

Case Study Fact Sheet: Clariant, Tarragona/Spain

In Tarragona (Spain), Clariant operates a production plant for specialty products, e.g. non-ionic surfactants, cosmetic compounds and additives. A full-scale wastewater treatment plant is part of the infrastructure, where the wastewater of Clariant and neighboring chemical companies is treated. A scheme of the existing WWTP is depicted in the figure below.

In 2016, the water intake from River Ebro to produce water for Clariant's production site amounted to around 200k m³. At the same time, about 140k m³ water was discharged. At full water reuse, this presents an opportunity to save more than 70 % of fresh water, which corresponds to great potential environmental benefits in a water stressed location like Tarragona.

Objective in INSPIREWATER

The demonstration activities aim at end-of-pipe solutions for water recycling for high grade purposes, e.g. process water. This includes the following specific objectives:

- ▶ Demonstrate water reuse and concentrate treatment towards zero liquid discharge for secondary effluent with high fouling potential at Clariant's Tarragona site
- ▶ Optimize the interplay of existing and new treatment units towards minimized energy consumption and chemical use

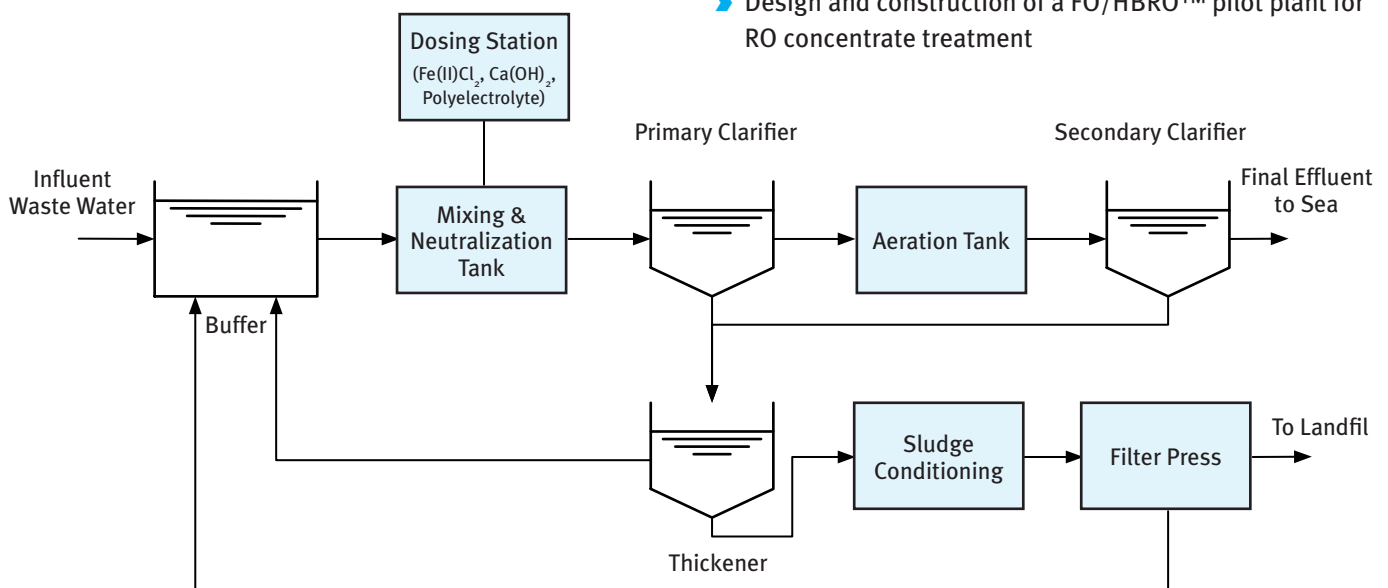
- ▶ Demonstrate UF/RO treatment in water reuse for high fouling feed solutions with suppression of biofouling by an innovative catalyst solution (MOL[®]LIK)
- ▶ Demonstrate FO coupled with high brine RO (HBRO[™]) and/or MD for water reuse and concentrate treatment
- ▶ Demonstrate recycling of water back into the production process
- ▶ Integrate discontinuous low-grade heat via a heat storage unit into the (continuous) water recovery process

Technologies used for the treatment in the INSPIREWATER case study:

