

PROJECT PROFILE SERIES

Seawater Reverse Osmosis Plant for India's First 4,000 MW Ultra Mega Power Project

The Facility

India's first Ultra Mega Power Project (UMPP) at Mundra in Coastal Gujarat, a 4,000 MW coal fired plant, is owned by Coastal Gujarat Power Limited (CGPL), a Tata Power group company. Tata Power is India's largest private sector power utility with an installed generation capacity of over 2,300 MW. The CGPL UMPP, awarded on a 20 year BOOT basis, will be India's first private sector power project using supercritical boiler technology; and is expected to be the most energy efficient plant in India.

CGPL will draw seawater from the Mundra coast for various utilities and for their main boiler. Aquatech has been awarded the contract for executing the 4,622 GPM (25,200 m³/day) (permeate) capacity Sea Water Reverse Osmosis Plant (SWRO) on EPC Basis. Aquatech is honored and very proud to be associated with the First UMPP going on stream in the country.

The Challenge

The challenge for Aquatech is 40% permeate recovery on difficult feed water, with Total Dissolved Solids (TDS) content varying from 42,000 mg/l to



46,000 mg/l and a maximum feed water temperature of 95°F (35°C). This has however not deterred Aquatech from committing stringent treated water quality of less than 450 mg/l TDS levels at the outlet of SWRO and 5-7 mg/l TDS levels at the outlet of Brackish Water Reverse Osmosis Systems (BWRO).

The Solution

One of the larger desalination projects to come up in India in recent years, the Aquatech plant, utilizing SWRO technology, will produce 25.2 MLD of desalinated water for various end user applications. A part of desalinated water will further be treated through a BWRO system to produce 660 GPM (3,600 m³/day) of permeate for using in the upstream mixed beds demineralization plant for boiler feed application.

The Aquatech SWRO system consists of a 514 GPM (2 x 1,400 m³/hr) pretreatment plant comprising Lamella Clarifiers followed by two-stage filtration using Dual Media and Pressure Sand Filters. The SWRO system consists of four streams of SWRO banks followed by two banks of BWRO.

Aquatech also has a mandate to carry out the O&M for a period of Three years after commissioning of the CGPL project.



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Feed Seawater Analysis

Parameters	Units	Max. Values
Color	-	Colorless
Suspended Solids	mg/l	1,000
Sodium as Na	mg/l	14,490
Calcium as Ca	mg/l	1,990
Magnesium as Mg	mg/l	510
Total hardness as CaCO ₃	mg/l	7,100
Turbidity	NTU	170
Chlorides as Cl	mg/l	23,500
Sulphates as CaCO ₃	mg/l	4,475
Bicarbonates as CaCO ₃	mg/l	990
Potassium	mg/l	NIL
TDS	mg/l	46,000
Iron as Fe	mg/l	NIL
COD	mg/l	170
BOD	mg/l	50
Colloidal Silica as CaCO ₃	mg/l	NIL
Silica Reactive as CaCO ₃	mg/l	3
Odor	-	Odorless
TOC	mg/l	2
pH	-	7.8
Temperature	Deg C	34

Treated Water Quality

Provided the equipment is operated as per the instructions issued by Aquatech the average water quality will not exceed the following limits:

Permeate Water Composition after First Pass RO

pH: 5.5 – 6.5
 Total Suspended: Below deductable Limit
 Total Dissolved: Less than 500 ppm
 (When feed TDS is 46,000 ppm)
 Less than 450 ppm
 (When feed TDS is 42,000 ppm)

Permeate Water Composition after Second Pass RO

pH: 5.0 – 6.0
 Total Dissolved: Less than 7 ppm
 (When feed TDS for 1st Pass RO is 46,000 ppm)
 Less than 5 ppm
 (When feed TDS for 1st Pass RO is 42,000 ppm)

PROCESS FLOW DIAGRAM

