Case Study Fact Sheet: SANDVIK, Sandviken/Sweden

The demonstration case SANDVIK is carried out at the SANDVIK stainless steel production site in Sandviken, Sweden. Here a pickling of the metal pieces is carried out using a mixture of phosphoric and sulphuric acid. The spent acid is neutralized and landfilled.

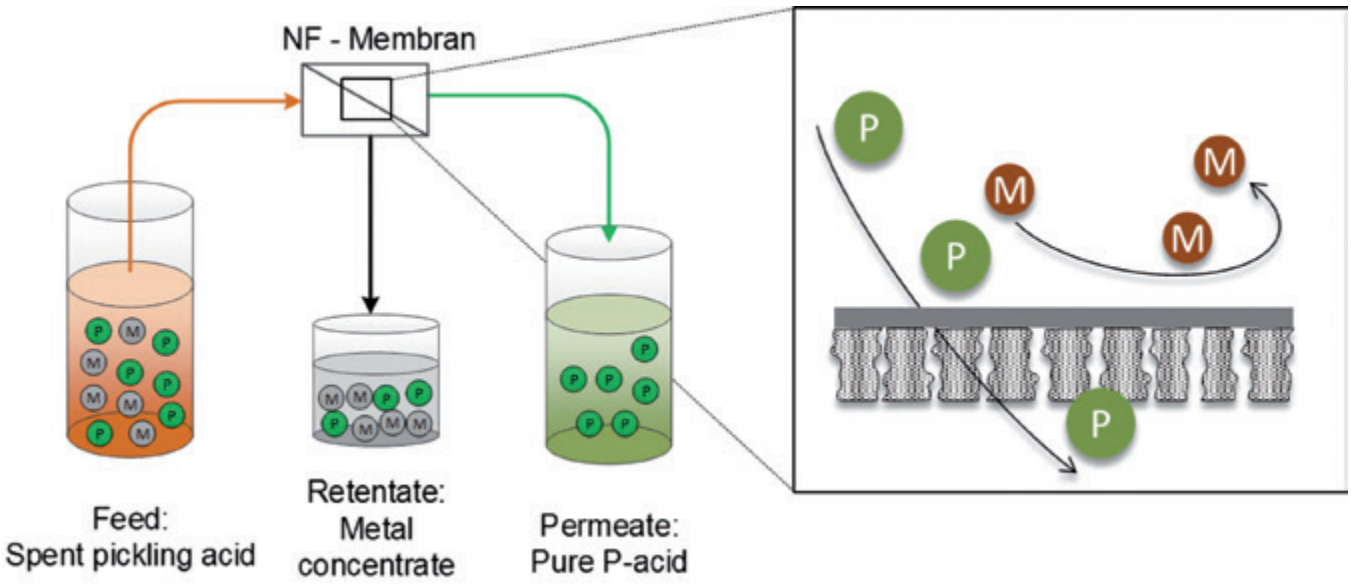
Phosphorus is a limited resource of global importance with natural deposits that are restricted to a few countries. Most nations heavily depend on P imports while wasting the resources contained in, sewage, industrial by-products or spent acid. Nanofiltration can enable P-recovery from waste streams by allowing the phosphorus to permeate through the membrane and retaining multivalent impurities.

A scheme of the nanofiltration step is depicted in the figure below. During the INSPIREWATER project this will be demonstrated at the Sandvik site in Sweden. By applying Nanofiltration over 50% of phosphorus recovery will be achieved. The pickling step is followed by a rinsing step. A optimization of the rinsing step will lead to a decreased water usage of over 70%.

Objective in INSPIREWATER

The demonstration activities at the Sandvik site aim at a closed loop resource and water recycling. This includes the following specific objectives:

- Demonstrate NF for phosphorus recovery from spent pickling acid at Sandvik site in Sweden
- Demonstrate RO for water and resource recovery from rinsing bath, towards zero liquid discharge
- Optimize the interplay of existing and new treatment units towards minimized energy and water consumption
- Minimize waste to landfill
- Identify suitable technologies for metal recovery from spent pickling acid
- Screening of innovative membrane technologies such as layer-by-layer modification



Scheme of P-recovery process at Sandvik.

