

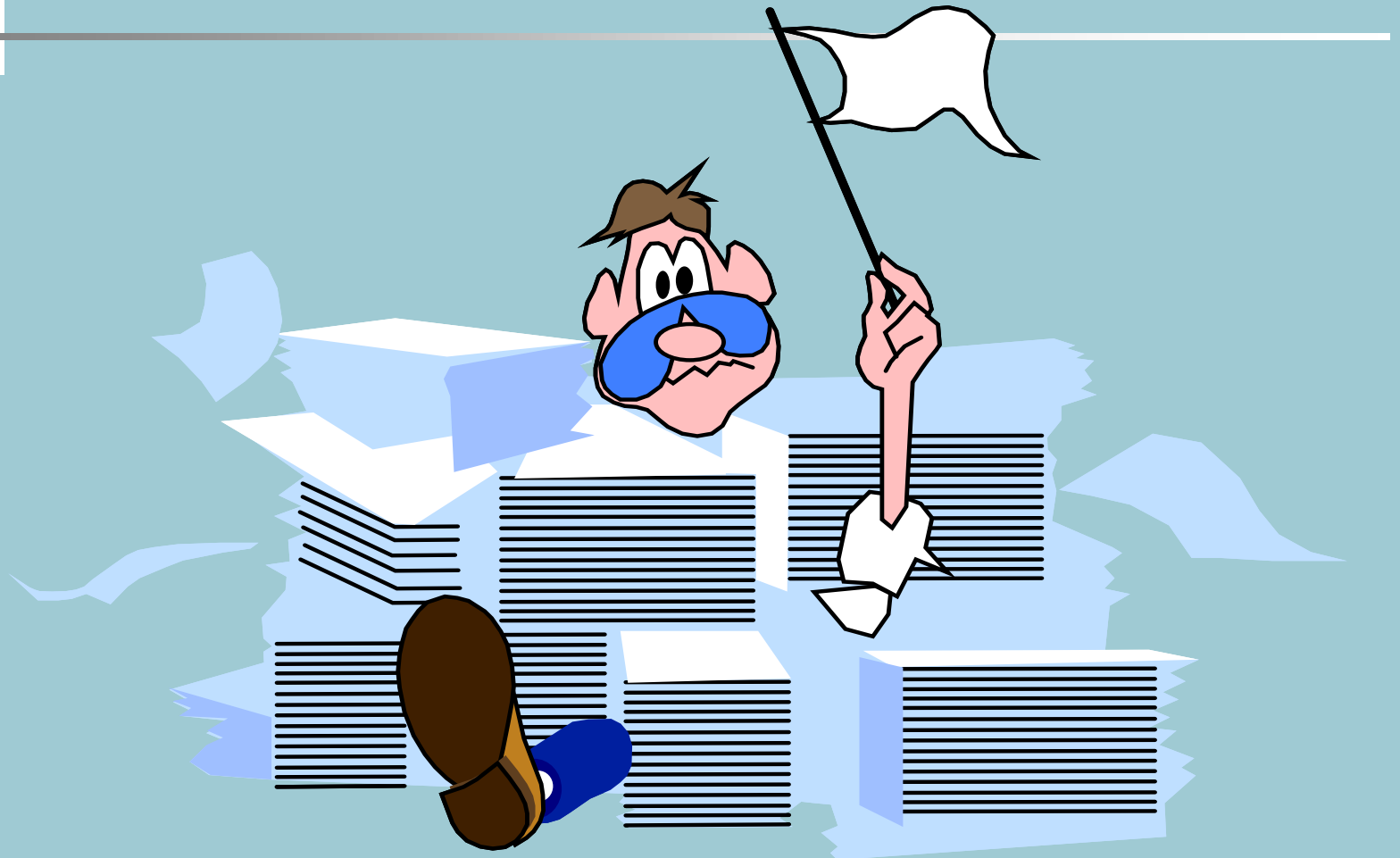
Sustainable Sandhills Water Resources Conference

