

## Press release

# AppliTek adds process transparency and enhanced QC/QA to desalination operations

### AppliTek releases new applications for the desalination industry

Nazareth, Belgium, October 29<sup>th</sup> 2012 – Large scale desalination operations have enabled the production of potable water from seawater at a cost that is not insurmountable in arid regions. Desalination plants, by definition manufacturing facilities, are continuously trying to improve performance or efficiency by means of process control. Suitable analyzer technology is the first step in order to achieve process transparency and take process performance to a higher level.

Desalination is based on a separation process of the mineral content of saline water by means of reverse osmosis (RO) or thermal distillation, with chemical and electrical consumptions as the main operating costs accounting for no less than 60% of the total plant cost breakdown. Measurements at critical points in the process are essential in various control loops in desalination plants, transmitting data to the DCS (distributed control system) in order to compare against the desired set-point.

Physical parameters such as temperature, flow and pressure are generally used for controlling the water production, but in most desalination plants only pH and conductivity are used as critical process parameters. Chemical measurements are usually done manually (off-line) in private or corporate laboratories.

Since 1985 AppliTek has established an extended database of chemical applications for water analysis for which the company designs, manufactures and installs automatic (on-line) analyzers. AppliTek's approach to addressing process issues in desalination facilities is different from traditional water management strategies, in a way that water analyzers are used to monitor the water chemistry throughout the process, from the raw water intake to the distribution of the finished product: raw water quality, scaling, membrane life and post-treatment water quality.

### Chemical parameters

Pretreatment of the saline water is necessary to prevent contaminants from interfering in the separation process. Bromide is naturally present in seawater but can lead to the formation of bromate if chlorine-based disinfection of the raw water is used. Additionally, it is recommended to monitor on-line the boron concentration, as borate or boric acid. Determination of this element, sometimes present at high levels in the seawater, can be used to control the boron removal process. These measurements at the pretreatment level allow also to verify the quality of the blend water, when used for balancing the mineral content of the processed water (see further).

Fouling and scaling are major problems in all desalination processes and causes a drop in efficiency or compromised water quality if not controlled. Conductivity measurements are typically used for determining silica and sodium, but fail to provide data on concentrations. AppliTek analyzers determine on-line the exact concentration of the desired parameters, up to ppb levels, and allow for precise dosing of scale inhibitors. Biocides, sometimes employed either to prevent fouling or to kill waterborne pathogens in RO processes, can also be monitored on-line.

In the desalination post-treatment process, AppliTek on-line analyzers can be implemented to monitor the RO permeate and the blending process. Parameters such as, calcium, magnesium and/or total hardness levels are monitored, with threshold settings depending on the technical specifications of the type of water (drinking water, irrigation or process water). When blending with seawater or groundwater is used for adjusting the typical aggressive and instable properties of the processed water, it can be necessary to measure again the boron and bromide concentrations in order to prevent unnecessary contamination.

At any time in the process, pH, conductivity and turbidity monitors can be used as a basic measurement, while the on-line analyzers provide full transparency on the chemical process parameters, according to customer's needs.

At the end of the desalination chain, AppliTek can supply a specific package of water analyzers to assess whether the water leaving the plant meets local regulatory requirements for drinking water. If chlorine-based disinfection is applied, it is recommend to measure on-line the chlorine concentration (total and free) to assure sufficient disinfection and prevent chemical residues during distribution. Corrosion inhibitors such as orthophosphate generally are of no concern but should be monitored for appropriate levels. Total Organic Carbon (TOC) is an established analytical technique that can be used as a non-specific parameter for organic content.

### **Water hygiene**

While not specifically linked with the desalination industry, the challenge in water distribution is to assess and maintain the microbiological quality of tap water at critical points of the distribution chain. Today this challenge can be dealt with by recent achievements at AppliTek's R&D department, where a proprietary analyzer system using the ATP measurement protocol was developed. Together with the above mentioned analyzer packages for water treatment and production, it is expected to be major leap forward in water QC/QA management.

### **About AppliTek**

AppliTek is a specialist provider of on-line analyzers and analytical solutions for several industries, such as the chemical and petrochemical industries, as well as utility industries such as power generation and water companies. Detail engineering and manufacturing of the systems are done at its headquarters in Belgium, while final commissioning on-site is organized with local AppliTek qualified partners. Visit [www.applitek.com](http://www.applitek.com) for more information.