



Distribution System Infrastructure PARTICIPANT HANDOUT

Overview:

This lesson, as part of distribution system infrastructure we will cover piping, valves, storage tanks, and hydrants. The lesson shows how this infrastructure impacts water quality and provides solutions to common problems.

Learning Objectives:

At the completion of this lesson, participants should have the ability to:

- Be able to describe components of the DS, and how they can impact water quality
- Be able to describe potential areas of water quality concern in your system, and consider ways to improve these

Key Concepts:

Pipe systems - dead ends

- Effect on water quality
 - Extended water age
 - Decay of chlorine residual
 - Increased DBPs
 - Increased microorganisms

If there is a failure – some customers will not have water service.

- As such, try to prevent a failure event as best you can!



Valves - Effect on Water Quality

- Closed valves create dead ends in the distribution system
 - Stagnation
 - Increased water age
 - Biofilm development
 - Sediment built up
- If opened or closed rapidly, water hammer can develop

Notes:

Solutions to dead ends

- Pipe loops
- Flushing valves
- Flushing program

Cross Connections

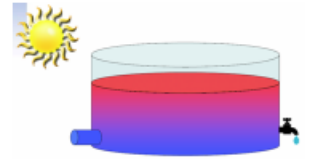
- Any point in a water distribution system where chemical, biological, or other contaminants may come into contact with potable water
- These contaminants can be drawn or pushed back into the water distribution system during a backflow event



Notes:

Factors that Impact Water Quality in Storage

- Stratification vs mixing
- Inlet/outlet configuration
- External contamination
- Increased water age
- Loss of chlorine residual
- Formation of DBPs
- Microscopic critters in the water
- BIG critters in the water



Hydrant Impacts on Water Quality

- Flushing, scouring and cleaning (planned/unplanned)
- Cross connection potential
- Poor sampling points
 - Water can be trapped in the barrel of the hydrant when closed, resulting in unrepresentative samples

Additional Resources:

- RCAP's Resource Library: www.rcap.org
- EPANet
 - <http://www.epa.gov/water-research/epanet>