

# FilterClear®

## Desalination: KAUST, Saudi Arabia

### Background

The King Abdullah University of Science and Technology (KAUST), is located at Thuwal, north of Jeddah in Saudi Arabia. The university is an international, graduate level research institution, dedicated to inspiring a new age in scientific achievement in the Kingdom and around the world.

One of the major research centres will focus on sea water desalination and sewage water treatment, both of which are of vital importance in a region where water scarcity is a perennial challenge.

To meet the demand for fresh water a new Sea Water Reverse Osmosis (SWRO) plant was designed to satisfy requirements of the University and surrounding area. Due to the sensitive nature and location of the seawater supply lagoon, the pre-treatment part of the SWRO plant had to function without use of chemicals.

### Solution

FilterClear® along with its partners, carried out trials of its patented pre-treatment filtration process at sites north and south of Jeddah in July 2007.

These compared the performance of FilterClear® against other filtration technologies without the normal addition of Ferric Chloride or any other coagulant.

On the basis of the trial results, FilterClear® was approved by Saudi Aramco for the application.

The FilterClear® pre-treatment plant installed at the SWRO plant consists of four (10m x 4m) horizontal filters each with a maximum flow of 1200m<sup>3</sup> / hour, giving total output of 4800m<sup>3</sup> / hour.

The high loading rate achieved by FilterClear®, compared with other media, meant that the number of vessels needed to treat the specified flow dropped from 16 to 4.

The SWRO plant was commissioned in March 2009 and has been producing water since April 2009. In 2019 Bluewater Bio were awarded the contract to upgrade capacity by adding a 5<sup>th</sup> FilterClear filter.



**FilterClear™**  
  
 A BLUEWATER BIO TECHNOLOGY

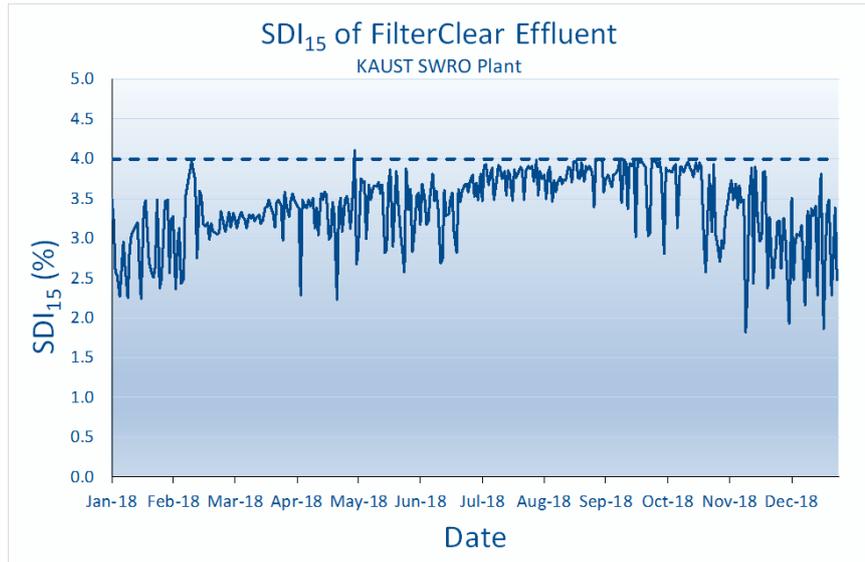
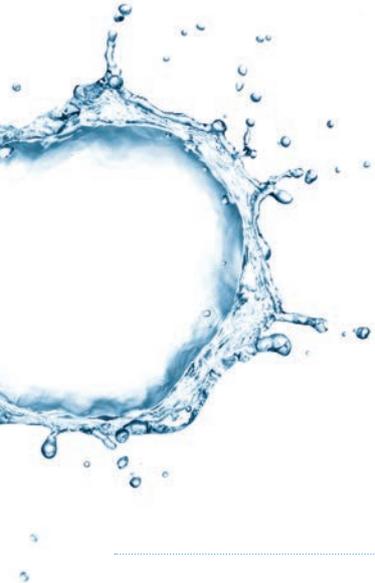
## Performance

The filters are currently being run at a loading rate of approximately  $30\text{m}^3/\text{m}^2/\text{hr}$  and have successfully been tested at  $40\text{m}^3/\text{m}^2/\text{hr}$  when extra capacity has been required. Typically, dual media systems are run at  $10\text{m}^3/\text{m}^2/\text{hr}$ .

The filters are backwashed approximately every 10 days for 15 minutes and the water used is sent direct to the intake lagoon, with no polluting chemicals being discharged.

The design specification was to obtain a Silt Density Index (SDI) level  $<4$ , upstream of the SWRO plant which contains Toray membrane modules. The SWRO plant runs routinely for 12 months without the need for a chemical clean. This is excellent performance and a strong testament to the performance of FilterClear®.

As shown in the following chart, even when the inlet turbidity hit extreme levels of 10 NTU, the filter easily handled the spikes to deliver consistent results.



## Conclusion

FilterClear® met all required targets from the outset, without the use of chemicals and achieving SDI levels well within the required standards for the SWRO membrane.

Significant capital cost savings were achieved by using FilterClear® instead of other media filters. Shrinking the footprint of the pre-treatment plant provided enormous civil engineering and plant cost savings.

In addition, operating cost savings from a reduction in power consumption, chemicals (both purchase and disposal) and reducing the frequency of the membrane clean have made the project a huge success for everyone involved. In addition, it should be noted that FilterClear® guarantees its media for 15 years.

FilterClear® is a high performance, environmentally friendly, low CAPEX and OPEX alternative to traditional technologies for SWRO pre-treatment.



**Project developers, Saudi Aramco, commented:**  
“FilterClear® is a breakthrough technology in a very conservative market place. It is important for KAUST to embrace innovation and be aligned to winning technologies; we are pleased to be part of this breakthrough.”

**To find out more about FilterClear® call:**

### Glasgow Office

Tel: +44 (0)141 776 2289

### London Office

Winchester House,  
259-269 Old Marylebone Road,  
London, NW1 5RA  
UK: +44 (0)845 519 5800  
info@bluewaterbio.com

