



# Public Health Considerations for Installation/Repair of Mains



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## † Public Health Considerations

- Hydrostatic Testing
- Disinfection and Bacteriological Sampling
- Emergency Repairs/Precautionary Measures



# Installation Procedures

- † Engineering Considerations
- † Trench Excavation and Preparation
- † Handling and Laying Pipe
- † Fire Hydrant and Valve Installation
- † Thrust or Reaction Blocking
- † Backfilling
- † Hydrostatic Testing
- † Disinfection and Sampling
- † Emergency Repairs



# Engineering Specifications

- † Local utilities hire a consultant to establish Specifications – Standard or Project specific
- † Specifications should identify design criteria and installation procedures
- † For example:
  - Minimum pipe diameter or wall thickness
  - Depth of Bury/Separation Distances
  - Acceptable Methods (Disinfection, Leakage)
  - Acceptable Materials (D.I., PVC, etc.)



# Design & Installation

- † Engineering Design Criteria from:
  - Recommended Standards for Water Works
  - DEQ Rules & Guidelines
  - AWWA Standards & Procedures
  - ANSI/NSF Standards
- † May be established by rule, by guidelines or by common practice



# Review & Approval

- † For each project, DEQ reviews and approves specifications
- † They may be submitted with the plans or they may be on file and already be approved
- † Permits are issued on the basis that acceptable materials and approved methods as specified will be used during installation



# Engineering Services

- † Inspection Services are a KEY element
  - Ensure Specifications are Followed
  - Provide Field Staking of Project
  - Ensure Separation Distances are Met Between Water Main and Any Sewer Lines
    - >10 ft Parallel; > 18 in Vertical (Crossing)
- † Protects local utility's interest that finished product is safe and acceptable

# Act 399 Requirements for New Main Installation

## † Hydrostatic Testing

- The requirements of a pressure test shall be met prior to placing a new main in service (R325.11109)

## † Disinfection and Sampling

- New mains must be flushed before disinfection
- Disinfection of new mains is required
- Before placing a new main in service, 2 consecutive samples shall indicate the absence of coliform (R325.11110)





# Hydrostatic Testing

## † General

- Test 1000 ft Sections or Less
- Let Thrust Blocks Cure >24 hours before Start

## † Pressure Test

- Fill Slowly - Evacuating Air in Line
- Close vents - Bring to Line Pressure (>24 hrs)
- Test at 1.5 Times Line Pressure
  - Minimum 150 PSI for 2 Hours
- Visually Check for Leaks During Test



# Hydrostatic Testing

## † Leakage Test

- Test at Operating Pressure
  - Minimum 150 PSI
- Allowable Leakage defined by AWWA Standard C600
- Formula is based on number of joints, length and diameter of pipe, and test pressure.

# Hydrostatic Testing

$$\dagger L = S \times D \times (P)^{0.5} / 133,200$$

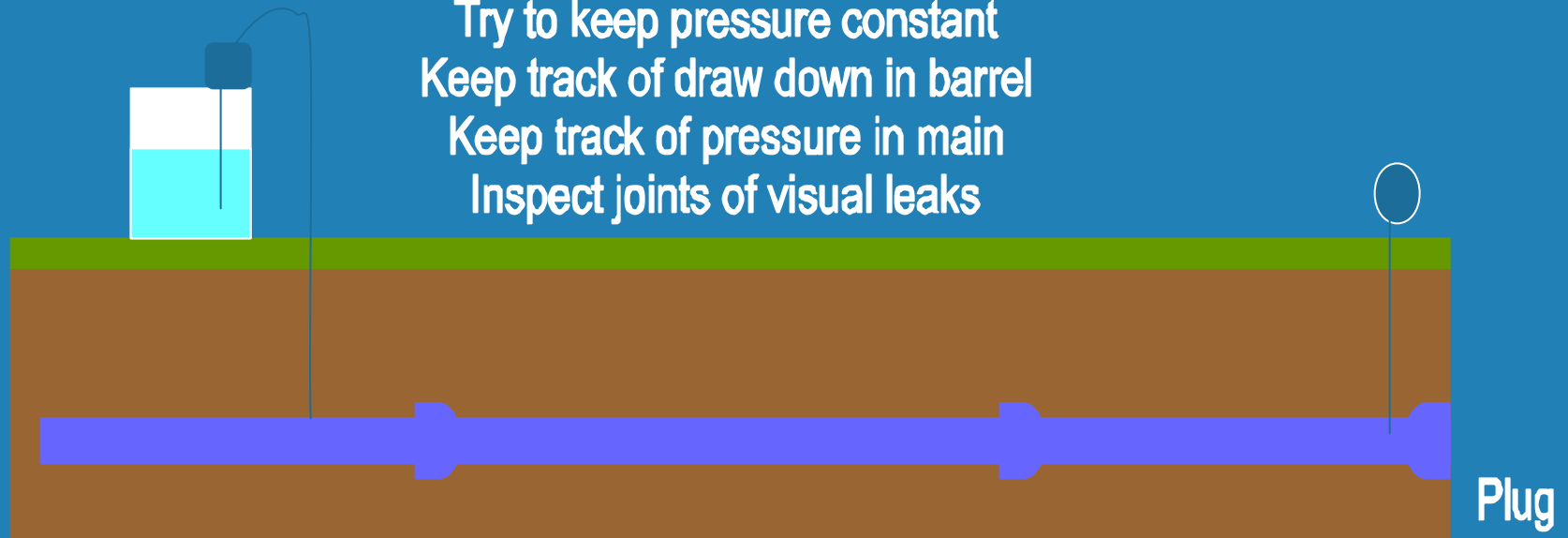
- Where:

- L = allowable leakage in gallons per hour (gph)
- S = length of pipe in feet (ft)
- D = diameter of pipe in inches (in)
- P = average pressure in pounds per square inch (psi)

# Hydrostatic Testing

## † Typical set up

Use pump to pressurize main  
Try to keep pressure constant  
Keep track of draw down in barrel  
Keep track of pressure in main  
Inspect joints of visual leaks



Physical separation from system

Plug



# Disinfection of Water Mains

- † Clean the Pipe Interior
- † Flush Pipe with Velocity  $> 2.5$  fps
- † Disinfect Lines with Chlorine
  - Inject at One End and Measure Residual at the Other End ( $>25$  ppm of free chlorine)
- † Disinfection Test
  - Let Water Stand in Line  $>24$  Hours
  - Check Chlorine Residual ( $>10$  ppm)
  - Flush Main Thoroughly & Retest



# Bacteriological Testing

- † Collect Total Coliform Samples
  - 1 sample every 1000 - 1250 feet
  - Need Two Consecutive Sets of Samples Collected Approximately 24 Hours Apart



# Emergency Repairs

## † Contingency Plan

- Standby Personnel
- Materials and Equipment Available

## † Water Main Leaks - Need to be Addressed Quickly

- May Jeopardize Fire Protection
- Health Hazard
- Can Cause Property Damage



# Repairing a Break or Leak

## † Small in Size

- Attempt without Depressurizing System

## † Larger in Size

- Isolate Break Using Valves
- De-Water Trench & Disinfect

## † Major Repairs

- Pressure Test, Flush, Disinfect & Sample (as with New Water Mains)





# DWSD CUSTOMER MEETING

## MAY 13, 2004

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