Environmental friendly technologies
KEE/ENT

ESF II project of the University of West Bohemia in Pilsen

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Lecture 11

Wastewater, wastewater tretment

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Wastewater Treatment

❖ **Purpose:**

To manage water discharged from homes, businesses, and industries to reduce the threat of water pollution.

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Wastewater Treatment

- Pre-treatment
- Preliminary treatment
- Primary treatment
- Secondary treatment
- Sludge (biosolids) disposal

Wastewater Treatment

- **Pre-treatment**
  - Occurs in business or industry prior to discharge
  - Prevention of toxic chemicals or excess nutrients being discharged in wastewater

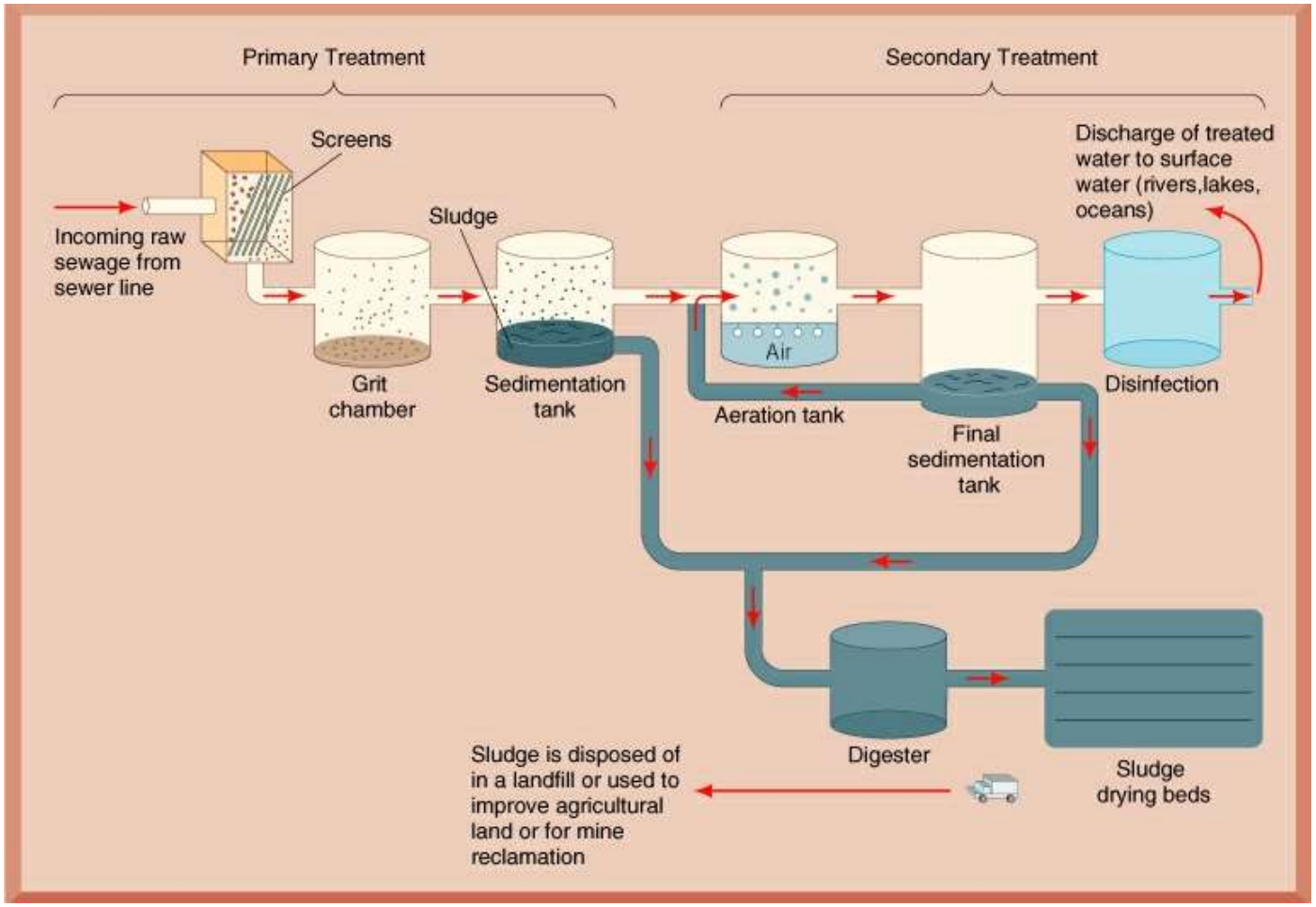
Wastewater Treatment

- Water discharged from homes, businesses, and industry enters sanitary sewers
- Water from rainwater on streets enters storm water sewers
- Combined sewers carry both sanitary wastes and storm water

Wastewater Treatment

- Water moves toward the wastewater plant primarily by gravity flow
- Lift stations pump water from low lying areas over hills

Wastewater Treatment



Wastewater Treatment

- **Preliminary Treatment**
  - removes large objects and non-degradable materials
  - protects pumps and equipment from damage
  - bar screen and grit chamber

Wastewater Treatment

- **Bar Screen**
  - catches large objects that have gotten into sewer system such as bricks, bottles, pieces of wood, etc.

