**FILMTEC Membranes**  
Troubleshooting: Membrane Element Evaluation

**Membrane Analysis**

The morphology of deposits is determined with a stereo and standard light microscope or a scanning electron microscope (SEM).

Information about the chemical elements contained in the membrane or its fouling/scaling layer is obtained from Energy Dispersive X-Ray Fluorescence (EDXRF) Spectroscopy. Samples of the membrane “as is” and of the cleaned and rinsed membrane, and of the isolated and dried foulant/scalant can be analyzed by EDXRF. The result gives a semi-quantitative composition of chemical elements of the membrane and the foulants. This method can also furnish evidence of halogen damage to the membrane. Typical elements found are Ca, Ba, Sr, S (scaling), Fe, Si, Pb, Zn (colloidal fouling) and Cl, Br, I (oxidation damage). However, purely organic fouling and biofouling can not be detected by this method.

**ICP** (Inductively Coupled Plasma Emission Spectroscopy) is being used to quantitatively determine metals and silica on the membrane surface.

Impurities which have been organically bound to the membrane surface can be identified with **ESCA** testing (Electron Spectroscopy for Chemical Analysis). This test is predominantly used to identify the source of oxidation.

**Plate and Frame Testing** is performed after the destructive autopsy. Round coupons are cut from the membrane of the autopsied element and placed in a plate and frame apparatus. The coupons can be cleaned or treated with different chemicals. The performance of the different plates with the differently treated membrane samples can be compared against control coupons.

Slimy deposits or foulants from the membrane surface may be scraped off and then **microbiological test** be done on these samples. The microbiological test would reveal the presence of bacteria and the kind of bacteria present which may in turn allow to devise an anti-biofouling strategy.
FILMTECTM Membranes
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