Experiences with Next Generation Technologies

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NextGen technologies in R5

- Geospatial Measurements of Air Pollution (GMAP) system equipped with Cavity Ring-down Spectroscopy (CRDS) for real-time H$_2$S & CH$_4$
- Xact 625 Fenceline Monitor for 1-hour near-real-time measurement of 23 trace metals and minerals via built-in XRF instrument
- Passive tubes for 1-2 week integrated sampling of VOCs with TO-15 analysis at EPA-ORD
GMAP system in action
Real-time CH$_4$ ribbon plot shows peaks downwind of landfill
Claim to fame: imminent and substantial endangerment finding (Sec. 303) due to $\text{H}_2\text{S}$ leak in Detroit
Metals trailer in action
Reel-to-reel metals filter tape
Site deployment and O&M

- Our current approach: short-term (3-6 month) studies
- Advance visit(s) needed to secure site access and get a quote for electrical installation
- Every time we move the trailer, 3-5 days of staff time and $2-4K needed for electrical installation
- Once system is running, filter tapes are changed once every 3 weeks. Local monitoring agency can be trained to change tapes.
- There are additional costs to maintain the system – annual purchase of filter tapes, flow certification
Metals deployments to date

• 3 studies of facilities that may violate Pb-NAAQS
  – Two showed elevated Pb in ambient air. Both have ongoing enforcement actions. Hourly metals & met data helped pinpoint Pb emitting processes.

• 3 studies of known high-Mn areas
  – Two gave useful information about specific Mn emissions points at large metallurgic operations.
  – Potential data uses:
    • Ongoing enforcement case (monitored site & others)
    • Voluntary reductions (monitored site & others)
    • Recommendations to OAQPS for future rulemaking
Facility “X” – Suspected Pb emissions point & trailer site
Pb pollution rose, follow-up
Barring a 3-month Pb NAAQS exceedance, we don’t have a regulatory “hook” for air enforcement.

Leading inspectors to emissions points where they find PM/Pb violations gives a murky “success story”.

Manganese is a lower priority since its toxicity suddenly dropped 6-fold: EPA replaced our 0.05 ug/m³ RfC with ATSDR’s 0.30 ug/m³ MRL.
Metals - next steps

- R5 is struggling to justify future funding of the metals trailer. My positive spin: this technology is bigger than just our Region! It’s a valuable resource for the Agency as a whole.

- We are investigating options to collaborate with other EPA organizations for special investigations – Regions, NEIC, ORD, State/Locals. The trailer should be in a nation-level pool of technological resources.
Passive VOC tubes in action

Region 5 component of ORD RARE & Regional Method Development
VOCs - next steps

- R5 field study was a success. Results are pending.
- We are starting a new R5 study to compare collocated passive tubes vs. canisters vs. auto-GC.
- Potential future sampling for community-based or enforcement related work.
- More to come..
THANK YOU!

- Questions on GMAP, contact Marta Fuoco (fuoco.marta@epa.gov, 312-886-6243)
- Questions on metals trailer, contact Motria Caudill (caudill.motria@epa.gov, 312-886-0267)