

CourseTitle: How Can Water Treatment Plants Meet Multiple Water Quality Objectives?

Course Duration: Four (4) hours or Six (6) Hours

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Water/Wastewater Consultant

Target Audience: Engineers, Operational Management, and Water Plant Personnel

Course Objectives are:

1. Provide a basic understanding of water treatment disinfection
2. Provide a basic understanding of water treatment disinfection by-products reduction
3. Provide an understanding of taste and odors removal
4. Provide an understanding of balancing multiple water quality objectives
5. Provide an understanding of the advantages and disadvantages of the following oxidants: ozone, chlorine dioxide, chlorine, chloramines, hydrogen peroxide, potassium permanganate, and ultraviolet light (UV).
6. What the best Plants do?

Course Outline

- I. Understanding Water Treatment Disinfection
 - A. Understanding Minimum Requirements for Giardia & Cryptosporidium Removal & Inactivation
 - B. Define CT Requirements
 - C. Understanding Basics of Tracer Study
 - D. Examples of CT calculation for chlorine, chlorine dioxide, ozone, and chloramines
 - E. Oxidants' ranking in terms of disinfection capability and stability
- II. Understanding Disinfection By-Products Reduction
 - A. How TTHMs and HAAs are formed?
 - B. Disinfection by-product regulations
 - C. 6 Ways to Reduce Disinfection By-Products
- III. Understanding Taste & Odors Removal
 - A. Sources in Drinking Water Supplies
 1. Copper Sulfate Treatment at Source
 2. Potassium Permanganate treatment at Source
 3. Lime Treatment at source
 4. Preventing Cyanobacterial Blooms
 - B. Water Treatment for Removal of Cyanobacterial Toxins
 1. Coagulation & Filtration Treatment
 2. Activated Carbon
 3. Chlorination
 4. Ozone Treatment

5. Potassium Permanganate, Ultraviolet Light, Hydrogen Peroxide, and chlorine dioxide
- IV. Balancing Multiple Water Quality Objectives
 - A. Disinfection Objective
 - B. Disinfection By-Product Objective
 - C. Taste & Odor Objective
 - D. Secondary Treatment Objectives
 1. Taste & Odors Objective
 2. Particulates Objective
 3. Regrowth Objective
 4. Corrosion Objective
 5. Iron and Manganese Objectives
 - E. Evaluation of Water Quality Objectives in terms of cost and operational factors
 - V. Comparison of Advantages and Disadvantages of Oxidants
 - A. Ozone
 - B. Chlorine Dioxide
 - C. Chlorine
 - D. Chloramines
 - E. Hydrogen Peroxide
 - F. Potassium permanganate
 - G. Ultra Violet Light
 - VI. What the Best Plants Do.
 - A. Disinfection
 - B. Disinfection by-products
 - C. Taste and Odors
 - D. Balancing Multiple Water Quality Objectives
 - E. Comparison of Oxidants