

PRODUCING HIGH QUALITY WATER FOR A POWER PLANT IN CHINA

The PROBLEM

A power plant in Shandong, China has been using fouling resistant Reverse Osmosis (RO) membranes made by another manufacturer. These membranes could not be cleaned (CIP) effectively. They required frequent CIPs, that reduced production and increased treatment cost. Permeate TDS was high, that required

frequent regeneration of the downstream ion exchange de-mineralization systems and increased downtime and treatment costs.

The power plant looked for a replacement membrane that will foul less, the CIP will be effective and that will produce permeate with lowest TDS.



<i>Location</i>	Shandong, China
<i>Feed water</i>	Well water
<i>Application</i>	Power generation
<i>Capacity</i>	80 m ³ /h
<i>Start-up date</i>	January 2018
<i>Array</i>	12:6 array of 6M vessels, total 2 trains

The SOLUTION

Hydranautics offered the power plant their PROC30 membranes. These membranes had 34 mil feed spacer that resisted fouling and made CIPs effective. Membranes had 99.8%

salt rejection under standard test conditions. This high salt rejection reduced the permeate TDS to low levels.

System Performance

RO Train	Membrane Model	Feed Pressure (MPa)	Inter-stage Pressure (MPa)	Concentrate Pressure (MPa)	Pressure Drop (MPa)	Permeate Conductivity ($\mu\text{S/cm}$)	Salt Rejection (%)
#1	PROC30	1.03	0.8	0.73	0.3	11	98.86
#2	PROC30	1.22	0.92	0.83	0.39	9	98.98
#3	Other	0.99	0.65	0.54	0.45	30	96.62
#4	Other	1.11	0.77	0.68	0.43	36	96.08

System Description

Membrane model	PROC30 8040
Pre-treatment	Dual media filter + UF
Membrane flux	20 l/mh
Recovery	75%
Membrane quantity/train	108
Number of trains	2

The IMPACT

After installing PROC30 membranes, immediate effect was seen in the permeate conductivity. While the previous membranes gave permeate conductivity in the range 30-36 $\mu\text{S/cm}$, PROC30 gave it in the range 9-11 $\mu\text{S/cm}$. This improvement in permeate conductivity meant downstream ion exchange units regeneration

frequency was brought down to only 1/3rd, thus reducing treatment cost.

The CIP frequency for earlier membranes was once in 3 months. Ever since PROC30 membranes were installed, no CIP has been carried out in the past four months.

About Hydranautics

Since our founding in 1963, Hydranautics has been committed to the highest standards of technology research, product excellence and customer fulfillment. Hydranautics entered the Reverse Osmosis (RO) water treatment field in 1970 and is one of the most respected and experienced firms in the membrane separations industry. We joined the Osaka, Japan based Nitto Denko corporation in 1987 which was founded in 1918 and now has 117 companies in more than 20 countries, with over 30,000 employees worldwide. Our alliance with this global film industry giant boosts Hydranautics to a superior level of technological sophistication, product performance and customer response.

We are not simply product manufacturers; we are your membrane technology partners. As leaders of high quality membrane solutions, we believe our obligations extend beyond manufacturing and selling our products. Our skilled staff of technicians, engineers and service professionals assist in designing, operating and maintaining a robust, reliable and efficient membrane system to meet your requirements and exceed your expectations. Our support is offered from early stage conceptual design and engineering to start-up and maintenance, no matter the location globally whether it is on land or off-shore.

