

Course Description & Outline

Basic Waterworks

Northwest Washington Subsection – PNWS-AWWA

- **Introduction**
 - Discussion of the day's program as an introduction to water supply, treatment and distribution for new utility employees, office personal and others looking for a general introduction to the industry.
- **Overview of Water Systems**
 - A quick tour of the elements of a water system including:
 - Essential Water – The resource we take for granted but cannot survive without.
 - What is a water system – Schematic of the elements of a typical water system.
 - Water Sources – Where we get water.
 - Treatment – How water is treated.
 - Storage – Storage for daily and seasonal needs.
 - Pumping Stations – The variety of pumps and configurations.
 - Transmission & Distribution – How to get water from the source to the user.
 - Water System Planning – The need to plan and project the needs of the users, the capacity of the source and the reliability of the infrastructure.
- **Regulations & Contaminants**
 - Outline the need for potable water treatment. Module will cover:
 - Water Regulations - Safe Water Drinking Act, Lead & Copper Rule, Disinfection By-Products Rule, Surface Water Rule, Long Term 2 – Enhanced Surface Water Treatment Rule, Groundwater Rule, State regulations
 - Contamination Categories – Bacteria, viruses, chemicals
- **Water Sources**
 - Discussion of the various sources of water. Where found, how each is treated to become potable:
 - Surface water
 - Groundwater
 - Brackish or seawater
 - Conservation – Our greatest untapped resource.
 - Water Rights – Guaranteeing a source
- **Hydrology & Hydraulics**
 - Introduce the water cycle and the limited supply of water. Discuss elements of basic hydraulics.
 - Hydrology – The water cycle, estimated volumes of water on earth
 - Hydraulics – Force of gravity, measures used in the water industry for pressure, velocity, volume, rate of flow. Head loss basics, pumps and control valves. Pressure zones.
- **Treatment & Disinfection**
 - Outline some of the processes commonly used to assure safe drinking water
 - Purification & treatment – Why do we need to treat and what is removed, water treatment goals, overview of different treatment techniques, chemicals used. Potential sources of contamination
 - Disinfection – Disinfection processes (advantages & disadvantages), affect of time, pH and temperature, disinfection by-products.

- pH adjustment – pH Primer, how to adjust pH.
 - Factors determining treatment processes – The decision factors in selecting treatment processes.
- **Water Quality Monitoring**
 - To provide an understanding of the processes and tools used to monitor the wide number of water quality parameters a utility tracks.
 - Water quality overview & perspective – History and effectiveness of disinfection in disease prevention.
 - Multiple barrier approach – Source water protection, Effective Source Treatment, Transmission & Distribution Integrity, Monitoring & testing, Public Health Protection.
 - Water quality monitoring tools – Field and fixed water monitoring instrumentation.
- **Water Quality Protection Practices**
 - Provide an overview of what is required in collecting and handling samples and what means and methods are used in protecting water quality and public health.
 - Water quality sampling
 - Distribution and service line disinfection
 - Water quality analysis
 - Response to water quality complaints – Different typical customer complaints and how to resolve the problem, pressure problems, consumption issues.
 - Reporting requirements
 - Cross-Connections – Backflow & prevention, how to remove suspected cross-connections.
- **Construction & Maintenance**
 - Brief introduction to the types of facilities constructed and special considerations during construction. Water system maintenance highlights.
 - Construction – Discussion of the different elements of infrastructure used in a water utility, buildings, tanks, pipelines, valves, services, meters.
 - Maintenance – Major issues in keeping all the infrastructure working to protect water quality. Corrosion prevention
- **Disaster Response**
 - For some of the potential disasters that can happen highlight how they affect the operation of the utility in delivering safe water.
 - Commonalities of disasters & response.
 - Natural Disasters – Fire, floods, earthquake, landslides/erosion, wind storms, snow & ice, drought, solar weather.
 - Human Caused Disasters – Accidents & negligence, criminal, terrorism.
 - Response to Disasters – Safety & planning/practice
 - Inter-agency assistance – Water/Wastewater Area Response Network, Federal Emergency Management Network, state & local response, other resources.