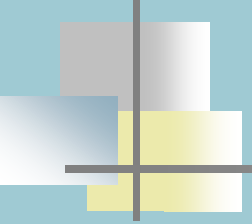
2007 Fall

Paul Rawls

Surface Water Protection Section

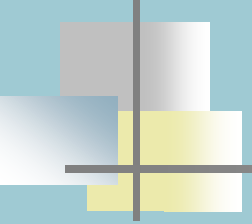
LAWS AND REGULATIONS





Permit Requirements

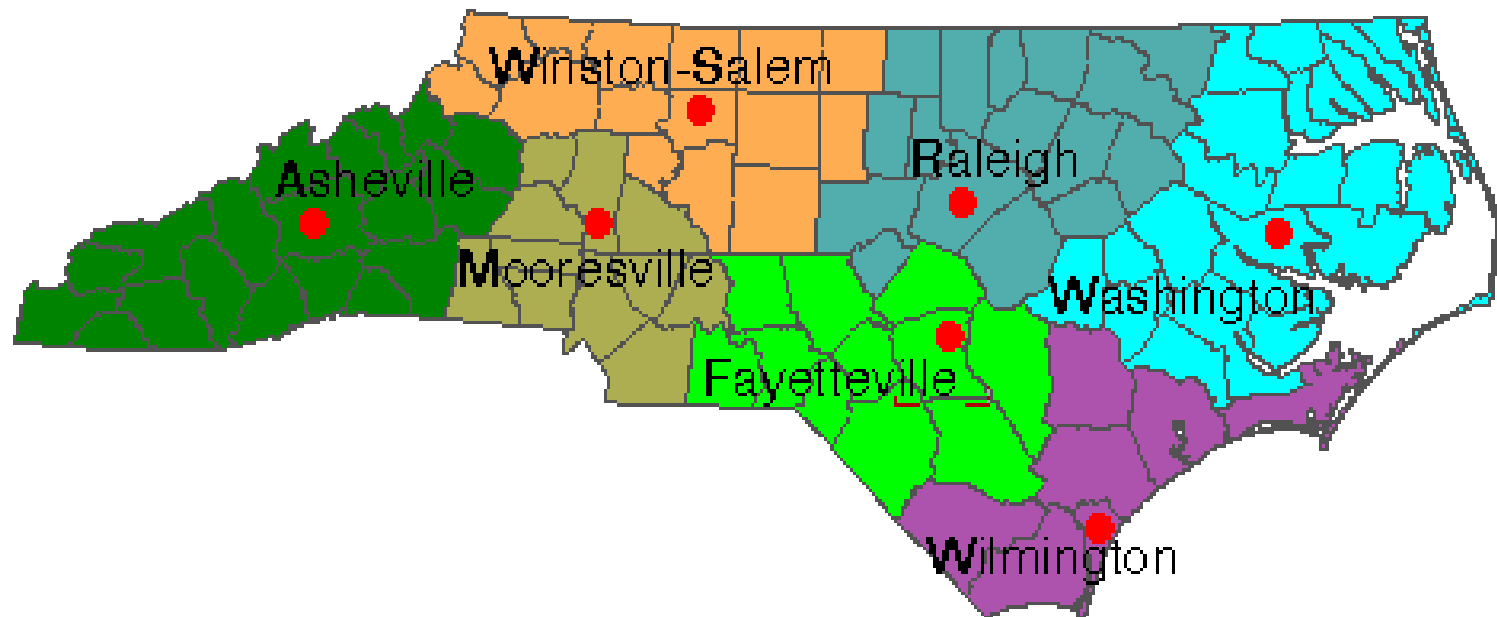
- Activities for Which Permits Required:
 - make any outlets into the waters of the State;
 - the construction of treatment works;
 - the operation of treatment works;
 - alter, extend, or change the construction or method or operation of treatment works.

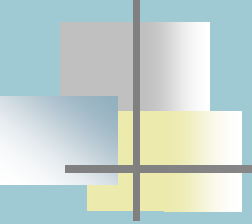


Permit Authority

- The Environmental Management Commission (EMC) has permitting authority for treatment works in NC.
- EMC has delegated permitting authority to the NC Division of Water Quality (DWQ).

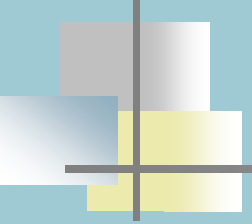
DWQ Regional Offices





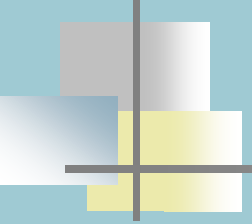
HISTORICAL PERSPECTIVE - NPDES

- 1972 - Federal Water Pollution Control Act (Clean Water Act)
- Two national goals:
 - the elimination of the discharge of pollutants into navigable waters by 1985;
 - “an interim goal of water quality which provides for the protection ... and propagation of fish ...wildlife ... and for recreation in and on the water ... to be achieved by July 1, 1983”.
- Main objective: “to restore and maintain the chemical, physical and biological integrity of the Nation’s waters”.



