Laboratory and Sampling Developments

National Pretreatment & Pollution Prevention Workshop

November 14, 2007
Federal Advisory Committee – Detection and Quantitation and Their Uses

- Detection – threshold for “Is it there?”
- Quantitation – threshold for “How much is there?”
- EPA’s version
    - Promulgated in 1984
  - Minimum Level (ML) is 3 times the MDL
# Why Care about Detection and Quantitation?

<table>
<thead>
<tr>
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<th>Facility X</th>
<th>Facility Y</th>
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<tbody>
<tr>
<td><strong>Analyte</strong></td>
<td>Aluminum</td>
<td>Chromium VI</td>
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<tr>
<td><strong>Water Quality Standard</strong></td>
<td>87 ug/L (chronic)</td>
<td>11 ug/L (chronic)</td>
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<td>750 ug/L (acute)</td>
<td>16 (acute)</td>
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<tr>
<td><strong>WQBEL</strong></td>
<td>DML = 87ug/L</td>
<td>DML = 16 ug/L</td>
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<td>AML = 58 ug/L</td>
<td>AML = 8 ug/L</td>
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<tr>
<td><strong>Method</strong></td>
<td>Method 208</td>
<td>Method 218.4</td>
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<tr>
<td><strong>Quantitation Limit</strong></td>
<td>100 ug/L (MQL)</td>
<td>10 ug/L (ML)</td>
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What Got Us Started?

- Longstanding concerns about how the MDL/ML is calculated and used in laboratory and regulatory programs
- Industry filed suit challenging the procedures used for determining detection and quantitation levels
- EPA and Industry reached a settlement agreement in October 2000 which lead to an assessment of detection and quantitation procedures, and a proposal to revise the ML/MDL procedure
- Received 136 comments indicating EPA could do better
- On November 1, 2004, decided to withdraw rule amendments and conduct a situation assessment by a neutral third party
What Did the Situation Assessment Recommend?

- **Common issues**
  - Current MDL/ML does not sufficient account for variability of results within and between labs
  - Need to address background contamination, matrix and recovery effects, false positive and negative rates
  - Need for a common set of terms and definitions
  - Need for consistency use of MDL and ML in reporting and determining compliance

- **Recommendations**
  - Federal Advisory Committee should be formed to reach agreement on
    - Definition of terms
    - One or more approaches for detection and quantitation for Clean Water Act purposes. Pilot test most promising procedures before deciding.
    - Interpretation and uses of numbers
  - FAC should be balanced set of stakeholders; EPA should be at the table.
  - FAC recommendations should be incorporated in rulemaking

- FAC charter effective May 31, 2005 for two years.
Who is on the FAC?

4 members each
- Environmental labs
- Water Utilities
- Environmental Community (one later resigned)
- Industry
- State Government

1 member
- EPA
What’s Happened Thus Far?

- 8 face-to-face meetings of the FAC; two FAC conference calls; over 100 meetings of several workgroups, subgroups and strike teams
- Pilot study of candidate detection/quantitation procedures
  - A dozen candidates narrowed to three pairs
  - Tested five methods over several weeks in 6-8 labs
- Original FAC Charter extended on May 30, 2007 to allow FAC to finish its work by end of CY07
- In September 2007, “resolution” of all issues; some consensus, other majority/minority opinions
What were the “Resolutions?”

- All in agreement that ML/MDL needs to be replaced; single-lab procedure identified but no consensus on all aspects of the new procedure
- New procedure should be pilot tested and peer reviewed
- EPA’s Drinking Water and Solid Waste Programs should consider using new procedure
- Regular validation important
- Measurement quality objectives (MQOs) important; various opinions about need for minimum or target MQOs
- Many want national guidance on matrix effects
More on “Resolutions?”

- Close to consensus on how detection and quantitation should be used in NPDES permits
  - Reporting
  - Calculation of monthly average
  - Compliance determinations
- National Quantitation Limit will be important benchmark for NPDES reporting and compliance; procedures on how National Quantitation Limits are calculated should be promulgated by EPA
- Did not have time to deal with uses for other CWA purposes
- Implementation will be critical
- EPA should devote resources to ensure implementation and promulgation of better analytical methods
What are the next steps?

- Last meeting Dec. 5,6 to finalize report to EPA
- EPA plans to proceed to rulemaking
  - Must decide what to do with majority/minority opinion issues
  - Pilot test and peer review the new procedure
  - Rulemaking and guidance
  - Implementation
What are the Implementation Issues?

- What is the lead time labs need to learn the new procedure?
- Which states will need to make corresponding changes in their rules and should this influence the effective date of any new rule?
- How do we ensure method developers are aware of the new changes?
- The reporting and compliance determination recommendations rely heavily on the existence of National Quantitation Limits which raises several issues:
  - Full implementation will take years. How do we operate a dual system in the meantime?
  - How does EPA prioritize the creation of National Quantitation Limits for existing and new methods?
- What guidance is needed for states?
  - Confusion between the old and new program, and lots of different QL types (national, state, permit, lab)
  - Guidance accompany the final rule would ensure consistent state implementation and a level playing field
  - Coordination with EPA Regions and States critical – training and workshops are needed regarding permit writing, reporting, and compliance determinations
POTW Study

- Initially
  - Not a redo of EPA’s “50 POTW-Study,” but would, in part, characterize performance changes of last 20 years
  - Measure influent and effluent concentrations of traditional and nontraditional (“emerging contaminants”) pollutants
  - This study focused on POTWs using well-designed and well-operated secondary treatment
  - Identify technology that treats nontraditional pollutants

- Original goals have changed significantly; focus now on nontraditional pollutants and nutrients
What Has Been Accomplished?

- Site visits at several POTWs with several mgd flow and significant industrial wastewater contribution
- Sampled four POTWs that met this industrial bias
  - Found traditional pollutants (metals, volatiles, nutrients)
  - No EE2 or Bisphenol A (plasticizer in your water bottle) detected in the samples with initial methods
  - Caffeine, Cholesterol, Acetaminophen, Ibuprofen found in abundance in influent and mostly not detected in the effluent
- Revised and peer reviewed initial analytical methods that measure pesticides, steroids/hormones and Rx/OTC drugs to improve sensitivity and selectivity
Where Are Our Study Goals Now?

- Study objectives and selection criteria focused on likely occurrence of Pharmaceuticals and Personal Care Products (PPCPs).
- Sample POTWs with mostly domestic discharges
- Will try to characterize treatment efficacy of technologies based on literature review
What Have Been Some of the Challenges?

- Need to “redevelop” and validating several existing PPCP methods for both wastewater and sludge
- Selecting facilities likely to have greater concentrations of PPCPs
- Procuring labs capable of accurately performing analysis
- Resources – sampling and analysis are very expensive; in future may be able to narrow PPCPs analyzed
What are our Next Steps?

In FY08,

- Conduct several one-day screener sampling episodes outside DC
- Scope logistics/costs to sample Potomac River Basin
- Conduct site visits at four more POTW candidates
- Determine next steps
Contacts

- **FACA**
  - Mary Smith at smith.maryt@epa.gov, 202-566-1056, or
  - Dick Reding at reding.richard@epa.gov, 202-566-2237

- **PPCP study**
  - Brian D’Amico at damico.brian@epa.gov, 202-566-1069 for POTW operations, or
  - Brian Englert at englert.brian@epa.gov, 202-566-0754 for analytical methods