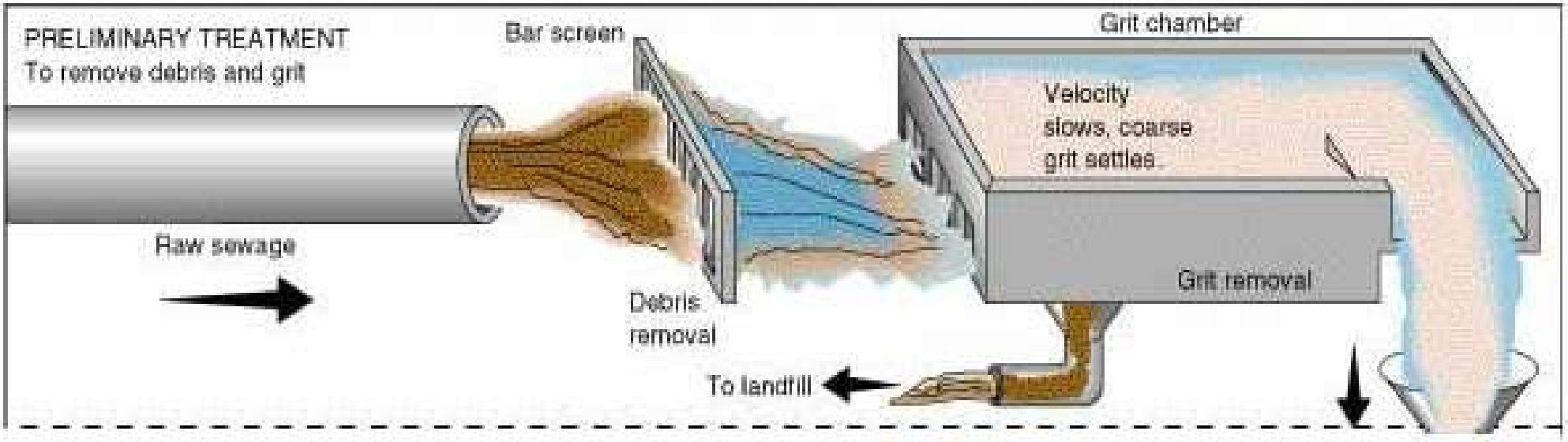


Wastewater Treatment

- **Grit Chamber**
  - removes rocks, gravel, broken glass, etc.
- **Mesh Screen**
  - removes diapers, combs, towels, plastic bags, syringes, etc.

Wastewater Treatment

Preliminary Treatment



Wastewater Treatment

- Measurement and sampling at the inlet structure
  - a flow meter continuously records the volume of water entering the treatment plant
  - water samples are taken for determination of suspended solids and B.O.D.

Wastewater Treatment

- Suspended Solids – the quantity of solid materials floating in the water column

