OCT ACADEMY,
An IACET Accredited School
Class Description submittal to OESAC

Title: **Water Distribution Operations**

√ **New Class**, or ☐ **Class Renewal**

OESAC - CEU Award requested: 0.7 **CEUs**

OVERVIEW:
Water Distribution Operations is an updated and enlarged two (2) day session designed to condensed, and intensive overview of potable water delivery through a municipal water distribution system from treated supply to residential and industrial user. For a distribution operator to be successful, it is necessary to understand both the fundamentals and advanced topics associated with the operation of a typical distribution system. This session is designed to review basic water distribution processes, equipment and methods to prepare attendees at work and to address the more common questions encountered on a water distribution operator certification examination.

CLASS DESCRIPTION:

DAY One (1):
Six (6) chapters.

OUTLINE:

Glossary of Words and Terms
Quiz – 36 MC questions.

Chapter 1. **The Distribution System:**
A Typical Small Community
Operation & Maintenance Components
Goals
Key Definitions
Quiz – 32 MC questions.

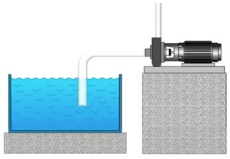
Chapter 2. **Water Reservoirs and Storage:**

Water Demand, GPCD
Daily Water Use and System Demand Variation
Types of Reservoirs and Storage Tanks, Materials and
Storage tank operations - Altitude Control Valves
Freezing conditions
Quiz – 20 MC questions.

Chapter 3. **Water Meters:**

Types of Meters
Venturi Meters
Meter Characteristics and Selection
Quiz – 22 MC questions.

Chapter 4. **Water System Hydraulics:**



Fundamental Hydraulic Concepts
Theoretical Maximum Suction Lift
Hydraulic Grade Line
Gravity Flow
Hydraulic Gradient and Pipe Size (Headloss)
The Hazen-Williams Formula (friction loss in pipes)
Quiz – 20 MC questions, 10 Math Problems.

Chapter 5. **Pipe, Types, Uses and Protection:**
Pipe Installation and Maintenance:
Pipeline Appurtances:

PVC Pipe

Pipe and Pipe Material
Joints and Fittings
Typical Valve Designs
Leaking Faucets
Dry and Wet Tapping
Trench Bedding
Thrust Blocking
Trench Safety
Excavation Safety
Water main Breaks and Reporting
Quiz – 66 MC questions.

DAY Two (2):
Six (6) chapters.

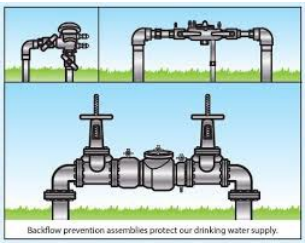
Chapter 6. **Valves in the Water Distribution System:**

The need for valves in a Distribution system.
Valves used in the Distribution system.
Gate Valve layout and applications.
Control Valves.
Valve Maintenance and Operations.
Quiz – 20 MC questions.

Chapter 7. **Fire Hydrants:**

The Four (4) Basic Purposes for Fire Hydrants
Glossary of terms
Hydrant General Specifications
Wet Barrel Hydrants
Three (3) Types of Dry Barrel Hydrants
Main Parts of a Hydrant
Typical Fire Hydrant Assembly
Depth of Bury
Typical Gate Valve Assembly
Typical Hydrant Components
Dry Barrel Hydrants - Base & Lower Barrels
Hydrant Minimum Operating Pressure and Color Code
Flushing a System
Quiz - 47 MC questions.

Chapter 8. **Cross-Connection:**



Looking for Cross Connections
Cross Connections, Back siphonage and Back Pressure
Air Gapping and Backflow Devices
Degree of Hazard
Air Gap Tanks
Back Siphonage Due to High Water Withdrawal
Protection Against Extreme Health Hazards
Standards and Testing Laboratories
Reduced Pressure Backflow Devices
Double Check Valve Assemblies
Pressure Vacuum Breakers
Atmospheric Vacuum Breakers
Quiz -

Chapter 9. **Corrosion:**
Corrosion Control
Cathodic Protection
Corrosion Stabilization Chemicals
Langelier's Saturation Index & Formula
Factors Affecting Corrosivity
Quiz – 30 MC questions.

Chapter 10. **Maps, Drawings and Public Relations:**
Distribution System Maps

Records
Kinds of Records
Manpower Log
Pumpage Record
Common Emergencies
Times When Emergencies will Occur
Quiz – 19 MC questions.

Chapter 11. **SCADA Instrumentation and Controls**:
General
Instrumentation & Control
Quiz – 12 MC questions.

SUPPORTING NARRATIVE:
The purpose of the two (2) day water distribution operations class is to introduce system operators to the water supply system or network, and better acquaint them with the many components that go into making up an operating system. It is a system of engineered appurtenances, hydrologic and hydraulic components which make up a water supply system.

The first emphasis is on understanding language associated with any water distribution system. If an operator does not understand the words and terms encountered, they cannot successfully operate the system, nor pass state exams, that contain this language.

The chapters that follow are written to comply with IACET format requirements with the following addressed: Learning objectives, Chapter Objectives, Main body text, and follow up multiple choice questions with a letter key answers for grading metric.

The water in the supply network is maintained as positive pressure levels to ensure that water reaches all parts of the network, that a sufficient flow is available at every take-off point and to ensure that untreated water in the ground cannot enter the network. Distribution system water is typically pressurized by pumps that push water into storage tanks constructed at the highest local point in the network. Water meters measure the amount of flow that is delivered and consumed.

Control valves control and regulate flow, isolate portions of the distribution system, start and stop flow, relief air or excessive flow and prevent reversal of flow. These systems are usually owned and maintained by cities, districts or other public entities, but are occasionally operated by a commercial enterprise (water privatization).Water supply networks are part of the master planning of communities, counties, and municipalities.

Planning and design take into account such factors as, location, current demand, future growth, leakage, pressure, pipe size, pressure loss, friction loss, and fire-fighting flows. Today, most systems are operated using SCADA systems. Operating records are required under both federal and state laws.

As water passes through the distribution system, water quality can become degraded due chemical reactions and biological processes. Corrosion of metal pipe materials in the distribution system can cause the release of metals, such as lead, copper and iron with undesirable aesthetic and health effects. Utilities will often adjust the chemistry of the water before distribution to minimize its corrosiveness. Reference; the Lead-Copper Rule.

DAY #1 TIME PRESENTATION OUTLINE:

Start Time	End Time	Instructional Time	Allotted Break Time	Chapter/Discussion/Quiz
8:00am	8:50am	50 minutes	8:50am–9:00am	Introduction, Glossary of Words and Terms
9:00am	9:50am	50 minutes	9:50am–10:00am	The Distribution System
10:00am	10:50am	50 minutes	10:50am-11:00am	Water Reservoirs and Storage Tanks
11:00am	12:00pm	60 minutes	12:00pm-12:30pm	Water Meters & Water System Hydraulics
12:30pm	1:20pm	50 minutes	1:20pm-1:30pm	Pipeline Installation and Maintenance & Valves in the Distribution System
1:30pm	2:20pm	50 minutes	2:20pm-2:30pm	Fire Hydrants & Cross Connections
2:30pm	3:20pm	50 minutes	3:20pm-3:30pm	Corrosion and Control Alternatives
3:30pm	4:30pm	60 minutes		Maps, Drawings and Public Relations
		420 minutes		

6 sessions of 50 minutes of instruction and 2 sessions of 60 minutes of instruction equals 420 minutes. 420 minutes equates to 7 hours of instruction divided by 10 which is 0.7 CEUs

END