Adding Hardness The Natural Way

Kingston Water District System Upgrades

Presented By:

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Overview

- Project Background
- Construction, Startup and Lessons Learned
- Results
- Summary and Questions

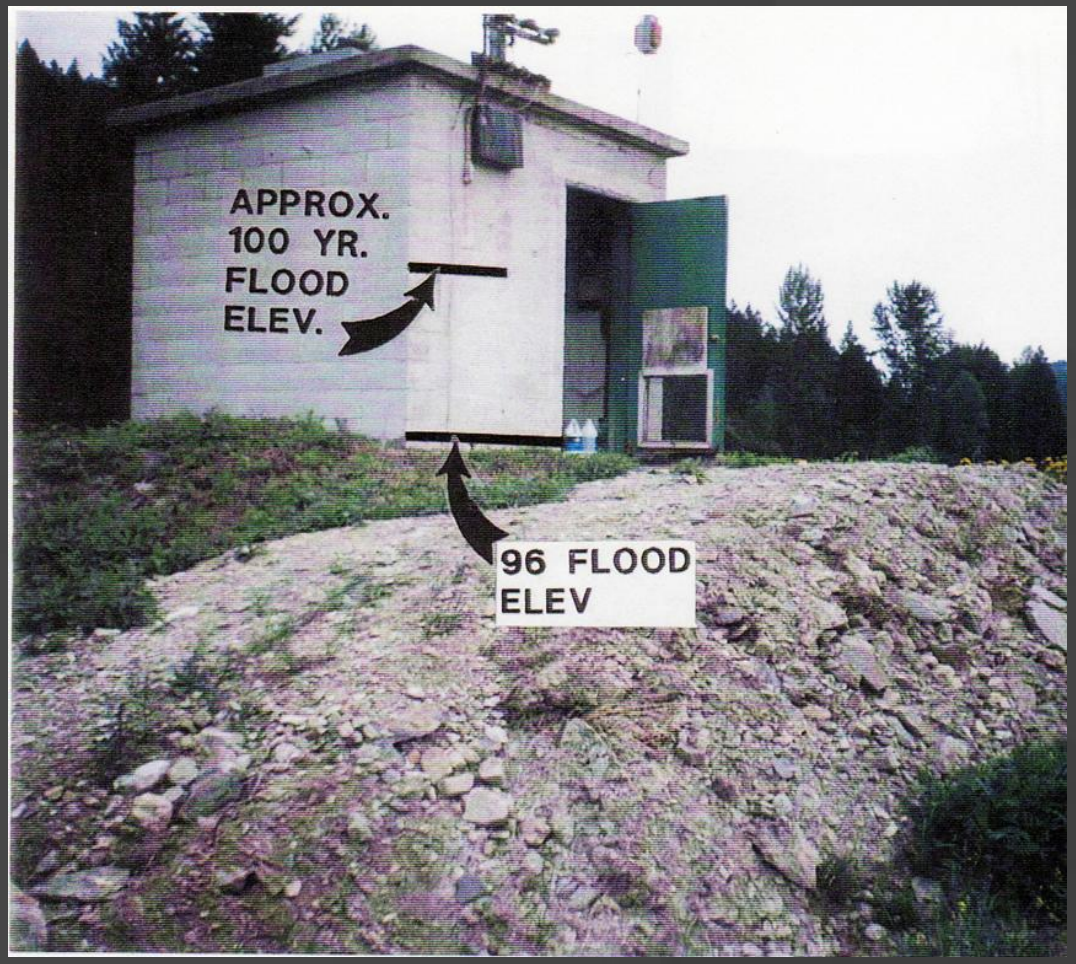
Background

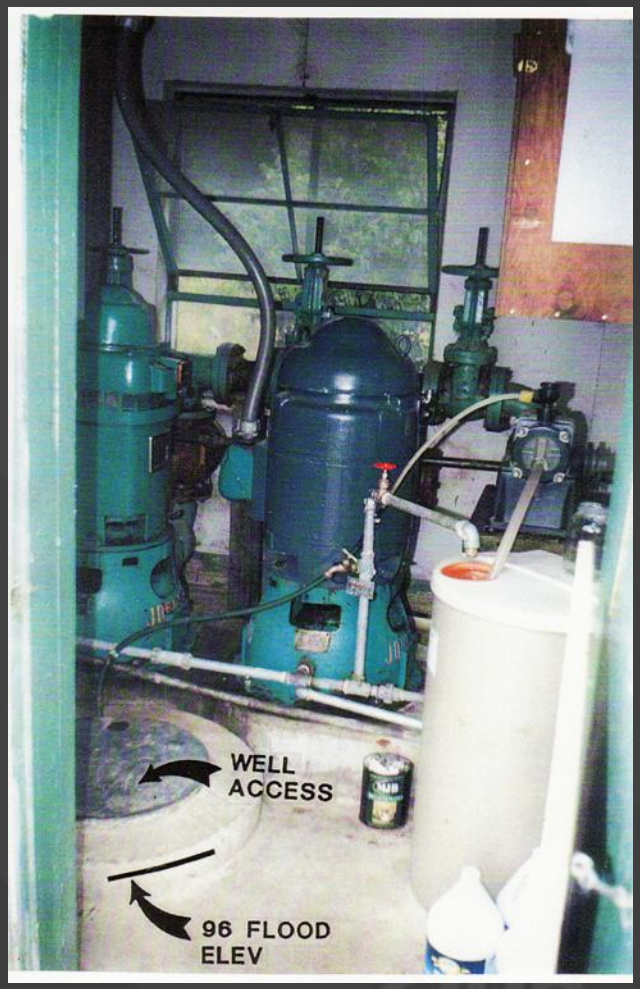
- Hand dug in 1950's, 18 feet depth.
- IDEQ made determination well was under the influence of surface water in April 1996.
- Corrosive - exceeded allowable copper levels (2.38 mg/L) and is at lead levels (0.015 mg/L).

