. One additional year of operator experience working as a certified treatment operator. This may be substituted with (2), (3), or (4) in the chart on page 3.

Grade		Minimum Qualifications for Examination		Eligibility Criteria for Certification
	•	Valid Grade T3 operator certification	•	Pass the Grade T4 operator examination within the three years prior to submitting the application for certification.
Т4	•	Three 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least two courses in drinking water treatment.	•	One year of operator experience working as a certified T3 operator, with shift or chief operator designation, at a T3 facility or higher. This may be substituted with (1) in the chart on page 3.
			•	Three additional years of operator experience working as a certified treatment operator. This may be substituted with (3) or (4) in the chart on page 3.
	•	Valid Grade T4 operator certification	•	Pass the Grade T5 operator examination within the three years prior to submitting the application for certification.
Т5	•	Four 36-hour OR 3.6-continuing-education- unit (CEU) OR 3-college-semester-unit courses of specialized training** that includes at least two courses in drinking water treatment.	•	Two years of operator experience working as a certified T4 operator, with shift or chief operator designation, at a T4 facility or higher.
			•	Three additional years of operator experience working as a certified treatment operator. This may be substituted with (3) or (4) in the chart on page 3.

^{*} This requirement may also be fulfilled with either the successful completion of the State Water Board's Basic Small Water Systems Operations course or 1 year as an operator of a facility that required an understanding of chemical feeds, hydraulic systems, and pumps. For more information on the State Water Board's Basic Small Water Systems Operations course, contact the Office of Operator Certification.

^{**}College level courses providing at least 36 contact hours of training each in drinking water or wastewater quality, drinking water or wastewater treatment, drinking water distribution, or drinking water or wastewater facility operation, offered by an accredited academic institution or an organization either accredited by the international Association of Continuing Education Training (IACET) or an authorized provider of IACET, or courses completed and deemed acceptable by the Department prior to January 1, 2001 for the purpose of operator certification.

Drinking Water Treatment Certification Experience Substitutions

- (1) Completion of a comprehensive operator training program may be used to fulfill this experience requirement if the applicant has a Bachelor of Science degree or a Master of science degree. Completion of the comprehensive operator training program must be verified, in writing, by the chief plant operator.
- (2) Experience gained while working as a certified treatment operator with lead responsibility for water quality related projects or research **may be used to substitute 1 year of additional operator experience**, on a day-for-day basis.
- (3) A degree earned at an accredited academic institution:
 - (A) An associate degree, or certificate, in water or wastewater technology that includes at least 15 units of physical, chemical, or biological sciences **may be used to fulfill 1 year of operator experience**.
 - (B) A bachelor's degree in engineering or in physical, chemical, or biological sciences **may be used to fulfill 1.5 years of operator experience**.
 - (C)A master's degree in engineering or in physical, chemical, or biological sciences may be used to fulfill 2 years of operator experience.
- (4) Experience gained as a certified wastewater treatment plant operator **may be used to fulfill up to 2 years of operator experience**. Two months of experience gained as a certified wastewater treatment plant operator will be credited as one month of treatment operator experience.





State Water Resources Control Board

WATER TREATMENT STUDY MATERIAL

Exam questions are written to test a candidates understanding of subjects listed on the Expected Range of Knowledge. Study material covering these subjects can be obtained from education providers listed on our Specialized Training and Continuing Education list.

Drinking Water Treatment Exam Expected Range of Knowledge http://www.waterboards.ca.gov/drinking_water/certlic/occupations/documents/opcert/2016/treat_range_of_know.pdf

California Health and Safety Code & California Code of Regulations

California Safe Drinking Water Act and Related Laws are available on our website at: http://www.waterboards.ca.gov/laws_regulations/

EPA Drinking Water Standards Quick Reference Guides http://water.epa.gov/lawsregs/guidance/sdwa/qref/index.cfm