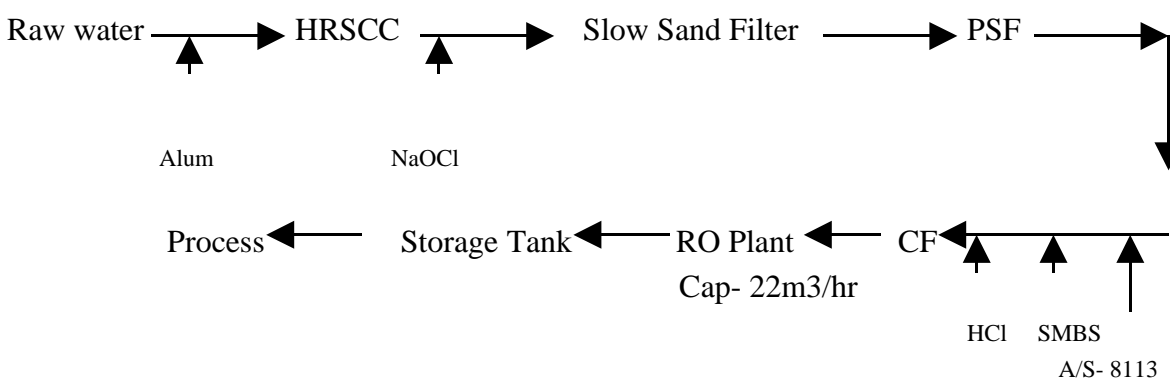


This time we have come out with one more innovative type of RO membrane cleaning. This case study had been conducted at site named M/s. Sree Rayalseema Alkalies and Allied chemicals, Kurnool.

Plant scheme: -



Make of the plant: - Thermax

The IESL Hyderabad had received the modification order for above plant along with replacement of 22 nos. of RO membrane and the plant had been commissioned in September 2004. The plant parameters during commissioning was as follows,

Sr. No.	Parameter	Reading during commissioning
1.	Feed pressure in kg/cm ²	10.2
2.	Second stage pressure in kg/cm ²	8.8
3.	Third stage pressure in kg/cm ²	6.2
4.	Reject stage pressure in kg/cm ²	5.6
5.	Permeate flow in m ³ /hr	22.0
6.	Reject flow in m ³ /hr	7.3
7.	Permeate conductivity in μ S/cm	23.0
8.	Raw water conductivity in μ S/cm	589.0
9.	SDI at Inlet of RO	3.3 – 4.8

IESL Hyderabad had received the complaint from the customer that permeate flow was reduced from 22.0 m³/hr to 12.5 m³/hr @ feed pressure 13.5 kg/cm².

Our Service Manager, Mr. N. P. Raghathan had visited the site and done thorough study at site and done the following activities,

All membrane from three pressure tubes have been removed and weighed and found that membranes had been fouled severely and also fouling sample had been collected and tested in various solvent for solubility. The result were as follows,

Sr. No.	Solvent used	Solubility Results
1.	NaOH solution	Insoluble
2.	H ₂ O ₂	Insoluble
3.	Sodium Meta Bi-sulphite	Insoluble but dissociation had observed

The weight of all membrane found increased by 70 – 80% as compared to normal weight of RO membrane.

After observing the solubility result Mr. NPR had taken bold decision and they had cleaned 2 membranes with 2 % SMBS solution with overnight recirculation and got unpredictable results. The weight of cleaned membrane is reduced by 4.0 kg against earlier weight 24.0 kg (before cleaning). After this they had cleaned all the membranes with 2% SMBS solution and the weights of all membranes have been reduced. Also checked the dissolved iron content in cleaning solution before and after the cleaning.

