

Regulatory Drivers for Pressure Loss Management - the RTCR



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Revised Total Coliform Rule - What Utilities Need to Know

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0.4 CEUs*/4 PDHs/4 Hours

Course Description

Under the Revised Total Coliform Rule (RTCR), water systems are required to conduct an Assessment of their system if coliform monitoring results indicate that the system may be vulnerable to contamination. This course is made up of four learning modules which provide an overview of the assessment process, as well as specific training associated with conducting assessments of sample sites and sampling practices, source water and treatment issues, and distribution system operations and maintenance practices.

Learning Objectives

- Familiarize students with the Assessment process.
- Encourage pro-active planning for successful completion of Level 1 and Level 2 Assessments.
- Facilitate data gathering and interpretation associated with specific Assessment elements.

CEUs

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1. To confirm that the coursework is acceptable for continuing education credit towards your license;
2. To learn about requirements for certification.

Steps in the Assessment Process

1. Work with Primacy Agency
2. Identify assessment team
3. Review assessment form
4. Gather available data/information
5. Identify data/information gaps
6. Conduct field investigations
7. Complete and submit form
8. Develop follow-up work plan



Level 1 Assessment Triggers

- If collecting fewer than 40 samples per month:
 - **Two or more** total coliform-positives
- If collecting 40 or more samples per month:
 - **Exceeds 5%** total coliform-positive samples
- Failure to collect every required repeat sample after any single routine total coliform-positive sample

Level 2 Assessment Triggers

- **A system has an *E. coli* MCL violation**
 - *E. coli* positive
 - Failure to collect every required repeat sample after any single routine *E. coli* positive sample
 - Failure to test for *E. coli* after a total coliform positive
- **The system triggers a second Level 1 Assessment within a rolling 12-month period**

Definitions

Sanitary Defect:

- **A defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure of a barrier that is already in place**

Significant Deficiency:

- **Term used in sanitary surveys conducted under the Interim Enhanced Surface Water Treatment Rule (IESWTR) or the Ground Water Rule (GWR).**

Sanitary Defect	Corrective Action
Main beak with loss of pressure	Disinfection and flushing
Hole(s) in storage tank	Replacement or repair of components
Cross connection	Implementation or upgrade of a cross connection control and backflow prevention program
Inadequate disinfectant residuals	Disinfection and flushing

Adapted from: USEPA Draft Assessment and Corrective Actions Guidance Manual, 2010

Example Assessment Form

Question	Checked ✓	Issue Found (Y/N)	Issue	Corrective Action
1. System pressure: Is there evidence that the system experienced low or negative pressure? If yes, when?				
2. List any identified cross connections.				
3. Pump station: Are there any sanitary defects in the pump station? Are pump(s) operable?				
4. Air relief valves: Is the valve vault subject to flooding or does the vent terminate below grade?				
5. Have there been any water main repairs or additions? If yes when, and what was the repair or addition?				
6. Was there any scheduled flushing of the distribution system? If yes, when?				
7. Is there any evidence of intentional contamination in the distribution system?				



Operational Data Reviewed During An Assessment

- **Distribution system and treatment plant process data**
- **Operations and repairs in the distribution system**
 - **Main breaks**
 - **Scheduled maintenance**
 - **Hydrant testing, fire fighting, external agencies**
- **Customer complaint and water usage data**
- **Pipe material and condition information**

Pressure Management

Pressure Management

■ Well supplies and Pump Stations – Look For:

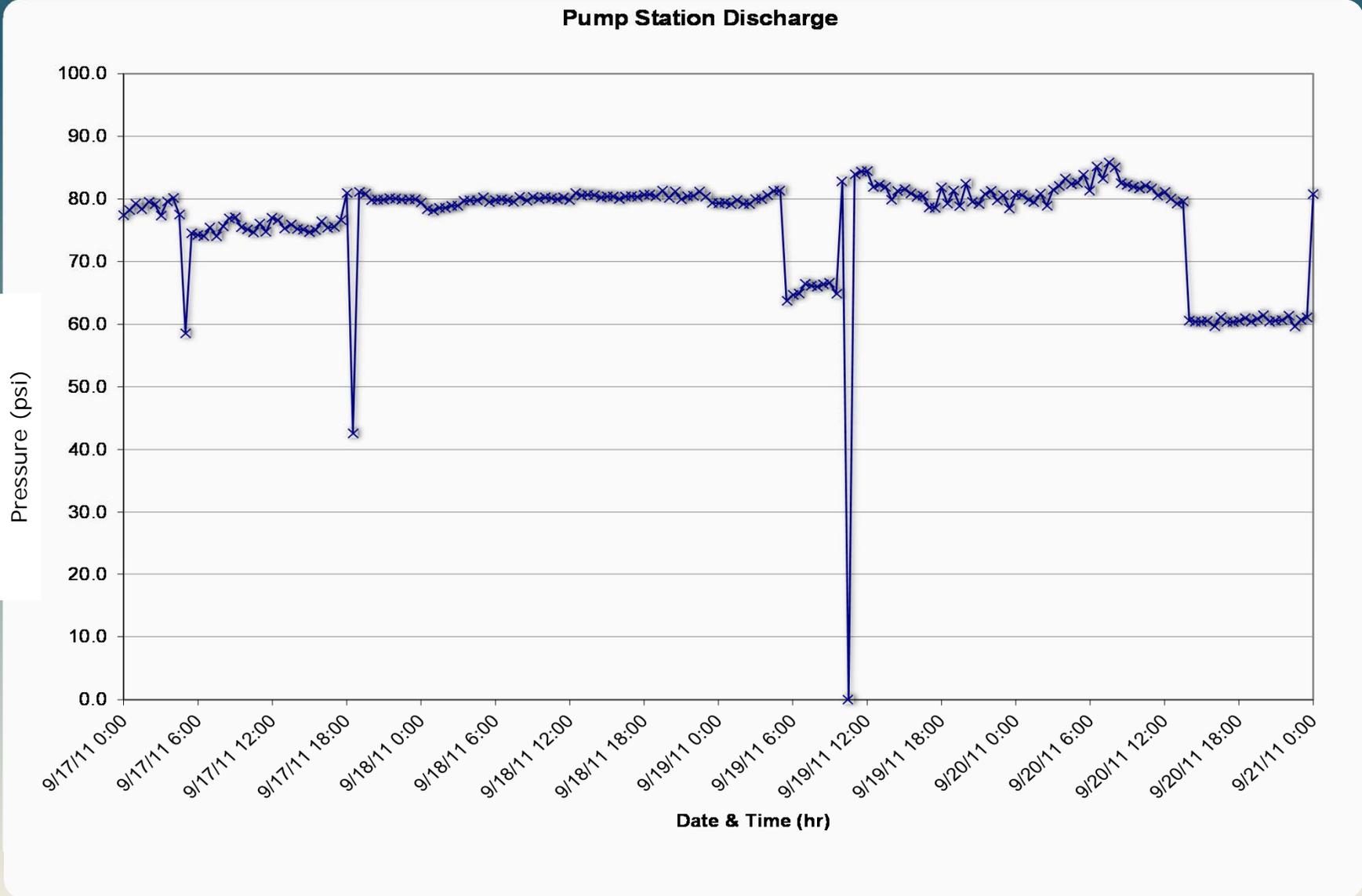
- ◆ Loss of power or loss of pressure
- ◆ Failure of surge control devices

■ Distribution system – Look For:

