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Biography®

- Yeh was born in Taiwan, in 1965. He received a Batcher degree in environmental engineering from National Chung Kung University in 1987, received a Master's degree in Civil and environmental from UC Berkeley in 1992 and a Ph.D. degree in Civil and environmental from Penn State University in 1997. He is a professor in the department of Civil and environmental engineering at National University of Kaohsiung.

What is wastewater treatment

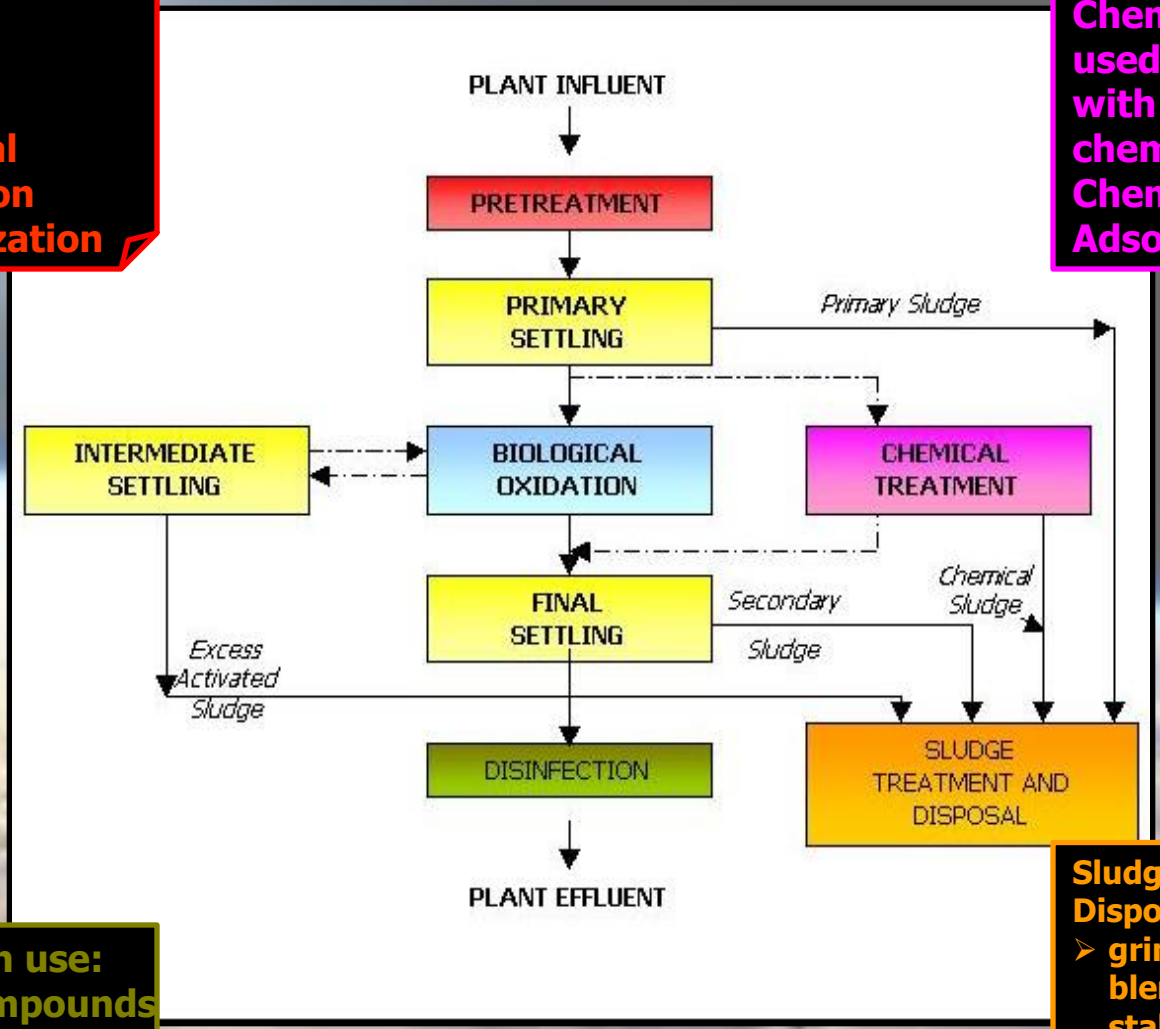
- Usually refer to sewage treatment, or domestic wastewater treatment
- process of removing contaminants from wastewater, both runoff and domestic

Where does wastewater come from?

