

## **Pumping Stations – Pumps, Motors, and Electrical Systems**

2 hours

Instructor: Jim Taube

### **Description**

This course presents key information regarding pumps and motors, and overall electrical systems used in pumping stations for water distribution. This information will be informative and a valuable resource for designers, engineers, and all personnel involved in the design, installation, operation, and maintenance of pumping stations. Based on past experience with the various types of pumps, motors and electrical systems, the overall design of the pumping station is optimized. Pumping stations serve the general population and therefore provides a health, safety, and welfare benefit for the population being served by the pumping station.

Intended Audience: Water Treatment and Water Distribution Operators

### **Objectives**

After successfully completing this course, you will be able to:

- Describe key electrical fundamentals involved in pumping station design – grounding, overcurrent protection, and branch circuiting
- Explain the types of pumps utilized in pumping stations and how to make selections based on the application
- Determine the basic steps required for sizing pumps and motors to transmit and distribute safe and sustainable water
- Recognize the types of engines that are in use for pumping stations and their benefit for critical operations so as not to affect the environment and public health in an adverse manner

### **Timed Outline**

#### **Introduction (10 Minutes)**

- Overview
- Objectives

#### **Pump Classifications (25 Minutes)**

- Mechanical Configuration
- Kinetic Pumps
- Checkpoint
- Positive Displacement Pumps
- Checkpoint

#### **Pump Designs (25 Minutes)**

- Centrifugal Pumps
- Checkpoint
- Close Coupled Pumps
- Non-Clog Solids Handling Pumps
- Checkpoint
- Wet Well Volute Pump
- Vertical Turbine Solids Handling Pump
- Self-Priming Pumps
- Vortex Pumps
- Cutter Pumps
- Checkpoint

- Grinder Pumps
- Impeller Between Bearings Pumps
- Vertical Pumps
- Positive Displacement Pumps
- Checkpoint

#### **Motors (25 Minutes)**

- Motor Types
- Installation Arrangements
- Checkpoint
- Constant/Adjustable Speed Systems
- Motor Enclosures
- Checkpoint
- Instrumentation
- Engine Generators
- Motor Specifications
- Checkpoint

#### **Electrical Systems (25 Minutes)**

- Transformers
- Switches, Circuit Breakers, and Motor Starters
- Checkpoint
- Motor Control Centers (MCC's)
- Checkpoint
- Generators
- Equipment Grounding and Electrical Loads
- Checkpoint

#### **Conclusion (10 Minutes)**

#### **AVAILABILITY**

This course is offered online and is available 24 hours a day, 7 days a week, 365 days a year.

#### **TRAINING METHODOLOGY & EVALUATION**

This course is self-paced online training. Review exercises reinforce the content, and students are evaluated with a multiple-choice exam. Upon completion, students are prompted to submit a course evaluation.