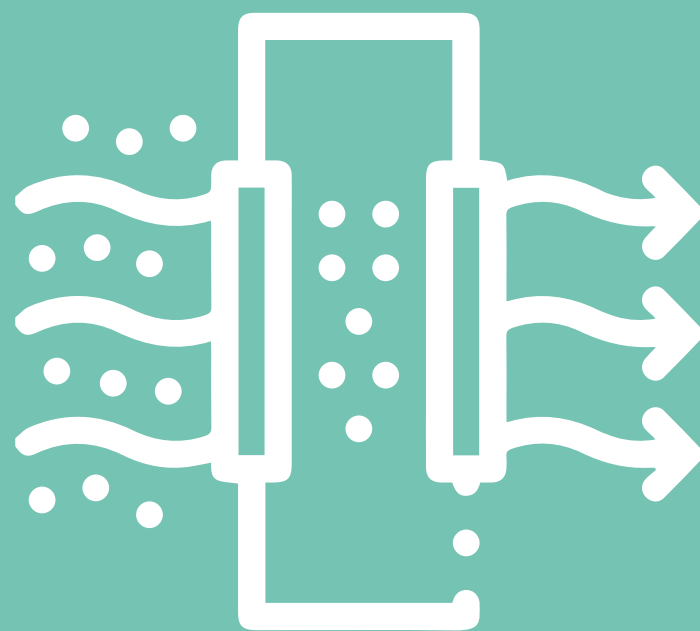




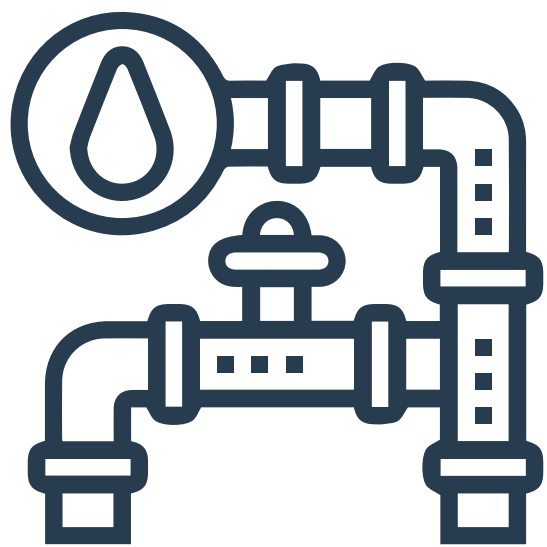
Case Study

**Water Optimization Project
using Membrane Systems**

Bahía Blanca, Argentina



Case Study



Customer:

Coca Cola Andina Bahía Blanca

Location:

Bahía Blanca, Argentina

Technology:

Water Optimization Project



Case Study

Water Optimization Project using Membrane Systems

Challenge

Water is a critical and essential ingredient to the food and beverage industry and a fundamental resource used throughout the supply chain. Water is a limited natural resource that year after year faces unprecedented challenges due to growing limited supplies, contamination of sources and mismanagement.

The ratio of total volume of water used by a plant compared to the total products produced is known as the Water Use Ratio (WUR). This critical ratio is closely monitored with many facilities continually seeking ways to improve it. Water reuse and optimization projects have a direct impact to the WUR and the Andean Bay White customer considered such a project. By optimizing the use of soft water and RO systems, the plant sought to decrease their WUR.

Process Description

The well water supply to the plant is fed to ultrafiltration equipment and an activated carbon filter to reduce suspended solids and remove taste and odors from the water. The filtered water is sent to a single pass reverse osmosis (RO) system that operates at 70% recovery, meaning 70% of the feed water is captured as high quality permeate and the remaining 30% is waste. As means to reduce water use, the waste from the RO system is sent to a concentrating RO system to capture additional permeate. When installed, the concentrating RO system was designed to capture an additional 40% of feed water.



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Aim

The goal of the water optimization project was to increase water reuse within the facility. Many options were evaluated that either increased the production of water in the plant or decreased the volume of water discarded. Once tabulated, it was determined optimization of the RO systems could meet both objectives with minimal capital expense.

Fluence South America performed numerous calculations and projections to aid in optimizing RO recovery rates to recover more water without increased risk of membrane scaling or fouling. Fluence evaluated multiple manufacturers anti-scalant and bio-dispersant products across varying water pH levels. From these evaluations, it was determined with effective chemical feed that the concentrating RO recovery rate could be increased from 40% to as high as 60%.

The plant also implemented a remote monitoring system on the RO systems to actively record system operating parameters and operations. This monitoring also allows real time adjustments to the chemical feed systems to increase reliability of the equipment.

The RO control system was modified to implement a control feedback loop for pH adjustment and dosing of the chemistries. Both dosage rates and pH are critical in RO systems to prevent carbonate and silica scale. To further increase reliability, dosing monitors were installed on the chemical feed pumps to alert operators if chemical was not fed properly.

Any RO recovery optimization project relies heavily on the feed water quality and effective chemical feed to prevent scale formation. Scale formation is most likely to occur in the final membranes in an RO system where salt concentration is highest. As such, the projected water quality in the final membranes must closely be compared against anti-scalant chemical effectiveness to promote long membrane life.



Case Study



Conclusions

With the proper adjustment of pH and the dosage of anti-scalant and dispersant chemistries to the concentrating RO, a system recovery rate of 53% was reliably achieved leading to an overall water plant recovery of 86%. The concentrating RO reject stream reached 28,000 ppm of total dissolved solids and 500 ppm of silica.

As the plant looks to further improve the WUR, additional products are being evaluated with the goal of the concentrating RO to reliably operate at 60% recovery leading to an overall water plant recovery of 88%. Any complete evaluation must always consider the impact to reliability and having RO permeate available at all times to the facility.



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