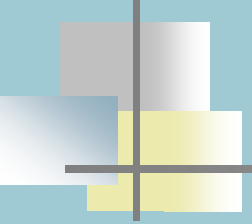
NPDES PROGRAM

- National Pollutant Discharge Elimination System (NPDES)
- The major goal is to improve water quality by reducing or eliminating pollutants from discharges.
- This goal will be achieved by the NPDES permit, which sets limits on the pollutants in effluents.



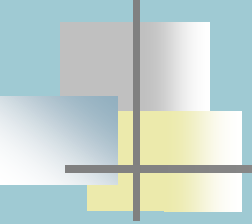
NPDES MONITORING

- The Act authorizes inspections and monitoring to determine NPDES permit compliance.
- The Act provides for two types of monitoring:
 - Self-monitoring: the facility must monitor itself; and
 - Compliance monitoring: checking and/or inspecting the self-monitoring program or monitoring conducted by the regulatory agency.



ENFORCEMENT ACTIONS

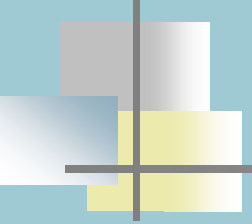
- Unless the violations are major, the initiation of an enforcement action is the issuance of a Notice of Violation (NOV).
- Enforcement may be taken by the State and/or EPA.
- The Regional Office reviews monthly monitoring reports and can issue NOV's and fines for violations of permit violations.



ENFORCEMENT ACTIONS:

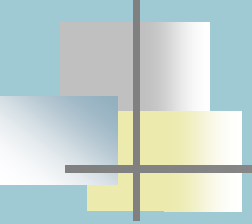
FINES

- State - Any person who knowingly violates permit terms, conditions or requirements may be assessed a civil penalty of not more than \$10,000 per violation, two years \$25,000.
- EPA - Any person who violates a permit condition is subject to a civil penalty not to exceed \$25,000 per day for each violation.
- Criminal penalties may be brought against the permittee or operator. Fines can start at \$2,500 per day of violation and can include imprisonment.



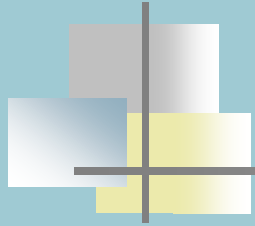
ENFORCEMENT ACTIONS: *NOV*

- The purpose of an NOV is to: 1) inform the permittee that a specific violation has been observed or measured; and 2) cause the violation to cease.
- NOVs are usually issued for limit violations, results of compliance inspections, or failure to monitor at required frequencies.
- NOVs will cause the permittee's administering and monitoring annual fee to be 25% higher.

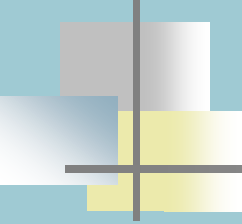


ENFORCEMENT ACTIONS

- Most common enforcement actions are for:
 - violations of permit limits;
 - not having a valid permit;
 - violations of water quality standards;
 - intentional or flagrant permit violations;
 - construction without a permit.

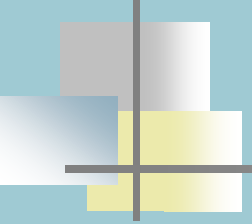


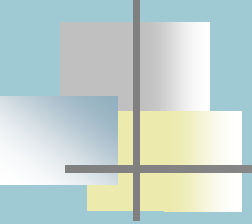
Wastewater



Why Treat Wastes?