UF, RO, FO, HBRO[™]/MD, MOL[®]LIK

INSPIREWATER activities and first results

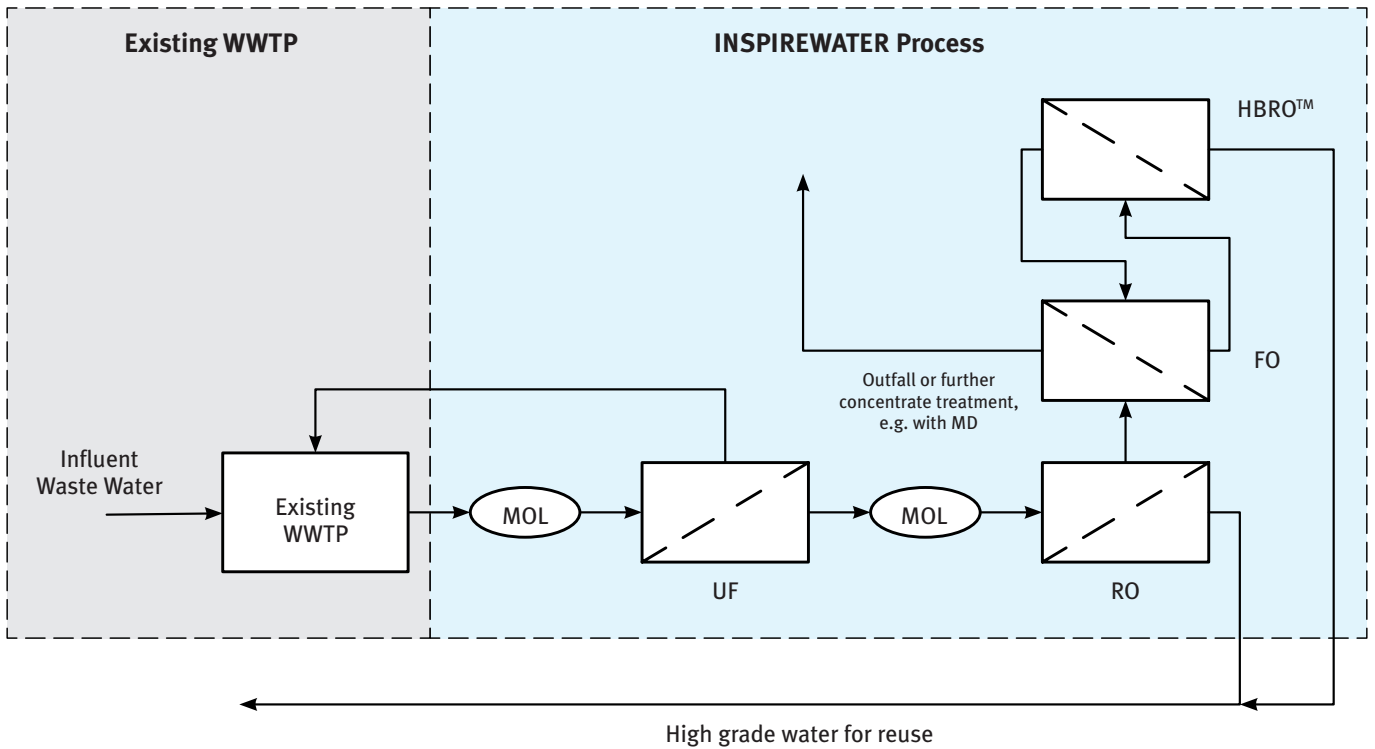
- ▶ Membrane selection: Tests with different UF and RO membranes
- ▶ Draw solution selection: Test of different salts as draw solutions for FO
- ▶ Laboratory tests of MOL[®]LIK catalyst in UF and RO applications
- ▶ Construction, commissioning and start-up of a UF/RO pilot plant with DOW IntegraFlux[™] SFP-2880XP and DOW FILMTEC[™] FORTILIFE[™] CR100
- ▶ Design and construction of a FO/HBRO[™] pilot plant for RO concentrate treatment



Scheme of Clariant's current WWTP in Tarragona.

Outlook

- ▶ UF/RO pilot plant will be operated until March 2019
- ▶ FO pilot will start around May 2018, treating the RO concentrate
- ▶ In Q4/2018, FO will be fed directly with WWTP effluent



Upgradation concept, from linear to circular. Effluent from the secondary clarifier is treated with the anti-fouling catalyst (MOL), UF, RO and FO. Permeates from RO and FO/HBRO™ treatments can be reused for high-grade purposes. To assess the effect of MOL®LIK, the UF/RO treatment line is operated without catalyst treatment in a parallel line with the same feed water.

Contact

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| FHNW: Christian Kazner | christian.kazner@fhnw.ch |
| DOW: Lorena Barberà Campos | LBarberaCampos@dow.com |
| Clariant: Friedhelm Zorn | Friedhelm.Zorn@clariant.com |
| BLUE-tec BV: Lex van Dijk | Lexvandijk@blue-tec.nl |
| MOL Katalysatortechnik GmbH: Jan Koppe | jan.koppe@molkat.de |

