Selection and Programming of Wastewater Samplers

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Topics

• Sampler Selection
• Equipment Options
• Sampler Programming
Grab Samples
Traditional Method – Inconsistent results

- Oil and Grease
- Specific depth
Birth of the Automatic Wastewater Sampler
Birth of the Automatic Wastewater Sampler

Time Interval

Bottle Volume

Distributor Arm

Peristaltic Pump
Automatic Sampling

Provides consistent samples while reducing manpower requirements
The most important rule of collecting water samples is......

The sample must represent the source...
Sampling Methods

Sampling Method needs to be considered for sampler selection

• Composite (Single Bottle)
• Sequential Distribution (Multiple Bottles)
  • Samples Per Bottle
  • Bottles Per Sample
• Run Continuously
Composite Samples

- Composite
  - Composite samples are samples taken and placed in a single large container.
  - Composite samples can be taken in two ways, fixed volume or flow proportional.
SEQUENTIAL SAMPLES

- Usually done when monitoring for specific events
- Used to determine pollutant trending
- 24 bottle sampling is most common.
- One or more samples collected in individual bottle each hour.
- There are samples/bottle or multiple bottles/sample options
Sampler Selection
What are the goals of your Sampling Program

• Monitoring WWTP
• Pretreatment Monitoring
• Stormwater Sampling
• CSO Monitoring
• Watershed Monitoring
WWTP’s

Waste Water Treatment plants

- Influent and Effluent Sampling
- Operating permit for Plant
  - Monitors incoming water conditions
  - Monitor water going out
  - Single bottle composite sampling
  - Flow Paced Samples
Single Bottle FR at Influent
WWTP’s

• Process Sampling
  • Monitors various stages of the plant processes
  • Multiple bottle used to identify issue with specific process
Permanent Sampler Options for WWTP Installations

5800 Refrigerated Sampler

• Major components separated for easy repair and maintenance
• 4 stored programs
• Analog or Digital inputs for flow paced sampling
• Meets most WWTP needs
Permanent Sampler Options for WWTP Installations

6712FR Refrigerated Sampler

- For more complex sampling requirements
- Provides all functionality of 5800, plus
  - 5 stored programs
  - Flow proportioned sampling
  - Modbus compatible
  - Can be connected to modem
  - Interchangeable flow modules
  - SDI-12 probes
Pre-treatment Monitoring

- Industrial Pre-Treatment Monitoring
  - Lets the treatment plant plan for treatment options
  - Used to indentify a source of non-compliant discharge water
  - Usually Timed Paced
Enforcement Monitoring

- Enforcement of permits
- Determine local limits
- Flow paced samples are more effective
Direct Dischargers (Enforcement)

- Monitor Discharge to Receiving Waters
- Monitor Discharge to Treatment Facility
- Monitor As Part Of Permit to Discharge
Portable Sampler Models

3700

GLS

6712
## Portable Sampler Models

<table>
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<th>Feature</th>
<th>GLS</th>
<th>3700</th>
<th>3710</th>
<th>6712</th>
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CSO MONITORING
(COMBINED SEWER OVERFLOWS)

- Reporting for Public Health concerns
- Determine impact to receiving waters
Watershed Monitoring

- Water Security Issues
- Monitors Impact From Storm Water Discharges
Storm Water Runoff

- Determining Impact To Receiving Waters During Rainfall
- Industrial Concerns
Government Enforcement Agencies and Research

• These Two Groups Perform The Vast Majority Of Storm Water Sampling

• Two Advantages For These Groups
  • Provide Valuable Information
  • Data Collected Is Used To Establish Regulations
Wide Variety of Sampler Models Used
2010 Storm Water Site
Wireless Communication

- CDMA, GSM Modems and Satellite Communication
- Data Retrieval through Flowlink
- Remote alarms (text messages)
6712 Remote Control

- Communication through Terminal Emulation Program
  - HYPERTERM
- Program Sampler
  - Emulates display screen on sampler
- Grab Samples – Perform manual functions
Data Storage

Sandy Creek
Storm Water Runoff Monitoring

Rainfall (0.67 in) Flow Rate (42118.3 gal)

Flow Rate

Rainfall

Samples Taken

2 Sat May 98
5/2/1998 8:00:00 AM - 5/2/1998 8:00:00 PM
Sampler Accessories

Now that we have identified the goals and the sampler required to meet these goals, some final equipment decisions need to be made

- Distributor Configuration
- Bottle Configuration
- Strainer Selection
- Power Options
Distributor Configurations
Bottle Configurations

- 24 Bottle
- 12 Bottle
- 4 Bottle
- 2 Bottle
- Single Bottle
STRAINERS

• PVC
  • Acidic liquid sources, and metals sampling

• Polypropylene & SST
  • Routine priority pollutants

• Stainless Steel
  • Low flow applications
Power Options

- Model 913 (120 VAC)
- Model 948
- Model 934
Sampler Programming
Why Composite Samples?

Composite samples are an effective means to collect data to support daily activities in WWTP

- Fixed volume samples – series of composite samples all having the same volume are collected at equally spaced time periods.
- The more individual samples collected, the better the composite will represent the flow stream. US EPA requires samples to be taken every 15 minutes over a 24 hour day
Composite Samples

In Waste Water Treatment Plants (WWTP), composite samples are required by permit.

Composite samples are used to monitor parameters such as BOD, suspended solids, ammonia, nitrogen and total phosphorus.
Composite Sample
Sequential Sampling

Sequential Samples are used to monitor the processes that occur inside a WWTP.
Bottles Per Sample

When larger samples (greater than 1000 ml) are required for proper analysis, the bottles per sample feature is used.
Samples Per Bottle

Customer’s often request a 1 hour composite sample, so the Samples per Bottle feature was added.
Sampler Pacing

- **Time**
  - Uniform Time
  - Non-uniform Time *
  - Fixed volume
  - Volume dependant on flow *

- **Flow**

- **Event Pacing**
Time Paced Sampling

TIME PACED
FLOW PACED

TIME BETWEEN
SAMPLE EVENTS
0 HOURS, 15 MINUTES
Time Paced - Volume Dependent
Flow Paced Sampling

- Time Paced
  - Flow Paced

- Flow between sample events:
  - 2 Pulses (1-9999)
Flow Paced - Fixed Volume

CalcFlow 1 (9890.0 gal)

Sample Event (11 SU)
• Event is level greater than 2.5 Inches
• 4 bottles per sample event
Run Continuously

- The sampler program allows the user to select a mode that runs the program indefinitely
  - User must stop sampler manually
Question Time!