



Washington Suburban Sanitary Commission  
Copper Pipe Pinhole Leak Investigation  
June 26, 2003

# Recent Work

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- Experiments with high pH, aluminum, chlorine and no Natural Organic Matter (NOM)
  - Substances making up NOM protect metal piping
- Indication of initiating pitting in lab for the first time
- Impact of higher pH contradicts conventional scientific wisdom
  - Higher pH generally less corrosive to copper

# What Does This Mean?

- U.S. EPA requirements may promote leaks
  - Increased NOM removal
  - Higher pH for lead/copper leaching
- Statewide / National problem
  - Senate Bill 54 - creation of statewide task force
  - Dr. Edwards is receiving calls from utilities / customers across the county
- Met with EPA officials on 4/18
  - EPA agreed to look into issue
    - Possible workshop with AWWARF and others

# What Can be Done?

- While we do not know what causes pitting, utilities have sometimes identified water chemistry changes that can reduce pitting frequency.
- Possible approaches include:
  - Increase or decrease pH and alkalinity
  - Increase or decrease disinfectant dose
  - Dosing of corrosion inhibitors (influence corrosion)
    - \* Uncertainty in approaches

# Corrosion Inhibitors

- Corrosion “inhibitors” are safe chemicals that can be added to water and which influence corrosion
- Most common are silicates and phosphates
- Corrosion inhibitors do not necessarily inhibit corrosion
  - Not a guarantee -- may help

# What are Phosphates?

- NSF / FDA approved
- On average, people consume 1,000 - 1,500 milligrams per day
- Occurs naturally in meat and dairy
- Additive in many foods and beverages
  - cheese; cakes; cookies; breads; crackers; breakfast cereals; butter; chocolates; and soft drinks.
    - Some soft drinks contain 500 times more phosphate per liter than we intend to use.

# Phosphates in Water

- Approx. 50% of all utilities nationwide have been safely using phosphates to control corrosion
  - Many since the passage of EPA's Lead and Copper Rule
- Locally, this includes: Rockville, MD; Fairfax, VA; Carroll County, MD; Calvert County, MD; Frederick County, MD

# Orthophosphate Lab Work / Pilot Project

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- Orthophosphate effective in lab test
- Yearlong pilot reduced pinhole leak rate in Laurel apartment complex
- Apartment management wants to keep using orthophosphate
- Additional pH testing reinforces use of this corrosion inhibitor
- Strongly recommended by Dr. Edwards



# Orthophosphate Systemwide

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- Received MDE permission to add during water filtration process
- One part per million (equivalent to one milligram per liter)
- Using in-house staff to expedite construction of interim orthophosphate facilities
  - Summer / Fall '03 completion date
  - Permanent facilities will be built in conjunction with ongoing work to upgrade both Water Filtration Plants.

# Next Steps

- **SPRING '03**
  - Received MDE approval
  - Reported results / recommendations to Commissioners
  - Reported results / recommendations to County Councils
  - Began work on interim facilities
- **Recommendation is to add orthophosphate**
  - Summer / Fall '03
    - Customer outreach
    - Construct interim orthophosphate facilities
    - Brief Montgomery County Council - June 26
    - Add orthophosphate -- potentially Summer / Fall '03

# Summary

- Complex problem
- Potential role of Federal water chemistry regulations
- Exact cause unknown
- Orthophosphate may minimize leaks
- Orthophosphate recommended