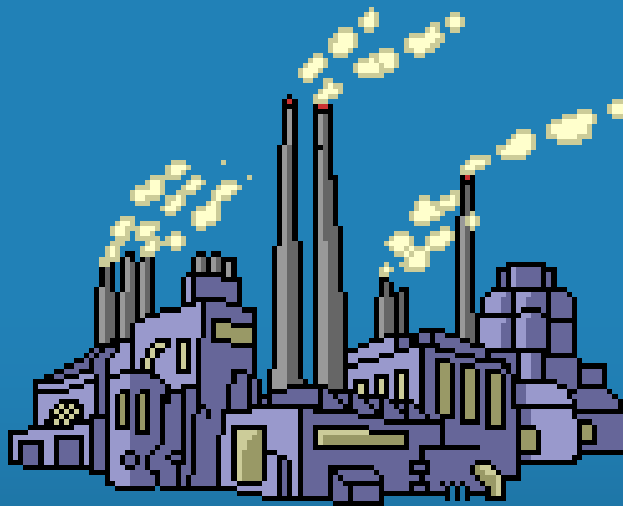


# Monitoring Equipment & Pretreatment Systems

**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/discharge**
- **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?

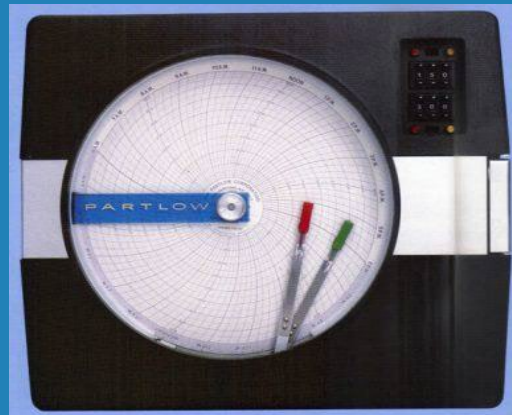
**A measure of acidity and alkalinity.**

- **Central San Local Discharge Limits:**
  - pH of  $> 5.5$  and  $< 11.5$
- **Recommended Pretreatment System 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



**Circular Chart Recorder**



**Strip Chart Recorder**

# Why The Need

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





# Flow Monitoring



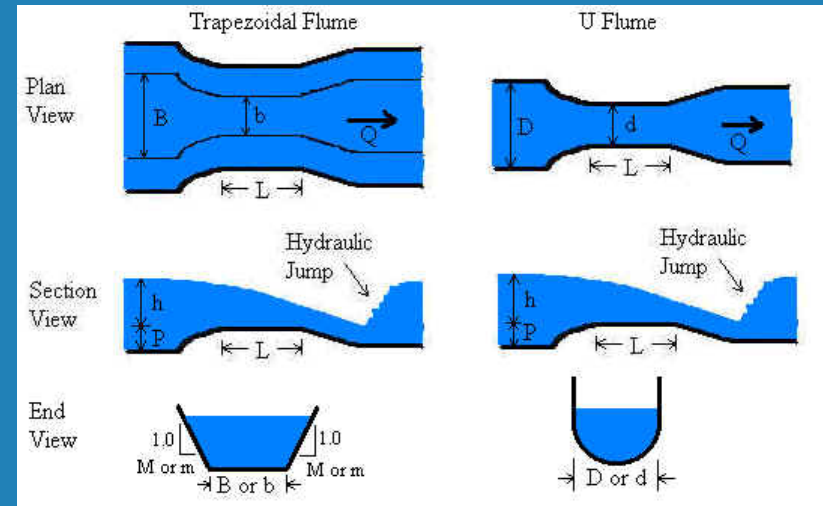
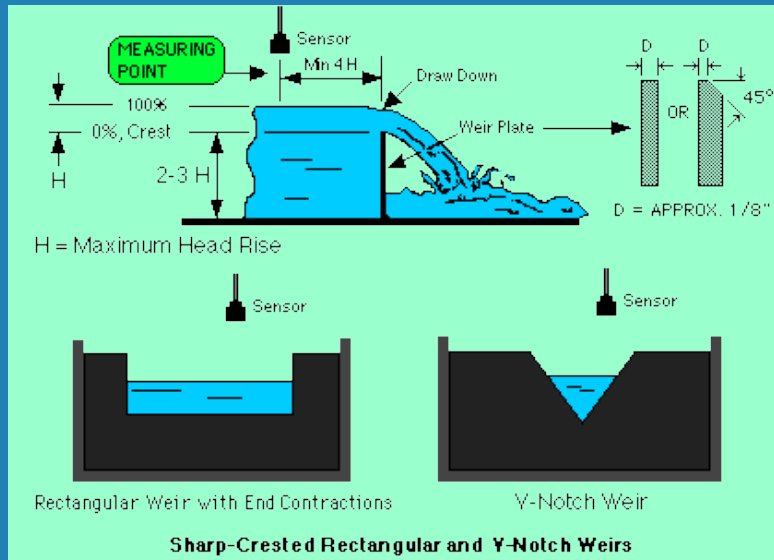
- **Determine operation within system capacity**
- **Sewer Service Fees based on loading**
  - a function of strength and flow