- Residences (kitchen, bathroom)
- Commercial institution
- Industrial institution (usually require specialized treatment process)

Conventional Wastewater Treatment Process

Pre-treatment involves:
- Screening
- Grit Removal
- Oil separation
- Flow equalization



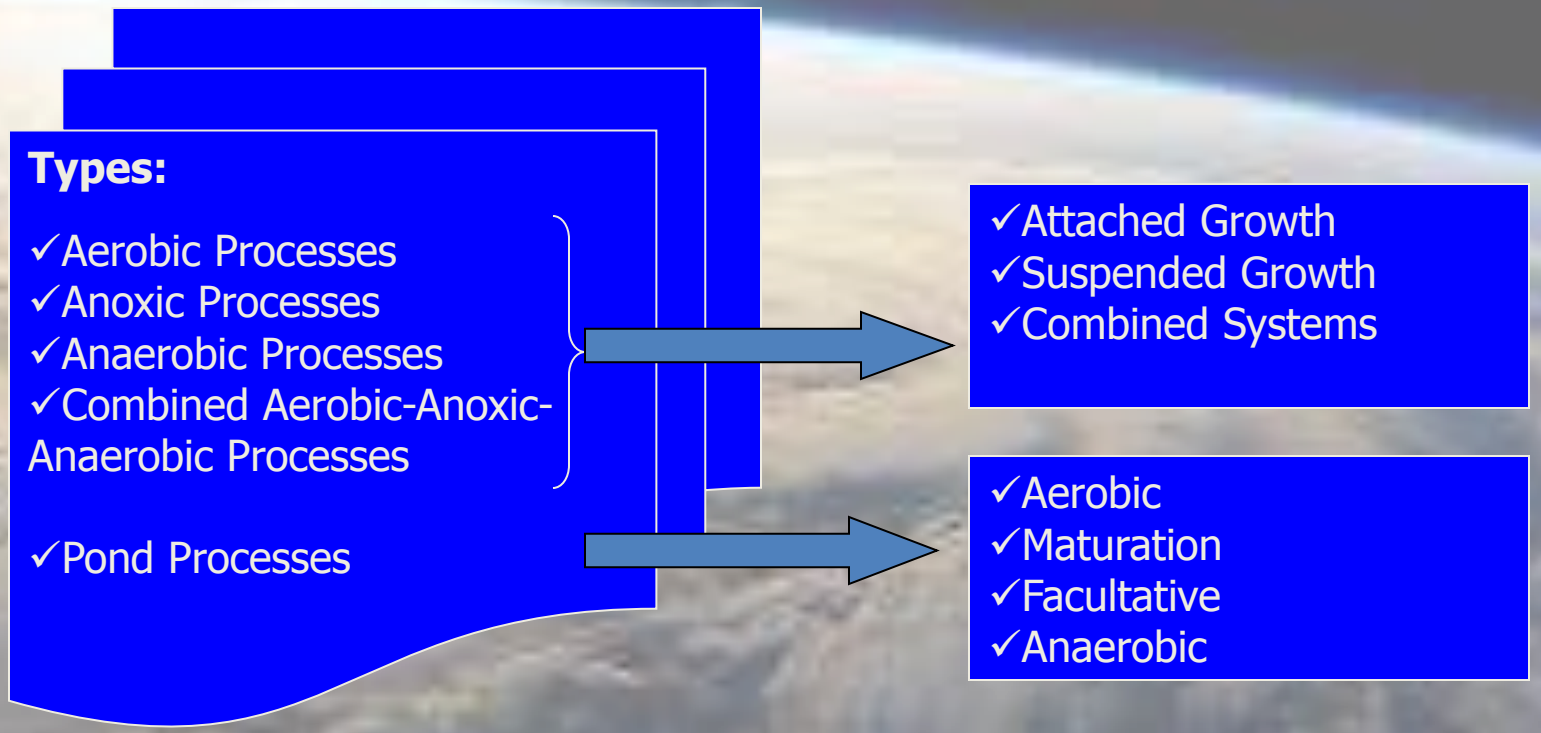
Chemical Treatment is used in conjunction with the physical and chemical processes:
Chemical precipitation
Adsorption

