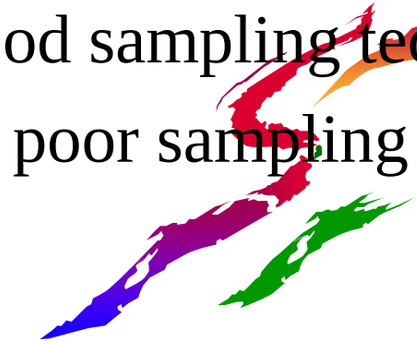
Flow Proportional Composite Sampling

DWSD's Notice &Requirements
Original: September 25, 2008
Updated: September 18,2014

Representative Wastewater Sampling & THE GOLDEN FLEECE

- Discussions about Representative Wastewater Sampling are like the quest for the Golden Fleece
  - It is highly desirable;
  - Attainment is difficult to achieve (Even for Heroes, Demi-gods, or IPP Personnel).
- The Industrial User's Viewpoint:
  - Sampling resulting in a compliance due to good sampling technique
  - Sampling resulting in non-compliance due to poor sampling technique



What is the Best Sampling Approach for Determining IU Compliance?

The Sampling Approach which REPRESENTS the Wastestream and Discharge from the facility.

Sampling Approach

- General Sampling Approach Must Consider:
  - Objective of Sampling
  - Sampling Location
  - Sampling Variables
    - Wastewater Character vs. flow or time
    - Volume of Discharge and Duration
    - Operating Conditions of Wastewater Source

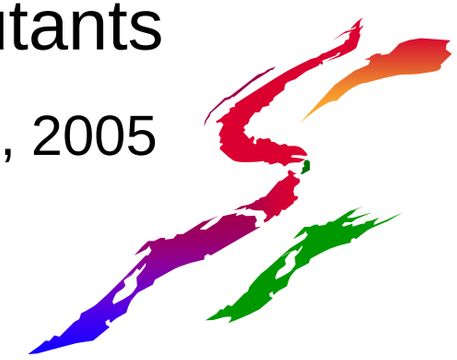
Approaches for Sampling of Wastewater Discharges

- **Grab Sample** are taken from a waste stream without regard to the flow of the waste stream and over a period of time not to exceed 15 minutes.
- **A composite sample** is prepared by combining a series of grab samples (aliquots) over a known **time** or **flow** intervals
  - Time-proportional – Collection at defined time interval
  - Flow-proportional – Collection at defined volume interval

DWSD Requirements (Since 2008)

- Implement Flow-proportional composite sampling per 40 CFR 403.12(g)(3)&(4)[1].
  - Collect Grab Samples for pH, Cyanide, Total Phenols, Volatile Organic Compounds (VOC)
  - Collect *flow proportional based* Composite samples for other pollutants

[1] – Final Rule found at 70 FR 60134, October 14, 2005



Flow-proportional Sampling Exemption Revised in 2005

- IU no longer required to demonstrate that Flow-proportional sampling is “infeasible” (pre-2005)
- IU must now demonstrate that time-proportional composite or grab samples are representative of the discharge
- Reasons for exemption must be documented in IU file

Flow-proportional or Time Composite?

- Detroit has 60 sites using Flow-proportional Sampling for Compliance Determination (24%)
  - Types of Sources include:
    - Landfills
    - Automotive Assembly & Production Facilities
    - Electroplating and Metalfinishing Facilities
    - Centralized Waste Treatment Facilities
  - Common Facility Characteristics:
    - Variable Characteristics of Wastestream
    - Treating Large Volumes of Wastewater (Batches)

Flow-proportional or Time Composite?

- Time-proportional Sampling used by 210 sites for Compliance Determination. (75%)
- Remaining sites use Grab method for Compliance Determination (<1%)

- Lesson: Sampling is not a One-size Fits All Approach.

DWSD Notice: Requirements for Pretreatment Program Sampling

DWSD, as Control Authority, placed burden of development on IU and burden of review on itself, so IUs have two options:

- Implement Flow-proportional sampling
  - ✓Submit Required Report describing how it will be implemented
- Continue Time-proportional sampling
  - ✓Submit required report demonstrating method yields representative results

Reporting Elements For Flow-proportional Sampling

- Provide F/P Sampling Information:
  - Industrial/Manufacturing Process
  - Wastewater flow characteristics
  - Flow measurement & sampling components available
- Description and time table for any required measures to be implemented for compliance
- Flow signal must be compatible with DWSD samplers

Documentation Requirements Exemption

- **User needs to demonstrate that time proportional composite sampling <u>will</u> be representative of discharge during the reporting period.**
  - Uniformity of volume discharged (flow)
  - Uniformity of wastewater characteristics
  - Uniformity of production rate
- Failure to Demonstrate - Flow proportional sampling required

Suggested Data Sources for Documentation

- Wastewater discharge volume, gpd
- Water consumption per day, per billing cycle etc.
- Pollutant concentrations (historical data)
- Production rate
- Sales volume
- Consumption rate of major raw material(s)

Experience w/Flow-Proportional Sampling

- Nearly 25% of all SIUs perform Flow-proportional sampling
  - Fewer sampling disputes and challenges (Good Sampling technique = Compliance)
  - In many cases, less variability between sample results
- SIU and POTW follow same “Sampler Steps” (inputs)
- Sampling events triggered with same flow device

  Places burden on SIU to keep unit in good working

  Order

  Eliminates discrepancies between different equipment

Issues w/Flow Proportional Sampling

- Sample Collection – need to confirm contacts are clean (User device and Sampler)
- POTW Staff comfortable in using F/P Methods
  - Set-up
  - Sample Collection protocols
- IU staff less familiar (Non-dedicated staff)

Other Issues

- Documentation and Analysis for authorizing F/P sampling may be more than 6 years old
  - DEQ Inspectors recently looked for file documentation which was archived using a 3-year schedule. Documents not requested during inspection; required pulling records from archived files.

RECOMMENDATION:

1. Add notation to file or permit to document that sampling method was reviewed and authorized by POTW (5 W)
2. Require SIUs to support sampling methodology during permit renewal.

Conclusion

- Implementation of F/P Sampling Methods has been relatively problem-free.
- *Representative Sampling* can be obtained through F/P Sampling or Time-proportional Composite Sampling (No Significant Difference)
- Review and Retain documentation on Sampling Approach in writing and in active file.

Conclusion

You Too Can Implement Representative Sampling and be an IPP Hero!