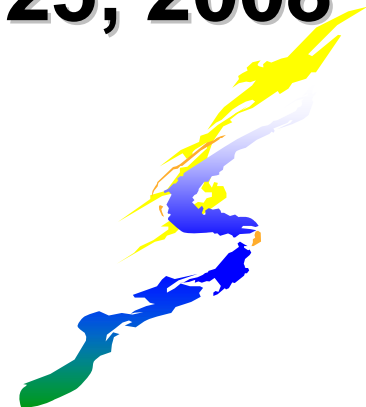




# Flow Proportional Composite Sampling

**DWSD's Notice & Requirements  
September 25, 2008**



# Summary

---

- 2005 Streamlining Changes included requirement for Flow-proportional sampling.
- DWSD SIU User base notified and required to comply.
  - Guidance prepared
  - Information presented to Industrial Groups
  - Inspection and Sampling personnel apprised of compliance requirement



# DWSD Requirements

---

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

<sup>1</sup> — Final Rule found at 70 FR 60134, October 14, 2005



# Sampling of 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



# Flow-proportional Sampling Exemption Revised

---

- 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 Sampling

---

- Consider fluctuation in the flow rate -
- Two Ways to do this:
  - ✓ By varying the sample collection frequency based on flow
    - Example: Collect fixed volume every 1,000 gals.
  - ✓ By varying the flow of each individual grab based on flow volume
    - Example: Collect weighted volume every 1,000 gals.



# Federal Regulation After Streamlining – 40CFR403.12(g)(3)

---

- Reports that require flow-proportional sampling
  - Baseline Monitoring Report - 403.12(b)
  - 90-Day Compliance Report –403.12(d)
  - Periodic Reporting (SMR) – 403.12 (e)
  - Reporting for Non-categorical SIUs- 403.12(h)



# 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

---

- Describe 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



# Other Requirements

---

- Identify the applications of flow-proportional sampling
  - ✓ Solely for sampling
  - ✓ Any other uses (e.g. process control etc.)
- Validation Plan (for meter accuracy)
- Interface requirement to DWSD sampling



# Reporting Elements for Time-proportional Sampling Option

---

- Industrial/Manufacturing Process description
- Wastewater flow characteristics
  - ✓ Source and average volume of wastewater
  - ✓ Type of discharge – batch, continuous etc
  - ✓ Operation cycle – duration of discharge
- Documentation establishing uniformity of flow and pollutant loadings



# Documentation Requirements Exemption

---

- **User needs to demonstrate that time proportional composite sampling will 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)



# Types of Analysis to be Used

(Time Proportional Composite Sampling)

---

- The issue: How accurately do current methods Represent actual (current) performance?
- Can apply graphical analysis
  - Plot data vs. time – 10% variability is acceptable



# Types of Analysis to be Used

(Time Proportional Composite Sampling) *(continued)*

---

- Can apply statistical analysis to demonstrate comparability between of sets of data
  - Descriptive statistics and Tests for Compatibility for data sets to show non-significant differences
  - T-test (Comparisons of Mean)
    - Test OK if  $t < t_{crit}$
  - F-test (Comparison of Stand. Dev.)
    - Test OK if  $F < F_{crit}$



# Case Study #1

---

- Nickel Plating
  - NCPS: 40 CFR 433 Metalfinishing (PSES)
    - Alkaline & Acid Rinsewater
  - Average flow = 1,418 gpd/operating day
  - Pretreatment = Batch treatment
    - Neutralization/Sedimentation
    - Storage Tank (Untreated Effluent) Available



# Case Study #1: Evaluation Approach

---

- Discharge Flow Rate: Controlled.  
Equalization tank permits accumulation of wastewater to balance waste load.
  - Wastewater Consumption compared to Wastewater Discharged with no significant variance in flowrate (F-test)
- Wastewater Pollutant Characterization
  - Data periods from July - December 2006 compared to January - June 2007 with no significant variance in pollutant quantity ( $F_{\text{calc.}} \ll F_{\text{table}}$ )



# Case Study #2

---

- Steel Pickling Operation
  - NCPS: Iron & Steel Manf 40 CFR 420
    - HCl Pickling - PSNS
  - Wastewater Volume = 30,000 gpd  
average from:
    - Pickling rinswater (5-stage counter-current cascade)
    - Acid Fume Scrubber



## Case Study #2: Evaluation Approach

---

- Discharge Flow Rate: Variable w/production.
  - Wastewater Consumption compared to Wastewater Discharged. Significant variance in flowrate ( $F_{\text{calc.}} \gg F_{\text{table}}$ )
- Wastewater Pollutant Characterization
  - Variable w/production
  - Data periods from July - December 2006 compared to January - June 2007 with no significant variance in pollutant quantity ( $F_{\text{calc.}} \gg F_{\text{table}}$ )



# Case Study #2: Flow-Proportional

---

- Established Flow Proportional Sampling Protocol
  - Flow Meter = ISCO 4200 w/data recorder
    - Setting One (1) pulse = 50 gals.
    - Sampler collects 50 ml every 5 pulses (250 gals.)
    - For 30,000 gals/250 gals x 50 ml = produces 6,000 ml of sample or 1.6 gals
- Company & DWSD use same flowmeter & sampling protocol



# Unacceptable Reasons for Exception

---

- No flow measuring device available.
- Small Facility/small operation
- Batch discharger
- Certification by authorized representatives
- Financial constraints



# Results: Notice Effort

---

- Total SIUs Being Sampled = 307
  - F/P Composite Sampling = 37 (12%)
  - Time Composite Sampling Validated = 266 (87%)
  - Compliance modification and study = 4 (1%)



# Conclusion

---

- 99% compliance by SIUs
- Six Month Reports - reflect appropriate sampling (either F/P or Time)
- Time-proportional Composite Sampling Permitted where *Representative Sampling* has been demonstrated
- Documentation requirements in writing and in file.

