

**Very Small Water System Operators' Guidebook
to Preparing for Certification**

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Association of Boards of Certification**

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Introduction and Purpose of the Guidebook

The purpose of this guidebook is to help operators of very small water systems serving a maximum population of 100 understand the provisions and purpose of the *Final Guidelines for the Certification and Recertification of the Operators of Community and Nontransient Noncommunity Public Water Systems*. This guidebook describes the certification requirements of the EPA *Guidelines*, operator need-to-know job tasks and capabilities, exam specifications, sample test questions, and additional information relating to operator training opportunities.

Summary of the National Certification Guidelines

The *Final Guidelines for the Certification and Recertification of the Operators of Community and Nontransient Noncommunity Public Water Systems*¹ require that all community and nontransient noncommunity public water systems have a certified operator in responsible charge. A community water system is defined by the EPA as a public water system that provides water “to at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.” A nontransient noncommunity water system is defined by the EPA as a “public water system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year” (p. 5921, section IV).

The objectives of the *Guidelines* are to ensure that:

- “Customers of any public water system be provided with an adequate supply of safe, potable drinking water.
- Consumers are confident that their water is safe to drink.
- Public water system operators are trained and certified and that they have knowledge and understanding of the public health reasons for drinking water standards” (p. 5919, section II.A).

To achieve these objectives the EPA developed the following operator certification guidelines. Please note that the EPA guidelines are minimum requirements. States may impose more strict requirements so it is essential for operators to contact their State Certification Program listed in the last section of this guidebook for specific state requirements.

Regulations for Certification

Each community and nontransient noncommunity water system must be under the responsible charge of an operator certified at a level equal to or greater than the system classification. This person has the authority to make decisions that affect water quality or quantity. In addition, “all operating personnel that make process control/system integrity decisions about water quality or quantity that affect public health must be certified” (p. 5919, section II.C.2). A certified operator must be available during each operating shift.

Requirements for Certification

To become certified an operator must satisfy minimum education and experience requirements and pass the appropriate certification examination. The EPA minimum requirements for certification are:

- Education - The operator must possess a high school diploma or general equivalency diploma (GED). States may allow experience and/or training to be substituted for the education requirement.
- Experience - The operator must meet the State’s on-the-job experience requirement.
- Examination - The operator must pass a certification exam. The exam will cover the knowledge, skills, ability and judgment necessary to operate systems within the State.

Current operators that do not meet these newly imposed requirements may be eligible to be grandparented through the State Certification Program. If grandparenting is allowed by the State Certification Program, operators may be permitted to become certified, with the system owner’s consent, without meeting all of the certification requirements. This is a restricted certificate and grandparented operators must meet all certification renewal requirements.

Among other restrictions, the *Guidelines* specify that “grandparenting is permitted only to existing operator(s) in responsible charge of existing systems which, because of State law changes to meet these guidelines, must for the first time have a certified operator.” If allowed by the State, “certification for the grandparented operator must be site specific and non-transferable to other operators.” “If the classification of the plant or distribution system changes to a higher level, then the grandparented certification will no longer be valid”;

1. Environmental Protection Agency, 1999. Final Guidelines for the Certification and Recertification of the Operators of Community and Nontransient Noncommunity Public Water Systems. *Federal Register*, Vol. 64, No. 24–Friday, February 5, 1999.

and “if the grandparented operator chooses to work for a different water system, he or she must meet the initial certification requirements of that system” (p. 5920, section II.C.3).

Renewal

Operators that meet the certification requirements and pass the certification exam will be certified by the State Certification Program for a specific period of time. The *Guidelines* require certificates to be renewed within a period of three years. Operators must attend State approved training in order to renew their certificates.

Need-to-Know Job Tasks and Capabilities

ABC conducted a very small water system operator job analysis to identify the most critical job tasks performed by operators and the capabilities required to competently perform these job tasks. Over 450 operators were surveyed by ABC as part of this process. In the survey, operators provided data on how frequently job tasks are performed and the potential seriousness of performing these tasks incorrectly.

The results of this survey were used to develop the following Need-to-Know Criteria. The Need-to-Know Criteria is a list of the subjects that a small water system operator needs to know to properly operate a system. Tasks and their requisite capabilities performed by at least 50% of the survey respondents and with a high seriousness rating are included in this list. This list includes both community and nontransient noncommunity public water systems. Examples of nontransient noncommunity systems include schools, day-care centers, and factories.

This type of information is used as the basis for developing certification exams.

