TRAINING PROGRAM

Microbiological Water analysis & Quality Control

Course Description

Water may include suspended solids, microorganisms, dissolved salts (ions) and dissolved gases, which cause various problems in systems, suspended solids and microorganisms must give a bad influence on the human health. In industrial water systems, boiler systems, hard soluble matter, such as calcium carbonate, may deposit as a scale on the cooling system and heat transfer surfaces of heat exchangers and boilers. Then their thermal efficiencies are reduced by the scaling. Dissolved oxygen and Sulfate Reducing Bacteria causes corrosion of metals composed of those systems and shortens their service lives. Microorganisms may grow and form slime (biofouling) on heat exchanger tube surfaces, etc., slime adhesion reduces thermal efficiencies of heat exchangers and sometimes causes under-deposit corrosion or microbiologically influenced corrosion (MIC). Even when water of same quality used, the kinds and the degrees of problems caused by water vary depending on usages of water and the operational conditions of systems. Therefore, the application of a suitable water treatment program with good water quality control and analysis in laboratory is inevitable to prevent problems caused by water, selection of program must be carefully carried out considering the water quality, the usage of water, the operational conditions all of these points will discuss in our course.

Course Objective

In the area of water monitoring and analysis, we have made technological improvements to ensure efficient operation and contribute to water and energy conservation in various water systems. We have also addressed critical issues surrounding water system, we believe that this course will proof of our commitment to quality of water technologies, and to environmental preservation and improvement. By the end of the training course, the delegates will be able to select the appropriate technology for their water analysis and protect their surrounding environment.

Organizational Impact:

Improvement the skills of employees are not less important than improvement the efficiency of equipment within the various institutions. From this point of view, if you want to invest in your human resources welcome to your employees in training course.

Personal Impact:

Your value in your field of work increases by increasing your theoretical and practical experiences, every information you gain in your working life increases your value in the work environment. From this point of view, we invite you to participate in this training program to increase your skills through lecturers at the highest level of experience in the field of water treatment for various industries technologies

Course Certificate

BTS certificate will be issued to all attendees completing minimum of 75% of the total tuition hours of the WORKSHOP.

Who should attend?

This course is designed for supervisors, engineers, chemists and technicians responsible for water analysis technologies in plants. this training course is suitable to a wide range of professionals but will greatly benefit:

- Operations and Maintenance Staff of water treatment
- Laboratory Staff involved in water treatment
- Personnel who is responsible for protecting the aquatic environment
- Personnel responsible for operating water boilers and cooling systems
- In general, All workers in the field of water management

Course Outline

Day 1

- Water sources quality considerations
- Necessity of Water Monitoring & Analysis
- Basic Chemistry for Water Analysis
- Chemical and Physical Properties of Water
- Water Borne Impurities
- Nature and Source of Water Pollution
- Problems caused by Impure Water
- Impurities & pollution in water sources
    - Types of Impurities in Water
    - Problems caused by impure water
    - Nature and source of water pollution
    - Effect of untreated water

Day 2

- Problem cause in water processing system
    - Corrosion
    - Scales
    - Microbiological/ Slime growth
- Algae, algal control and reservoirs
- Biological Treatment & Disinfection
- Why do we need to analyze water?
- Water Lab & Recommended water analyses
- Main Instruments used in water analysis
- Global standard test methods of water analysis
    - pH acidity and alkalinity, Turbidity
    - Total Hardness, P, M & OH Alkalinity
    - Total Solids (TS): TSS, TDS
    - Nutrients, Chloride, Cyanide analysis
    - Sulphite, Phosphate analysis

Day 3

- Analysis for Chemicals used in water treatment
- Oil and Grease analysis, Inorganic Chemicals
- Oxygen Demand (DO, COD, BOD)
- Organic contaminants & Toxic Organic Compounds
- Microbiological control and analysis
- Types of Microorganisms in water (Algae, Fungi, Protozoa, Bacteria)
- Effective of bacteria in water industry
    - Sulfate Reducing Bacteria – SRB
    - Iron-Oxidizing Bacteria
    - Slime Forming Bacteria
- Microbiological testing bacteria

Day 4

- Common Indicator Bacteria
    - Total Coliforms
    - Fecal Coliforms
    - E.coli
- Culturing, Identifying, Counting Bacteria
- Cultures and readings for bacteria
- Bacterial measurement
    - Membrane Filtration
    - Presence-Absence (P-A)
    - Most Probable Number (MPN)
    - Colilert methods
- Interpreting water analysis test results
- Evaluation of result by water quality index WQI
- Records and Data Reporting

Day 5

- Water Quality Control
- Interpreting water analysis test results
- Evaluation of analytical data
- Correction of errors and improving accuracy
- Reputability, Reducibility and mean of replicate
- Detection Limit (LOD, LOQ, LOL,….)
- Rationale of uncertainty
- Statistical Laboratory Data Analysis SD & RSD, F-test, T-test, Q-test, Z-score
- Quality Control and Quality Assurance
- Practical exercises:
    - Calculate Reputability, Reducibility
    - Calculation of detection limit
    - Calculation for Uncertainty
    - Used Excel Function for Uncertainty
    - Drawing Control Chart by Excel