

# DEMINERALISED BOILER FEED WATER



## Key Facts

**Client:** CS Energy

**Site:** Kogan Creek Power Station

**Location:** Brigalow, QLD

**Purpose:** Reduce TDS prior to Ion Exchange (IX)  
– Demineralised water production for boiler feed

**Technology:** Reverse Osmosis (RO)

**Supporting infrastructure supplied by Ixom:**

- Chemical Storage & Dosing Systems
- MCC

**Capacity:** 0.9 ML/day

**Feed Water Source:** Bore Water with TDS less than 2700 mg/L

**Treated Water Quality:** Permeate with conductivity less than 250  $\mu$ S/cm

**Contract Type:** Hire to buy

**Start-up:** August 2016

**Benefits:**

- Chemical cost savings greater than \$300K/yr
- Reduce overall silica levels to less than 0.01 mg/L in the boiler feed
- Better for ash handling system and other equipment due to reduced sodium sulphate loading in IX waste
- Better for the Environment due to reduced chemicals use

## BACKGROUND

CS Energy uses Ion Exchange (IX) technology to demineralise bore water for the boiler feed. An average of 12,000 m<sup>3</sup>/month of demineralised water is produced. The IX resin is regenerated using sodium hydroxide and sulphuric acid.

CS Energy engaged Ixom to design and build a customised single pass RO plant to replace the existing "off the shelf" rental RO plant which was not suitable for long term operation.

The purpose of the RO plant is to pre-treat the bore water prior to the IX plant to:

- reduce the TDS load on the IX
- increase IX cycle
- reduce chemical cost

Ixom was selected to deliver the project as it offered a customised solution which could be delivered rapidly, cost competitively and to a high quality.



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## CUSTOMISED SOLUTION

Ixom worked closely with CS Energy during the concept and detailed design phases to develop a fit for purpose solution which was cost effective and in full compliance with site requirements.

The RO plant was designed to produce 25 - 30 m<sup>3</sup>/hr permeate water with a target recovery of 80% with the following pre-treatment:

- bag filters
- cartridge filtration
- provision for biocide and SBS dosing to control biological fouling
- antiscalant dosing

Ixom designed the skids in 3D and reviewed the design with CS Energy prior to manufacture, which resulted in a compact and user friendly plant. Ixom then manufactured the RO skid complete with brackish water membranes, and a semi-automatic Clean-In-Place (CIP) system in Ixom's Adelaide manufacturing facility. The RO skid was manufactured and delivered within 16 weeks. Ixom also designed and built the MCC and the chemical storage and dosing systems.

Ixom developed the functional description which enabled CS Energy programmers to write the PLC code and integrate it to the site wide control system. Ixom attended site to process commission the RO with CS Energy.

## RESULT

Ixom commissioned the RO plant in August 2016, and the plant produced permeate water quality that is better than the design requirement of 250 µS/cm with silica levels being less than 0.1 mg/L in the IX feed, and less than 0.01 mg/L in the boiler feed.

With the RO in operation, the water volume treated between regeneration in the IX plant increased from 650 to 5,000 m<sup>3</sup>. Taking into account the cost of chemicals to run the RO, CS Energy saves approximately \$300K/yr in chemical costs.



## What's your challenge?

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