# Flow Meter Devices

## Open Channel

### Primary Devices

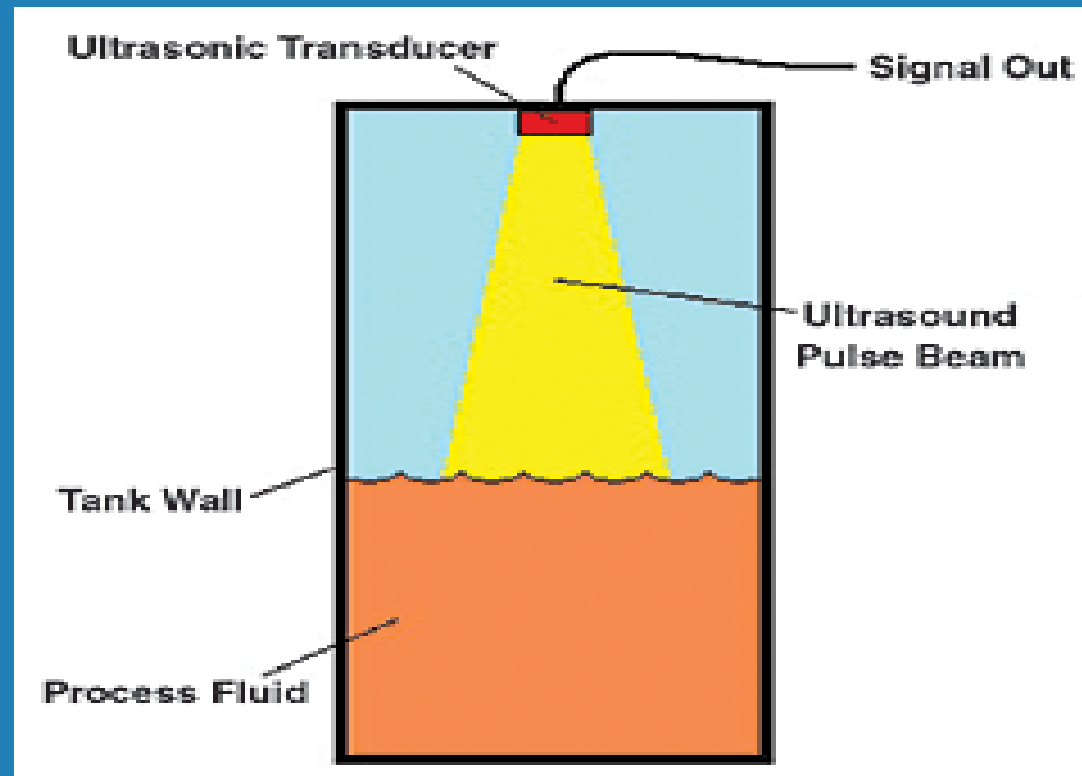
### Flumes Weirs



# 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 – best representative data**
- **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

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- **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**
  - Example: 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**

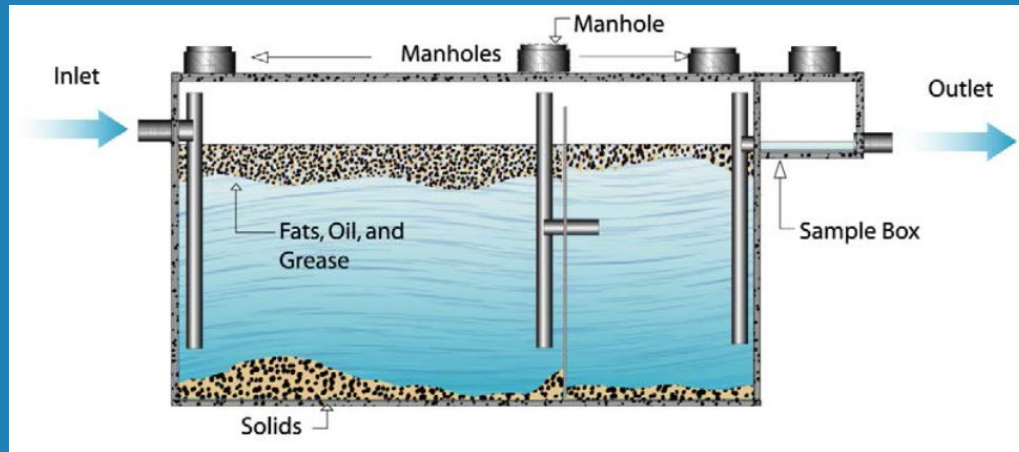
**Vehicle Service/Fleet Maintenance**

**Car Washes**

**Fleet Maintenance**

# Grease Removal Devices

- **Protect Collection System and prevent overflows**
  - **Interceptors**
  - **Traps/separators**



**Grease Interceptor Operation**



**Grease Traps:  
in or above ground**

# Maintenance

- **Grease Removal Devices**
  - **Must be serviced by a licensed and permitted waste hauler at least once every 90 days, more often if fat, oil, grease, and solids >25% sooner.**
  - **Decanting of wastes back into an interceptor and other improper cleaning techniques are not allowed. (refer to GI Maintenance Fact Sheet).**
  - **Maintain service records onsite for 3 years.**
  - **See specific Grease Removal Device information at the following link, click on “For Food Service Facilities”**  
<https://www.centrialsan.org/post/best-management-practices>

# 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!**