Introduction

A semi conductor plant was suffering from high differential pressure across both stages of a primary reverse osmosis system. The differential pressure (from feed to reject) had increased from 1.3 bar per stage to 2.8 bar per stage. While a differential pressure as high as this is not likely to damage the element, unless action is taken promptly then the DP's are at likely to continue to increase. This could result in telescoping the elements, which will cause irrevocable damage and the elements would require to be replaced.

Assessment

The most likely cause of high differential pressures across all stages of a reverse osmosis plant is biological activity. Slime builds up on the feed spacer and restricts the flow channels. The slime also entraps particles that have passed the pre-treatment and would otherwise be carried harmlessly through to the reject stream. Confirmation of the problem was made by shutting down the system and opening the vessels. Slime was visible on the inner surface of the vessel and on the end of the elements. In addition a strong biological smell was apparent.

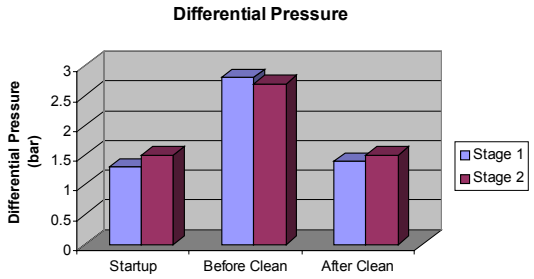
Recommendation

Based on the above, a biocide was applied to the system to kill as much biological activity as possible. RoCide DB5, a broad spectrum biocide was applied at 200ppm for 60 minutes. The solution was recirculated, and additional biocide was added to the system after 30 minutes to ensure the application strength was maintained.

Following the application of the biocide, the system was cleaned using a 2% solution of RoClean P111. The cleaning solution was applied for 60 minutes, which included a 20 minute soak period. The system was then flushed, and put back on line.

Results

The following graph show the differential pressured before and after the chemical clean.



As can be seen, the clean resulted in a significant drop in differential pressure.

The client now applies RoCide DB5 biocide on a regular basis to prevent further growth in the system. This has reduced the rate of biogrowth, and greatly increased the interval between chemical cleans.

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