

## Exercises II: organic micropollutant treatment I

### Applied wastewater engineering

#### Exercise 1: Financing of new sewer pipe

Wastewater treatment plant (WWTP) A was designed (85<sup>th</sup> percentile) for 4'800 kg COD/d. It currently receives 3'000 kg COD/d (85<sup>th</sup> percentile) from inhabitants only.

- For how many population equivalents was WWTP A designed for?
- The receiving water of WWTP A is a lake used for drinking water supply. Will WWTP A have to install an organic micropollutant treatment?
- WWTP A could potentially be connected to a larger WWTP, which is equipped to treat organic micropollutants. How high are the maximum creditable costs for this new sewer pipe?
- What is the maximal refund that the community of WWTP A can expect to receive from the Federal Office for the Environment (FOEN)?

#### Exercise 2: Presence of micropollutants

- Where do you expect to find the highest micropollutant concentrations of domestic origin: in Lake Geneva, certain small rivers of Canton de Vaud or in the Rhone River in Valais? Explain your answer.
- During which periods of the year do you expect to find the highest organic micropollutant concentrations (of domestic origin)? Why?

#### Exercise 3: industrial wastewaters with inorganic micropollutants (iMP)

An industry group is planning to construct a new production site in Canton de Vaud. They estimate that the new production site will produce 15 m<sup>3</sup>/day of wastewater with the following composition (iMP and oMP which are not given in the list will not be used at the future site):

Parameter	Estimated value
pH	5.0
Temperature	5 – 25 °C
Transparency	10 cm
Total suspended solids (TSS)	40 mg/L
Cobalt (Co)	0.3 mg/L
Copper (Cu)	5.0 mg/L
Nickel (Ni)	10.0 mg/L
Cyanide (CN <sup>-</sup> )	0.01 mg/L CN <sup>-</sup> (free and easily releasable cyanide)
Volatile chlorinated hydrocarbons (VOCI)	0.3 mg/L

- Will the new site have to install a wastewater pre-treatment to discharge the wastewater into the public sewer system (no special requirements apply for this industry)?
  - Which parameters/micropollutants will have to be treated?

- b. Based on the general requirements for industries what criteria for these parameters/micropollutants will the effluent have to respect?
2. The communal wastewater treatment plant (WWTP) discharges into a small unpolluted river with a flowrate of 2800 m<sup>3</sup>/day (including water of the WWTP). The communal WWTP removes 30 % of the metals by adsorption to activated sludge. Will the metal concentrations in the river respect the WPO or might the 'Direction générale de l'environnement' (DGE) impose a reinforcement of the industries' effluent concentrations?