



CORROSION CONTROL PROGRAM

Village of Croton-on-Hudson

September 17, 2007

▪ Introduction

- Summarize previous findings
- Purpose of this presentation
 - Detailed discussion of corrosion control program
 - Reason
 - Additives
 - Equipment Additions & Modifications

Corrosion Control Program – Purposes

- “Brown” Water Control
- EPA – Lead & Copper Rule
 - Lead levels reduced
 - Lead \leq 15 ppb
 - Copper \leq 1.3 ppm
- Increased system lifespan
 - Public Water Supply System
 - Customer Plumbing System
- Improved system operations

Corrosion Control Program

- Commonly used in communities with older distribution systems
- Westchester County Statistics
 - Widely Utilized
 - County Water District #1
White Plains, Yonkers, Scarsdale
 - County Water District #3
Westchester Medical Center, NYSDOT
WCDPW, NY Medical College

Corrosion Control in Westchester County (Cont.)

- Ossining
- New Castle
- Harrison
- Pleasantville (V)
- Mt. Pleasant
- Peekskill
- Yorktown
- Somers
- Mt. Vernon
- New Rochelle
- Mount Kisco (T&V)
- Irvington
- Elmsford (V)
- Cortland
- Montrose

Water Supply Influences on Pipe Corrosion

- pH
- Alkalinity/Hardness
- Temperature
- Dissolved Oxygen Concentration

Croton Water Supply Chemistry (circa 2005)

- pH \approx 7.25 (neutral = 7.0)
- Temperature 10-21° C
- Alkalinity 100-110 mg/L
- Hardness \approx 135-160 - Moderately Hard (Moderately Low on Hardness Range)

Corrosion Control Program – Additives

- Orthophosphates
- Zinc Orthophosphates
- Polyphosphates
- Zinc Polyphosphates
- Ortho/Poly Blends
- Silicate Phosphate Blends

200+ variants ANSI/NSF Standard 60 (Drinking Water-Health Effects) Certified

Compatibility

Additive	pH		Hardness	
	Hi	Lo	Hi	Lo
Ortho	✓	✓	✓	✓
Poly	✓			✓
Silicate	✓			✓

Recommendation

Zinc Orthophosphate

- Most commonly used corrosion control additive.
- Works over a wide range of system conditions.
- Positive results for all types of supply piping.
- Does not form soluble complexes that may precipitate, as with polyphosphates.

Zinc Orthophosphate – ZnPO_4

Components:

1. Inert liquid
2. Phosphoric Acid
3. Zinc Chloride

How does it work?

- Completely soluble in water.
- Zinc Orthophosphate forms an insoluble protective film on pipe walls at cathodic areas of corroded pipe surface. Also, bonds with iron, lead, and galvanized pipe.
- Zinc ion will bond with other anions to also form a protective film on pipes.

Additive Dosing Rate

Initial (Passivation) Dose ≥ 5 mg/L

Ultimate (Maintenance) Dose ≈ 3 mg/L

1 mg/L \approx 1 PPM

Therefore, at 5 mg/L, 5 gallons of ZnPO_4
per 1,000,000 gallons water.

Target

Achieve a residual zinc concentration of ≈ 1 mg/L throughout the distribution system.

Results

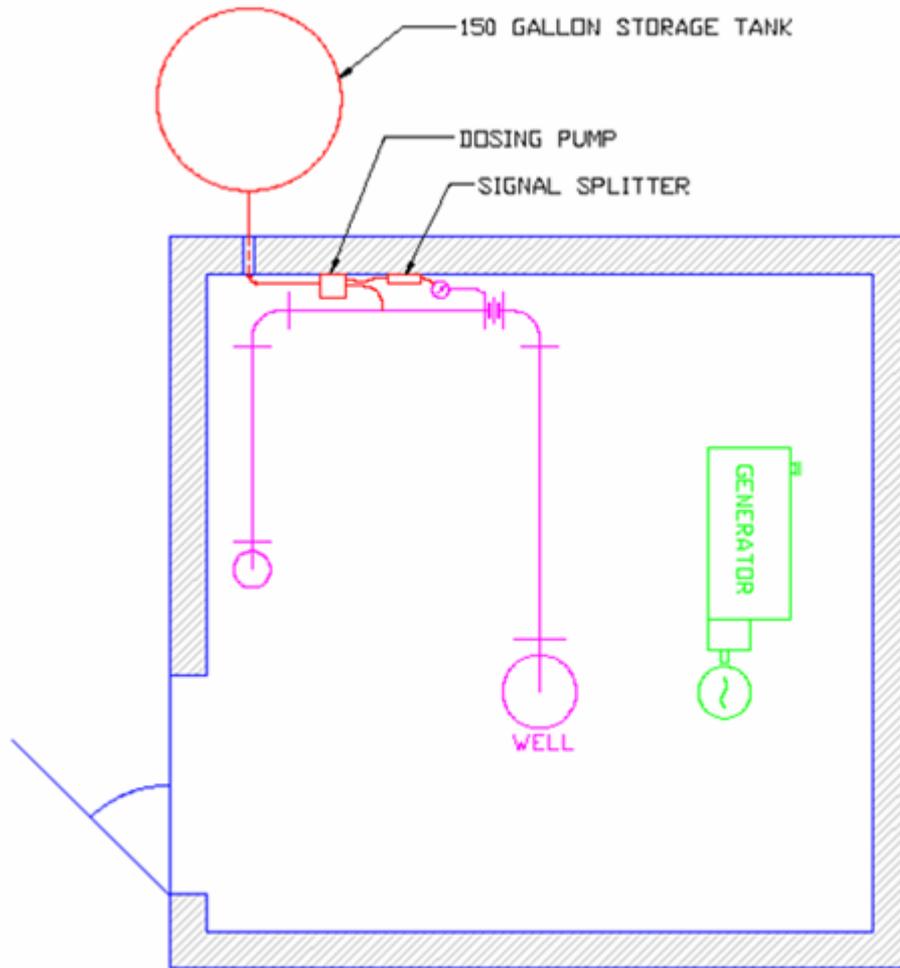
- A reduction in “brown water” events.
- Reduction of lead concentration in water supply. A public health and operational benefit.
- Prolong life of water supply system.
- Reduce operating costs.

- Comprehensive Supply System Improvements

The Village is:

- Replacing older water pipes where necessary, as funding is available.
- Rehabilitating pipe, where possible.
- Eliminating dead-ends in the distribution system, where possible.
- Corrosion Control Program complements other system improvements.

Corrosion Control



TYPICAL DOSING ARRANGEMENT