March 26, 2007

Background - Kingston Well

(Ground Water Under the Direct Influence of Surface Water)

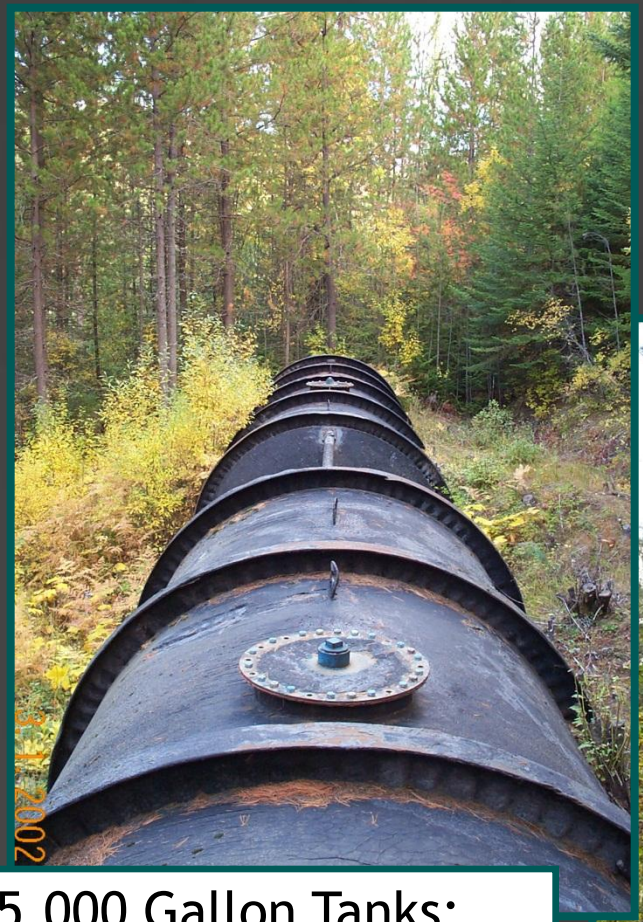




Background - Kingston Well

Kingston Well – 2007 Flood

Background - Tank Project



Two 15,000 Gallon Tanks:
- Provide Little Storage
- Freeze in Winter

75,000 Gallon Tank:
- Good Condition

Background - High Water Use

- Unmetered
- Aging Steel Lines – Many leak repairs

Recommended Plan

New Wells:

- *Mandatory Water Quality Requirements*
- *Increase Supply Capacity*
- *Reliable Supply*

Tank Replacement

- *Increase System Capacity Through Operational Storage*
- *Provide Emergency Storage*