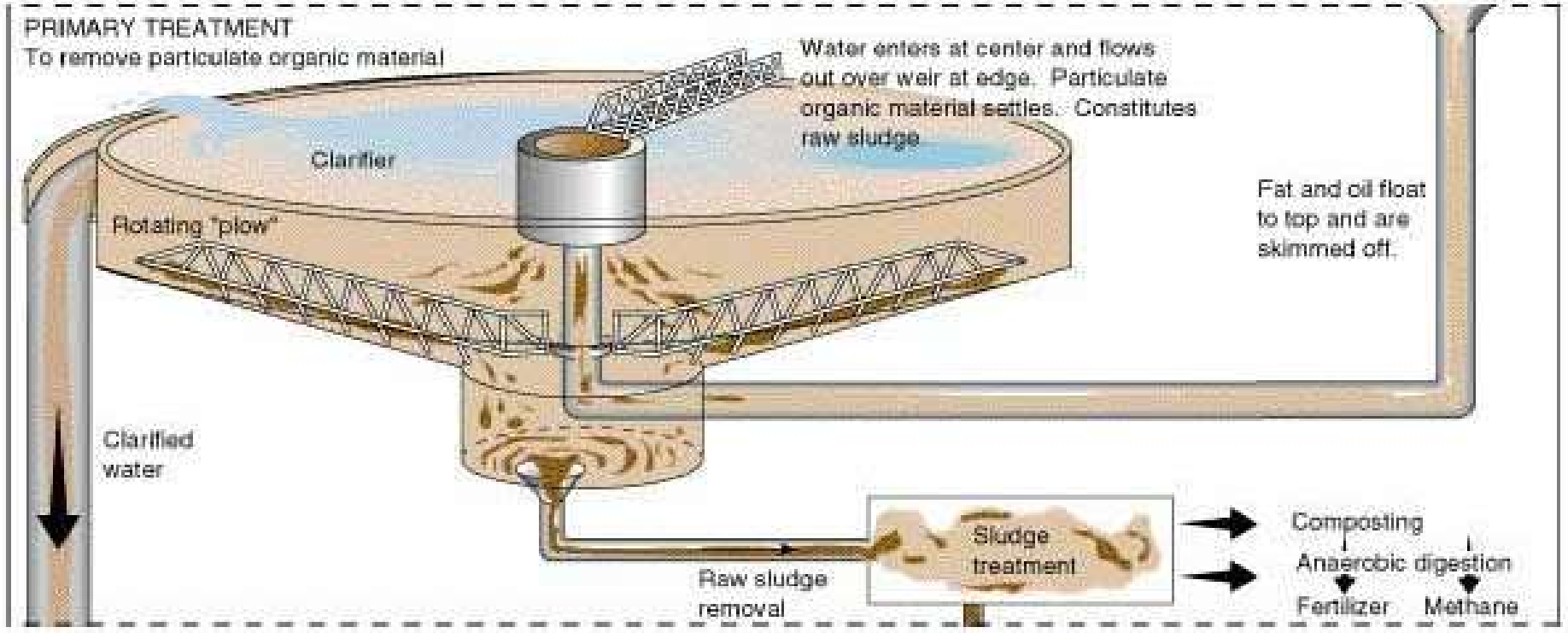
- B.O.D. = Biochemical Oxygen Demand
  - a measure of the amount of oxygen required to aerobically decompose organic matter in the water

Wastewater Treatment

- **Primary Treatment**
  - **-- a physical process**
  - **-- wastewater flow is slowed down and suspended solids settle to the bottom by gravity**
  - **-- the material that settles is called sludge or biosolids**

