Case Study

# DOW FILMTEC™ membranes

FILMTEC™ elements in Minimal Liquid Discharge (MLD) system reduces 70-75% of water needing expensive Zero Liquid Discharge (ZLD) treatment for Flue Gas Desulfurization (FGD) Wastewater in HuaNeng ChangXing Power Plant

## Site Information:

***Location:***

ChangXing, ZheJiang Province, China

***Purpose:***

FGD wastewater MLD/ZLD

***Performance:***

Successfully concentrate wastewater before forward osmosis and evaporator

In December 2014 the HuaNeng ChangXing Power Plant in ChangXing city, ZheJiang province in China started up. It has two 660 MW power generating units and since April 2015, practices zero liquid discharge treatment of its Flue Gas Desulfurization (FGD) wastewater (18 $m^3/h$) and ion exchange regeneration wastewater (4 $m^3/h$).


Figure 1. The view of HuaNeng ChangXing power plant and GWI award on this ZLD project (Photo courtesy of Beijing Woteer Water Technology Co. Ltd)

## Process

The MLD/ZLD treatment process is shown in the Figure below. It includes lime/soda chemical softening to remove the majority of hardness, weak acid cation (WAC) ion exchange resin to remove the residual hardness, two passes reverse osmosis (RO) system to pre-concentrate the ion composition, forward osmosis (FO) to further concentrate the ion composition, and finally evaporation followed by crystallization to obtain the crystallized salt.

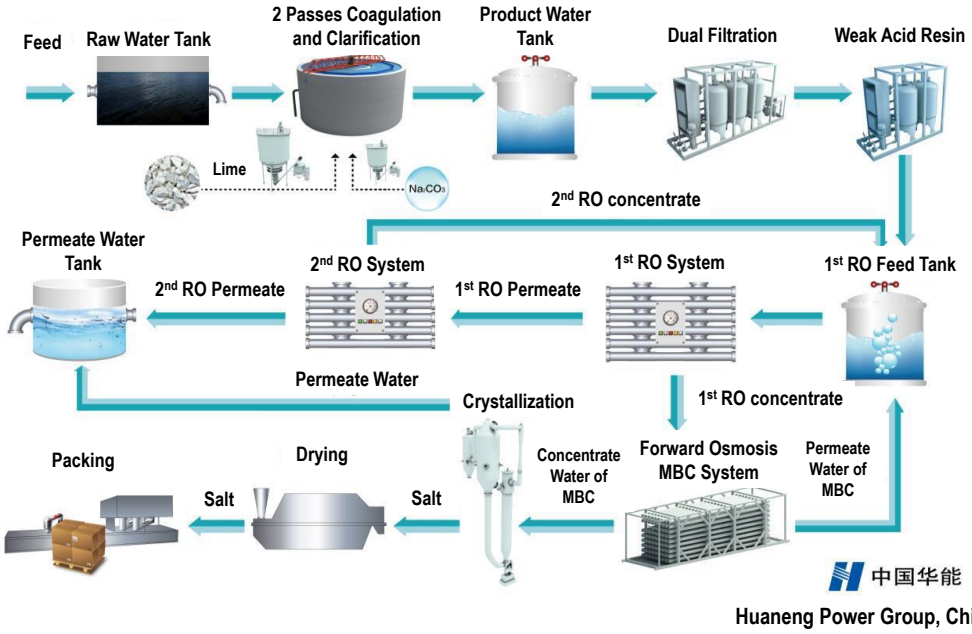


**Figure 2.** MLD/ZLD treatment process of HuaNeng ChangXing power plant (Photo courtesy of Beijing Woteer Water Technology Co. Ltd)





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The RO system is designed with two passes. The first passes is a two stage system equipped with 70 pcs of DOW FILMTEC™ SW30HRLE-370/34i reverse osmosis elements. The recovery of the first pass is stably maintained at 70-75% recovery and achieves >60,000 mg/L TDS reject concentration levels (Figure 3). The two passes RO system provides a stable, high permeate quality of <50 mg/L TDS. This stable operation not only provides ~100,000 $m^3$/yr of reliable high quality source of water for reuse but also provides a reliable low water volume for downstream concentration steps and helps to eliminate ~2,000 tons/yr of salt to be released to the local river.

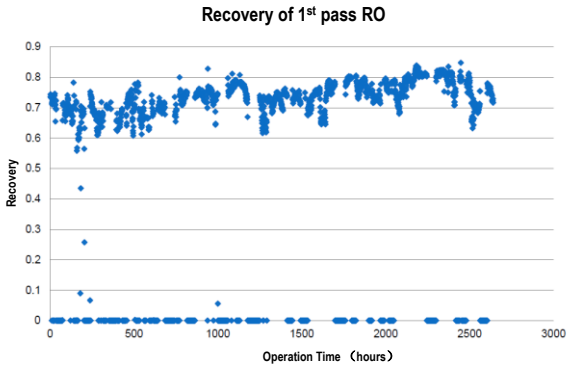


**Figure 3.** System recovery of the 1st pass RO (Photo courtesy of Beijing Woteer Water Technology Co. Ltd) (translate into English)

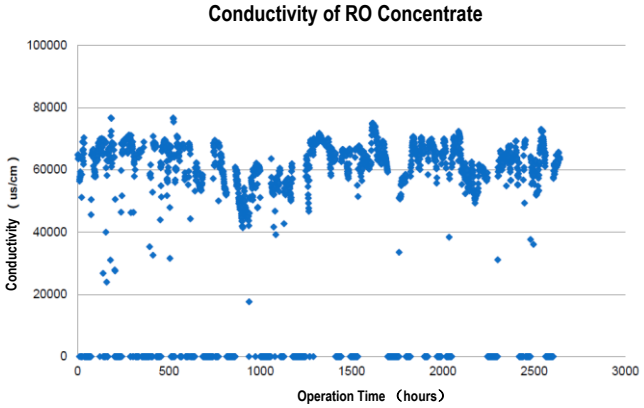


**Figure 4.** Concentrate conductivity of 1st pass RO (Photo courtesy of Beijing Woteer Water Technology Co. Ltd) (translate into English)

## References

[1] Daxin Wang, Industrial application of forward osmosis in the high salinity wastewater ZLD. Tsingdao CDA conference, 2016.

**DOW FILMTEC™**

**For more information about DOW™ resins, call the Dow Water & Process Solutions business:**

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