# Quality Water to the Customer

## EPA Region 9 Distribution System Research Interests

Bruce Macler
USEPA Region 9
415 972-3569
macler.bruce@epa.gov

# Regs are but a Means to an End

- EPA Regional drinking water programs focus on compliance and enforcement
- But the public focuses on water quality at its taps
- The better utilities want and try to do both
- Other utilities are trying to survive
- Whatever help we can bring is appreciated

# Water Distribution Issues in R9

- Metals, mostly:  As, Cr, Cu, U, V…
  - Corrosion complaints
  - Redox reactions: binding and release
- Empty houses and old water
  - Maintaining residuals
  - Disinfection and byproducts
  - Flushing and flows
- Managing assets
  - Conservation and leak detection
  - Rehabilitation
  - Preparing for disasters
- Talking to the public

# Toxic Metals

- Compliance at distribution's entrance, but toxicity at the tap
- R9 has limited Pb issues, but other metals are plagues from distribution
  - As, Cr, U, V binding, release from iron pipes
  - Re/oxidation of Cr3 to Cr6
  - Cu corrosion after new construction

# Metals Work Needed

- Basic chemistry of metals reaction with pipe materials under different water quality conditions
- Specific research on interactions between problematic metals in distribution systems
  - Especially As, U, V, Cr
  - Contaminant Candidate List metals Mo, Co, Sr
- Effects of disinfectants and corrosion control agents on speciation and binding

# Fighting Old (Water) Age

- Much activity associated with Stage 2 DBPR compliance
  - Flushing
  - Mixing
  - Localized treatment
- Use of chloramine not without controversy
- Nitrification, loss of residual even with attention to detail

# Chloramine and N-DBPs

- Chloramine use has some controversy
  - Some folks seem to have an aversion reaction
  - Public health implications hard to evaluate
- Water quality changes and instabilities can lead to nitrification and loss of residual
- N-disinfection byproducts a concern
  - NDMA and other nitrosamines
  - The Unknown Ns

# Water Distribution Systems and Managing Buried Assets

- Water conservation
  - High use and leak detection
- Aging infrastructure
  - Repair/ replace only as needed?
  - Continuous upgrades?
- Sustainability and disaster planning
  - Abrupt: surviving an earthquake
  - Gradual: climate change
- Customer's expected level of service

# Monitoring for Managing

- Managing the distribution system requires data and effective models
  - Inputs from real-time monitoring
  - Sampling data
- Results from Water Security Initiative, AMI, other distribution monitoring show opportunities for data integration

# Sustainability

- Earthquakes and other abrupt events
  - Distribution systems are the weak links
  - Many systems will bleed out within hours
  - Power failures could achieve the same end
- Level of service during prolonged recovery
  - It would take months after a Big One
  - Taking showers with bottled water…
- Suitable designs exist for mitigation
  - Costly for retrofit, though
  - What more could be done?

# Communicating with the Public

- The public wants to know what's going on
  - Consumer Confidence Reports are confusing
  - Media reports are disturbing and misleading
- EPA isn't a public health agency, but has a communications responsibility
- Same for water utilities
- CDC, ASTHO and the public health community could help

# R9 Drinking Water Research

- Congressional line-item appropriations have funded nearly $26 M in DW research through Region 9
  - $9.1 M for desalination technologies
  - $5.4 M for water security
  - $5.2 M for water treatment
    - Perchlorate, chromate, TOC, lead, etc
- Only about $1.6 M addressed distribution
  - Mostly involving security
- So your work is important.  Keep making it count!