



*Training Course:  
Water and Sewerage Management*

*24 - 28 June 2024  
Kigali (Rwanda)*

## Training Course: Water and Sewerage Management

Training Course code: EW234937 From: 24 - 28 June 2024 Venue: Kigali (Rwanda) - Training Course Fees: 7140 € Euro

### Introduction

This Water and Sewerage Management course is designed to train operators in the practical aspects of operating and maintaining wastewater treatment plants, emphasizing safe practices and procedures. Information presented includes detailed descriptions of the equipment and advanced treatment processes used for odor control, pure oxygen-activated sludge treatment, solids removal from secondary effluents, residual solids management, enhanced biological control including nitrogen and phosphorus removal, and wastewater reclamation.

Operators also learn to operate and maintain treatment plant instrumentation equipment and systems. The residual solids management chapter contains information on sludge types, characteristics, and quantities; sludge thickening using gravity thickeners, dissolved air flotation units, centrifuges, and thermal conditioning as well as wet oxidation and elutriation; dewatering with pressure filtration plate and frame, belt, vacuum, centrifuges and drying beds; volume reduction using composting, mechanical drying, incineration, and lagoons; and disposal methods for dewatered or liquid stabilized sludge.

This course focuses on actual operating procedures and teaches operators to manage, analyze and solve operational problems.

### Training Objectives

The objectives of the Water and Sewerage Management Training Program include but are not limited to the following:

- Wastewater and Sewerage Management
- Wastewater and Sewerage Treatment
- Odor Control
- Activated Sludge Pure Oxygen Plants and Operational Control Options
- Residual Solids Management
- Solids Removal from Secondary Effluents
- Phosphorus Removal
- Nitrogen Removal
- Enhanced Biological Nutrient Control
- Wastewater Reclamation and Reuse
- Instrumentation and Control Systems

### Target Audience

This Water and Sewerage Management training course is suitable for a wide range of professionals in the water and wastewater treatment industry, but will greatly benefit:

- Project managers
- Professionals involved in the regulatory monitoring of water quality
- Engineers involved in the monitoring and maintenance of wastewater treatment systems in the Process

Industries

- Process engineers and operators in Sewage Treatment Plants

## Training Outlines

### Wastewater and Sewerage Management

- Introduction
- Generation and Decomposition
- Wastewater and Sewerage Collection and Maintenance
- Wastewater Treatment
  - Selection of Appropriate Wastewater Treatment System
  - Sludge Treatment
- Wastewater Reuse
  - Selecting Appropriate Reuse Applications

### Wastewater and Sewerage Treatment

- Types of pollutants found in wastewater
- Preventing discharging and regulatory prohibitions.
- wastewater collection, conveyance, and treatment systems.
- Schematic plan layouts of typical wastewater treatment plants
- Major wastewater treatment processes.
- Discharge, reclamation, and reuse and solids handling, disposal, and reuse.

### Preliminary Treatment

- Flow meters, racks, screens, shredders, grit channels, grit separators, preparation, and emergency storage facilities.
- Properly and safely start up, operate, shut down, and maintain preliminary treatment processes.
- Prepare wastewater treatment processes and emergency storage facilities.
- Read, calibrate, and maintain flow measuring devices in pipelines, open channels, or flumes.
- Develop an operational strategy for sedimentation and clarification based on the principles of clarifier processes.
- Operate clarifiers efficiently using standard procedures, preventive maintenance, and performance indicators including loading calculations and laboratory results to manage normal and abnormal operating conditions and correct problems.
- Recognize safety hazards in and around clarifiers and take steps to eliminate those hazards by corrective action.

### Activated Sludge Systems Secondary Treatment

- Operate activated sludge processes, including determining process loadings and applying operating parameters, ranges, and guidelines.
- Schedule and conduct operation and maintenance duties such as adjusting treatment processes, performing laboratory testing and microscopic observation, and keeping records.
- Safely operate, inspect, startup, and shut down activated sludge processes.
- Identify factors that cause abnormal operation in the activated sludge process, and take corrective action.
- Become familiar with the purpose of common process modifications to the conventional activated sludge process.

- Understand how to review engineering drawings and specifications for the activated sludge facility.

#### Fixed Film Processes Secondary Treatment

- Explain fixed film processes and their use in stand-alone and combined process systems.
- Use fixed film key operating parameters to successfully monitor and control fixed film processes.
- Safely operate, shut down, and start-up fixed film treatment units.
- Identify operational problems or abnormal operations in fixed film processes using observations and lab results and take corrective measures.

