

FilmTec™ Membranes

FilmTec™ BW30-400 Elements: Municipal Application on Well Water

System Description

The Island Water Association (IWA) on Sanibel Island operates a 4-MGD reverse osmosis plant using all FilmTec™ elements to produce drinking water for island residents. Each of the six trains consists of a 14-by-6 staging array with 6 elements per vessel for a total of 120 elements per train. The system operates at a recovery of 80%, with a feedwater total dissolved solids level typically in the range of 2700 to 3000 mg/l and a feedwater temperature of 29 °C. The permeate flow rate is 450-500 gpm per train depending on demand for water, with an average flux rate typically in the range of 15-16 gfd (gallons per square foot per day). The feedwater is a low-fouling well water which results in very stable operation. The pressure drop is low, and the trains have been cleaned once in the last two years due to problems with the antiscalant.

Element Selection

FilmTec™ RO elements have been in use at IWA for the last 10 years. The elements in Trains A, B and C were replaced with a new generation of FilmTec™ thin-film composite elements after 8 years of service and before the end of their normal useful life. These new elements are even more efficient and have allowed for an incremental increase in capacity of about 21% while maintaining the original membrane flux. The advantage to IWA was that they were able to cancel a major plant expansion just by replacing membrane elements. This also allowed IWA to accelerate other needed improvements to the water plant.

BW30-400 Properties	Minimum Performance Specifications	Average QA Data for Installed Elements	Stabilized Field Performance
Product flow (GPD)	9765	11764	9975
Salt Rejection	98	98.6	99.2-99.4

Results and Discussion

Train C started up on August 4, 1993, with FilmTec™ BW30-400 elements. The normalized salt rejection and the normalized permeate flow rate versus time are plotted for the first 500 days of service in Figure 1. As can be seen, the performance has been quite stable over this time period. The normalized permeate flow rate is down only about 5%, and the normalized salt rejection has been in the range of 99.2% to 99.4% over most of this time period. Also, Table 1 lists the actual feed, concentrate, and permeate analysis as performed on samples collected on September 29, 1993,

compared to the permeate quality predicted by ROSA (FilmTec's Reverse Osmosis System Analysis computer program). The actual permeate quality is significantly better than predicted under the assumption of average 99.0% rejection under standard test conditions.

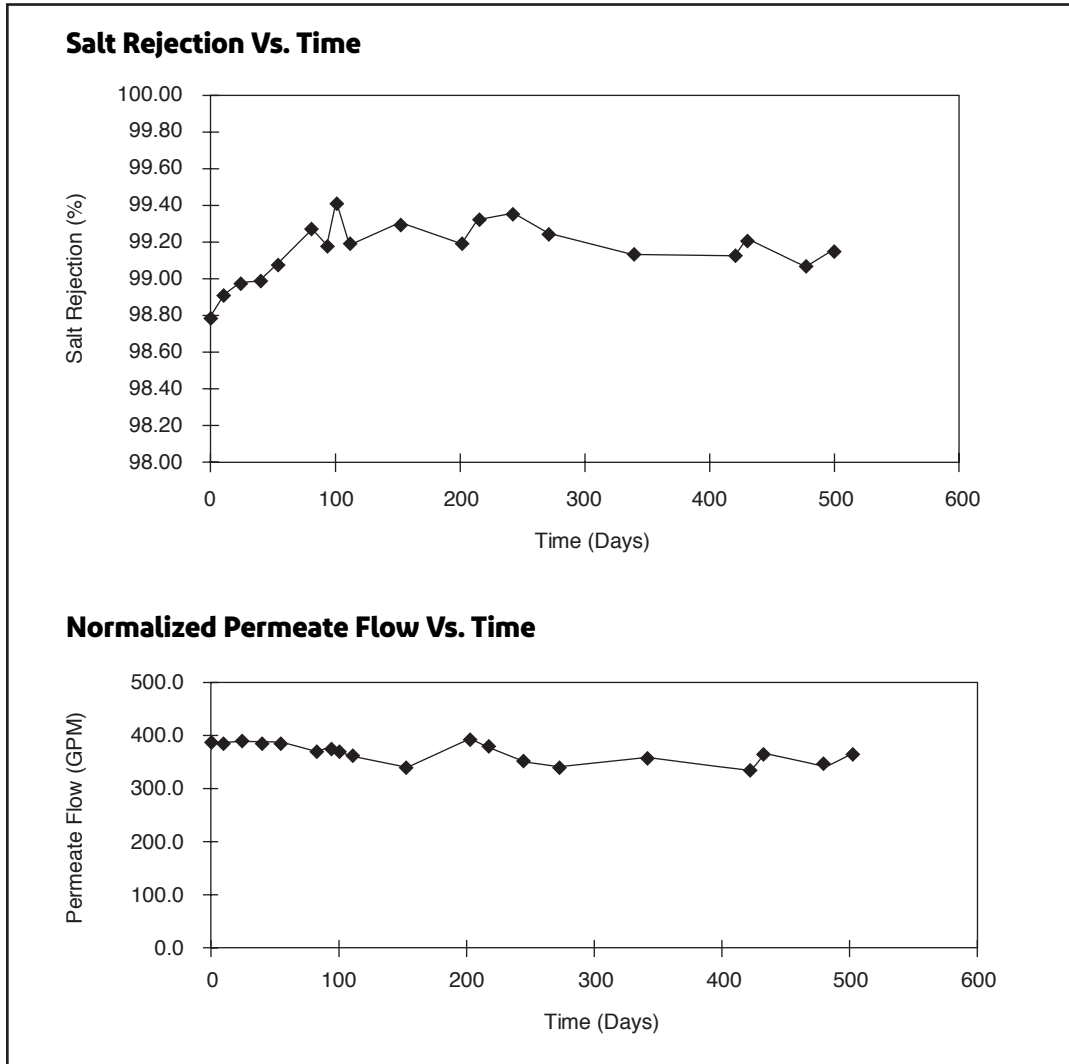
Table 1. Actual Vs. Predicted Permeate Quality in Train C at Sanibel Island

Ion	Actual Analysis / Sampled 9-29-93			
	Feed mg/l	Concentrate mg/l	Permeate mg/l	Rosa Predicted Permeate mg/l
Na	770	3600	29	26.4
Mg	110	501	1.0	2.2
Ca	98	480	0.84	1.7
Sr	9.9	48	0.09	0.2
HCO ₃	195	933	7	7.4
Cl	1330	5890	35	42.4
SO ₄	380	1740	9	6.7
Total	2893	13192	82	87

FilmTec™ Membranes

For more information about FilmTec™ membranes,
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Figure 1.



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