Disinfection can use:
- Chlorine compounds
- Bromine Chloride
- Ozone
- UV Radiation

Sludge Treatment and Disposal involves:
- grinding, degritting, blending, thickening, stabilization, conditioning, disinfection, dewatering, heat drying, thermal reduction.

Biological Treatment

- In the case of domestic wastewater treatment, the objective of biological treatment is:
  - To stabilize the organic content
  - To remove nutrients such as nitrogen and phosphorus

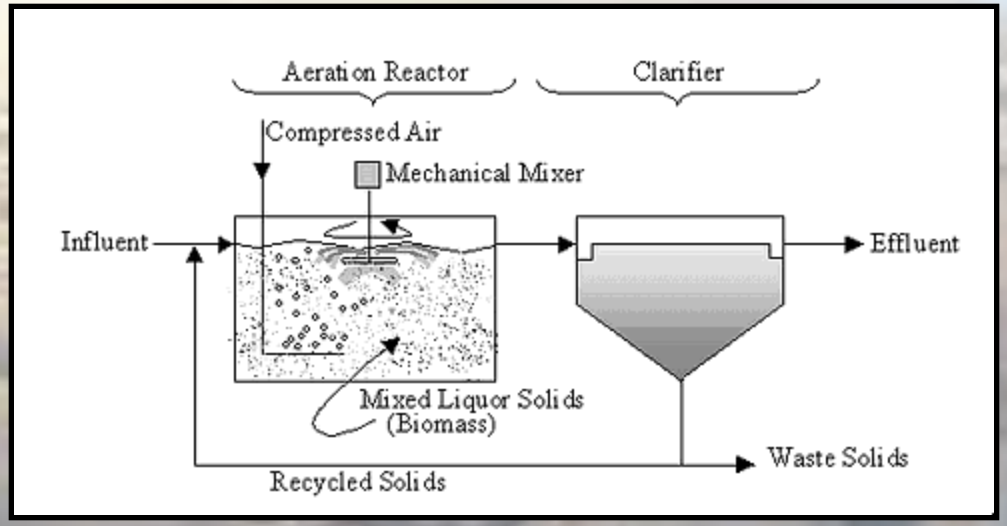


Major Aerobic Biological Processes

Type of Growth	Common Name	Use
Suspended Growth	Activated Sludge (AS)	Carbonaceous BOD removal (nitrification)
	Aerated Lagoons	Carbonaceous BOD removal (nitrification)
Attached Growth	Trickling Filters	Carbonaceous BOD removal. nitrification
	Roughing Filters (trickling filters with high hydraulic loading rates)	Carbonaceous BOD removal
	Rotating Biological Contactors	Carbonaceous BOD removal (nitrification)
	Packed-bed reactors	Carbonaceous BOD removal (nitrification)
Combined Suspended & Attached Growth	Activated Biofilter Process ✓Trickling filter-solids contact process ✓Biofilter-AS process ✓Series trickling filter-AS process	Carbonaceous BOD removal (nitrification)

