QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1561

Water & Wastewater Treatment Plant Operations Training Course

UTILITIES & PLANT ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION
5 Days

DELIVERY
Classroom

Course Overview

The Water & Wastewater Treatment Plant Operations Training Course provides a comprehensive professional program designed to develop the technical knowledge and operational skills required to manage, monitor, and optimize modern water and wastewater treatment facilities. Effective plant operation is essential for maintaining consistent treatment performance, protecting equipment, supporting environmental requirements, and ensuring reliable water and wastewater services. The course provides participants with a practical understanding of treatment processes and the operational decisions that influence plant performance.

The program examines the complete treatment cycle, from preliminary treatment and screening through clarification, biological treatment, filtration, disinfection, sludge handling, and final discharge or reuse. Participants explore the purpose and operating principles of major treatment units while learning how process conditions, flow variations, loading rates, chemical dosing, aeration, and equipment performance influence treatment efficiency.

The course also focuses on operational monitoring, process control, equipment reliability, and troubleshooting. Participants learn how to interpret key operational and water quality parameters, identify abnormal conditions, investigate process deterioration, and implement appropriate corrective actions. Particular attention is given to common challenges such as hydraulic overload, poor settling, excessive solids, inadequate aeration, process instability, chemical dosing problems, membrane or filtration issues, and equipment failures.

The Water & Wastewater Treatment Plant Operations Training Course integrates operational excellence with maintenance, energy efficiency, resource management, and continuous improvement. Participants develop practical approaches for improving plant reliability, optimizing chemical and energy consumption, reducing operational losses, and maintaining stable treatment performance. The program is designed to support coordination between plant operators, engineers, maintenance teams, laboratory specialists, environmental professionals, and management.

Through practical exercises, operational scenarios, case studies, process analysis, and troubleshooting workshops, participants develop a structured methodology for evaluating treatment plant performance and improving day-to-day operations. The course is suitable for municipal utilities, industrial facilities, oil and gas organizations, petrochemical plants, power generation facilities, manufacturing companies, and other organizations operating water and wastewater treatment plants.

Objectives

- Analyze the fundamental principles of water and wastewater treatment processes and their application within treatment plants during the course.
- Evaluate major plant operating parameters, including flow, pressure, loading, solids, dissolved oxygen, pH, and treatment performance indicators.
- Apply appropriate operating procedures for preliminary, primary, biological, tertiary, and disinfection treatment processes.
- Assess the performance of clarification, filtration, biological treatment, and disinfection systems under varying operating conditions.
- Analyze the impact of hydraulic and organic loading changes on treatment plant stability and performance.
- Evaluate chemical dosing, aeration, mixing, and process control requirements to support effective treatment.
- Apply systematic troubleshooting techniques to identify the causes of process deterioration and abnormal operating conditions.
- Assess the condition and operational performance of pumps, blowers, screens, mixers, valves, and other critical plant equipment.
- Develop practical approaches for improving energy efficiency, chemical utilization, process stability, and resource recovery.
- Strengthen preventive monitoring and operational control practices to reduce unplanned plant disruptions.
- Evaluate sludge treatment, dewatering, handling, and disposal or reuse processes according to plant requirements.
- Develop an operational improvement plan based on plant performance indicators, process conditions, and identified improvement opportunities.

Who Should Attend

The Water & Wastewater Treatment Plant Operations Training Course is designed for water and wastewater treatment plant operators, process operators, utility operators, plant engineers, environmental engineers, chemical engineers, mechanical engineers, civil engineers, process engineers, and professionals responsible for the operation and performance of treatment facilities. It is particularly suitable for professionals involved in water treatment, wastewater treatment, industrial utilities, environmental management, process control, and plant operations.

The course is also relevant to plant supervisors, operations managers, maintenance managers, utility managers, water treatment managers, wastewater treatment managers, environmental managers, reliability engineers, maintenance engineers, laboratory specialists, process control specialists, and technical supervisors. Professionals responsible for monitoring water quality, wastewater characteristics, chemical treatment, biological processes, equipment condition, and regulatory performance can also benefit from the program.

The course is especially appropriate for organizations operating municipal or industrial treatment facilities, including oil and gas companies, refineries, petrochemical plants, power plants, manufacturing organizations, food processing facilities, pharmaceutical plants, and public utilities. It also supports managers and decision makers responsible for plant reliability, environmental performance, operating efficiency, asset management, and continuity of water and wastewater services.