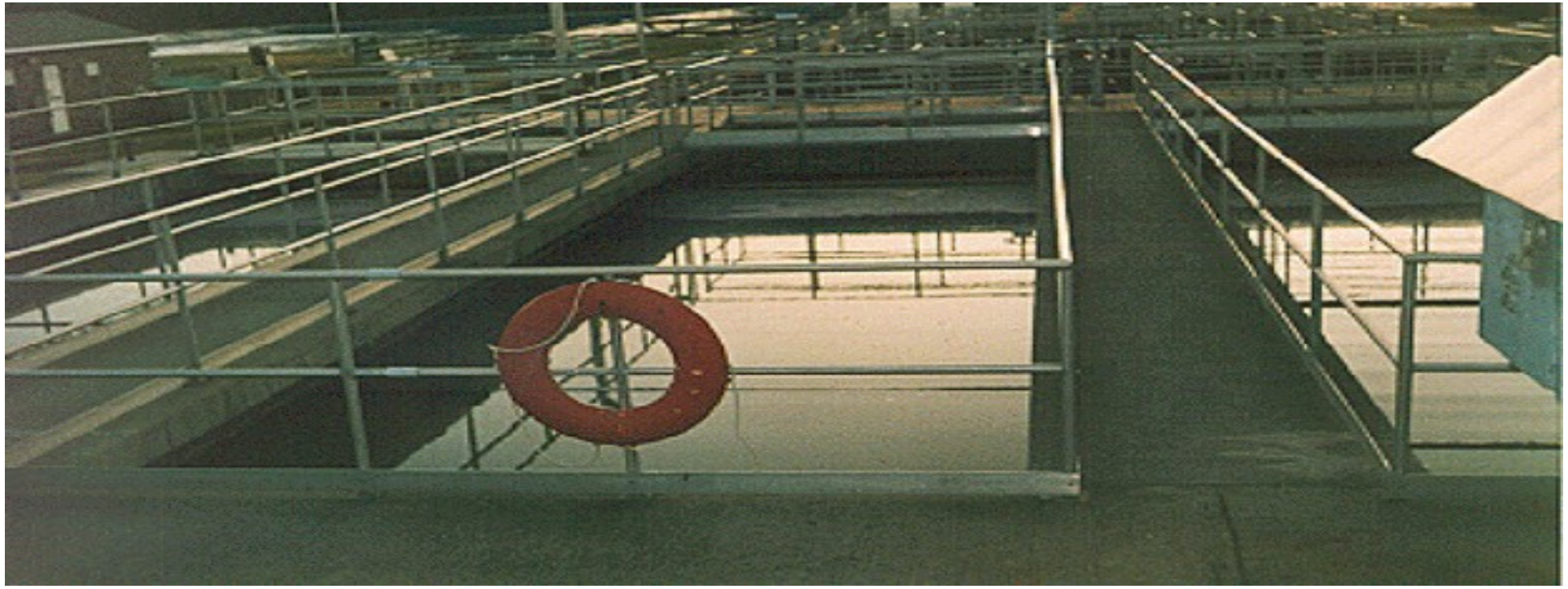
Wastewater Treatment

- Primary Treatment



Wastewater Treatment

- Primary Treatment

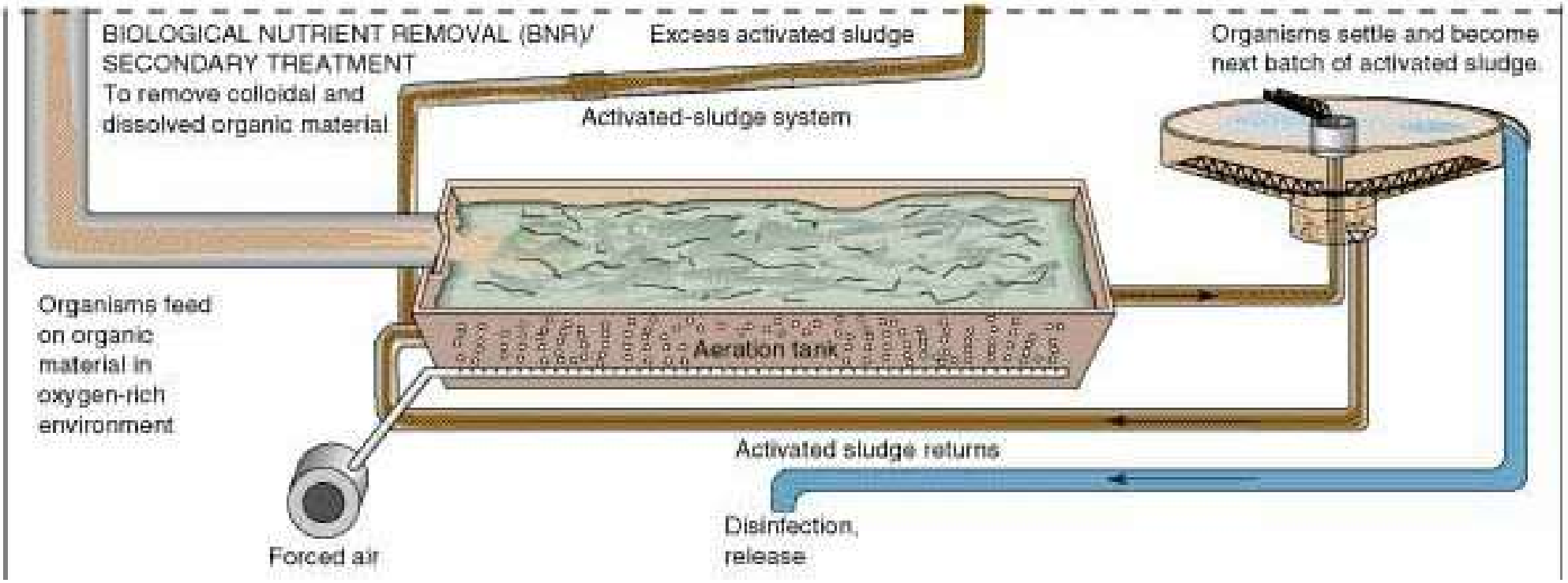


Wastewater Treatment

- Sludge from the primary sedimentation tanks is pumped to the sludge thickener.
  - more settling occurs to concentrate the sludge prior to disposal

Wastewater Treatment

- Secondary Treatment



Wastewater Treatment

- The final clarifiers remove additional sludge and further reduce suspended solids and B.O.D.



Wastewater Treatment

- The wastewater plant lab conducts a number of measurements and tests on the water.

suspended solids
B.O.D.
pH

temperature
nitrogen
phosphorus

Thank you for your attention...

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