

Introduction

A BWRO unit, producing boiler feed water on a Spanish industrial complex, was suffering from low salt rejection. The plant was fed with surface water that was pre-treated with an Aluminium Chloride based coagulant. Avista Technologies carried out an autopsy on one of the elements and determined that the elements had been fouled with Aluminium and organic material. The following case study details the cleaning procedure recommended to remove this fouling and presents the results obtained.

Cleaning Procedure

The Avista Technologies Autopsy Report recommended that the unit should be cleaned with high and low pH cleaners. A suggested cleaning procedure using RoClean P111 followed by RoClean P303 was provided and an Avista technician attended site to supervise the cleaning process.

The BWRO unit consists of 2 trains of 2 stages. The high and low pH cleans were carried out on each stage independently.

Each stage was cleaned using a 2% solution of RoClean P111 with the solution being applied at 30°C for 2 hours. During this time the CIP solution was alternately circulated at 9 m³/h per pressure vessel for 20 minutes and allowed to soak for 20 minutes.

After this time the solution was rinsed out and the procedure was repeated with a 2% solution of RoClean P303.

Inspection of the CIP facilities were made and recommendations submitted to improve the cleaning system operation and minimise handling of chemicals.

Results

The results can be summarised as follows:

Feed Pressure:	15% improvement.
Δ P:	35% reduction.
Permeate Flow :	5% increase.
Permeate Conductivity:	2% improvement.

Conclusions

The results show significant improvements in all parameters, returning to design values.

A technical review by Avista of the plant, particularly the dosing system, recommended changes to prevent a re-occurrence of membrane fouling from excessive coagulant dosing.

Avista Technologies Ltd

Waterside House

PO Box 28612

Edinburgh

EH14 5ZL

Email: sales@avistatech.co.uk

www.avistatech.co.uk

Tel: 0131 449 6677

Fax: 0131 449 5599