

# Identification of Pollutant Sources



Pretreatment Workshop  
Sponsored by: Colorado River Basin  
Regional Water Board & EPA Region 9

Presented by:  
Chuck Durham, Tetra Tech, Inc.  
July 21, 2015

# Pollutant Sources

- Review Industrial Waste Survey Results
  - Chemicals known present, Chemicals suspected present
- During Industrial User Inspections
  - What chemicals are used and stored
  - What areas are chemicals used and why?
- Be familiar with chemical by-products
- Be familiar with laboratory analysis interferences



# Copper



- Plumbing/piping
  - Example: New copper water line at aquarium. Several rare fish species killed. Copper concentrations 4 mg/L to 6 mg/L
  - Takes several months for residential copper piping to form biofilm to prevent high Cu leaching
  - Hot water can cause more leaching (boilers, steam, industrial laundries)
- Controlling algae and aquatic plant growth
- Paints, dyes – mildew resistance, biological control
- Water resistant adhesives
- Consider increased safety factor for Copper (& Zinc) when doing local limits.



# Zinc

- National Avg Domestic Background: 0.231 mg/L
- Oils, lubricants, greases
- City water corrosion inhibitor (Zn polyphosphate)
- Medicines, cosmetics
  - One septic tank from residence had Zn concentrations > 1,000 mg/L
- Plumbing, piping
- Anti-sticking agent (Zn stearate)
  - Windshield wiper IU had increased Zn concentrations and ask if any processed changed, they said no. However, eventually found out that new rubber supplier had recently started.



# Arsenic

- Wood preservatives
- Glass manufacturing
- Agricultural Products
  - Example: Arsenic product used to defoliate cotton.
  - Problems at clothing mfr.
  - Problems with corrugated box mfr. (potatoes – starch contamination)



# Molybdenum

- Lubricating oils
- Smoke suppressant, used in some plastics
- Foods (nitrogen fixing agent assisters- beans, peas, etc..)
- Corrosion Inhibitor
  - Cooling water additive
    - Different forms, look for sodium molybdate.
    - Concentrations may range from 2 to 20 mg/L



# Total Phenols

- Resins used in Plywood adhesives, wood preservatives
  - Landfills can have elevated phenols
- Disinfectants, deodorizers
  - Automobile mfr had chronic phenol violations. Over 1 yr of research and sampling conducted. Identified disinfectant/deodorizer.
- Air Masking Agents
  - Sweet smelling aroma. Pentachlorophenol contamination in WWTP sludge
- Antiseptics, Lotions, Lozenges

# Organics

- Chloroform
  - IU did not use chloroform but had concentrations > 14 mg/L
  - By-product of chlorination
- Phthalates
  - Do not use plastic containers when sampling, and use Teflon tubing not Tygon



# Other Volatile Organic Compounds

- Toluene, Benzene, Trichloroethylene, MEK, and other solvents or cleaners
  - Industrial laundries can have clients that send them solvent rags to be cleaned
  - Identify the source of the solvent rags sent to the industrial laundry, this may identify another Industrial User.

# Ammonia

- Seasonal Variation
  - Expect significantly higher concentrations of ammonia in the summer (temp, urea, etc...)
- Septic conditions can lead to higher concentrations
  - Sewage pumping stations
- Cooling additive
- At higher pH, ammonia is more toxic, and ammonia can be stripped from wastewater.

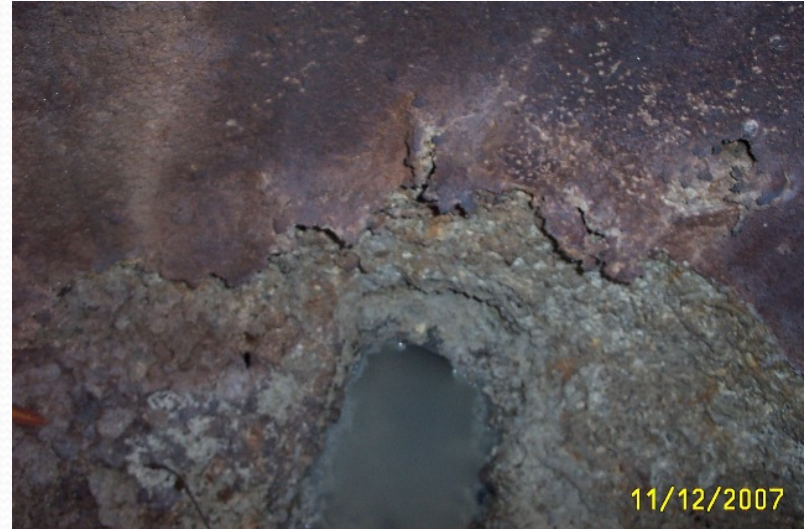


# Hydrogen Sulfide

- Force main discharges
  - Higher concentrations due to temperature increases, pH changes and retention time (longer with no Infiltration/Inflow to collection system)
- Below food service establishments
- Certain industrial users with high sulfate or sulfide concentrations, or can have very high BOD<sub>5</sub> or low oxygen content to ww



# H<sub>2</sub>S – Hydrogen Sulfide





# Industrial Corrosion



Part of Industrial Pretreatment Sampling is to be aware of the varying conditions at the IU, and potential impacts to the collection system.



# Industrial User Corrosion

- Corrosion impact may be further downstream than immediate downstream manholes.
- CCTV
  - Dairies
  - Bottling operations
  - Metal finishers





# Corrosion

- Hydrogen Sulfide-anaerobic decomposition of sulfate
  - FOG can contribute to sulfide formation in sewer pump stations and in collection system
  - Also, **sulfate** can react with calcium in concrete to form calcium sulfate, which can cause concrete to crack
- Chloride
  - Can cause decay and penetrate coatings
- Chlorine
  - HCl and HOCl can increase rate at which iron and steel corrode
- Nitrates and Nitrites
  - Can contribute to iron and steel corrosion
- Dissolved Salts
  - Electrolytic action on base material can corrode concrete, cement mortar
- Organic Compounds
  - Solvents will promote the dissolution of gaskets and rubber and plastic linings

# FOOD SERVICE ESTABLISHMENT -Grease Interceptor deterioration, baffle wall collapse, leaking, and corrosion impact to public sewer





# Other sources of corrosion



Sewer corrosion below a coffee shop

**\*Food Service Establishments**

**\*Coffee Shops**

**(coffee pH 4.6 to 5.1)**

**\*Bakeries, FSEs with high sugar use**

**Industrial Users: Dairy products, colas**

**Work with Collection System Support & Preventive Maintenance Personnel**



# Infiltration & Inflow Prevention Effects

- Some WWTPs have experienced a dramatic increase in pollutant concentrations when the collection system has been repaired to prevent I & I.
- In some cases, the WWTP has blamed an IU for the elevated concentrations in pollutants, so recommend doing some residential and commercial background sampling to identify pollutant concentrations.





# Questions, Comments?