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An autopsy study of a fouled reverse osmosis membrane element used in a brackish water treatment plant

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Table 1: Results of chemical analysis of filtered water prior to RO treatment process.

Elements *	Concentration (mg/L)
Bicarbonate, HCO_3^-	59
Carbonate, CO_3^{2-}	<1
Ba	0.099
Ca	29
Cl	410
Fe	<0.02
K	6.1
Mg	31
Mn	0.004
N, nitrate	0.006
Na	180
P	0.007
S	25
Si, total as SiO_2	3.3
Sr	0.33

* The analysis was carried out using either ICP or ICP/MS. Chloride and nitrogen concentrations were determined using potentiometric titration and colorimetric methods, respectively. Bicarbonate level was determined using bicarbonate titration with electrometric endpoint.

Table 2: Results of ICP-AES analyses of deposits scraped from the fouled membrane surface.

Elements *	Concentration (mg/kg)
Ag	60
Al	2570
Ba	14
Ca	2760
Cl	1430
Cr	24
Cu	20
Fe	590
K	110
Mg	320
Na	190
Ni	22
P	1225
S	865
Si	410
Sr	23
Ti	5.4
Zn	35
Zr	19

* Chloride concentration was determined using potentiometric titration.