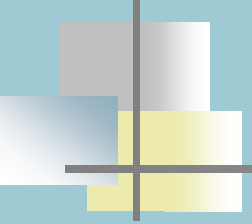
- Protect Public Health
- Protect Streams
 - Protect Downstream Water Users
 - Farms
 - Drinking Water for Next Town
 - Recreational Use
 - Economic and Aesthetic Value – ex. tourism
- Protect Wildlife

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- The operator's main job is to protect the many users of the receiving waters.
and the investment put forth by the permittee.
 - Definitions of pollution include:
 - any interference with the beneficial reuse of water or failure to meet water quality standards



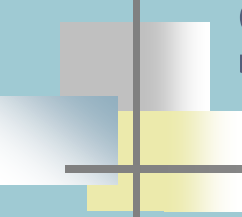
Getting Started With a Few Terms...

- Influent
- Effluent
- Receiving Waters
- Treatment Plant
- Treatment Ponds
- “Package Plants”



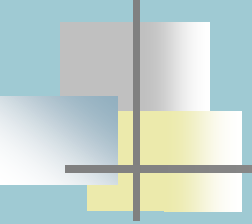
Sources of Pollution

- Point source
- Non-point source



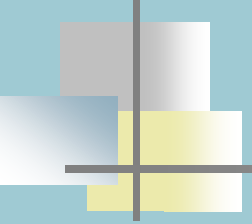
Sources of Waste Discharges

- Households
- Businesses, Factories, Industries
- Storm waters
- Infiltration
- Inflow



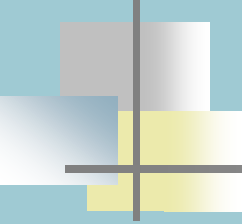
Types of Waste Discharges

- Pathogens
- Biochemical Oxygen Demand
- Oil and Grease
- Nutrients
- pH



Types of Waste Discharges: “Shock Loads”

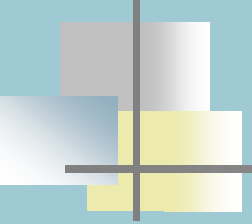
- What are “Shock Loads”?
 - Sudden large volumes
 - of influent waters
 - of high temperature influent waters
 - Of toxic substances

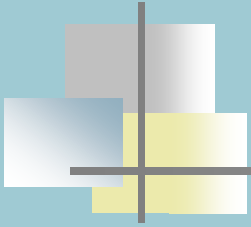


Flow Variations in Plant Influent

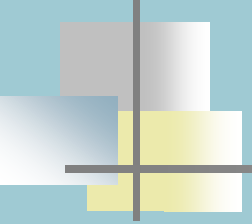
- Sources of Daily flow variations
- Sources of Seasonal flow variations
- Infiltration/Inflow

Example Treatment Processes

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- Flow measurement
 - Preliminary Treatment
 - Primary Treatment
 - Secondary (Biological) Treatment
 - Final settling
 - Tertiary Treatment
 - Disinfection
 - Solids Handling
 - Effluent Disposal

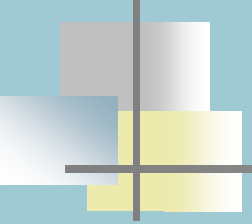


Wastewater Collection Systems



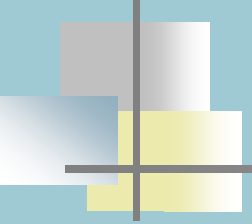
Introduction To Collection Systems

- The collection system is the network of pipes which carry the wastewater from its sources to the Publicly Owned Treatment Works (POTW) for treatment.
- Proper design and construction of the lines along with a continuous program to check, service and maintain those lines is the first step in obtaining efficient operation of the POTW.



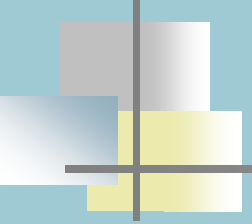
Types of Systems

- Sanitary sewer
- Storm sewer
- Combined sewer



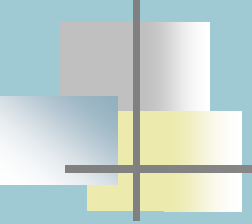
Collection System Problems

- Inflow
- Infiltration
- Exfiltration
- Illegal connections



System Hydraulics: Flow of Wastewater

- Lateral lines
- Gravity Mains
- Force Mains

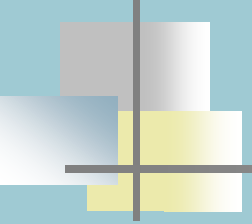


System Hydraulics: Velocity

- Importance of collection line slope
- Velocity
 - two feet/second (2 ft/sec)
- Problems with low velocity

