

## **The use of Autopsies as a Diagnostic Tool for Optimizing RO Treatment Programmes**

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RO autopsies are often performed on units when poor performance is encountered resulting in a reduced life span of the elements/ modules. The information revealed by the membrane autopsies and analyses performed give insight into factors contributing to the poor performance. Various analysis techniques including energy dispersive x-ray fluorescence (XRF), energy dispersive x-ray spectrometry (EDAX), Fourier transformation infra red (FTIR) spectrophotometry, scanning electron microscopy (SEM), Fujiwari test for determining halide damage, research light microscopy, and species selective plate cultures are used as diagnostic tools to identify the nature of fouling as well as to identify damage to the membrane structure. This information can then be used to formulate specific treatment programmes for the specific system or application. Typical problems diagnosed include iron fouling, various different forms of scale such as calcium sulphate, calcium carbonate, strontium sulphate, silica scale etc., biofouling, debris deposition and membrane surface damage caused by halides. These problems can then be avoided from reoccurring by adjusting or optimizing both the pre-treatment of the RO feed water as well as the treatment of the elements themselves. The treatment programmes can include the addition of screens and filters as well as chemical treatment to facilitate iron removal, prevention of scaling, prevention of chlorine entering the membrane units and treatment with biocides to prevent biofouling.