



Seawater intake and partial pre-treatment with Neodren - results from investigation and long-term operation

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Received 22 October 2009; accepted 17 June 2010

ABSTRACT

In the last few years the efforts to improve operation and maintenance of seawater intake systems and of the pre-treatment of seawater for desalination plants have been enforced, especially for those designed on the basis of the membrane process reverse osmosis (RO). Driving forces have been the increasing importance of seawater desalination with RO, the need for the reduction of related costs, and the minimization of the impact of the operation related side effects on the environment. This concerns, e.g., the discharge of water resulting from rinsing and cleaning processes, that are also influenced by agents used in the pre-treatment. Thereby as one very important aspect it has to be considered, that the intake and the pre-treatment of seawater have to be adapted to the specific conditions at the construction site of each plant. These can differ however in a wide range. Beside the influences determining the raw water quality, also items like the geological situation, environmental aspects and details related with infrastructure or logistic are usually different and have to be considered consequently during design, construction and operation of a desalination plant. A successful possibility to reduce these efforts has shown to be the seawater intake and partial pre-treatment system Neodren, that allows for a reliable and long-term operation of desalination plants with nearly no need for chemicals, under certain circumstances even without them. The system is based on porous drains that have been installed with a specially developed horizontal directional drilling technology in about 4–7 m depth in the stratum below the seabed. This is acting as a natural filter and helps to avoid completely usual problems at seawater intakes, like influences on the marine habitat or weather induced contamination peaks. Even if the first system is in trouble-free operation since 1996, and in June 2008 nine systems with a total capacity of about 382,000 m³ of Neodren-filtrate per day have been installed and are successfully in operation, further investigation is carried out by Catalana de Perforacions and cooperation partners, to take advantage of all benefits of these systems. As one option has been identified to operate them in combination with ultrafiltration. That would allow for increasing the productivity of the RO units, or, if compared to an operation with conventional pre-treatment, for a reduction of the necessary membrane area for the production of the same capacity respectively. Related results from investigation are presented together with an overview of Neodren systems with long-term operation, that confirm the economical and ecological sustainability of the Neodren technology, and details of a new installation.

Keywords: seawater intake; sub-seabed filtration system; pre-treatment for RO; seawater desalination; ultrafiltration

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