Technologies used for the treatment in the INSPIREWATER case study:

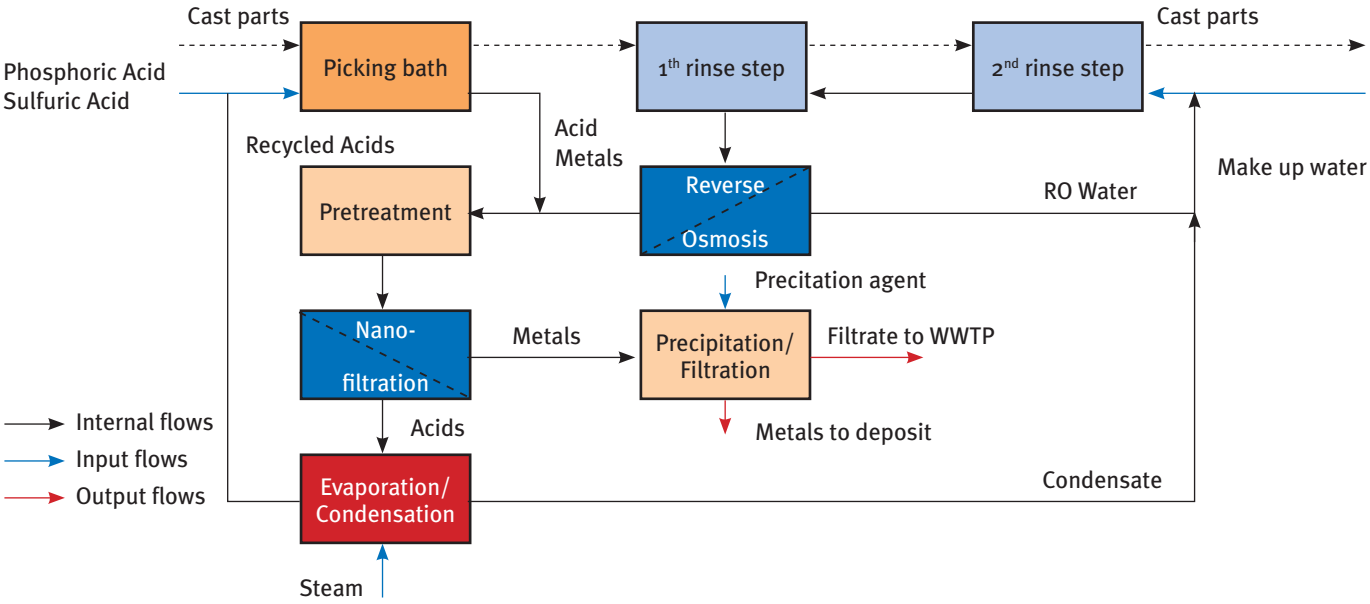
- MF, NF, RO, Evaporation

INSPIREWATER activities and first results

- Membrane selection: Tests with different NF and RO membranes
- Pre-treatment selection: Test with different dilutions and pre-filtration steps
- Post-treatment selection: Dimensioning of evaporator
- Design, construction, commissioning and start-up of a NF pilot plant
- Optimization of rinsing step including construction, commissioning and start-up of a RO pilot plant

Outlook

- NF pilot plant will be operated until March 2019
- RO pilot will start around May 2018, treating the RO concentrate
- In Q3/2018, NF will be run in semi-continuous mode including pre- and post-treatment



The closed loop recovery system for both pickling acid and rinse water at the SANDVIK demonstration case.

Contact

Sandvik: Stefan Björk stefan.bjork@sandvik.com
IVL: Fredrik Hedman fredrik.hedman@ivl.se
FHNW: Kirsten Remmen kirsten.remmen@fhnw.ch

www.inspirewater.eu

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