



PROJACS ACADEMY
by egis



Water Network Systems Operations and Maintenance

تشغيل وصيانة أنظمة شبكات المياه

30 October – 03 November 2023

London / United Kingdom

Introduction

Water Network Systems Operations and Maintenance Training provides practical skills and knowledge and safe practices and procedures in operating and maintaining water distribution systems and networks.

The course is designed to develop the knowledge and skills to effectively operate, maintain and control a water networking system and distribution system with 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.

Objectives

After attending this course, the participants will be able to:

- Learn 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 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
- Discuss Water Distribution System operation

Who Should Attend?

- Operation engineers
- Maintenance engineers

Course Outline

Day One

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

Day Two

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

- 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

Protection for Water Network Systems

- Line protection function
- Valves, pumps, pipe protection
- Transformer protection function
- Compensator 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

Day Three

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

Maintenance of 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 problems and repairs
- Implementing Alarms

Day Four

Safety, and Administrative Procedures

- 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

Day Five

Water Network System Security

- The Role of the SCADA System “Supervisory control and data acquisition”
- Operations and management for process monitoring and automation
- SCADA communication
- Process controllers or programmable logic controllers (PLC’s)
- Remote terminal units (RTU’s)
- Security Breaches
- Implementing Network Security Measures
- Pump operations
- A Secure SCADA System
- Security measures with process operations
- Backup power systems
- Redundant networks
- Distributed operator workstations
- Alarm system alerts

Training Method

- Pre-assessment
- Live group instruction
- Use of real-world examples, case studies and exercises
- Interactive participation and discussion
- Power point presentation, LCD and flip chart
- Group activities and tests
- Each participant receives a 7" Tablet containing a copy of the presentation, slides and handouts
- Post-assessment

Program Support

This program is supported by interactive discussions, role-play, case studies and highlight the techniques available to the participants.

Schedule

The course agenda will be as follows:

- | | |
|---------------------|------------------|
| • Technical Session | 08.30-10.00 am |
| • Coffee Break | 10.00-10.15 am |
| • Technical Session | 10.15-12.15 noon |
| • Coffee Break | 12.15-12.45 pm |
| • Technical Session | 12.45-02.30 pm |
| • Course Ends | 02.30 pm |

Course Fees*

- **5,200 USD**
**VAT is Excluded If Applicable*

المقدمة

يوفر هذا التدريب، عن تشغيل وصيانة أنظمة شبكات المياه، المهارات العملية والمعرفة والممارسات والإجراءات الآمنة في تشغيل وصيانة أنظمة وشبكات توزيع المياه.

تم تصميم الدورة لتطوير المعرفة والمهارات اللازمة لتشغيل وصيانة ومراقبة نظام شبكات المياه ونظام التوزيع بشكل فعال مع مواضيع مثل مشغلي نظام توزيع المياه، وعمليات الإجراءات والصيانة للآبار الصافية، وصهاريج التخزين، والعناصر الوظيفية، ومكونات وميزات مرافق نظام التوزيع، وتشغيل وصيانة أنظمة وشبكات التوزيع، الحفاظ على جودة المياه في الشبكة، وتطهير المرافق الجديدة والإصلاحية، وطرق وتقنيات السيطرة على المخاطر والإجراءات والبرامج الآمنة.

الاهداف

بعد حضور هذه الدورة، سيتمكن المشاركون من:

- تعلم أساسيات نظام شبكة المياه
- قائمة خصائص نظام شبكة المياه وتشغيل وصيانة نظام التوزيع
- تشغيل نظام شبكة المياه
- صيانة نظام شبكة المياه
- اختبار ومراقبة نظام شبكة المياه
- تصميم وقراءة خريطة شبكة المياه
- سرد اعتبارات جودة المياه في أنظمة التوزيع وشبكات المياه
- قائمة إجراءات التطهير والسلامة وأفضل الممارسات
- استخدام التطبيقات والأدوات لتحليل وتشغيل وتصميم شبكة المياه
- مناقشة تشغيل نظام توزيع المياه

الحضور

- مهندسو العمليات
- مهندسو الصيانة
- المصممين