Learning Outcomes

- Explain the purpose, operating principles, and sequence of major water and wastewater treatment processes.
- Interpret key operational and water quality parameters used to monitor treatment plant performance.
- Operate and monitor preliminary, primary, biological, tertiary, and disinfection treatment processes effectively.
- Evaluate clarification, filtration, aeration, and biological treatment performance using relevant operating indicators.
- Identify the effects of hydraulic loading, organic loading, flow variations, and process changes on plant stability.
- Assess chemical dosing, aeration, mixing, and disinfection requirements and identify opportunities for improvement.
- Diagnose common operational problems and apply structured troubleshooting techniques.
- Evaluate the operating condition of critical treatment plant equipment and identify early signs of deterioration.
- Analyze sludge production, thickening, dewatering, handling, and disposal or reuse requirements.

- Identify opportunities to reduce energy consumption, chemical usage, water losses, and unnecessary operational costs.
- Apply preventive operational and maintenance practices to improve plant reliability and continuity.
- Develop a practical action plan for improving water and wastewater treatment plant operations and performance.

Course Outline

DAY 01

Fundamentals of Water and Wastewater Treatment Plant Operations

- Water treatment and wastewater treatment objectives and applications
- Characteristics of raw water and wastewater
- Physical, chemical, and biological contaminants
- Treatment plant process flow and process integration
- Preliminary treatment and screening systems
- Grit removal and flow measurement
- Primary clarification and sedimentation principles
- Hydraulic flow, loading rates, and process capacity
- Fundamental plant operating parameters
- Introduction to process monitoring and operational control

PRACTICAL APPLICATION

Analyze a complete treatment plant process flow and identify the function and operating requirements of each major treatment stage

DAY 02

Biological Treatment, Clarification, Filtration, and Disinfection

- Fundamentals of biological wastewater treatment
- Aeration systems and dissolved oxygen management
- Biological process control and biomass management

DAY 02 — CONTINUED

- Activated sludge processes and operating principles
- Secondary clarification and solids separation
- Sludge age, solids concentration, and process stability
- Filtration systems and filtration performance
- Chemical treatment and coagulation processes
- Disinfection methods and operational considerations
- Monitoring treatment effectiveness and final water quality

PRACTICAL APPLICATION

Evaluate biological treatment and clarification performance using operating data and identify appropriate process adjustments

DAY 03

Plant Equipment Operation, Monitoring, and Maintenance

- Pumps and pumping systems in treatment plants
- Blowers, aeration equipment, and air distribution systems
- Screens, mixers, valves, and mechanical equipment
- Chemical storage and dosing systems
- Instrumentation and process measurement
- Monitoring flow, pressure, levels, pH, dissolved oxygen, and other key parameters
- Preventive maintenance principles for treatment plant equipment
- Condition monitoring and early identification of equipment deterioration
- Coordination between operations and maintenance teams
- Equipment reliability and critical asset management

PRACTICAL APPLICATION

Develop an operational and preventive maintenance inspection plan for critical treatment plant equipment

DAY 04

Troubleshooting, Process Control, and Sludge Management

- Common operational problems in water and wastewater treatment plants
- Hydraulic overload and process instability
- Poor settling, sludge bulking, and solids carryover
- Inadequate aeration and dissolved oxygen problems
- Chemical dosing and disinfection problems
- Filtration performance deterioration and blockage
- Equipment failures and operational disruptions
- Root cause analysis for recurring treatment problems
- Sludge thickening, dewatering, handling, and management
- Developing corrective and preventive actions

PRACTICAL APPLICATION

Analyze a treatment plant performance problem and apply a structured troubleshooting and root cause analysis methodology

DAY 05

Plant Optimization, Energy Efficiency, and Continuous Improvement

- Treatment plant performance indicators and operational benchmarks
- Process optimization and performance improvement
- Energy consumption in pumps, blowers, aeration, and treatment systems
- Improving aeration and pumping efficiency
- Optimizing chemical consumption and dosing practices
- Reducing water losses and improving resource utilization
- Improving sludge management and resource recovery opportunities
- Integrating operations, maintenance, laboratory monitoring, and process control
- Developing continuous improvement and operational excellence practices
- Establishing plant performance monitoring and improvement plans

DAY 05 — CONTINUED

FINAL WORKSHOP

Conduct a comprehensive assessment of a water and wastewater treatment plant and develop an action plan for improving treatment performance, reliability, energy efficiency, maintenance, and operational control

Register or Request More Information

Course page: https://quest-training.com/courses/water-wastewater-treatment-plant-operations-training-course
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