American Water Works Association
Pacific Northwest Section
Northwest Washington Subsection

Course Description & Outline

Water Storage Basics

Northwest Washington Subsection – PNWS-AWWA

Goal - To provide a basic understanding of the requirements for potable water storage, the codes involved and the alternatives for materials and tank configuration. This workshop will also look at soils and seismic conditions and how they affect selection of a storage tanks and performing facility surveys in the event of a seismic event. Routine inspections, sanitary surveys and corrosion prevention will also be presented.

- ***Section 0 – Introduction*** *(15 minutes, not included in the instruction time for the program)*
  - Discussion of the day's program as an outline of planning, construction and maintenance of water storage reservoirs
  - Housekeeping announcements
  - Safety emphasis
- ***Section 1 - Water Storage Basics – 20 minutes***
  - Discussion of the how reservoirs are sized, why they are needed and other basic elements including:
    - What is water storage?
    - Why do we need water storage?
    - How are reservoirs sized?
    - What materials are used for water storage?
    - Where should water storage be located?
- ***Section 2 – Soils & Seismic Considerations for Water Storage Siting & Design – 40 minutes***
  - Soils 101
  - Seismicity in the Pacific Northwest
  - Earthquake hazards, seismic design parameters
  - Geologic hazards & earthquake induced damage
  - Project examples
- ***Section 3 – Structural Considerations for Design- 45 minutes***
  - Loads relevant to tank design
  - Codes & standards
  - Structural behavior
- ***Section 4 – Post Seismic Event Surveys – 15 minutes***
  - Foundations
  - Structure
  - Mechanical
- ***Section 5 – Piping Connections – 20 minutes***
  - Review of the need for flexibility between the in-ground piping and the reservoir
- ***Section 6 – Inspection of Water Storage Facilities – 60 minutes***

    - Inspection frequency
    - Security
    - Physical & structural inspections
    - Record keeping
    - Cleaning
    - Major modifications
- ***Section 7 – Sanitary Surveys of Finished Water Storage – 60 minutes***
    - General information - Why do we need pressure storage tanks?
    - How do they work?
    - Sizing
    - The details
- ***Section 8A – Corrosion Control Methods for Water Storage Tanks – 45 minutes***
    - An introduction to the corrosion process and ways to protect materials.
        - Corrosion Basics
        - Methods of corrosion control
        - Typical corrosion control alternatives
- ***Section 8B – Coatings – 25*** minutes
    - Coating options
    - Inspection & inspector certifications
- ***Section 9 – Pressure Water Storage – 15 minutes***
    - Planning and use of pressure storage tanks for potable water systems.
        - General information - Why do we need pressure storage tanks?
        - How do they work?
        - Sizing
        - The details
- ***Section 10 –Tank Materials – 30 minutes***
    - Brief overview of the materials that are available for small potable water storage tanks and chemical storage tanks. Typical size range and use, advantages and disadvantages, Considerations in selection. Materials include:
        - FRP
        - HDPE
        - Wood, CIP Concrete
        - Steel

  Section 11 – Large reservoirs – 20 minutes
    - Review of the materials, sizes and configuration for large potable water storage reservoirs
        - Planning considerations
        - Common large reservoir problems and fixes
- ***Section 12 – Reservoir Water Quality – 25 minutes***
    - How to maintain water quality in reservoirs.
        - Water Quality Concerns
        - Causes of water quality issues
        - Approaches to improve water quality

Total Instruction time – 420 minutes (7 hours). 0.7 CUEs requested.

Presentation authors. The following PNWS-AWWA members were responsible for preparing and developing the curricula and presentations for the workshop:

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- Brian Boye – Washington State Department of Health
- Jeff Lundt – KCWTD
- Jeremy Hailey – Northwest Corrosion Engineers
- Lance Stevens – Gray & Osborne, Inc.
- Ben Scrace – Whitney Equipment
- Tom Lindberg - Murraysmith
- Marshall Meyer – Murraysmith
- Norm Heerspink – Mt Baker Silo