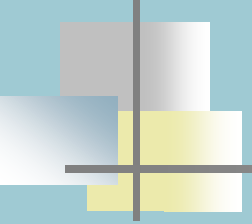


Grease Traps and Grease Interceptors



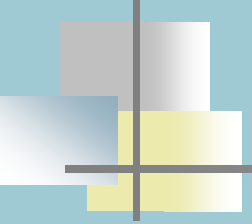
Grease Traps and Oil

- Fats, oils and grease (FOG)
 - clog pipes and interfere with proper operation of collection system and treatment system
 - must be removed prior to treatment



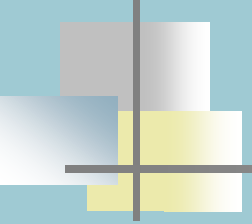
Grease Traps

- Grease traps
 - FOG of animal and vegetable origin
 - biodegradable
- Required/recommended at
 - food service facilities
 - meat markets
- Receive only kitchen waste
 - no toilet waste



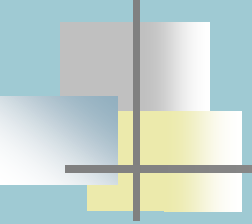
Grease Traps

- Slow flow of hot greasy water
 - allow cooling and congealing of FOG
 - grease and solid separation
- Provides mechanism for grease removal
- Reduces BOD and TSS
- Provides additional storage



Grease Trap Design

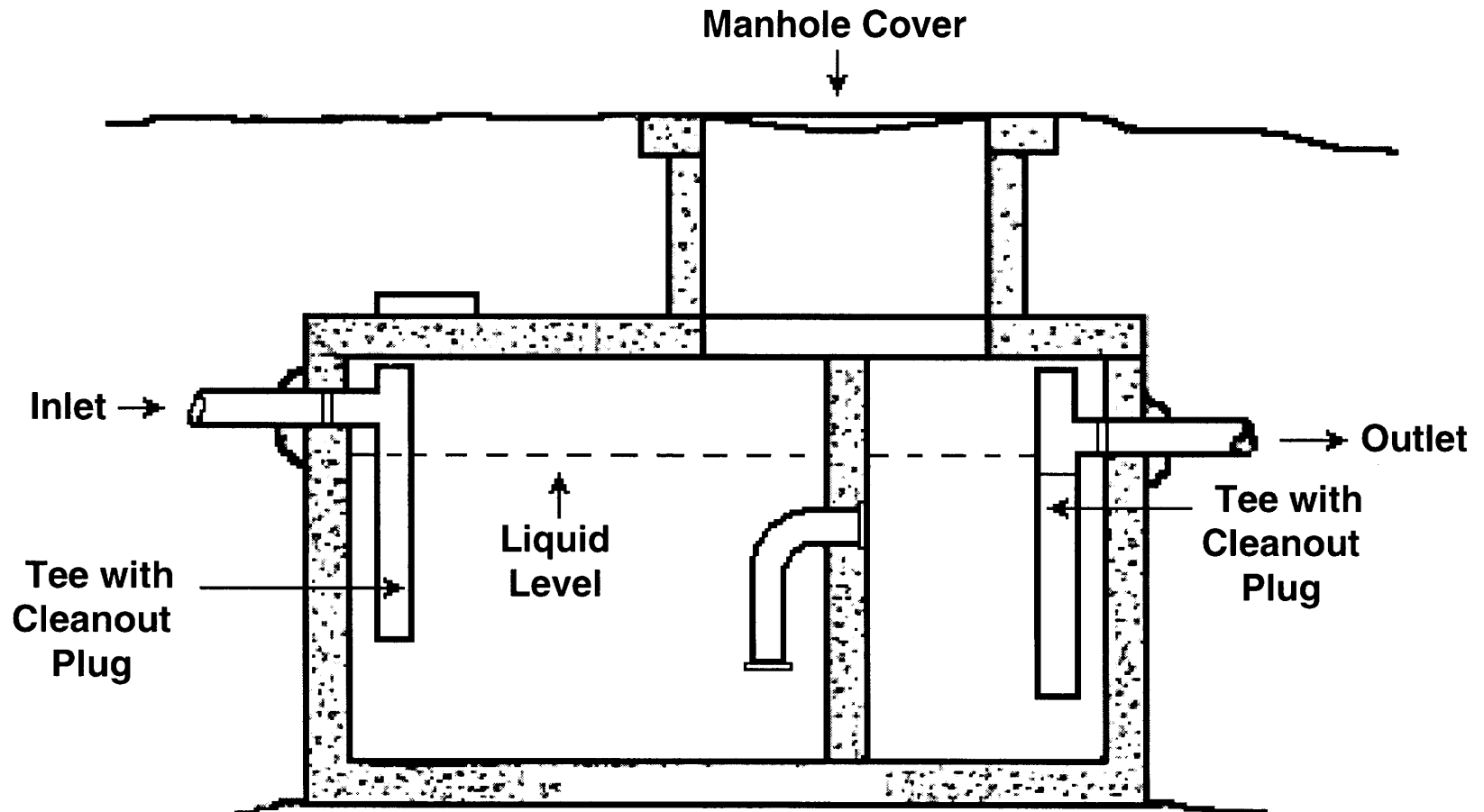
- Modified septic tanks
 - deeper outlet tees
 - must extend down at least 50% of liquid depth
 - larger access openings
 - minimum diameter of 24 inches
 - sufficient capacity for storage
 - 2/3 of the required septic tank liquid capacity

