

## Desalination and Demineralization

Abu Dhabi, United Arab Emirates

### How we created value

- A total system was provided as pre-engineered and pre-assembled packages.
- Total dissolved solids reduced from 48g/l to less than <10ppm during desalination.
- Total dissolved solids reduced to less than <0.1ppm during demineralization.



### Brief

An industrial client is constructing what it intends to be the world's largest single-site aluminum smelting plant at its Abu Dhabi base in the United Arab Emirates. Ovivo's seawater desalination and demineralization system was commissioned to provide a total solution that fulfilled several needs. Treated water supplies power the plant and serves the aluminum production process. To maximize the value of the water resource used, a final process prepares wastewater for potable use.

Stringent requirements cover all site activities at the plant, so Ovivo systems were provided as pre-engineered and pre-assembled packages to meet those specifications. The flexibility with which Ovivo technology can be supplied was instrumental in reducing the overall project time and minimizing the constraints related to site installation.

### Solution

At first six dual media filters process water through sand prior to reverse osmosis (RO). Sodium metabisulfite is injected into the screened seawater

in order to neutralize any residual chlorine, which would otherwise damage the membranes in Ovivo's reverse osmosis desalination system.

The desalination plant shares a common intake channel with the power plant as well as the industrial user that it supplies with water. Passing a coarse screen, which extracts larger particles from the flow, seawater is pumped to the desalination plant where it is shock-chlorinated with sodium hypochlorite weekly in order to minimize biological growth in the membrane systems upstream.

Six RO systems desalinate 2,600m<sup>3</sup> of seawater each day. A further six RO units demineralize 1,900m<sup>3</sup>/day. Three deionization systems handle 66m<sup>3</sup>/day. The result after its industrial application is a safe, treated potable product water.

**Outcome**

Ovivo's plant reduces Total Dissolved Solids (TDS) in seawater from 48,000mg/liter to <10ppm at the first stage of reverse osmosis treatment and to <0.1ppm in the second stage. The design recovery value for the total solution implemented is 40%.

Desalination is a process that requires high-energy consumption. A pressure exchanger is used for transferring the energy created at the expulsion of brine to power other plant operations with high efficiency. Thus, Ovivo's desalination technology reduces the energy demand of the desalination process and lowers operating costs.