Sr. No.	Solution status	Dissolved Iron content in ppm
1.	2% SMBS solution(before cleaning)	< 0.2 ppm
2.	Circulated SMBS solution (after cleaning)	1.6 ppm

After this all membranes have been cleaned with 1% SERCON MC solution (pH boosted to 10.5 by NaOH) and 2% SERCON CC3 (@ pH 2.5) found that weight of membrane had been reduced to its normal range. The dissolved Iron content in cleaning solution had been checked, the results were as follows,

Sr. No.	Solution status	Dissolved Iron content in ppm
1.	2% SMBS solution(before cleaning)	< 0.1 ppm
2.	Circulated SMBS solution (after cleaning)	1.8 ppm

The weight details of membranes is tabulated as follows,

Sr. No.	Serial No of Membrane	Initial weight	Weight after SMBS cleaning	Weight after SERCON cleaning
1.	A9703645	21.76	19.5	16.04
2.	A9726329	21.94	19.0	16.08
3.	A9726340	20.8	18.8	16.08
4.	A9704071	20.3	18.6	15.80
5.	A9728361	20.4	18.8	15.76
6.	A9702950	20.9	19.5	16.50
7.	A9703387	20.5	19.3	16.64
8.	A9703394	24.3	18.2	16.52
9.	A9704070	22.3	20.4	16.42
10.	A9728639	20.9	18.3	16.18
11.	A9703636	20.7	17.7	15.50
Sr. No.	Serial No of Membrane	Initial weight	Weight after SMBS cleaning	Weight after SERCON cleaning
12.	A9702632	22.7	17.2	16.18
13.	A9726334	18.4	16.1	15.44
14.	A9702955	19.3	16.7	15.22
15.	A9702952	18.7	17.2	15.12
16.	A9704073	21.7	17.5	15.74
17.	A9726339	21.2	18.2	16.0
18.	A9728638	22.0	15.9	16.82
19.	A9695833	18.3	16.5	15.54
20.	A9726830	17.2	16.6	15.46
21.	A9726739	19.5	15.5	15.72
22.	A9726336	19.6	15.5	14.96
23.	A9726334	17.2	15.2	14.7
24.	A9702954	16.8	15.9	14.7

The same procedure has been followed to sort out the RO problem at M/s. ACE TYRES Hyderabad. At this site also IESL Hyderabad representative had used the SMBS for cleaning of RO membrane and they got good results. The details of all results were as follows,

For ACE TYRES, Hyderabad

Sr. No.	Parameter	Before cleaning	After cleaning
1.	Feed pressure in kg/cm ²	16.5	15.5
2.	Second stage pressure in kg/cm ²	13.5	12.0
3.	Reject pressure in kg/cm ²	11.5	11.0
4.	Permeate flow in m ³ /hr	4.7	8.0
5.	Reject flow in m ³ /hr	5.0	5.0
6.	Permeate conductivity in μ S/cm	47	61

The weight details of membranes is tabulated as follows,

Sr. No.	Serial No of Membrane	Membrane weight before cleaning in kg	Membrane weight after cleaning in kg
1 st Stage Membrane			
1.	8544667	19.67	15.5
2.	8544856	20.0	15.0
3.	8544672	17.6	14.8
4.	8544527	17.4	14.7
5.	8544498	18.0	14.9
2 nd Stage Membrane			
6.	8544708	16.5	14.9
7.	8545490	15.8	14.8
8.	8544697	15.4	14.8
9.	8544530	14.95	14.56
10.	8544530	15.0	14.78

After observing above results customer is very satisfied and they had given ROMS Servicing contract to IESL Hyderabad.

From above two case studies we conclude that we can use this SMBS as RO membrane cleaner as a effective cleaner for Fouling of Membrane.

Kudos and full credit to Mr. N. P. Raghunathan (Famously known as “NPR”) for his innovative and successful troubleshooting and implementation of conventional chemical as a RO cleaner. He can be contacted for further details on 09849406420 / secuncroser@ionexchange.co.in

This case study, am sure will help all our other engineers for RO troubleshooting.

We are forwarding the case study to Technology so that they can study the same and we will standardize this SMBS as RO membrane cleaner.