LG Chem

LG Water Solutions

Our Stories

POWER GENERATION

Long-term Stable Production of High-Purity Water at a Power Generation Station

CS54-EN-100821

Product type: **Highest Rejection BWRO w/ L Spacer**
RO model: **LG BW 400 R G2**

Application:
Industrial Boiler Feed

Background

One of the largest coal-fired plants in North America, located in Georgia, supplies approximately 3,499 mW of power to the northwest communities in the state. The plant uses reverse osmosis as a pretreatment to a two-bed deionization (DI) unit to extend the time between regenerations and provide uninterrupted service. In 2019, the power plant began operating LG Chem's next-generation and highest rejection BWRO membranes for long-term durability and reliability.

Table 1: System information

Feed water	City water
Feed water conductivity	100–110 µs/cm
Pretreatment	Chlorine, UV, cartridge filters
Temp. range	12–30°C
Pilot system design	Two trains of 4:2 (6M)
Capacity per train	681 m^3/d (180,000 GPD)
System recovery	75%

Performance Criteria

LG BW 400 R G2, LG Chem's highest rejection BWRO membrane element with the new low differential pressure L feed spacer, was installed with the specifications and operating conditions listed in Table 1. The operational requirements of LG NanoH_2O™ RO membranes at the power generation facility can be summarized as follows

- Maintain permeate conductivity between 3.5 and 5.0 µs/cm, permeate flow rate of 250 gpm per train, and recovery of 75%;
- Demonstrate long-term stable membrane performance after cleaning cycles.

NanoH_2O™

Membrane Performance

LG BW 400 R G2 has been operating for over 600 days with positive results. As shown in Figure 1, the seasonal temperature variation affected the feed (and permeate) conductivity. However, the permeate conductivity returned to the required range after each CIP (Figure 2), confirming the robustness of the membrane and minimal impact of cleanings on RO performance.

The differential pressure remained stable, indicating a low membrane fouling rate. Only two CIPs were conducted during the operating period, about half the requirement for conventional RO technologies operated at the plant. The plant benefits from the intrinsic anti-fouling properties of TFN membrane technology combined with the low dP feed spacer, which helps to delay fouling and improve cleaning efficiency.

Figure 1: Feed Conductivity & Temperature

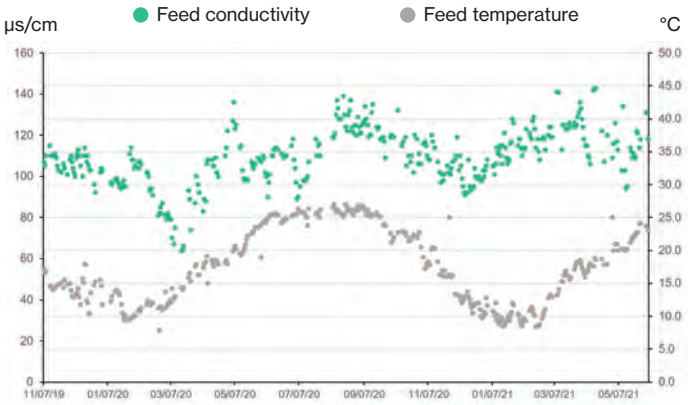


Figure 2: Permeate Conductivity

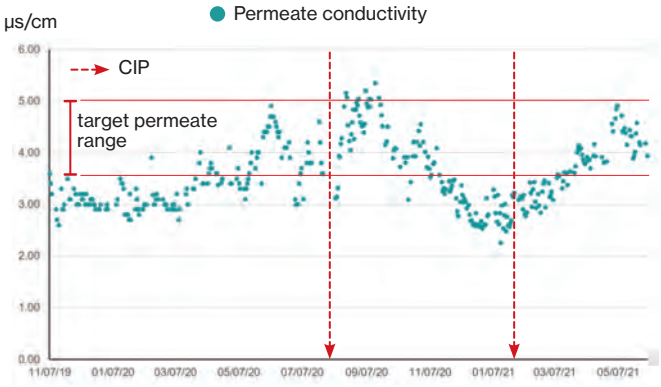
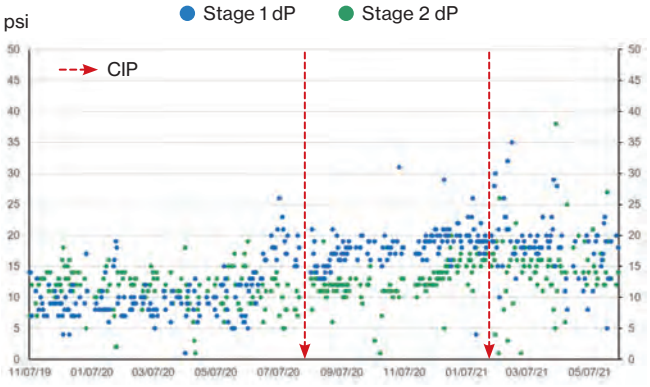


Figure 3: Differential Pressure



Results

In summary, LG BW 400 R G2 membranes performed better and more reliably than a non-TFN conventional RO membrane for the power generation facility by meeting the following expectations:

- The high standard of permeate water quality required for the boiler feed;
- Good recovery of permeate flow rate and salt rejection after cleanings;
- Low differential pressure indicating a low fouling rate and fewer cleaning requirements.