System Demand Reduction

- *Leak Detection*
- *Water Metering*

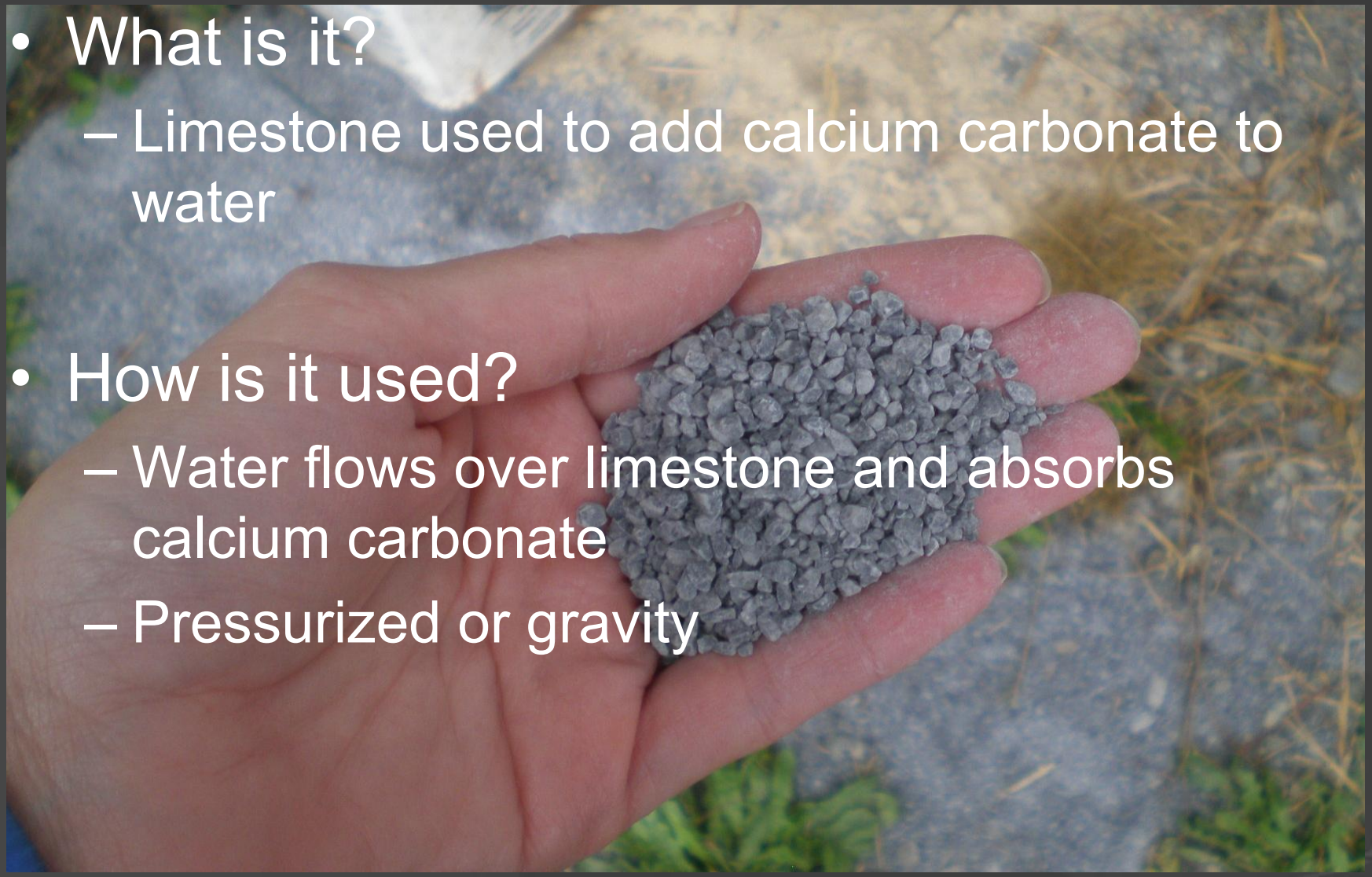
New Supply

- Original Supply
  - Waiver for Pb and Cu
  - Turbidity average 0.1 NTU, Peaks of 3 NTU
- Test Well at New Site
  - Alkalinity – 13.5 mg/L
  - pH – 7.1
  - Calcium – 3.6 mg/L
  - Iron – 0.04 mg/L
  - Manganese – ND
  - Turbidity – 0.06

Corrosion Control

- Options evaluated
  - Caustic Soda
  - Hydrated Lime
  - Soda Ash
  - Calcite Contactors

Calcite Contactors



- What is it?
  - Limestone used to add calcium carbonate to water
- How is it used?
  - Water flows over limestone and absorbs calcium carbonate
  - Pressurized or gravity

Calcite Contactors

- Advantages
  - Easy to operate
  - Low maintenance
  - No risk of overdosing chemical
  - Operates in upflow mode
  - No need for controllers/motor actuated valves or backwashing
- Disadvantages
  - Large footprint
  - Becomes less cost effective for systems over 1 mgd
  - Limited control
  - Materials handling

Kingston Water District

- Constructed 2008-2010
  - Two 6-inch Wells
  - 250,000 Gallon Concrete Reservoir
  - 7,000 feet of transmission main
  - Radio Read Metering System
  - Over 12,000 feet of waterline

Treatment Startup

- On-line fall 2009
  - Check valves not seating
  - Taste and cloudy water complaints

Treatment Startup, Cont.

- Turbidity
  - 3/29 0.127
  - 3/31 0.781 am – turned contactors off
  - 3/31 1.189
  - 4/1 1.208
  - 4/2 1.115

Kingston Water District

- Lessons learned
  - Two days to replenish filters
    - One day to add media
    - One day for disinfection
  - Wash media before startup
  - Media Size
    - Turbidity
  - Verify adequate wash water supply
    - 10 to 12 gpm per square foot
  - Ball valves or site glass to check media depth
  - Ventilation
  - Headloss

Water Quality Post Construction

- Lead and Copper Tests in January of 2011
  - All but one Pb test ND (MCL 0 mg/L)
  - Cu tests ranged from .008 to 0.085 mg/L (MCL 1.3 mg/L)
- Turbidity
  - 0.09 NTU
- Water Use
  - Demands reduced by over 60,000 gpd

Summary

- New Supply, Storage and Water Lines
- Corrosion Control Treatment
- Lessons Learned

Acknowledgements

Kingston Water District

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Questions?

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