

## Champlain Water District Corrosion Control Program

- Champlain Water District's Corrosion Control Program began in 1984 and achieved optimization under the USEPA Lead & Copper Rule.
- CWD's optimization activities are implemented using a framework that complements CWD's longstanding goals.
- CWD is a municipal entity chartered by the Vermont Legislature to provide drinking water to member communities.
- Eight (8) publicly elected commissioners, one from each member city/town
- Serves 75,000 people
- 23 MGD modified direct filtration-type plant in South Burlington, VT
- 3 Contact Adsorption Clarifiers & 8 deep bed multimedia filters
  - Preoxidation/Zebra Mussel treatment
  - Primary Disinfection to inactivate pathogens
  - Coagulation/Flocculation with adsorption clarification as pre-filtration
  - Deep Bed Multimedia Filtration for particle and natural organic material removal
  - Fluoridation for Vermont Department of Health Dental Division recommendations
  - pH adjustment to consistent, neutral pH
  - Secondary disinfection to ensure safe, effective residual throughout the distribution system, and to reduce formation of disinfection by-products
  - Corrosion control treatment to reduce lead and copper leaching from home plumbing
- Treatment plant optimization
  - Combined and individual filters
  - Particle Counts and turbidity
  - Further optimization lower DBP levels
  - Partnership for Safe Water
    - Completed Phase 3 & 4 Program Requirements
    - Excellence in Water Treatment Awardee – First in the Nation
    - Best of the Best Taste Awardee for North America
- CWD compliance agent for municipal consecutive systems.
- All SDWA sampling and reporting conducted via formal agreement dating back 25 + years.
- CWD ownership, operation & maintenance of infrastructure via MOUs.
- 24/7 operation of transmission/storage via SCADA system.
- CWD's source is more like a "Great Lake" than a typical low alkalinity New England source.
- Lead service Lines (LSLs) are not present.
  - Target materials are 50/50 lead tin solder and brass fittings in home plumbing
- Historical 1984 – 1991 (i.e. before the Lead & Copper Rule (LCR) !)
  - Bench scale coupon comparisons.
  - Consumer location sampling (16 locations)

- Investigated corrosion inhibitor which reduced rate 78 %.
- Corrosion control treatment with orthophosphate started April 1987.
- Based upon lab/pilot scale coupon studies and some system wide coupon insert studies.
- Ideal pipe loop – solenoid driven to simulate home water use. (Pilot scale to implement optimized corrosion control treatment (OCCT)).
  - Pilot scale allows you to set conditions that may exist within consumer's home plumbing.
  - Used to simulate corrosion conditions within a "typical" copper pipe system soldered with 50/50 lead tin solder.
  - Evaluate treatment changes on home plumbing.
  - Galvanic coupling of metals.
  - Indicated passivation of the coupons from the standpoint of metal release.
  - Moved to an optimized orthophosphate dose and optimized pH.
- Metals release pilot (metals release monitoring):
  - Based upon Ideal Pipe Loop concept
  - Use solenoid driven system to simulate home water use/materials contact times for 50 50 lead tin and brass.
  - Collect "first draw" 1 liter grab samples
  - Continue to track passivation impact on home plumbing metal release overtime.
  - As experienced during ideal pipe loop study, metals release baseline established after passivation period.
  - Used to ensure treatment changes do not impact home plumbing.