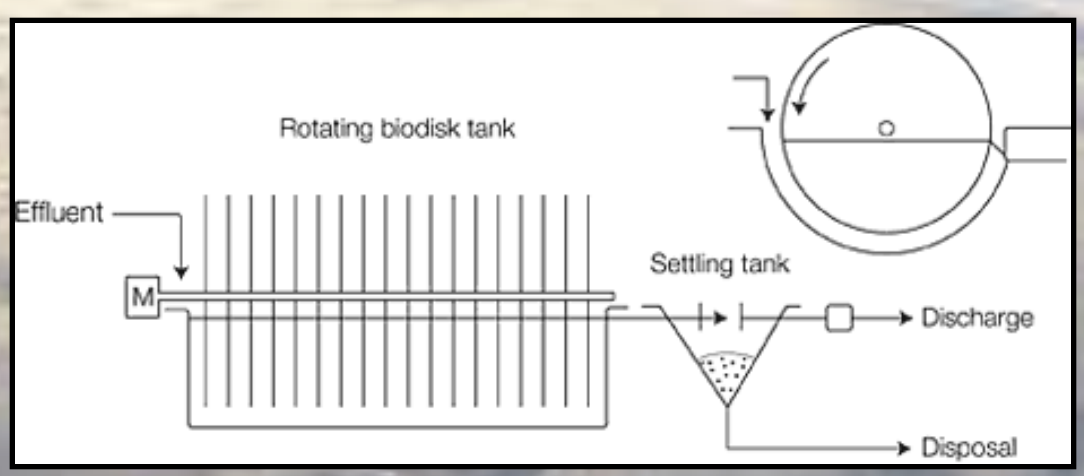
Activated Sludge Process

- The aeration tank contains a suspension of the wastewater and microorganisms, the mixed liquor. The liquor is mixed by aeration devices (supplying also oxygen)
- A portion of the biological sludge separated from the secondary effluent by sedimentation is recycled to the aeration tank
- Types of AS Systems: Conventional, Complete-Mix, Sequencing Batch Reactor, Extended Aeration, Deep Tank, Deep Shaft



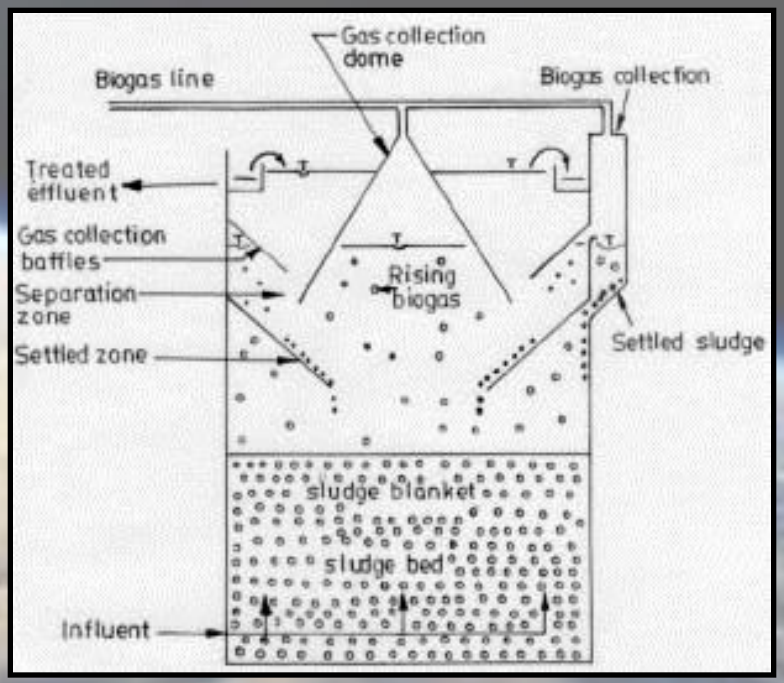
Rotating Biological Contactors

- It consists of a series of circular disks of polystyrene or polyvinyl chloride that are submerged in wastewater and rotated slowly through it
- The disk rotation alternately contacts the biomass with the organic material and then with atmosphere for adsorption of oxygen
- Excess solids are removed by shearing forces created by the rotation mechanism