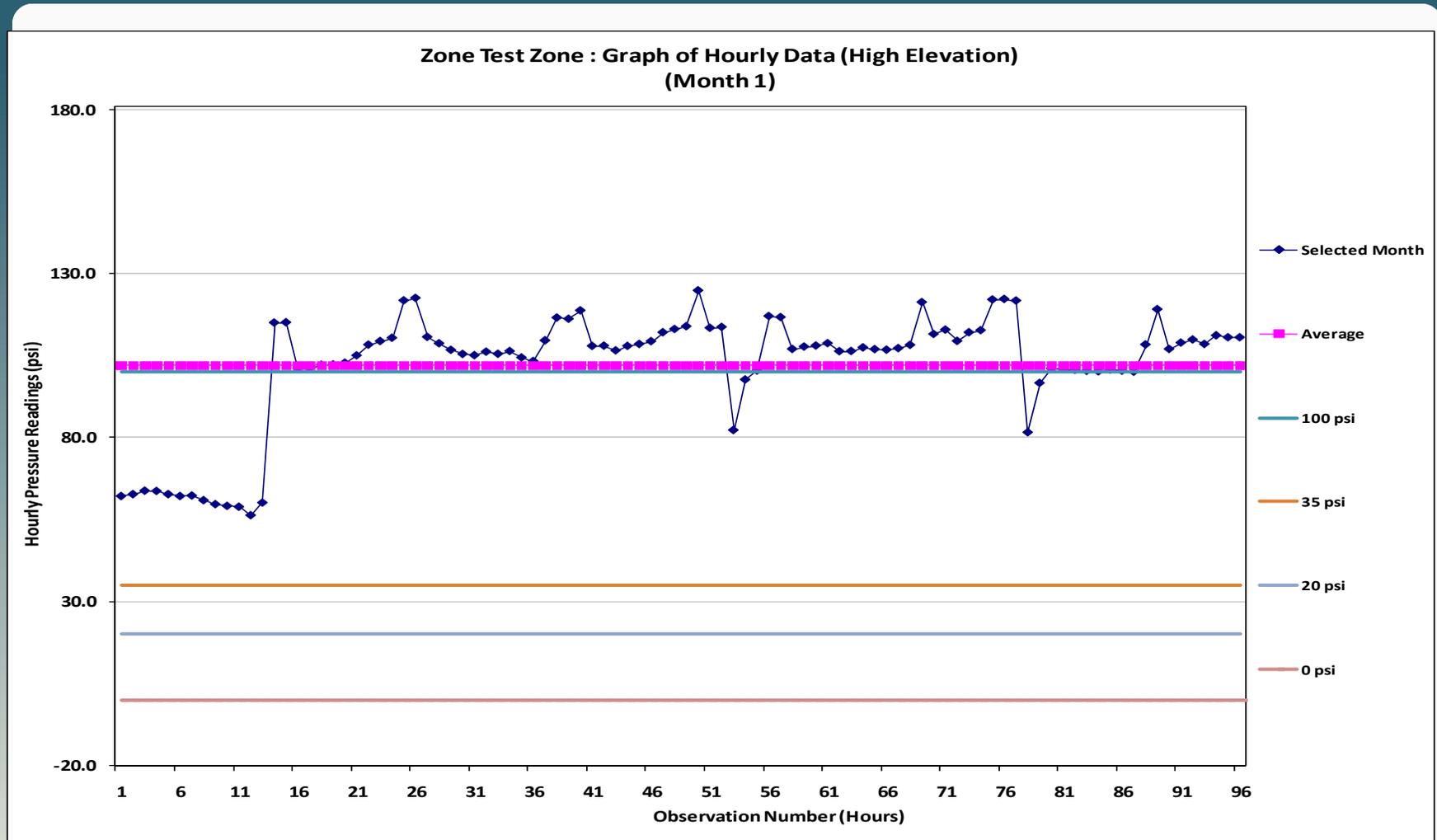
- ◆ Main breaks and repairs
- ◆ Fire flow or other high demand events
- ◆ Storage facility out of service

Many states require systems to have an operational pressure of at least 20 psi under ALL flow conditions at all ground-level points.