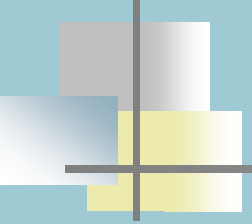


Grease Trap Design

- Easy and convenient cleaning and removal
- Inaccessible to vermin and insects
- Under-the-counter types (30 to 100 gallons)
 - installed directly below source
- Outdoor/underground types (1000 to 5000 gal)
 - buried outside near source

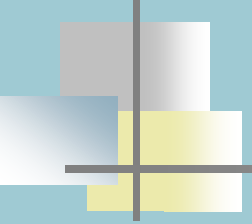
Grease Trap





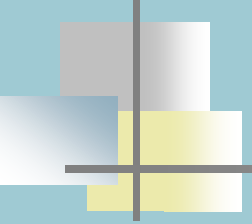
Grease Trap Performance

- Factors affecting performance
 - distance from source
 - temperature
 - hydraulic loading
 - detention time
 - operation and maintenance



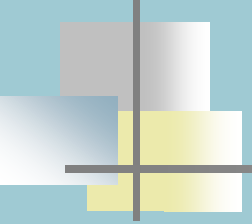
Grease Trap O & M

- Similar to septic tank
 - damage (cracks, breaks, deterioration)
 - signs of leakage
 - settlement of tank
- Remove captured grease
- Pump out oils and solids



