

# National Air Toxics Trends Stations

Methods Update  
September 27, 2005

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# Outline

- Recent Developments
  - Hexavalent Chromium
  - Acrolein Research
  - Continuous Metals Method
- Future Developments



# Collection and Analysis of Hexavalent Chromium

## ■ Objective

- Identify cleanest filter media
- Stabilize the  $\text{Cr}^{6+}$  on the filter
- Recover spiked  $\text{Cr}^{6+}$  on filters exposed to ambient air

## ■ Sample Design

- Assessed filter media (cellulose, PVC and Teflon)
- Performed stability study
- Sampled ambient air with spiked filter media for 24 hours (as a collocated sample)

## ■ Conclusions

- Although Teflon filter retained  $\text{Cr}^{6+}$  longer on control filters, Cellulose filters demonstrated higher  $\text{Cr}^{6+}$  recovery after sampling air containing reducing agents (reducing  $\text{Cr}^{6+}$  to  $\text{Cr}^{3+}$ ).



## Analysis of Acrolein in Ambient Air

### ■ Objective

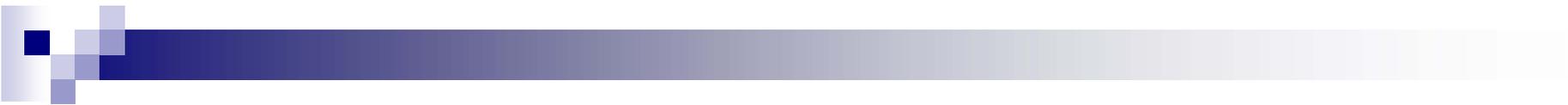
- Determine the feasibility of analyzing Acrolein from TO-15 canisters

### ■ Sample Design

- Performed stability study
  - Four different canister manufacturers
  - Two different concentrations (0.5 and 10 ppbv)
  - Two different humidities (10 and 80%)
- Spiked other TO-15 compounds (to simulate real world samples)
- Measured 4 replicate intervals (25% RPD and 15% CV)

### ■ Conclusions

- Acrolein appears to be stable in canisters (with varying humidity, concentration, manufacturers)
- Method TO-15 (SIM) can be used to determine acrolein at 0.11  $\mu\text{g}/\text{m}^3$  without interfering with other target compounds



## **Proof of Concept: Adapt Metals CEM Technology for Ambient Air Toxics Continuous Monitor**

- **Project Goal:** Determine ability to measure non-cancer risk levels (<50pg/dscm) for Cr, Mn, Ni, As, Cd, Hg, and Pb in PM2.5 samples collected semi-continuously at 4 hour intervals. Applications for source attribution modelers and health effects researchers.
- Two-week sample collection by CARB at Fresno, CA, using modified Met One BAM monitor with stretched-Teflon filter media (low metals background levels).
- Samples analyzed by Cooper Environmental using optimized XRF system.
- Desired detection levels were achieved and further development continued with goal to meet 10-20 pg/dscm cancer risk thresholds.



## **Future Methods Development Activities**

- Develop and verify SOP for air toxics metals analysis by ICP/MS. Needed to help establish consistency within NATTS laboratories to meet data quality objectives.
- Update Air Toxics Technical Assistance Document.
- Investigate need for further development and verification of a method for 1,3-butadiene.