Monitoring Equipment & Pretreatment Systems

Tools for ensuring compliant discharge
# Overview

## Common Monitoring Systems
- LEL Meters
- pH Monitoring
- Flow Monitoring
- SCADA systems for monitoring and process control – not as common

## Common Pretreatment Systems
- pH Neutralization
- Solids removal/clarification
- Granular Activated Carbon - Adsorption
- Fats, Oil and Grease Removal
What is LEL?

**Lower Explosive Limit**

“The lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in the presence of an ignition source (arc, flame, heat).”

- District code prohibits discharge of wastewater that results in:
  - Two successive readings of 5% or greater LEL
  - Or one reading of 10% or greater LEL
Continuous Monitoring
LEL Meters

- Alarm system
  - Visual
  - Audible

- Automatic shutdown of treatment system

- Maintenance
  - Keep probe dry
  - Calibrate properly
Why The Need

- Protect the Collection System
- Protect the Treatment Plant
- Prevent Pass-Through
- Protect Employees, Public Health and the Environment

1992 – Guadalajara, Mexico. More than 250 fatalities, 5 miles of city streets destroyed – sewer explosions resulting from flammable liquid (gasoline) discharge
What is pH?

A measure of acidity and alkalinity.

- **Central San Local Discharge Limits:**
  - pH of > 5.5 and < 11.5

- **Recommended Set Points to stay in compliance:**
  - pH= 6, pH= 11 (as an example)
pH Monitoring

Continuous pH Monitoring with or without Chart Recorders

- Alarm set points – visual/audible
- Proper Calibration
- Chart paper/pens
- Electrode cleaning/maintenance
Why The Need

- Protect sewer facilities from corrosion
- To prevent violent/toxic reactions
- Protect Employees, Public Health and the Environment
Flow Monitoring

- Determine operation within system capacity
- Sewer Service Fees based on loading
  - a function of strength and flow
Flow Meter Devices

Open Channel
Primary Devices
Flumes
Weirs

H = Maximum Head Rise

Rectangular Weir with End Constrictions

Sharp-Crested Rectangular and Y-Notch Weirs
Flow Monitoring

Open Channel Meters

- One example: Ultrasonic
Flow Meter Devices

- Closed Pipe
  One example: Propeller/Turbine
Flow Meter Maintenance

- Clean flumes/weirs frequently
- Properly calibrate
- Inspect electrical/sensors
- Software diagnostics
- If device fouled, clean it
Flow Meter Interface with Sampler

- Can connect flow meter to composite sampler
  - Flow Proportional Monitoring
- Calibrate flow meter before using
- Check electrical connections for corrosion
Pretreatment Systems

Wastewater Pretreatment

- Central San’s Treatment Plant cannot remove ALL pollutants
  - Pretreatment at the source is more effective

- Must be used in conjunction with Best Management Practices
Wastewater Pretreatment

- Eliminating, reducing or altering pollutants in wastewater before discharging to Central San facilities
- Helps businesses meet Local Discharge Limits and prevent blockages and damage to Central San’s facilities

Batch Treatment

Continuous Treatment

Maintenance
Pretreatment

Batch Treatment

- **pH neutralization**
  - If alkaline, add acid/buffer
  - If acid, add caustic/buffer

- **Chemical Deactivation**
  - Glutaraldehyde
    - Add Glycine to deactivate
Pretreatment

Continuous Treatment

- Granular Activated Carbon – adsorption
- Fats, Oils & Grease removal
- Solids removal/clarification
- Silver recovery – photo developing
- Mercury amalgam separator – dental industry
Granular Activated Carbon (GAC) - Aqueous Phase

- Treats Hydrocarbons
- Small Volumes of Solvents
- Some Metals
- Groundwater Remediation

**Maintenance:**
- Pre-Soak with Fresh Water
- Monitor For Break-Through Concentrations – replace
- Rotate Vessels to Maximize Carbon Life (Only With Multiple Vessels in Series)
FATS OILS AND GREASE (FOG)

Animal & Vegetable:
- Cooking oil
- Animal products – butter, lard, meats, dairy
- Hospitals
- Food Service/snack bars
- Food Manufacturing

Mineral:
- Motor Oil
- Lubricants
- Vehicle Service/Fleet Maintenance
- Car Washes
- Fleet Maintenance
Grease Removal Devices

- Protect Collection System and prevent overflows
  - Interceptors
  - Traps/separators
• **Grease Removal Devices**

  - Must be serviced by a licensed and permitted waste hauler at least once every 90 days.

  - Decanting of wastes back into an interceptor and other improper cleaning techniques are not allowed. (refer to GI Maintenance Fact Sheet).

  - Maintain receipts onsite for 3 years.

  - See specific Grease Removal Device information at the following link, click on “For Food Service Facilities”

Solids Removal/Clarification

- Protect Collection System and prevent blockages and overflows
  - Screening
  - Clarification/gravity settling
    - tanks, polymers
  - Filtration
    - bag, cartridge, membrane, filter media
Monitoring and Pretreatment Equipment Maintenance

- Inspection
- Preventative Maintenance
- Repairs
- Replenishment
- Calibration

Don’t be afraid to call a technician!