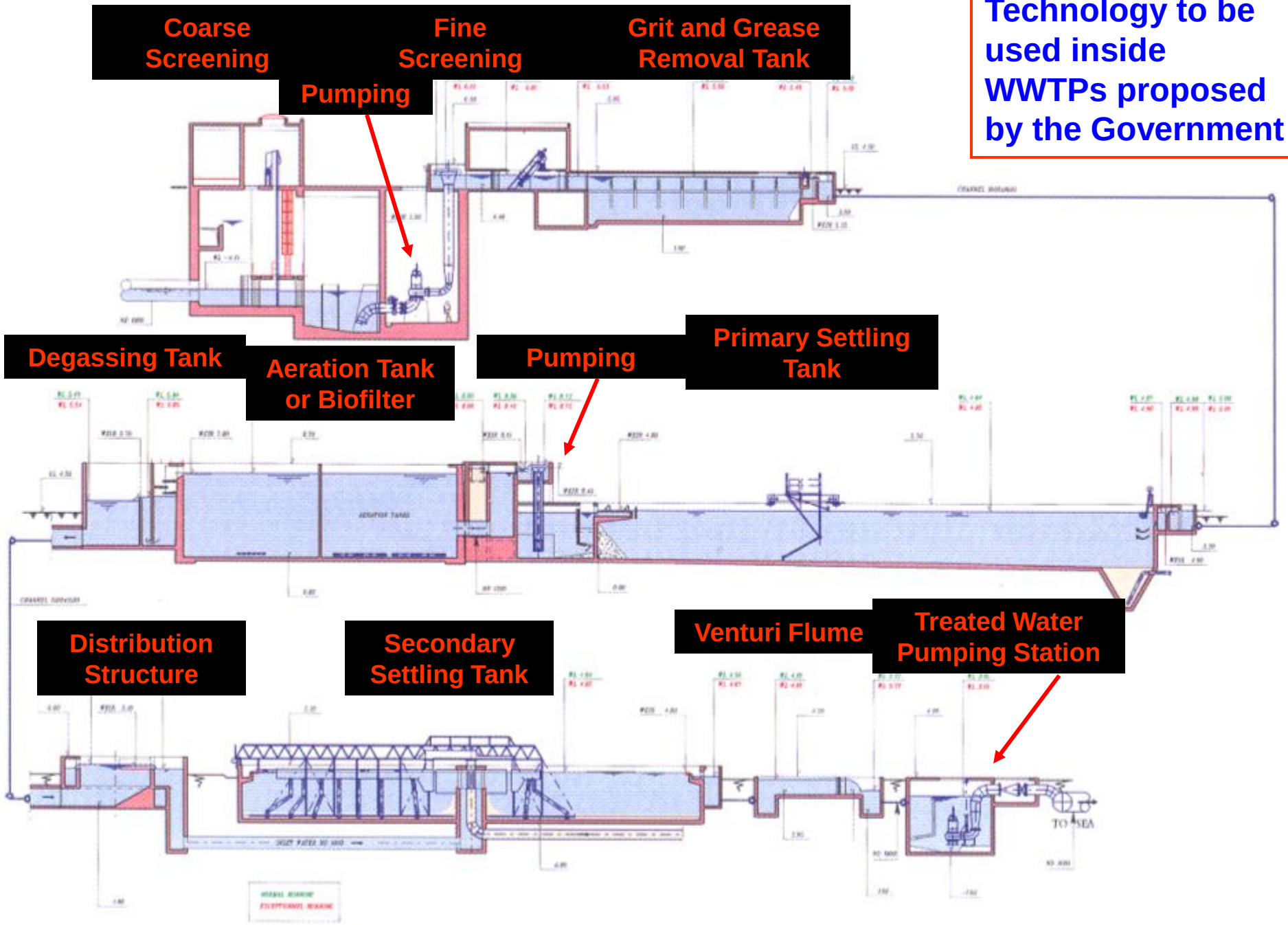


Upflow Anaerobic Sludge Blanket

- Wastewater flows upward through a sludge blanket composed of biological granules that decompose organic matter
- Some of the generated gas attaches to granules that rise and strike degassing baffles releasing the gas
- Free gas is collected by special domes
- The effluent passes into a settling chamber



Technology to be used inside WWTPs proposed by the Government



Hydrology: Current Research
Related Conferences

5th **Biodiversity Conference** March 10-12,2016 Madrid, Spain

Hydrology: Current Research Related Journals

- **Journal of Geology & Geosciences**
- **Journal of Geophysics & remote Sensing**

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