Using a Solari OV AFM filter as a pre-filter before membranes such as Reverse Osmosis (RO) Systems can save up to 33% in operating costs. Similar operating cost savings also apply to pre-filtering feed water for boilers and other industrial plant.

Membrane Fouling Control

Membrane fouling is the main cause of permeate flux decline and loss of product quality in RO systems, so fouling control dominates RO system design and operation. Sources of fouling can be divided into these four principal categories.

Scale We address scale issues by oxidising the water using our advanced oxidation technologies, such as micro/nano bubbles or a Zeta Potential Mixer (ZPM) before filtration to bring iron, manganese, calcium and other soluble contaminants out of solution as precipitates and effectively filtering those from the water using the OV AFM.

Silt (particles) Where silts are greater than 0.45 micron we remove these with an efficiency level of 92% to 97% using the OV AFM. If less than 0.45 micron we utilise the ZPM and flocculent to aggregate particles for removal by the OV AFM.

Bacteria (bio fouling, growth of bacteria) Activated Filter Media (AFM) as used in either Multi Media Vessels or the OV filter does not result in biofouling within the filter and both are very efficient at removal of such materials, particularly when preceded by the ZPM.

Organic Fouling (oil, grease) Similarly organic fouling is addressed and rectified using the OV AFM. Where levels of oil and grease are above certain levels the use of micro/nano bubble technology in conjunction with a skimmer or DAF will result in these materials being effectively removed from the water.

Fouling control involves pre-treatment of the feed water to minimise fouling as well as regular cleaning to handle fouling that still occurs. Using the process above there is a minimal fouling possibility. Fouling by particulates (silt), bacteria and organics generally affects the first modules in the plant the most. By removing these issues using the OV AFM filtration system, membrane performance is enhanced considerably.

Scaling is worse with more concentrated feed solutions, therefore the last modules in the plant are most affected, because they are exposed to the most concentrated feed water. Using the advanced oxidation technologies we have in conjunction with ZPM and the OV AFM filtration system, issues of scaling are removed prior to membrane filtration.

A few words about Silt Density Index (SDI)

Silt is composed of suspended particulates of all types that accumulate on the membrane surface. Sources of silt are organic colloids, iron corrosion products, precipitated iron hydroxide, algae and fine particulate matter. All of these are capable of removal using the OV AFM filtration system.

Silt Density Index testing is a widely accepted method for estimating the rate at which colloidal and particle fouling will occur in water purification systems, especially using reverse osmosis or nanofiltration membranes.

SDI is a measurement of the fouling potential of suspended solids. It's not measuring the quantity of particular matter, since the size and shape vary.

Turbidity is a measurement of the amount of suspended solids in a number of instances but not all. They are not the same and there is no direct correlation between them.

In practical terms however, membranes show very little fouling when the feed water has a turbidity of 1 NTU (Nephelometric Turbidity Unit).

The OV AFM filter and advanced oxidation technologies we use regularly filters water to produce an NTU of 1. Correspondingly membranes show very low fouling at a feed SDI of less than 5.

The SDI test is used to predict and then prevent the particulate fouling on the membrane surface. Other names for it are the Kolloid-Idex (KI) or the Fouling-Index(FI). The test is defined in ASTM Standard D4189, the American Standard for testing material.

It measures the time required to filter a fixed volume of water through a standard 0.45 micron pore size microfiltration membrane with a constant given pressure of 30 psi (2.07 bar).

The difference between the initial time and the time of a second measurement after normally 15 minutes (after silt build up) represents the SDI value.