Grundfos Smart Filtration Suite - case story from VIVAB

"Optimization of complex membrane filtration processes is crucial to achieve sustainable drinking water treatment. Therefore, I consider the SFS concept as a promising alternative for adaptive control solutions in the future."

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SITUATION

In 2019, extended field testing of a control system for membrane filtration, developed by Grundfos, was carried out in cooperation with a Swedish utility, Vatten & Miljö i Väst AB (VIVAB), responsible for municipal drinking water supply, wastewater treatment and waste disposal management for the municipalities of Varberg and Falkenberg. The testing site, Kvarnagården water treatment plant (WTP) located in Varberg, provides approximately 5 million m^3 drinking water annually to 60,000 residents, produced from surface water. The current treatment process consists of rapid sand filtration, Ultrafiltration (UF) combined with a coagulation step, pH adjustment and disinfection with UV.

In November 2016, the WTP was upgraded with an Ultrafiltration (UF) facility (maximum capacity of 1080 m^3 h-1 net permeate flow rate), to meet stringent requirements for microbiological barrier function and enhanced removal of natural organic matter (NOM). In brief, the full-scale plant consists of a two-stage UF membrane filtration process, with in-line coagulation in the primary UF-stage. Since the sewer capacity of the site was limited, and the backwash water contained coagulant residues, a secondary UF-stage was applied to increase the recovery of the plant to >99%.

SOLUTION

Grundfos implemented the Smart Filtration Suite (SFS) in the first stage of the UF system to optimize the backwash frequency, backwash duration, chemical cleaning timing, and to stabilize the operation. For VIVAB to gain trust in the solutions, SFS was deployed in GhostMode where decisions and suggestions were logged but not executed. SFS quickly detected the improvement potential in filtration cycle length and backwash length, especially under fluctuating incoming water qualities, as well as the potential to largely decrease the chemically enhanced backwash (CEB) frequency.

SFS suggested to double the time between CEB. To test the recommendations issued by the SFS algorithms, the operators prolonged the CEB interval by 20% on two out of four racks.

THE RESULT

The savings amounted to EUR 4475 per year when scaled to the whole system, with no negative impact on the process detected with the new CEB frequency.

This trial demonstrates how an even small change in just one of the variables SFS controls can lead to significant monetary savings for the entire system, without negative impact.

CLEANER

17.9%
resource consumption

BETTER

Automated risk-free operations, which gives greater peace of mind - requires no operator supervision

CHEAPER

EUR 4475
total yearly savings