The AS-PF Module

(Plug Flow Activated Sludge)

Audience and Processes

For engineers managing **Long, Narrow Aeration Lanes** or **"ditch"** configurations. It models the hydraulic profile where the concentration of substrate and oxygen demand changes as the water moves from the inlet to the outlet.

Functionality

- **Spatial Profiling:** Provides a **"map"** of the concentrations along the length of the reactor.
- **Tapered Aeration Modeling:** Allows for the simulation of higher oxygen demand at the head of the tank where concentrations are highest.
- **Substrate Gradient Analysis:** Models how the food-to-microorganism (F/M) ratio shifts across the flow path.

Usage: The Longitudinal Simulation

- **Geometry Input:** Define the volume of the system.
- **Aeration levels:** Users can simulate **"Step-aeration"** configurations along the reactor.
- **Profile Analysis:** Visualize where nitrification is completed within the tank to optimize blower placement.

Concepts and Assumptions: Integrated ASM1

- **The Bridge:** Applies ASM1 kinetics across a series of virtual sub-reactors (Tank-in-Series model) to simulate the non-mixed hydraulic behavior.
- **Minimal Back-Mixing:** Assumes longitudinal dispersion is minimized, creating a concentration gradient.

Benefits

- **Precision Aeration:** Enables **"Tapered Aeration"** designs that save energy by reducing air supply toward the end of the channel.
- **Process Stability:** Better handles **"shock loads"** of toxic or concentrated influent due to the plug-flow hydraulic buffering.

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