Evaluate characteristics of source water	
Job tasks	Capabilities
Evaluate characteristics of source water, such as:	Ability to communicate observations verbally and in writing
Bacteriological	Ability to discriminate between normal/abnormal conditions
Biological	Knowledge of normal characteristics of water
Chemical	Knowledge of wellhead protection
Physical	
Operate system	
Job tasks	Capabilities
Add liquid disinfectants	Ability to adjust disinfectant feed rates
Monitor, evaluate, adjust chlorine disinfection	Ability to calculate dosage rates
Inspect, maintain, repair flow measurements	Ability to confirm disinfectant strength
Inspect, maintain, repair well operation	Ability to diagnose/troubleshoot process units
Perform leak detection	Ability to interpret Material Safety Data Sheets
	Ability to maintain processes in normal operating condition
	Ability to measure disinfectant weight and volume
	Ability to perform basic math
	Ability to prepare and apply disinfectants
	Knowledge of general biology and chemistry
	Knowledge of disinfectant concepts and properties
	Knowledge of disinfectant processes and design parameters
	Knowledge of general electrical and mechanical principles
	Knowledge of normal chemical range
	Knowledge of personal protective equipment
	Knowledge of principles of measurement
	Knowledge of proper handling and storage of disinfectants
	Knowledge of proper lifting procedures
	Knowledge of regulations

Need-to-Know Criteria (Continued)

Collect, perform, and interpret laboratory analyses	
Job tasks	Capabilities
Collect, perform, and interpret laboratory analyses, such as:	Ability to calibrate instruments
Chlorine demand	Ability to follow written procedures
Chlorine residual	Ability to interpret Material Safety Data Sheets
Microbiological	Ability to perform disinfection calculations
	Ability to recognize abnormal analytical results
	Knowledge of general chemistry
	Knowledge of laboratory equipment
	Knowledge of principles of measurement
	Knowledge of proper disinfectant handling and storage
	Knowledge of proper safety procedures
	Knowledge of proper sampling techniques and procedures
	Knowledge of quality control and assurance practices
	Knowledge of regulations, such as the Safe Drinking Water Act
Establish safety plans and apply safety procedures	
Job tasks	Capabilities
Establish safety plans and apply safety procedures, in areas such as:	Ability to communicate safety hazards verbally and in writing
Chemical hazard communication	Ability to demonstrate safe work habits
Confined space entry	Ability to follow written procedures
Electrical grounding	Ability to identify potential hazards and unsafe work conditions
General safety and health	Ability to operate safety equipment
Lifting	Knowledge of potential impact of disasters on facility
Lock-out/tag-out	Knowledge of regulations
Personal hygiene	Knowledge of risk management
Personal protective equipment	
Slips, trips, and falls	
Operate equipment	
Job tasks	Capabilities
Operate equipment, such as:	Ability to evaluate and adjust operation of equipment
Chemical feeders	Ability to monitor electrical and mechanical equipment
Electronic testing equipment	Knowledge of disinfection concepts
Instrumentation	Knowledge of function of tools
Motors	Knowledge of general electrical and mechanical principles
Power tools	Knowledge of proper safety procedures
Pumps	Knowledge of regulations
	Knowledge of start-up/shut-down procedures

Need-to-Know Criteria (Continued)

Evaluate operation of equipment	
Job tasks	Capabilities
Check speed of equipment	Ability to adjust equipment
Inspect equipment for abnormal conditions	Ability to calibrate equipment
Perform maintenance on chemical feeders	Ability to diagnose/troubleshoot process units
Perform maintenance on pumps	Ability to discriminate between normal/abnormal conditions
Read meters	Ability to follow written procedures
Read pressure gauges	Ability to monitor electrical and mechanical equipment
	Ability to perform general maintenance and repairs
	Ability to record information
	Ability to report findings
	Ability to use hand tools
	Knowledge of facility operation and maintenance
	Knowledge of general electrical and mechanical principles
	Knowledge of proper safety procedures
	Knowledge of safety regulations
	Knowledge of start-up/shut-down procedures
Perform administrative duties	
Job tasks	Capabilities
Establish recordkeeping system for facility operation	Ability to communicate verbally and in writing
Organize work activities	Ability to demonstrate safe work habits
Record information relating to facility performance	Ability to determine what information needs to be recorded
Write reports	Ability to evaluate facility performance
	Ability to follow written procedures
	Ability to identify potential hazards and unsafe work conditions
	Ability to interpret and transcribe data
	Ability to operate safety equipment
	Ability to perform basic math
	Knowledge of facility operation and maintenance
	Knowledge of monitoring and reporting requirements
	Knowledge of recordkeeping function and policies
	Knowledge of regulations

Exam Specifications

The very small water system certification exam evaluates an operator's knowledge, skills, ability and judgment related to the operation of very small water systems. The Need-to-Know Criteria presented in the previous section of this guidebook results in the recommended specifications shown below for an exam. Each state determines the content of its certification exams. Please contact your State Certification Program listed in the last section of the guidebook for any information they may provide to applicants.

