

DECISION MAKING TOOL FOR OPTIMIZED PROCESS OPERATION AND MASS FLOW MANAGEMENT AT GREVESMÜHLEN WWTP

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Abstract

The "IWAMA" (Interactive Water Management) project, funded by the BSR INTERREG 2014 - 2020 program aims to improve the water quality of the Baltic Sea. One of the most important tasks is to train the participating operators of the treatment plants, with regard to energy efficiency and sludge management. WWTP Grevesmühlen currently has a capacity of approx. 65,000 PE. The incoming wastewater is characterized by high proportions of industrial discharges (dairy, coffee production). In addition to the biological treatment, based on the activated sludge process, a central sludge treatment forms the core of the plant. Due to additional digestion of sewage sludge from surrounding WWTPs and various co-substrates, the biogas yield is improved/high. Besides a sludge thickening and co-substrate receiving station the plant is equipped with a thermal hydrolysis unit to intensify the digestion processes, aiming to further improve the biogas production and dewatering characteristics of the digested sludge. The sludge liquor is treated in a partial flow treatment, based on a two-stage deammonification to significantly reduce the nitrogen load. The complex overall system allows an energy-efficient treatment of wastewater without compromising the effluent quality. The decision-making tool aims to link the inter-dependent treatment components. For this reason a simulation model of the WWTP Grevesmühlen was developed in a step-by-step approach, based on a detailed baseline study and operational data analysis. Based on a successful calibration and validation of the simulation model including pre-treatment, aerobic biological treatment, sludge digestion, co-fermentation, thermal hydrolysis and deammonification, optimization potentials will be identified. Subsequently, the findings will be implemented in the full-scale operation of the treatment plant. The verification process includes a detailed measurement campaign before and after implementation of the optimization measures. The IWAMA project started in March 2016 and has a term of three years with a total budget of € 4.6 million.

Keywords: Simulation, energy efficiency, plant wide modelling