Exercises I: Introduction

Applied wastewater engineering

Exercise 1: Solid waste production and energy consumption of classical wastewater treatment

1) What kind of solid waste do you generate in a classical wastewater treatment plant having a primary clarifier?
2) What happens during a biological treatment?
    a. Aerated sludge age (at moderate temperatures: < 15 °C): < 5 days
    b. Aerated sludge age: 10 days
    c. Aerated sludge age > 25 days
3) What major off-gases are generated in the biological tank?
    a. Aerated sludge age (at moderate temperatures: < 15 °C): < 5 days
    b. Aerated sludge age: 10 days (no denitrification tank)
    c. Aerated sludge age: 10 days (with denitrification tank)

Exercise 2: Biological treatment

A wastewater treatment plant without a primary clarifier has difficulty to nitrify during the colder months of the year. Based on the data collected at the wastewater treatment plant you computed that its aerated sludge age is six days.

1) Why do they have difficulty to nitrify correctly?
2) What modifications do you suggest in order to solve the problem of nitrification? Propose two solutions knowing that your client does not want to modify the secondary clarifiers. Furthermore, you know, that the secondary clarifiers will not decant properly if the sludge concentration in the biological tank is increased.
3) For both solutions suggested, your client asks you whether the oxygen consumption of the aeration tanks will change.