

## **Developing Realistic, Representative Laboratory Test Methods for Profiling Scale Inhibitors Minimum Effective Dosage: Calcium Carbonate**

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Various Laboratory test procedures have been used to develop profiles and models of minimum effective dosage as a function of water chemistry, temperature and time. Some procedures provide realistic data, directly applicable to operating systems. Others that have been used and published serve only as generators of marketing data under conditions no sane water treatment chemist would run, with performance no customer would accept. This paper discusses the development of standard test procedures for simulating calcium carbonate scale control in operating systems. This study and paper is the first in a series on test procedures for calcium carbonate, calcium phosphates, calcium sulfate, barium sulfate, and the elusive culprits silica and magnesium silicate.

Moderator: Bonnee Randall

Saturday, 10:15 – 10:45 AM Ballroom C

## **Lead and Copper Workshop**

Robert Ferguson

French Creek Software

Federal and State recommendations for preventing hazardous levels of Pb and Cu in drinking water rely upon technology from 1936 to model corrosion and as control points for preventing metal transport through the distribution system. State laws also rely upon the same simple indices with a tenuous relationship to Pb and Cu corrosion, and metal solubility for transport. Use of these "technologies" resulted in the fiasco at Flint and general contamination throughout the United States. Current recommended Pb and Cu control techniques emphasize "anti-corrosive" treatment, and ignore the dissolution of existing deposits, and the solubility of hazardous metals in the water, that allows their transport through municipal distribution systems. In many cases, the phosphates and polyphosphates used for corrosion control increase the solubility and transport of lead and/or copper through the system. This paper outlines a multifaceted approach to lead and copper contamination of municipal water systems using 21st century modelling techniques that correlate directly to transport. The techniques address: The maximum solubility of Pb and Cu over the pH and temperature range of a municipal distributions systems, from the reservoir temperature through hot water heater and sanitizing

dishwashers; Pb and Cu corrosion in the systems based upon general models, and when available, correlations based upon measured corrosion rates in the system under study.

This workshop should be a 2 to 4 hour break away. It will draw upon the paper submitted for technical background and is a practical extension, not a substitute, for the technical paper. Many current laws regarding hazardous metal contamination of potable water by lead and copper are based upon simple calcium carbonate indices from the 1930's that have, at best, a tenuous relationship with lead and copper corrosion, dissolution of existing lead and copper based deposits, and transport through a municipal distribution system in a soluble form.

This workshop will use computer models to demonstrate the evaluation of current and proposed water sources based upon:

- The maximum soluble lead and copper in the water.
- The projected corrosion rates for lead and copper based upon generic model.

Evaluations will be done over the operating temperature range (reservoir temperature to hot water heater and dishwasher) and pH range. The development of system specific corrosion models based upon in system corrosion testing will be demonstrated. **Attendees are invited to submit their water chemistry, treatment protocols, and corrosion data for use as examples.**

Moderator: Conor Parrish

Friday, 9:00 – 10:30 AM, Ballroom D