



**VELAN GLOBAL RESOURCES SDN.BHD. (1091957 P)**

# Water and Wastewater Treatment Technology

---

Training Program Proposal



By PSMB Approved Trainer

**No. 74A, Lorong Sanggul 1E Bandar Puteri, 41200 Klang, Selangor Darul Ehsan. Telephone : +603-5166 8311  
Facsimile : +603 - 5523 5484**

**E - mail : [gmani@velan.com.my](mailto:gmani@velan.com.my) Website : [www.velan.com.my](http://www.velan.com.my) HP: +601 33471816**

# Water and Wastewater Treatment Technology Training Program

2 days

## **Target Group:**

Managers, Senior Engineers & Engineers  
From the Facilities/Utilities Department

## Overview:

Knowledge about processes involved in water and wastewater treatment whether from classroom training or hands on important skill that employees in the facilities or utilities departments should have. Most issues arising from the operational activities of the water or wastewater treatment plant needs to be quickly acted upon by management on the advice of the skilled personnel.

Analysis, diagnosis or troubleshooting of the treatment plant should gather sufficient information or data so that the management decision can be timely and correct. Failure to make corrective fact finding may lead to wrong or late decisions being made – leading to lost of production time, and having to face legal consequence of non compliance to authorities and failure to meet internal requirement for water in terms of quality and quantity.

This program aims to assist trainees with knowledge both technical and hands on in a structured and step-wise manner. It will provide easy guided information to the steps involved in the water treatment process

In addition, the program will bring participants to real live example and case studies from the trainer's and trainees previous experience that can shared for the benefit of all other participants in this training program.

There will be ample of examples, videos and models with simplified illustration on this topic. Group breakouts and brain storming tasks will be part of this program.

The program will highlight the importance of water and wastewater training for the benefit of the company and the society as whole. It is expected that participants leaving this training program to have the confidence to effectively manage their treatment plant.

This program is design for 2 days.

## Program Objectives:

By the end of the program, participants will be able to:

- Understand and demonstrate the use of water chemistry terminologies used in the water treatment industry
- Understand and list down the needs for water and wastewater treatment.
- Able to conduct a jar testing study
- List down the basic process of raw water treatment
- List down process primary, secondary and tertiary treatment process
- Identify suitable process for sludge handling in own premise
- How to engage a suitable treatment strategy for own plant

## Program Content

### Day 1

#### Morning Session

#### **WATER CHEMISTRY BASICS AND NEEDS FOR WASTEWATER TREATMENT**

Participants will be exposed to concepts and terminologies commonly used in the water treatment industry. They will be given a snapshot of compliance to various parameters (31 for Malaysian DOE standards), and legal implications. The session proposed is as follows

1. Basic Water Chemistry Terminologies and its Meaning
  - a. Water Chemistry Terminologies
  - b. Water Cycle Charts
  - c. Measurement of Parameters
2. Why Do Treatment
  - a. Water Conservation Purposes
  - b. Cost Saving Benefits for Industry
  - c. Compliance to Local Standards

#### Afternoon Session

#### **RAW WATER TREATMENT**

The lesson plan will begin with the most basic method of doing solid liquid separations, the chemistry of coagulation and flocculation plus filtration methods

1. Water Clarification Processes
  - i. Contaminants Removed
  - ii. Sludge Production
  - iii. Economics
  - iv. Treatment Plant Design
  - v. Equipments for Clarification
    1. Factors Affecting Design
    2. Background of Terminology and Methods
  - vi. Unit Processes
  - vii. Sedimentation
  - viii. Operating Parameters
  - ix. Clarifier Equipments
2. Chemistry of Coagulation and Flocculation
  - i. Coagulation
    1. Charge Stabilization and Colloids
  - ii. Flocculation
    1. Rates and Affecting Factors
  - iii. Coagulation and Flocculation Chemicals
  - iv. Sedimentation
3. Granular Media Filtration
  - i. Introduction

- ii. Filtration Mechanism
- iii. Granular Media Filters
- iv. Gravity Filters
- v. Service Operating Parameters
  - 1. Water Quality
- vi. Chemical Treatment
- vii. Direct Filtration

### Day 2

#### Morning Session

#### WASTEWATER TREATMENT

The session will move into industry specific where wastewater treatment process is carried out

- 1. Primary Wastewater Treatment
  - a. Clarification Process
    - i. Principle of Operation
    - ii. Equipment
    - iii. Operational Performance Parameters
    - iv. Physical Chemical Treatment Systems
    - v. Heavy Metals Removal
    - vi. Chromate Reduction
    - vii. Ph Neutralization
    - viii. Lime Treatment for Solids Removal
- 2. Secondary Wastewater Treatment
  - i. General Principles of Secondary Treatment
    - 1. Basic Methods
    - 2. Principles of Biological Waste Treatment
    - 3. Important Microorganisms
    - 4. Bacterial Growth
    - 5. Aerated Lagoons
    - 6. Significant Operational Control Parameters
    - 7. Trickling Filters
  - ii. Chlorination
- 3. Advanced Wastewater Treatment
  - i. Chemical Coagulation/Flocculation in Waste Treatment
    - 1. Rapid Mixing
    - 2. Flocculation
    - 3. High Rate Sedimentation Basins
    - 4. Wastewater Filtration
    - 5. Microstrainers
    - 6. Granular Bed Filtration
    - 7. Chemical Treatment
    - 8. Filter Cleaning

- ii. Membrane Process
  - 1. Reverse Osmosis
  - 2. Ultrafiltration
- iii. Chemical Oxidation
  - 1. Oxygen
  - 2. Ozone
  - 3. Permanganate
  - 4. Chlorine
- iv. Ion Exchange
- v. Activated Carbon

### Afternoon Session

### SOLID WASTE HANDLING

**The final part will focus on solids wastes left behind from the above discussed process, important part of the wastewater treatment practices**

- 1. Anaerobic and Aerobic Digestion
  - a. Principles of Operation
  - b. Equipment
  - c. Chemical Treatment
  - d. Operating Parameters
- 2. Sludge Thickening
  - a. Gravity Thickening
  - b. Flotation Thickening
  - c. Principle of Operation
  - d. Processes
- 3. Sludge Dewatering
  - a. Twin Belt Press Dewatering
  - b. Screw Press
  - c. Vacuum Filtration
  - d. Centrifuge Systems
  - e. Pressure Filtration
  - f. Sludge Drying
  - g. Other Methods

### Workshop Methodology:

- Interactive lectures
- Group Brainstorming
- Video Presentations
- Case Studies
- Discussion
- Feedback session
- Question and Answer

What will be provided?

- Comprehensive manual with all the technical notes
- ***“Certificate of Competency”*** upon completion

### Evaluation Process:

- Level 1 (Reaction) and Level 2 (Learning) will be done
- Pre Test and Post Test