Lewabrane® RO B400 HR is used to produce water for a refinery in Bratislava, Slovakia. The water treatment plant is fed by surface water from the Danube river. The water is pre-treated by flocculation, followed by ultrafiltration (UF). The reverse osmosis (RO) system itself consists of five trains in three stages. After the RO, a mixed bed is used to produce demineralized water for boiler feed and other technological water demand in the refinery. The feed water quality varies in the range of 320–400 mg/l TDS (conductivity up to 580 μS/cm) and has seasonally dependant organic material content that may cause fouling.
Membrane performance

The operating company has defined performance requirements as follows: permeate conductivity (max. 15 μS/cm), permeate flow rate (up to 135 m³/h) and recovery rate (up to 85%). Lewabrane® RO B400 HR replaced a competitive product that produced, after 4 years, a conductivity in the range of 40–50 μS/cm. Right after start-up, Lewabrane® confirmed the excellent salt rejection as projected with the LewaPlus® design program, providing permeate conductivity below 10 μS/cm in all trains. After 4 months of operation, when pressure drop and permeate conductivity visibly increased, all RO trains were cleaned, restoring the initial parameters. It is worth highlighting that Lewabrane® membranes were cleaned after 4 months, while the previously used membranes required cleaning every 4–6 weeks, from the very beginning of their use.

Conclusion

Lewabrane® RO B400 HR membranes have fulfilled all requirements, especially providing very good permeate quality, with a rejection above the customer’s expectations. After 6 months, stable permeate quality and permeate flux with lower cleaning frequency were confirmed. Thus, lower consumption of cleaning chemicals and reduced consumption of regenerate for the mixed bed could be realized.

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