Molybdenum Local Limit Development

Ted Graber, Industrial Waste Specialist
Regulatory Compliance Division
Metro Wastewater Reclamation District
What is the Metro District?

The Metro District is the wholesale treatment facility for the Metro Denver Area.
Metro District Fun Facts!

- Serve 57 Municipalities
- Serve 1.6 Million People
- Treat 140 MGD
- Produce 80 Dry Tons/Day of Biosolids
Why is Molybdenum a Concern?

40 CFR 503 – Subpart B, “Land Application.” Ceiling Limit for Molybdenum = 75 mg/kg
What Molybdenum Levels did the District Experience in its Biosolids?
Investigative and Analytical Efforts (2003)

- Surveyed Local Pretreatment Programs.
- Question to Yahoo Pretreatment Coordinators Group.
- Implemented Molybdenum Method w/ an improved Reporting Limit (5 vs. 30 ug/L).
- Increased Influent, Effluent and Biosolids Monitoring for Molybdenum (Removal Efficiency of 20-22%)
- Contacted Denver Water.
Denver-Water Transmountain Diversions
Climax Molybdenum
Investigative and Analytical Efforts (2004)

- Sampled Water Treatment Plants
- Sampled Residential Areas
- Potential Commercial/Industrial Sources
- Surveyed and met with the Water Treatment Chemical Community
Domestic Sources of Molybdenum

Forest & Missouri, & Severn & Jasmine vs Denver's Southern WTPs - Summer 2004

Date

mg/L

Denver Foothills & Marston Flow Weighted Ave []
Severn Pl. & Jasmine St. (mg/L) (Loc. Code #2002)
Missouri & Forest (mg/L) (Loc. Code #2001)
Domestic Sources of Molybdenum

Molybdenum Loadings From WTP, at Metro's Headworks and Roberts Tunnel Flows - May-Sept 2004

- Mo from WTPs (lbs/day)
- Mo at District's Headworks (lbs/day)
- Roberts Tunnel Flow (MGD)
Potential Commercial/Industrial Sources

- Truck Washes (0.014 mg/L)
- Deicing Products (< Reporting Limit)
- Antifreeze (automotive, < RL; Heavy Duty, 50 mg/L)
- Steris Sterilization Units (3.5 g/use; 2.5 lbs/day)
- Hauled Waste (0.01 lbs/day)
- SIUs (1 lb/day)
- Water Treatment Chemicals (8 lbs/day)
  - Cooling Towers (1-5 mg/L)
  - Closed-Loop Heating and Cooling Systems (50-300 mg/L)
Sources of Molybdenum

- Domestic: 62%
- Commercial: 35%
- SIUs: 3%
Commercial Sources of Molybdenum

- H2O Treat Chems - 58%
- Hospital Sterilization Units - 15%
- Other - 27%
Rules and Regulations changes, effective June 6, 2006:

• The District’s Molybdenum Local Limit was reduced from 0.71 mg/L to 0.43 mg/L.

• This limit applies to all non-residential users of the Metro District.
Rules and Regulations changes, effective January 1, 2007:

• Discharge from cooling towers, boilers, closed-loop heat transfer systems and any other cooling/heating system treated with molybdenum-containing water treatment chemicals is prohibited entirely (8 lbs/day or >).
Compliance with prohibition determined by either:

- Certification(s) from water treatment chemical blender(s)/manufacturers; or

- Laboratory analysis using 40 CFR 136 approved test methods verifying the absence of molybdenum in the discharge.
Best Management Practices
Open Systems
Best Management Practices

Open Systems

- Change over to non-molybdenum-containing products no later than December 31, 2006.
- Document date of changeover.
- Obtain certification(s) from vendor(s).
- Perform molybdenum analysis.
- Return unused molybdenum containing water treatment chemical(s) to the vendor(s).
Best Management Practices
Closed Systems
Best Management Practices

• Closed Systems (Alternative I)

- Drain system and replace with non-molybdenum-containing products no later than December 31, 2006.
- Document date of changeover.
- Obtain certification(s) from vendors.
- Perform molybdenum analysis.
- Return unused molybdenum-containing water treatment chemical(s) to the vendor(s).
Best Management Practices

• Closed Systems (Alternative II)

- Begin using non-molybdenum products (without draining system) no later than December 31, 2006.
- Document date of changeover.
- Obtain Certification(s) from vendors.
- Post Advisory.
- Seal or otherwise protect drain(s) from accidental discharges.
- Return unused molybdenum-containing water treatment chemical(s) to the vendor(s).
- Manage all wastewater from the closed-loop system in a zero discharge manner.
Steris 1 Sterilization Units

- 3.5 grams of Mo/use.
- 1000’s of uses/year/large hospital.
- Estimated 2.5 lbs/day discharged in our Service Area.
- Letter Sent Requesting Voluntary Reduction in Steris Usage. Informed they were required to comply w/ New Local Limit.
Where are we at Today?

- In the Summer of 2007 the District’s Mo Loadings decreased by 19 lbs/day or 62% from the Summer of 2004.
- However, it was estimated that as much as 15 lbs/day or 79% of this decrease was due to reductions in loadings from the Water Treatment Plants in our Service Area.
Where are we at Today?

District's Hopper Cake, Roberts Tunnel Flows 2005-2008
Vs. Time

Date
8/1/04 2/17/05 9/5/05 3/24/06 10/10/06 4/28/07 11/14/07 6/1/08 12/18/08 7/6/09

mg/kg (dry wt)
0 10 20 30 40 50 60

MGD
0 100 200 300 400 500 600 700

District's Hopper Cake
Roberts Tunnel Flow
Questions