Oil/Water Separators

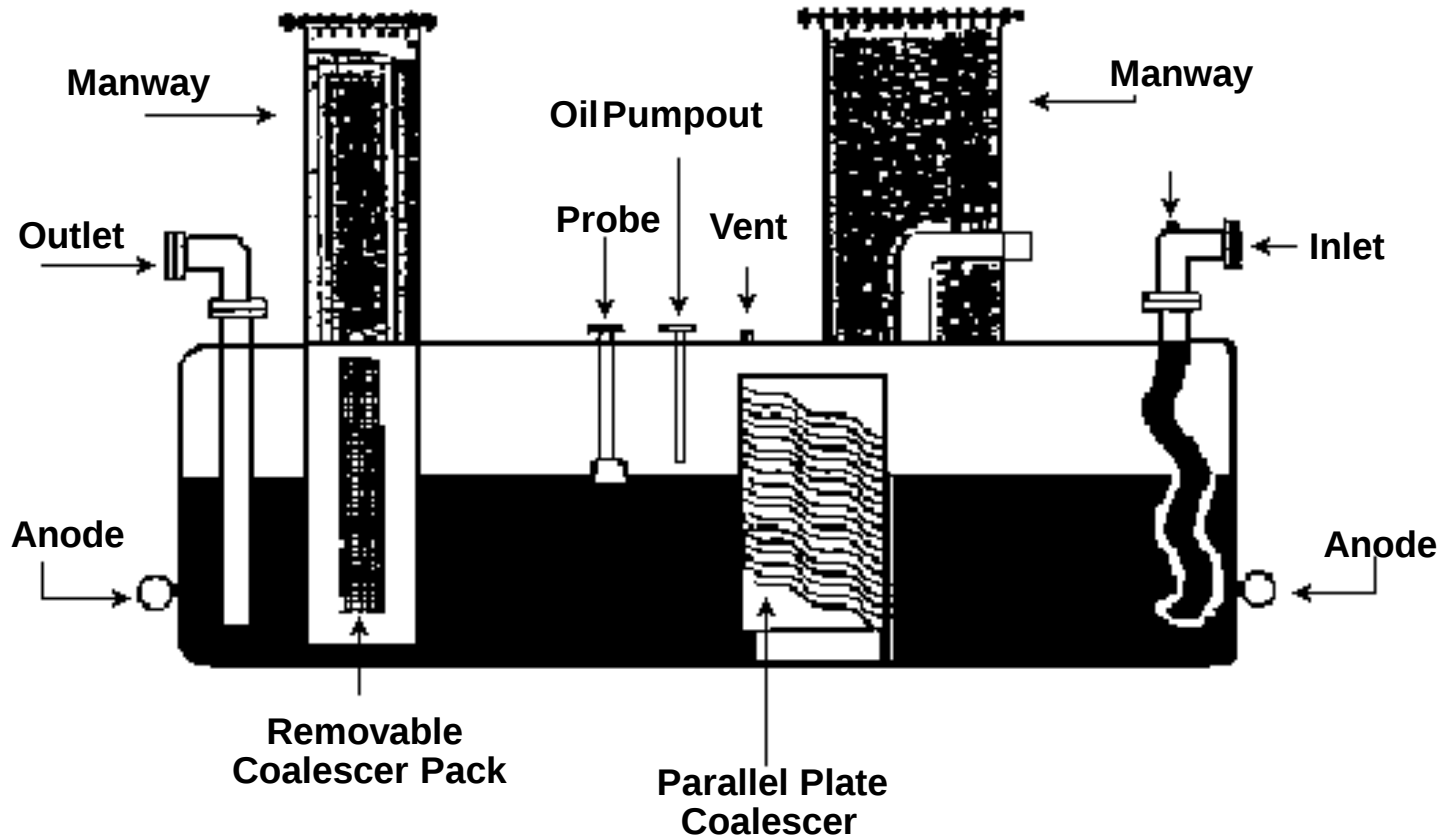
- Petroleum-based hydrocarbons
 - not readily degraded
- Required/recommended
 - machine shops, services garages, car washes
- Similar to grease traps
- Continually skim floating oils
- Recovered oil held in tanks for disposal

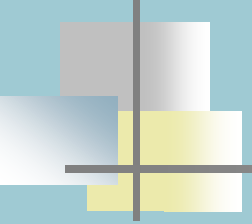


Oil/Water Separators

- Gravity oil/water separators
 - floatable oils are lighter than water and rise to top
 - not effective with suspended or emulsified oils
- Coalescing oil/water separators
 - enhance gravity separation
 - plastic or other oil-attracting media
 - oil particles form beads and float to surface

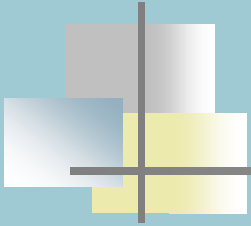
Oil/Water Separator



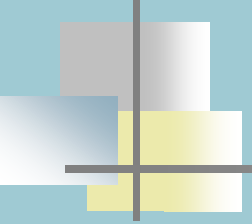


Oil/Water Separators

- Ultrafiltration units
 - filters allow water to pass but not oils
 - remove a greater amount of oil and grease
 - require more maintenance
- Dissolved air floatation
 - pressurized air pumped into tank
 - oil and grease particles cling to air bubbles

