Membrane Autopsies the Ultimate Troubleshooting Tool

OK, you've tried cleaning with everything you can think of and your membranes still aren't recovering. You've taken the system apart and there are no mechanical issues. You have no idea what went wrong, so you don't know how or what to fix. When you get to the end of this road, a membrane autopsy is your best option.

Membrane autopsies can be a little pricey (normally $1700-2000) but the information uncovered by a good autopsy can help you prevent the failure from ever happening again – once you find the root cause of the problem, you can take action knowing exactly what went wrong. A good autopsy will examine both the interior and exterior of the membrane as well as to analyze the foulant layer removed from the membrane surface. A proper autopsy includes:

- External visual exam – a thorough examination of the exterior of the element, for damage or defects in the brine seal or O-rings, as well as the membrane ends and the fiberglass wrap.
- Wet test – for flow, pressure, rejection, normalized flux. This data is compared later to the cell test data.
- Internal visual exam – the outer wrap is removed, and the membrane cut open. Glue lines are examined, and notes made of color on the membrane leaves and/or odors. If foulants are present, a sample is removed for evaluation.
- Chemical identification of foulants – various techniques are used to determine the nature of both organic and inorganic foulants. A Scanning Electron Microscope (SEM) is used to photograph the foulant layer.
- Loss on Ignition (LOI) – measures the percent of organic vs. inorganic foulant.
- Cell and dye test – a sample is cut from the membrane and placed in a special cell test unit, evaluated for flow and rejection. A dye test is performed to determine if the membrane has been exposed to oxidation or if there is evidence of physical damage.
- Fujiwara test – to determine whether the membrane has been exposed to halogenated compounds such as chlorine.
- Summary and recommendations – A formal comprehensive report is issued, including recommendations for reducing fouling, improving cleaning, and obtaining the best possible performance from the system.

The membrane autopsy is the ultimate troubleshooting tool. Frequently, the autopsy will uncover issues with the pretreatment to the membrane system – some easily corrected, others more complex. However, once these are addressed, fouling can be better controlled, the system can typically be cleaned less frequently (and more effectively) and you'll save time, money – and headaches!

For further information, please contact your local Process Solutions, Inc. sales representative.