

## CASE STUDY

### Advanced Water Desalination Technology at Akshaya Patra Kitchen

*“A severe water crisis looms ahead for India unless the country changes the way it manages water – and changes it soon. India faces a turbulent water future. Unless water management practices are changed – and changed soon – India will face a severe water crisis within the next two decades and will have neither the cash to build new infrastructure nor the water needed by its growing economy and rising population”. From a World Bank report.*

#### Challenge

The Infosys Foundation, a not-for-profit initiative of IT major Infosys Limited headquartered in Bangalore, was looking for an efficient Reverse Osmosis (RO) based water treatment technology to produce clean water used in a large, high-tech mega kitchen in Kandi, Telangana. The one-of-a-kind mega kitchen run by the Akshaya Patra Foundation is a not-for-profit organisation headquartered in Bengaluru, India, and provides meals to more than 100,000 children on each school day. The entire construction cost of the Kandi kitchen of Akshaya Patra was funded by Infosys Foundation.

Conventional RO systems traditionally used in the country for similar applications deliver recovery rates as low as 50% - meaning only half of the water processed is useable and the other half is wasted. The efficient use of water was a key requirement for this large kitchen considering finite amount of water available in the site borewells and potential future depletion of ground water levels. So, B&P Aqua systems was contacted to use an advanced technology to purify borewell water at the site that offered maximum efficiency, and could make every drop count as well as assure the future sustainability of this critical water source. The clean water requirement for the mega kitchen was more than 20 million litres per year and an expected RO recovery was 90%.

#### Solution

B&P Aqua Systems supplied and commissioned a Desalitech ReFlex™ system featuring patented **Closed Circuit Reverse Osmosis™ (CCRO)** technology to Akshaya Patra’s kitchen. The CCRO system available exclusively from Desalitech has a capacity of 8,000 Litres per hour at a recovery rate of 90%. Compared to a traditional system, the more efficient Desalitech system draws nearly half the well water making it more sustainable, making better use of well water supplies and saving energy. In addition, the Desalitech system is less susceptible to fouling and scaling by design having the flexibility to automatically adapt to variations in well water quality, making it easier to maintain and more reliable than the traditional RO system.

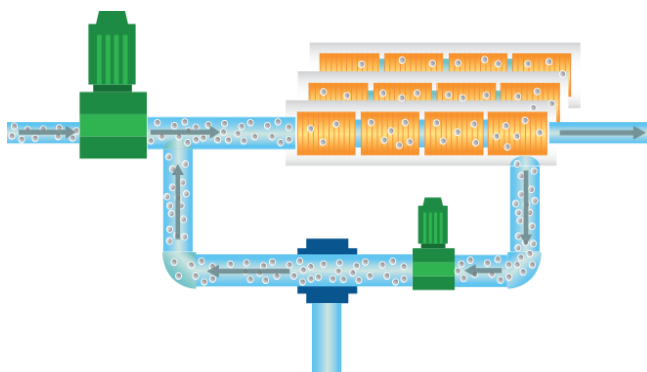
*Desalitech's ReFlex Reverse Osmosis system at the Kitchen featuring patented **Closed Circuit Reverse Osmosis (CCRO)** technology for increasing the rate of water recovery from groundwater and minimizing brine waste.*



**Photo: High Recovery CCRO Supplied to Kandi Project**

The **CCRO system** is built with single stage short membrane array which allows for optimal flux distribution, a higher and more precisely controlled cross flow, and concentration variations that disrupt both scaling and organic fouling growth in the system. The **CCRO system** is an elegant way of operating crossflow reverse osmosis membranes in a highly efficient and flexible simple filtration device. Like any simple filtration device, the **CCRO system** features equal feed and permeate flow rates during normal operation mode. At a software-based set point, the system automatically flushes out all the concentrate, and then returns to its normal operation mode. The flush is triggered by the **CCRO** operating software, based on any combination of flow, concentration, pressure and additional set points. During the concentrate flush step, the system continues to be fed and to generate permeate, while concentrate is pushed out of the system in one sweep.

*This innovative **CCRO Technology** features a step change in reliability, flexibility and efficiency over traditional Reverse Osmosis. The diagram illustrates the CCRO.*



## Results

The **CCRO** Desalitech system requires less or no biocide, less frequent CIP (cleanings-in-place), and less antiscalant. This saves client costs in the form of capital and labor expenses. The new RO system also helps the plant to achieve its sustainability goals of Akshaya Patra and Infosys Foundation by reducing water and carbon footprints. Few salient features of **CCRO** at Kandi site are here below:

- About **2 Lakh Liters Per Day Design** Capacity RO Plant uses the latest **CCRO Technology** from USA for Drinking Water Treatment, **a First time to India**.
- Higher than **90% Recovery Rate** versus conventional RO **reducing well water draw by nearly half**.
- Annual Water Savings is approx. over **33 Million litres** compared to traditional RO Plants– the equivalent of water required for approx. **800 people or 200 to 300 families** Every Day.
- Potential to increase RO Recovery Rate even up **to 95%** for greater sustainability.
- Minimized **Scaling and Fouling** of RO Membranes increasing reliability and reducing maintenance.
- Plant incorporates **Energy Saving** Design and uses Low Energy RO Elements for Operation.
- Easy to use with **Automatic RO Operation**, and Capability to treat Higher than design Feed Water TDS (Total Dissolved Solids).
- **Remote monitoring and support** for maximum uptime and pre-emptive maintenance.

## Conclusion

Against the backdrop of mounting water stress driven by the need to address critical water needs by agriculture, growing urban population and industries, it is critical for India to adopt progressive treatment strategies as a measure to enhance the sustainability of operations and reduce water shortage risks. The **CCRO** technology, a new development in the water industry, has been a solution to reduce water foot print, and so to save significant amount of water.

The **CCRO** technology could be explored to different areas of water and wastewater applications and in different commercial and industrial sectors in the country to conserve water and for a cleaner environment by recycle and reuse of water.

This above example of Akshaya Patra Kitchen at Kandi demonstrates how water shortage challenges can be effectively overcome by using cutting-edge technologies and strategic implementation which resulted in multiple benefits including less energy, reduced raw water consumption and lower wastewater generation, and above all the key need of the hour is **Water Security and Sustainable Water Future**.

Please contact Kiran Kumar at B&P Aqua Systems for further information on the above Technology and to see whether it would meet your needs. EMail: [kkumar@elifeaqua.com](mailto:kkumar@elifeaqua.com) Mobile #91-9900921377