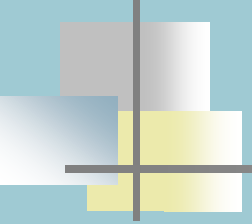


Pretreatment



History of the Pretreatment Program

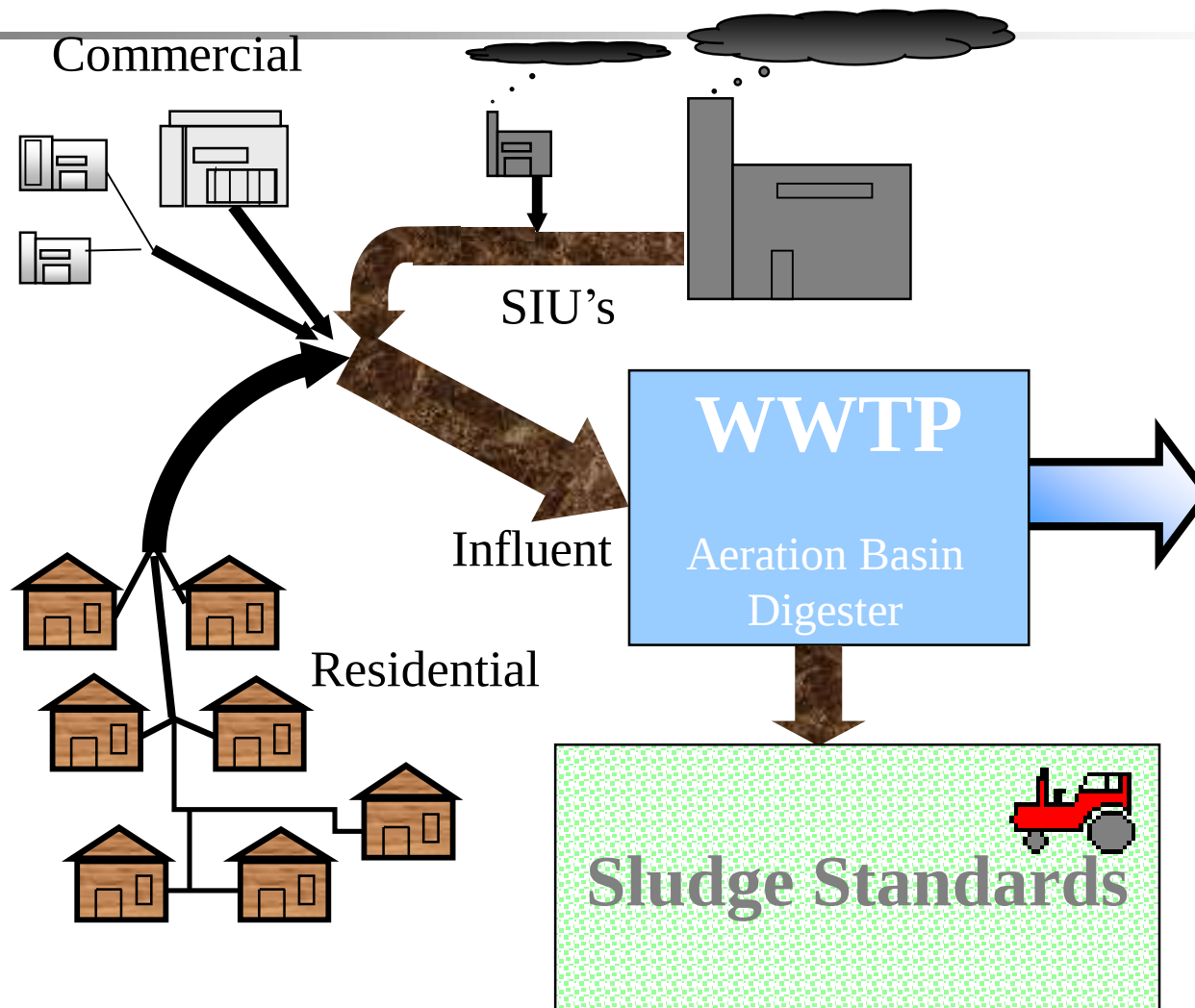
- 1972 Clean Water Act
- 1978- Federal Pretreatment regulations established
- 1982- EPA approval of the NC Program
- 1983-84 - majority of NC POTW Pretreatment Programs approved
- 1987-90 - major revision to NC and Federal pretreatment regulations
- 2005 – Streamlining of the Pretreatment Program



What's the Purpose of the Pretreatment Program?

- Prevent Pass Through
 - clean rivers, groundwater, and land
 - compliance with NPDES+sludge limits
- Prevent Interference
 - properly functioning + compliant WWTPs and collection systems
- Promote the beneficial use of biosolids
 - good sludge for land application or composting
- Protect Worker Health and Safety
 - healthy people

TYPICALVILLE



~~NPDES~~
~~Permit~~
~~Limits~~

~~Water~~
~~Quality~~
~~Standards~~