



## A nanofiltration membrane for the removal of color from surface water to meet Norwegian standards

Cristina Vergel<sup>a,\*</sup>, Rich N. Franks<sup>b</sup>, Craig Bartels<sup>b</sup>, Maria Neculau<sup>c</sup>

<sup>a</sup>*Biovac Environmental Technology, Frogner, Norway, email: cristina.vergel@biovac.no*

<sup>b</sup>*Hydranautics/Nitto Denko, 401 Jones Road, Oceanside, CA 92058, USA*

<sup>c</sup>*Hydranautics/Nitto Denko, Barcelona, Spain*

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### ABSTRACT

The color removal from a lake on the border between Engerdal municipality in Norway and Älvdalen municipality in Sweden by a Norwegian water treatment plant using a new nanofiltration (NF) membrane is demonstrated in this study. This water source has low turbidity but a high concentration of natural organic matter (NOM), which gives the water undesired color, smell and taste. In order to fulfill the Norwegian Drinking Water Regulations, this plant installed new NF membranes, the sulfonated polyethersulfone HYDRACoRe 50. The typical Norwegian water treatment design was used for the water treatment, which consisted of a screen filter of 50  $\mu\text{m}$ , the NF membrane rig, a UV unit and an alkaline filter treatment. The initial flux, 14 L/m<sup>2</sup>·h, was recovered to around 90% after all the main cleanings were applied during 4 years of service. This effort helped to maintain a good performance of the plant. Each year, the normalized flux declined 7%, suggesting the formation of the common fouling layer over the membrane surface. This performance loss is normal after 4 years of continuous operation with NF membranes. In fact, there have been no membrane replacements during the time under study. The color and infectious microorganisms removal with this selected process was higher than the 90% that shows its adequacy to treat the typical high colored Norwegian water sources. This paper presents the successful application of the NF membranes in the typical Norwegian water treatment design.

*Keywords:* HYDRACoRe; Color; NOM; Nanofiltration membranes

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\* Corresponding author.