



Nalco 3D TRASAR™ Membrane Technology helps a fertilizer plant to reduce its overall production costs by US\$40,800/year

NALCO

An Ecolab Company

CASE STUDY - CHEMICALS

CH-1678

BACKGROUND

A fertilizer plant in Latin America uses permeate from its reverse osmosis system to supply their medium and low pressure boiler system and process. In addition to focusing on quality and the need for permeate availability, there is also a desire to reduce the total operating costs associated with this system. The following key business drivers were identified on their operation:

- Extend membrane life
- Increase operating availability of their reverse osmosis plant

- Optimize operator time (labor)
- Reduce water consumption

SYSTEM CHARACTERIZATION

- System: Reverse Osmosis
- Number of trains: 2
- Permeate flow per train: 90 gpm (~ 20 m³/h)
- Number of stages per train: 2
- Total number of vessels per train: 5
- Number of elements per vessel: 5

CUSTOMER IMPACT

eROI™

ECONOMIC RESULTS

Water consumption reduced by 11,400 m³/year as recovery improved from 74% to 76%.



Total cost-saving of US\$ 14,100.00/year.

Antiscalant and biocide volume reduced as recovery improved from 74% to 76%.

Total cost-saving of US\$ 3,200.00/year.

Chemical cleaning frequency reduced from 5 to 3 times/year leading to reduced chemicals and labor.



Total cost-saving of US\$ 9,800.00/year.

Membrane life extended from 36 to 51 months as a result from reduced chemical cleaning and automatic anti-scale control.

Total cost-saving of US\$ 5,000.00/year

Labor used to collect data and system maintenance was reduced as a result from automatic monitoring and control.



Total cost-saving of US\$ 8,700.00/year.

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

(Continued on Reverse Side)

- Chemical program: PC-191T/PC-56
- Pre-treatment: clarification
- Water source: surface water
- Number of operators: 1 per shift

The plant was already a Nalco customer and the implementation of 3D TRASAR Technology was offered as part of the Improvement Plan agreed for their pre-treatment system. The system characteristics and opportunities identified were as follows:

- There was a lack of continuous monitoring of critical system parameters on the reverse osmosis unit. Manual data collection, in addition to being time-consuming for the operator, failed to detect events or eventual deviations. As a result, corrective actions were not appropriate for the operation.
- Chemical membrane cleaning was performed as a function of time, leading to early cleaning, a waste of chemicals, increased water and labor use, and a reduction in membrane life and operating system availability.

- Anti-scale supply was manual, and membranes were put at risk, as the system was not able to perform automatic corrections to offset variations in the chemical preparation, feeding pump failures or even changes in the feeding system flow rate.

SOLUTION

After reviewing all plant conditions, we recommended using Nalco 3D TRASAR Membrane Technology along with Nalco 360™ Service, which continuously monitors critical system parameters, controls anti-scale feeding automatically and includes the remote support of specialists in reverse osmosis systems to monitor the system 24x7, offering technical recommendations based on performance reports.

RESULTS

The implementation of 3D TRASAR for Membranes Technology and Nalco 360 Services has enabled significant improvements in system performance. Recovery rate has been improved from 74% to 76%, due to continuous monitoring and visibility, generating US\$14,100 of water savings per year. It also provided savings of US\$3,200/year in antiscalant and biocide. Due to

the data normalization, chemical cleaning was also optimized from 5 to 3 annual cleanings, providing US\$9,800/year in cleaning chemicals and labor. Manpower is also another area that feels the benefits of automatic data collection and reports, saving US\$8,700/year by optimizing manpower usage. As a result from all improvements above, membrane life could also be extended from expected 36 months to 51 months. It provided annual saving of US\$5,000.

CONCLUSION

The online monitoring and automatic production of standardized reports helped optimize the recovery rate, and the immediate detection of unusual situations, while reducing the number of hours that were previously required for this purpose. The solution also provided for cleaning as a function of standardized pressure than a function of time, resulting in reduced use of water, chemicals and labor; and extending membrane life, which was a result of the automated control of the anti-scale feed, and delivering more accurate feeding rates, even when the product preparation system had variations.

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