Example SCADA Pressure Data



Example Analysis of Pressure Data

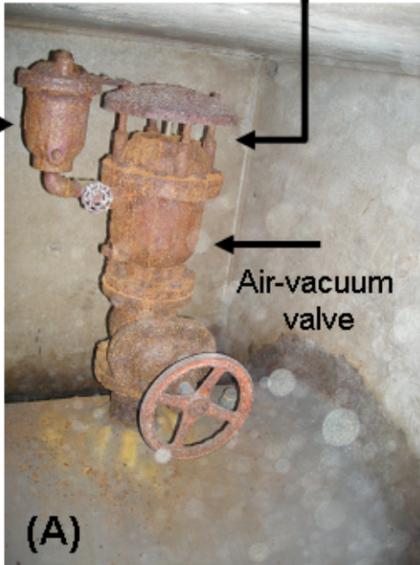


Source: Friedman et al., WaterRF 4109

Examples of Below Grade/Submerged Air-Vac Valves

Air-release valve

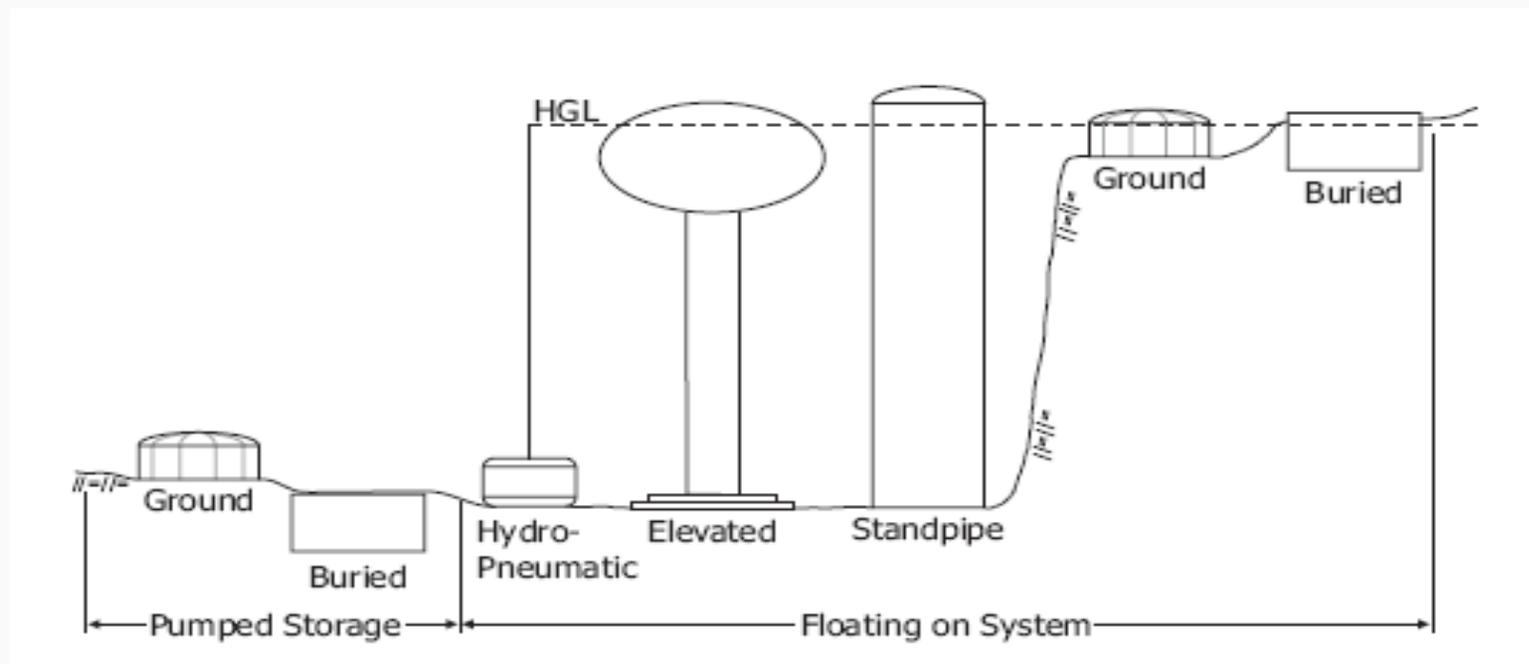
Air-vacuum valve outlet



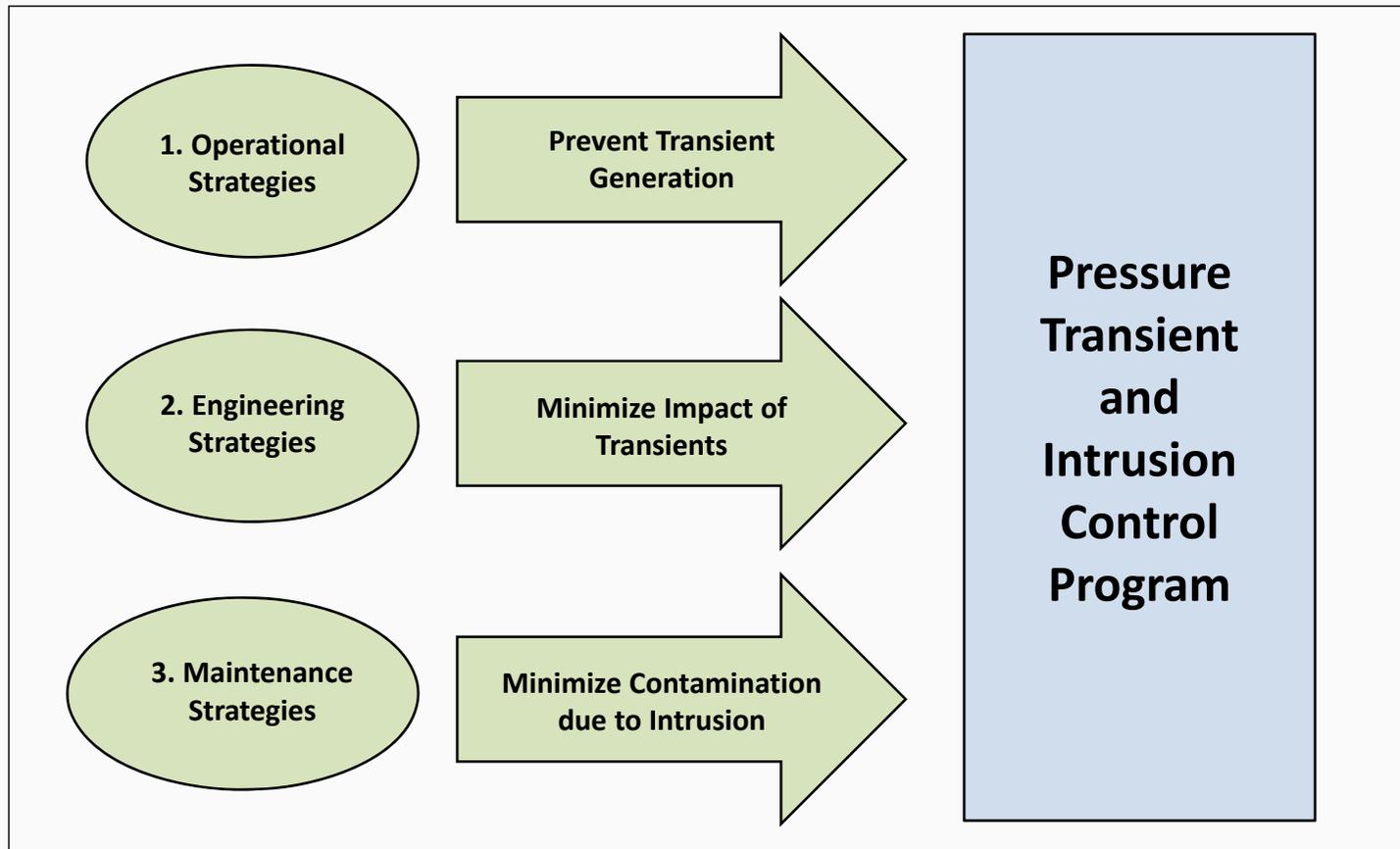
Overhead Storage

■ “Floating” storage can dampen surges

- ◆ Provide backpressure
- ◆ Release water into system during downsurge
- ◆ Receive water during upsurge



Comprehensive Pressure Management and Intrusion Control Program



Adapted from Friedman et al. 2004. Verification and Control of Pressure Transients and Intrusion in Distribution Systems. WaterRF.

Pressure Management

- **Minimum, average, and maximum pressures maintained within the same pressure zone of the distribution system for a one-week period leading up to coliform event.**
- **Identification of atypical pressure conditions and potential causes of pressure events**
 - ◆ Main break/repair
 - ◆ Power failure
 - ◆ Construction activity
 - ◆ High demand event such as fire flow or hydrant testing
- **Breaches in the distribution system that may have allowed for contamination during pressure events.**

Assessment of Main Breaks and Potential Contamination

Contamination during main repair

■ Three phases of main installation/repair in which contamination may occur:

- Prior to installation/repair: at point of manufacture of replacement pipe or materials; during handling and storage; at the site
- During installation/repair: soil and trenchwater; cross connections; leaching
- After installation/repair: leaking pipe joints; stagnant water in adjacent pipe sections; cross-connections; pressure transients

USEPA. EES and AWWA. 2002. New or Repaired Water Mains. Distribution System White Paper.

www.epa.gov/safewater/disinfection/tcr/pdfs/whitepaper_tcr_watermains.pdf .

