Drinking water supply by reverse osmosis plants: three years of experience at El Prat de Llobregat Municipality

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ABSTRACT

Deep coastal aquifer of Llobregat delta constitutes the main source of drinking water supply to El Prat de Llobregat municipality (64,000 inhabitants) near Barcelona (Spain). Since 70s this aquifer initiates a gradual salinization process by seawater intrusion, magnified by an exhaustive and not ordered water extraction. Also, aquifer pollution by volatile organic compounds (trichloroethylene and tetrachloroethylene) appeared in 90s. In order to remove groundwater pollution, three air stripping plants were built 15 years ago. When groundwater salinity achieved non-drinking water standards, two water treatment plants (Sagnier WTP and Mas Blau WTP) were built using reverse osmosis technology. Both WTPs by RO has a pre-treatment based in volatile organic compounds removal by air stripping, in-line coagulation (only for one WTP), multimedia filtration, cartridge filtration and scaling inhibitor dosage. Chlorination and dechlorination is available but it is not used. Each WTP has two RO lines with two stages and 75% recovery design. As energy recovery device, Turbo Charger is working as booster pump between first and second stage. Drinking water quality according to Spanish regulations is achieved using filtered water by-pass blend and postchlorination before distribution tank. Operation and maintenance aspects are monitored using supervisory control and data acquisition register and remote/local control by O&M team of Aigües del Prat (public company). Water quality (raw water, filtered water, RO feed, permeate, blend, distribution tank and point of use) is monitored daily by Aigües del Prat laboratory (accredited under ISO 17025) according to drinking water Spanish regulations and municipality health criteria. Since January 2009, Aigües del Prat produces without interruption the 90% of drinking water of El Prat municipality using RO plants. This paper presents the experience acquired on operation and maintenance, reliability, drinking water quality distributed control, groundwater quality evolution, network changes and public perception.

Keywords: Drinking water; Groundwater; Reverse osmosis; Seawater intrusion

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