



## **Water Distribution System**

### **Training program**

#### **Introduction:**

This course is designed to train operators in the practical aspects of operating and maintaining water distribution systems, emphasizing safe practices and procedures. Topics include the role and duties of water distribution system operators and related Utility & General Services Departments, procedures for operating and maintaining water systems, clear wells and storage tanks, components and characteristics of distribution system facilities, operating and maintaining distribution systems, maintaining water quality in the system, disinfecting new and repaired facilities as well as water delivered to consumers, and techniques for recognizing hazards and developing safe procedures and programs. You learn to analyze and solve problems when they occur and perform mathematical calculations commonly associated with operating a distribution system.

#### **Who should attend?**

Water Plant Personnel, Operators Water Plant Engineers, Supervisors, Petroleum Technicians, Quality Personnel, Field Supervisors, Field Personnel with operating and service companies, Personnel involved in water plant supply, distribution, inspection and other operations.

#### **Learning objectives**

**Upon completion, the participant should be able to:**

- Procedures for monitoring, operating and maintaining water systems
- Keep clear wells and storage tanks
- Components and characteristics of distribution system facilities
- Operating and maintaining distribution systems
- Maintaining water quality in the system
- Disinfecting new and repaired facilities as well as water delivered to consumers
- Techniques for recognizing hazards and developing safe procedures and programs
- Perform mathematical calculations commonly associated with operating a distribution system
- Identify and select water pipes conforming to international standards and quality measurements
- Regulate water quality and production using analytical and flow monitoring equipment



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- Analyze instrument readings and make necessary adjustments to equipment
- Troubleshoot and make adjustments to pumping systems to resolve distribution issues
- Monitor chemical supplies, receive and unload chemicals, and change chemical cylinders
- Follow proper safety procedures for handling dangerous chemicals
- Evaluate, maintain, and repair equipment, tanks, and storage containers
- Monitor Supervisory Control and Data Acquisition (SCADA) equipment

## **Outline**

### **Water Distribution System Operation and Maintenance: The Water Distribution System Operator**

- Explain the type of work done by water distribution system operators.
- Describe where to look for jobs in this profession.
- Find sources of further information on how to do the jobs performed by water distribution system operators.

### **Water Distribution System Operation and Maintenance: Storage Facilities**

- Identify various types of storage facilities.
- Determine suitable locations for facilities.
- Inspect storage facilities.
- Take a storage facility out of service and put it back on line.
- Safely operate and maintain a storage facility.
- Select protective coatings for a storage facility.
- Apply interior and exterior protective coatings to a storage facility.
- Collect samples from a storage facility.
- Troubleshoot storage facility problems.
- Protect a storage facility from corrosion.
- Disinfect a storage facility.
- Maintain records for a storage facility.

### **Water Distribution System Operation and Maintenance: Distribution System Facilities**

- Explain the purpose of a water distribution system.
- Describe the importance of hydraulics in the performance of a distribution system.
- Explain the purpose of distribution system storage and pumping facilities.
- Identify various types of pipes and joints.



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- Properly and safely install pipe.
- Identify and test various types of meters.
- Identify the various types of backflow prevention devices.
- Determine the need for and install backflow prevention devices.

### **Water Distribution System Operation and Maintenance: Water Quality Considerations in Distribution Systems**

- Identify types of contaminants that could get into water distribution systems.
- Identify and correct sources of contaminants in distribution systems.
- Identify and correct causes of water quality degradation in distribution systems.

### **Water Distribution System Operation and Maintenance: Distribution System Operation and Maintenance**

- Develop and conduct a water distribution system surveillance program.
- Develop and conduct a water quality monitoring program for a water distribution system.
- Develop and conduct a cross-connection control program.
- Locate buried pipes and leaks.
- Repair leaks.
- Make pipe connections.
- Flush pipes.
- Clean pipes.
- Contract out a pipe lining job.
- Thaw frozen pipes and hydrants.
- Test and read meters.
- Disinfect mains and storage facilities.
- Develop a recordkeeping system and keep accurate records.
- Train operators to prepare for and respond to emergencies.
- Effectively deal with the public.
- Maintain the landscaped areas around distribution system facilities.
- Safely operate and maintain a water distribution system.

### **Water Distribution System Operation and Maintenance: Disinfection**

- Describe the factors that influence disinfection.
- Explain the process of disinfection using chlorine, hypochlorite, chlorine dioxide, and chloramines.
- Describe the breakpoint chlorination process.
- Identify the various points of chlorine application.
- Disinfect new and existing wells.



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- Disinfect pumps, mains, and storage facilities.
- Calculate chlorine dosage.
- Determine hypochlorinator and chlorinator settings.
- Operate and maintain hypochlorinators.
- Operate and maintain chlorinators.
- Troubleshoot chlorination systems.
- Conduct a chlorine safety program.

### **Water Distribution System Operation and Maintenance: Safety**

- List the responsibilities of operators and managers for safety.
- Prepare and conduct tailgate safety sessions.
- Conduct a safety inspection of the water distribution system facilities.
- Protect other operators and yourself while working in and around water distribution system facilities.
- Identify and safely handle hazardous chemicals.
- Recognize electrical hazards.
- Operate and maintain water storage facilities, wells, and pumps safely, with attention to the safety of operators and consumers.
- Inspect safety features of vehicles and equipment.
- Drive vehicles defensively and safely.
- Work safely in the plant.
- Protect the motoring public and pedestrians from work areas in streets and sidewalks.
- Understand the proper use of temporary traffic control (TTC) zone devices.
- Follow the safety rules for excavations.