Wastewater Sample Collection Procedures

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OVERVIEW

• Sampling justification
• Sample collection
• Sample handling
• VPDES Clean Sampling
• QA/QC
• Questions
Future generations will inherit clean waterways and be able to keep them clean.
- Regulations/Compliance
  - 40 CFR Part 403
  - NPDES/VPDES
- Prevent introduction of pollutants that may interfere with plant works
- Prevent introduction of pollutants to POTW which may cause pass through
• Recycle or reclaim municipal/industrial wastewaters and biosolids
• Informational purposes/trends
• Reduce health and environmental risks of pollution from toxic pollutants
• Surcharge
KEY POINT:

THE ANALYTICAL RESULTS OF A SAMPLE ARE ONLY AS ACCURATE AS THE QUALITY OF THE SAMPLE TAKEN.
SAMPLING LOCATIONS

- Manhole
- Cleanout
- Batch tank- Top, Middle, Bottom
- Discharge lines of processes
- Sumps
• Seasonal operations
• Daily operating hours
• Production clean-up
• Upsets and spills
• Compliance history
TYPES OF SAMPLES

• Composite samples
  ▪ Time-weighted
  ▪ Flow-weighted
• Grab samples
• Volatile organics grab
• Semi-Volatile organics
  ▪ Grab
  ▪ Composite
WHAT PARAMETERS?

- Characteristic of process
- Categorical pollutants of concern
- Potential to upset or pass-through POTW
- Local Limits
- Surcharge
• Composite sampling equipment
• Portable pumps
• Grab pole
• Jar on a string
• Meters
SAMPLE PROBES
• Composite sampler
• Portable pumps
• Grab equipment
• Jars/Bottles
• New or cleaned sampling probes
• New or cleaned sample tubing
• Intermediate bottle (composite jug)
COLLECTING A REPRESENTATIVE SAMPLE

- Identify sample point
- Identify representative wastestream
  - Composite samples/portable pumps – place probe near middle of moving wastewater stream
  - Manual sampling with jars – place mouth or collection container below the surface to avoid excess floating material (surface skimming)
  - Batch Tanks – collect samples in equal aliquots from the top, middle and bottom or the tank
• Confined spaces
• Traffic
• Chemical vapors/fumes
• Explosion hazard
• Biting insects
• What is it?
  – Chemical or physical treatment of a sample to assure continued presence of the target analytes at the same level as when the sample was first taken

• Why do it?
  – Sample preservation restricts chemical and biological changes that could continue after sample collection

APPROVED SAMPLE PRESERVATION METHODS ARE LISTED IN 40 CFR PART 136
• Adsorption or ion exchange with walls of sample containers
  – Ex. Metals

• pH changes can cause some constituents to dissolve and others to precipitate
  – Ex. Calcium Carbonate, Hardness
• Biological and microbiological activity can change oxidation states of constituents either releasing them into solution or binding them
  – Ex. Nutrients, BOD
• Head space can result in loss of compounds
  – Ex. Volatile Organics
PRESERVATION METHODS

- pH control
- Interference checks/removal
- Cooling to 6 degrees Celsius
- Use of amber and opaque bottles
• Logbooks
  – Characteristics of wastestream
  – Sample volume collected
  – Field pH
  – Collection time

• Chain of Custody (C.O.C.)
  – Preservation noted
  – Interference checks noted
  – Number of samples
Quality assurance protocols are implemented to ensure that sample collection and cleaning procedures are not resulting in contamination of samples used to determine compliance.
QUALITY ASSURANCE METHODS

- **Equipment Blanks**
  - DI water is drawn through a cleaned sampler and collected for analysis

- **Field Blank**
  - DI water is drawn through a cleaned sampler in the field and collected for analysis

- **Split Samples**
  - Sample is divided into two containers for analysis to check handling and analytical procedures

- **Duplicate Samples**
  - Separate samples taken from the same source at the same time are collected for analysis
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