Suggested QC Practices for On-Line Analysis

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Why do we need continuous monitoring?

Laboratory sampling is only a “snapshot” of the sample on a good day.
Sampling at the “pipe” does not sample storm water or irrigation water
Sources of pollution may be outside “the pipe”
Rarely do we sample when rivers are flooding

Just one more bottle
But there are no USEPA approved methods for on-line analysis!

- EPA approves methods
  - Methods include:
    - Sampling
    - Preservation
    - Calibration Verification
    - Duplicates
    - Spikes
    - LCS
Can get around sampling and preservation since analysis is immediate
There is no generation of a laboratory report, no batch QC
A significant portion of “normal” is eliminated.

- **Analysis**
  - Physical Treatment
  - Chemical Treatment
  - Measurement

- **Reporting**
  - Review/React
But a method includes “batch” QC steps that must be done

- Calibration and Calibration Verification
- Blanks
- Duplicates
- Matrix Spikes
- Analysis of Control Samples
Calibration of on-line analyzers can be automated

- Methods should ensure that analyzers automatically recalibrate
- Use multiple points if necessary
- Or, Operators should periodically recalibrate
Calibration verification should be automated

- Methods should ensure that analyzers automatically verify the calibration in a fixed interval
- Failed CCV should repeat calibration or flag
Analyzer should run “blanks” if target analyte varies

- Process control ≠ blanks
- Ambient water = blanks
The concept of “duplicates” does not apply, however precision should be evaluated

- The on-line method should require a way to collect repeatability data

- Stick the sampling straw in a beaker
The concept of “spikes” does not apply, however recovery should be evaluated

- The on-line method should require a way to determine recovery in the matrix
- Recovery determined on commissioning
The concept of “LCS” does not apply, however precision and recovery should be evaluated

- The on-line method should periodically evaluate an LCS
- LCS defined as comparison to approved method
Example of TN (on-line) compared to TKN (approved)

![Graph showing TKN vs TN]

- **TKN** vs **TN**

**Average Total Nitrogen (mg/L/day)**

**Date**

- 11/19/04
- 11/29/04
- 12/9/04
- 12/19/04
- 12/29/04
- 1/8/05
Example of TKP (approved) compared to TP (online)
On-line monitoring allows you to see “upsets”
Any new “method” for continuous on-line monitoring should:

- Obtain equivalent results to approved laboratory methods
- Be “rugged”
- Use few reagents
- Have a sufficient range
- Sample/”handle” a complex matrix
- Calibrate with multiple points
- Require periodic check samples compared to lab
The on-line analyzer must be rugged enough for field/plant use
The on-line analyzer should be capable of sampling multiple streams, or cost effective
The on-line analyzer should be capable of handling TSS if necessary.

Multiple Stream TSS Unit
Benefits of On-Line Monitoring

- Achieve Maximum Efficiency
  - Faster Response
  - Better Treatment
  - Cost Reduction

- Flexibility of Sampling
  - Hourly
  - Daily
  - Weekly
  - Monthly

- Reduce
  - Labor
  - Time
  - Money

- Automatic
  - Sampling
  - Pretreatment
  - Digestion
  - Analysis
  - Report
On-line analyzer methods are needed if data is to be reported for compliance

- Some QC in existing methods does not apply
- New methods can be written that still provide sufficient QC
- On-line results should be compared to lab results
Thank You!

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For more information contact

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