



UF + RO Reduces River Water Demand



Source: Arrow Energy Pty Ltd

DOW™ Ultrafiltration and DOW FILMTEC™ Reverse Osmosis membranes enable recovery of 2.4MLD of coal seam gas water to be treated to irrigation and dust suppression water quality standard.

Fast Facts

Project Name:	Moranbah Gas Project	Feed Water Source:	Coal Seam Gas Water Dam
Location:	Bowen Basin Region, Queensland, Australia	UF Feed Flow:	2.4 MLD
OEM:	Aquatec-Maxcon	RO Feed Flow:	2.0 MLD
Start-Up Date:	June 2012		
Purpose:	Dust suppression and irrigation		

Purpose

Coal seam gas (CSG) refers to naturally occurring gas trapped in underground coal seams by water and ground pressure. The water, which is under pressure from the rock material above, holds the gas in place—when the water pressure is reduced, the gas is released. In the extraction process, the water pressure is reduced when a well is drilled into a coal seam and the water is gradually pumped out of the seam. This allows the gas to flow to the surface in the well. The produced gas is an important source of energy, while the treatment of extracted water represents a separate challenge.

CSG water has usually been underground, between layers of solid rock for a long time with very little fresh water penetration. As a result, the water has gradually acquired some of the chemical properties of its surroundings. CSG waters are characterized by high bicarbonate, high sodium, low calcium, low magnesium, and very low sulphate concentrations. Depending on the nature of the coal seam, chloride concentrations may also be high. Of the dissolved salts present in the water, sodium is the most prevalent. This has specific implications where the water is destined for agricultural use. High levels of sodium can affect drainage, damage soil structure and potentially increase susceptibility to erosion.



DOW™ Ultrafiltration provides excellent quality feed water to the reverse osmosis system. Typical Ultrafiltration filtrate has turbidity < 0.1 NTU and SDI15 < 2.5. At the Coal Seam Gas Project, the reverse osmosis system is arranged in three stages to maximize the recovery of the feed water. The use of different Reverse Osmosis membrane element types in stages one, two and three helps to balance the flows and boost pressure requirements.

Ultrafiltration Feed Water Design Basis

Parameter	Unit	Ultrafiltration Feed Water Quality	Specified Reverse Osmosis Permeate Quality
Temperature	°C	15 – 35	–
pH	std units	8.6 – 9.3	6.5 – 8.5
Turbidity	NTU	15	–
TSS	mg/L	30	–
TOC	mg/L	30	–
TDS	mg/L	5,000 – 6,450	400
Chloride (Cl-)	mg/L	1,500 – 4,280	–
Reactive Silica (SiO ₂)	mg/L	10 – 17.6	–
Sodium Bicarbonate Alkalinity	mg/L as CaCO ₃	838 – 2,540	–

Ultrafiltration System Summary

Number of UF trains	1
Number of UF modules per train	36
UF module type	DOW SFP - 2880
Active area per membrane module	77 m ²
Total installed membrane area	2,772 m ²
Design flux	40.8 l/mh
Design recovery	84.1%

Reverse Osmosis System Summary

Stage	Number of Pressure Vessels	Membrane Elements/PV	Membrane Element Type	Total Number of Elements
First Stage	8	6	SW30HRLE-440i	48
Second Stage	4	6	SW30XLE-440i	24
Third Stage	2	6	SW30ULE-440i	12