Recommended Very Small Water System Exam Specifications

Job Duty	Percent of Exam
Evaluate characteristics of source water	7%
Operate system	18%
Collect, perform, and interpret laboratory analyses	11%
Establish safety plans and apply safety procedures	25%
Operate equipment	10%
Evaluate operation of equipment	13%
Perform administrative duties	16%

Please refer to the Need-to-Know Criteria on the previous pages for a listing of the tasks and capabilities associated with each job duty.

Training Opportunities and Resources

There are many sources of training for very small water system operators. Operator training classes may be offered by the American Water Works Association (AWWA), local water utilities, community colleges, vocational-technical schools, and so on. Training must be approved by the State to satisfy the certification and training requirements. Therefore, it is important to contact your State Certification Program listed in the next section of the guidebook for a list of State-approved training.

In addition to training opportunities available in your state, there are general reference materials that may help prepare you for certification. The following is a partial list of reference material available in the United States.

California State University, Sacramento

- *Small Water System Operation and Maintenance*
- *Water Distribution System Operation and Maintenance*
- *Water Treatment Plant Operation, Vol. I & II*

Materials may be ordered from:

Office of Water Programs
California State University, Sacramento
6000 J Street
Sacramento, CA 95819
Phone: (916) 278-6142
E-mail: wateroffice@csus.edu
Web site: <http://www.owp.csus.edu>

American Water Works Association

- *Water Distribution Operator Training Handbook*
- *Water Distribution System Operation and Maintenance, A Field Study Training Program*
- *Introduction to Water Treatment, Principles and Practices of Water Supply Operations*
- *Water Transmission and Distribution*
- *Water Treatment*
- *Basic Science Concepts and Applications*
- *Design and Construction of Small Water Systems*

Materials may be ordered from:

AWWA Customer Service
6666 W. Quincy Avenue
Denver, CO 80235
Phone: (800) 926-7337
E-mail: custsvc@awwa.org
Web site: <http://www.awwa.org>

Texas Operator Certification Program

TNRCC, MC 178
P.O. Box 13087
Austin, TX 78711-3087
Phone: (512) 239-6139
Web site: <http://www.tnrcc.state.tx.us/enforcement/csd/ocs/>

Utah Water Operator Certification Commission

Utah Divn. of Drinking Water
150 North 1950 West
P.O. Box 144830
Salt Lake City, UT 84114-4830
Phone: (801) 536-4200
Web site: <http://www.deq.state.ut.us/eqdw/>

Vermont Department of Environmental Conservation

Water Supply Division
Old Pantry Building
103 South Main Street
Waterbury, VT 05671-0403
Phone: (802) 241-3400
Web site: <http://www.anr.state.vt.us/dec/watersup/wsd.htm>

Virginia Board for Waterworks and Wastewater Works Operators

Dept. of Profess. and Occup. Reg.
3600 West Broad Street, 5th Floor
Richmond, VA 23230-4917
Phone: (804) 367-8595
Web site: <http://www.state.va.us/dpor/indexne.html>

Washington Water Works Operator Certification Program

Department of Health
Division of Drinking Water
P.O. Box 47822
Olympia, WA 98504-7822
Phone: (360) 236-3137
Web site: <http://www.doh.wa.gov/ehp/dw/>

West Virginia Office of Environmental Health Services

Bureau for Public Health
815 Quarrier Street, Suite 418
Charleston, WV 25301-2616
Phone: (304) 558-2981
Web site: <http://www.wvdhhr.org/oehs/eed/organization.html>

Wisconsin Water and Wastewater Operator Certification Program

Wisconsin DNR
101 S. Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Phone: (608) 266-0498
Web site: <http://www.dnr.state.wi.us/org/es/science/opcert>

Wyoming Operator Certification Program

WY DEQ/Water Quality Division
4th Floor Herschler Building, 4W
122 West 25th Street
Cheyenne, WY 82002-5011
Phone: (307) 777-7781
Web site: <http://deq.state.wy.us/wqd/certop.htm>