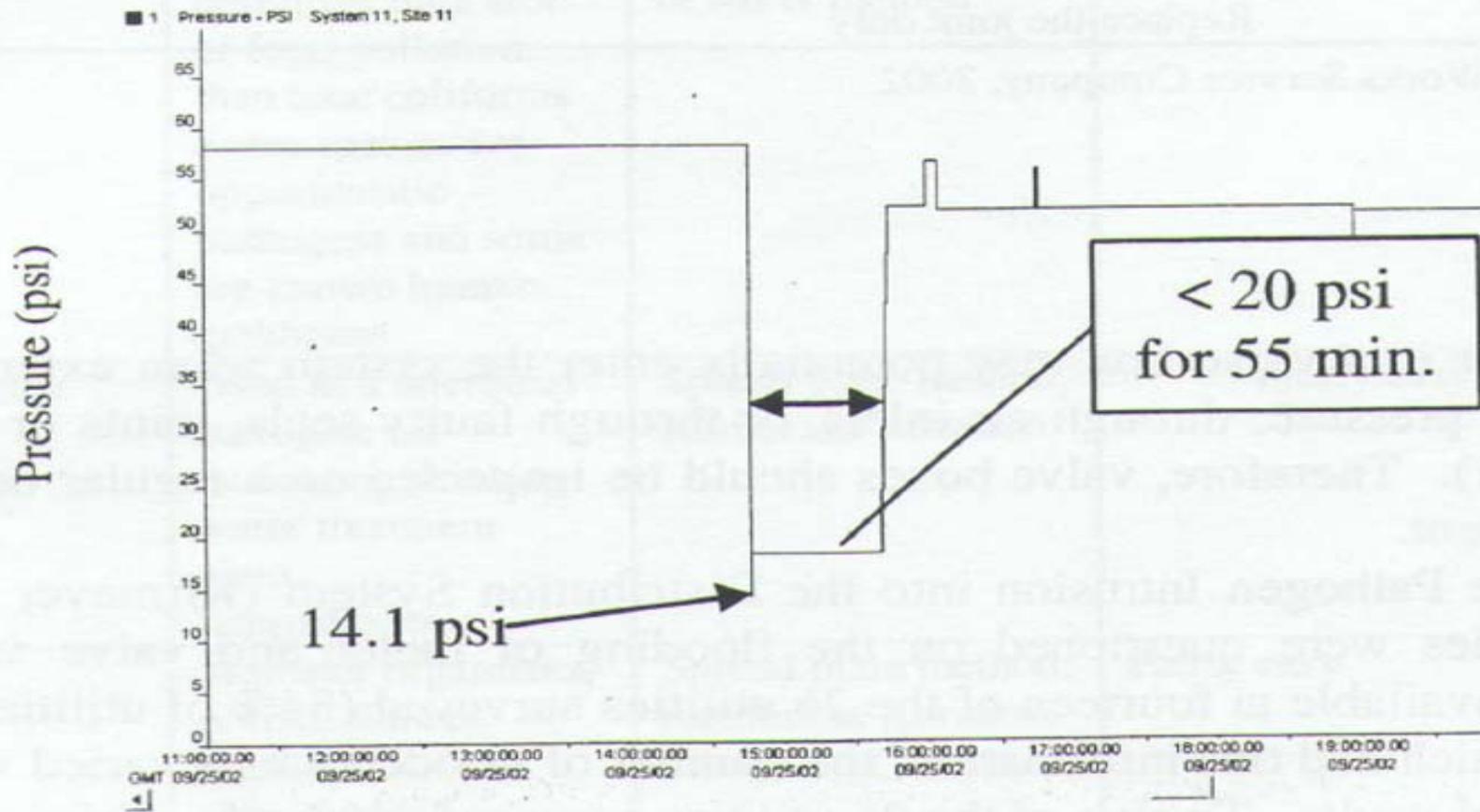
Accessed 01/15/2007.

Main Repair Practices

- **Survey of 46 construction inspectors in one state found sanitary problems were common during main installation and repair**
 - ◆ Soils gains entry to pipe
 - ◆ Runoff enters trench
 - ◆ Positive pressure lost before site secured
 - ◆ Replacement parts dirty
 - ◆ Could not inspect in-place pipe before repair was made

Pierson, G., K. Martel, A. Hill, G. Burlingame, A. Godfree. Practices to Prevent Microbiological Contamination of Water Mains. AwwaRF. Denver, CO.

Example: Pressure Loss due to Main Break



Questions?

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