

# AERATED LAGOON

# Problem with Facultative Pond

High organic loading

High flow rate

Lack of oxygen

Anaerobic

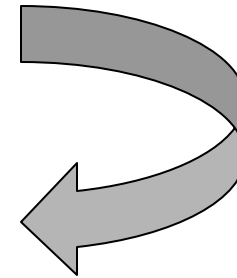
Odor

# Solution

Introduce  
**mechanical  
aerator**



**Facultative Pond**  
**Aerated Lagoon**







A **suspended growth** process

Similar to **AS** but **without sludge recycling**

Similar to **WSP** but **with mechanical aerator**

Up to 90% BOD<sub>5</sub> removal

HRT = **2-6 days**

MLSS = **200 – 400 mg/L**

Almost **no settling** in the lagoon

# Design and Arrangement

Followed by maturation pond(s)

Depth: 2- 4 m

Effluent BOD<sub>5</sub> from AL can be divided into:

Dissolved organics

Solid organics

## Relationship between **influent BOD<sub>5</sub>** and **(dissolved) effluent BOD<sub>5</sub>**

$$F_e = \frac{l_i}{1 + Kt} \quad (\text{Eqn. 9.1})$$

where:

$l_i$	=	influent BOD <sub>5</sub>
$F_e$	=	dissolved effluent BOD <sub>5</sub>
$K$	=	dissolved BOD <sub>5</sub> removal rate constant



# Temperature effect on K value

$$K_T = 5 (1.035)^{T-20}$$

# Total BOD<sub>5</sub> Effluent, $I_e$

$$I_e = F_e + 0.95X$$

$$X = \frac{Y(I_i - F_e)}{1 + bt}$$

$X$  = cell concentration in the lagoon, mg/L

$Y$  = yield rate coefficient = 0.6 – 0.7

= mass of developed cells/mass of BOD used

$b$  = autolysis rate = 0.07 day<sup>-1</sup> at 20°C