WATER NETWORK SYSTEMS OPERATIONS AND MAINTENANCE

MCE068

COURSE DESCRIPTION

This water network systems operations and maintenance training course provides practical skills and knowledge and safe practices and procedures in operating and maintaining water distribution systems and networks.

This course is designed to cover the related topics such as water distribution system operators, procedures operations and maintenance for clear wells, storage tanks, functional elements, components and features of distribution system facilities, operating and maintaining distribution systems and networks, maintaining water quality in the network, disinfecting new and repaired facilities, and methods and techniques for hazard control and safe procedures and programs.

COURSE GOAL

To enhance the participants' knowledge, skills, and abilities necessary to effectively operate, maintain and control a water networking system and distribution system.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand the fundamentals of water network system.
- List Characteristics of water network system and distribution system operation and Maintenance.
- Operate water network system.
- Maintain a water network system.
- Test and control water a water network system.
- Design and read a water network map.
- List water quality considerations in distribution systems and water networks.
- List Disinfection and safety procedures and best practices.
- Use applications and tools to analyze, operate and design a water network.
- Determine the role of water distribution system operator.

WHO SHOULD ATTEND

- Water Handling Controller
- Water Handling Field Operator II

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. Introduction to Water Systems Networking

- Anatomy of a water system
- Water system classifications
- Water systems networks
- Classification of water systems
- Water supply system concepts
- Fundamental considerations
- Water distribution systems
- Continuous availability of water supply
- Water supply considerations
- Water treatment plants
- Water quality monitoring
- Water distribution system design concepts
- Water supply source classifications
- Water system components
- Calculate capacities and volumes, head and pressure and flow rates
- Water purification processes
- Calculate chemical dosage
- Describe the disinfection process and the chemicals used in water network system
- Type of water network system and modern water network system
- A brief history of water network
- Network hydraulics, fluid properties and theory
- Source and chemical characteristics of water
- Pre-treatment and water standards
- Potable water quality management
- Water sampling procedures and analysis
- Pressure drop calculations in different water networks and fittings
- List type and applications of typical water storage facilities

2. Importance of Operation and Maintenance

- What is Operation and Maintenance (O&M)?
- Cost-effective, efficient, and sustainable water systems
- O&M built into operational programs
- Constrains of Operation and Maintenance
- Scope of work off the O&M Network

- Available O&M Tools
- Case Study
- Promoting Operation and Maintenance
- Design of system management
- Training
- Spare parts
- Finance
- Examples of Inappropriate O&M
- Water Leakage Prevention Measure
- Corrective Measures
- Preventive Measures
- Technology Development
- Leakage Survey
- Leakage Repair
- Pipe Laying and Construction Supervision
- Piping Design Procedure/Process
- Supervision System
- O&M requirements

3. Protection for Water Network Systems

- Line protection function
- Valves, pumps, pipe protection
- Transformer protection function
- Compensator protection function
- Busbar protection function
- Circuit-breaker, back up protection function
- Monitoring and evaluation function
- Key Issues for Improvement of O&M
- Operation and maintenance requirements
- Monitoring for effectiveness
- Planning tools

4. Operation and Management (O&M) of a Water Network System

- The Supply and Operation
- Water network major components
- Mechanical and electrical system components
- Water-gate, valves, stop cocks, motors, and instruments

- Hydraulic of water system networking
- Water network system design
- Pipeline materials, Type and design
- Distribution and transmission system valves (operation, installation, check and control)
- Water pump type, selection, installation, operation and intakes.
- System design for water pumping
- Variable- speed pumping
- Operation and management of a water network (daily operation)
- Monitoring process information
- Operation records and reports
- Electrical control systems

5. Maintenance Water Network Systems

- Test water network system
- Failure mode for water network system
- Flow problem and control
- Pressure problem and control
- Test and control valves, pipes, pumps and switches
- Problem and reduce vibration and noise
- Investigation of system contamination
- Take off-line
- Shutting down system
- Power outages
- Power Consumption
- Water distribution system flushing
- Leakage prevention and control;
- Maintenance and adequate disinfectant residual
- Friction losses
- Maintenance information system
- Retrofitting existing water pumping system
- Daily operation problem and repairs

6. Security, Safety, and Administrative Procedures

- Water Network System Security
- Health and Safety Regulation
- Hazardous Materials and Safety
- Normal/abnormal conditions

- Normal characteristics of water Chemical
- Monitor, evaluate, adjust chlorine disinfection
- Ability to calculate dosage rates
- Inspect, maintain, repair flow measurements
- Inspect, maintain, repair well operation
- Diagnose/troubleshoot process units
- Leak detection
- Processes in normal operating condition
- Disinfectants concepts and properties
- Disinfectant processes and design parameters
- Disinfection calculations
- Proper handling and storage of disinfectants
- Lifting procedures
- Regulations
- Microbiological
- Safety plans and apply safety procedures
- Safety hazards verbally and in writing
- Safe work habits
- Chemical hazard communication
- Electrical grounding
- Potential impact of disasters on facility
- Slips, trips, and falls