#### Disinfection

- Explain the disinfection process using chlorine, hypochlorite, ultraviolet UV radiation, and ozone.
- Describe the breakpoint chlorination process.
- Identify the points of disinfectant application and select the proper dosage.
- Start up, shut down, troubleshoot, and maintain disinfection equipment and systems.
- Handle disinfectants safely and develop and conduct safety programs for using, handling, and storing disinfectants.

#### Laboratory Procedures

- Safely operate laboratory equipment.
- Collect representative samples and preserve and transport the samples.
- Prepare samples for analysis.
- Describe lab test limitations, recognize precautions for those tests, and record lab test results.
- Understand principles that apply to field or laboratory tests for solids, gases, and chemical and biological parameters, as well as tests for process control and sludge.

#### Odor Control Objectives

- Following completion of Chapter 1, students should be able to:
- Determine the source and cause of odors.
- Respond to odor complaints.
- Solve odor problems.

#### Activated Sludge Pure Oxygen Plants and Operational Control Options

- Safely operate and maintain a pure oxygen-activated sludge plant.
- Review the plans and specifications for a pure oxygen system.
- Describe the various methods of determining return sludge and waste sludge rates and select the best method for their plant.
- Operate an activated sludge process that must treat both municipal and industrial wastes.
- Operate an activated sludge process that must treat strictly industrial waste.
- Operate an activated sludge process to produce a nitrified effluent.

#### Residual Solids Management

- Explain the purposes of the processes.
- Properly start up, operate, shut down, and maintain these processes.
- Develop operating procedures and strategies for both normal and abnormal operating conditions.
- Identify potential safety hazards and conduct their duties using safe procedures.
- Troubleshoot when a process does not function properly.

- Review plans and specifications for the processes.

## Solids Removal from Secondary Effluents

### CHEMICALS

- Describe the proper procedures for using chemicals to remove solids from their treatment plant's secondary effluent.
- Operate and maintain chemical feed equipment.
- Safely store and handle chemicals.
- Review plans and specifications of chemical feed systems.
- Start up and shut down a chemical feed system.
- Perform a jar test.
- Select the most cost-effective chemicals and determine the proper dosage.
- Troubleshoot a chemical feed system.
- Develop an operational strategy for a chemical feed system.

### FILTRATION

- Identify and describe the components of gravity and pressure filters.
- Explain how membrane filters operate.
- Safely operate and maintain filters.
- Start up and shut down filters.
- Troubleshoot a filtration system.
- Develop operational strategies for inert media and membrane filtration systems.
- Review plans and specifications for filter systems.

## Phosphorus Removal

- Explain the need for phosphorus removal and describe some of the different systems used for this purpose at various treatment plants.
- Place a phosphorus removal system into service.
- Schedule and safely conduct operation and maintenance duties.
- Sample influent and effluent, interpret lab results and make appropriate adjustments in the treatment process.
- Recognize abnormal operating conditions, understand the cause, and take corrective action to ensure proper phosphorus removal.
- Inspect a newly installed phosphorus removal facility to determine if the installation has been proper.
- Review plans and specifications for a phosphorus removal system.

## Nitrogen Removal

- Explain why nitrogen is removed from wastewater.
- Identify the types of nitrogen removal systems.
- Describe nitrification and denitrification processes.
- Operate nitrification and denitrification processes.
- Describe the differences between suspended growth and fixed film reactors.
- Explain how ammonia stripping, breakpoint chlorination, and ion exchange processes remove nitrogen.

## Enhanced Biological Nutrient Control

- Explain how an enhanced biological treatment system can be used to improve biological treatment process

control and performance.

- Set priorities when more than one treatment objective must be met.
- Operate and maintain enhanced nitrogen and phosphorus removal systems.
- Operate and maintain enhanced SVI control to prevent sludge bulking.
- Operate and maintain the Bardenpho process.
- Review plans and specifications for an enhanced biological treatment system.

#### Wastewater Reclamation and Reuse

- Describe the various methods of wastewater reclamation and reuse.
- Develop operational strategies for wastewater reclamation and reuse facilities.
- Safely operate and maintain a wastewater reclamation and reuse facility.
- Monitor a wastewater reclamation and reuse program and make appropriate adjustments in treatment processes.
- Review the plans and specifications for a wastewater reclamation and reuse facility.

#### Instrumentation and Control Systems

- Explain the purpose and nature of instrumentation and control systems.
- Identify, avoid, and correct safety hazards associated with instrumentation work.
- Recognize various types of sensors and transducers.
- Read instruments and make proper adjustments in the operation of wastewater treatment facilities.
- Identify symptoms of measurement and control system problems.



## Registration form on the Training Course: Water and Sewerage Management

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Complete & Mail or fax to Global Horizon Training Center (GHTC) at the address given below

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