

# WATER TREATMENT TECHNOLOGY FOR INDUSTRIAL, COMMERCIAL & ENVIRONMENTAL APPLICATIONS

JANUARY 2014 - WATER TREATMENT NEWSLETTER

## Chlorine Demand Determination - An Important Water Reuse Tool

When considering water reuse it is often advantageous to chlorinate the water prior to using it as process or cooling water. Effective free chlorine residuals will eliminate possible pathogens and prevent process problems including biofouling and MIC (microbiological influenced corrosion). Knowing the chlorine demand of water prior to treatment gives the information to project chlorine feedrates. Chlorine demand studies can also help in troubleshooting low chlorine residuals.

When using membrane separation technology for water reuse prechlorination may be a practical and economic pretreatment. Knowing the chlorine demand for these reuse waters is an important first step.

Method for chlorine demand determination - [CLICK HERE](#)

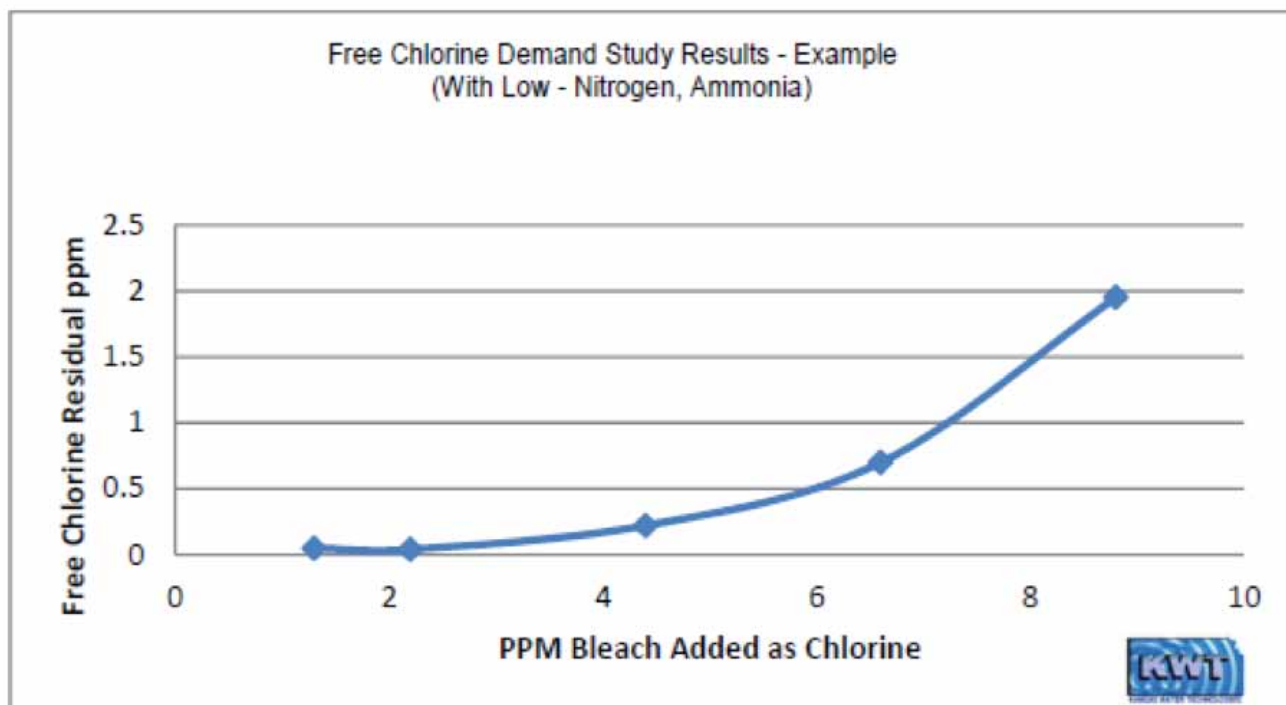
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**Kansas Water Tech**  
[kansaswatertech.com](http://kansaswatertech.com)



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## RSC Reaches Milestone in 2014 - 7.5 Billion Gallons of Groundwater Treated in the Last 14 Years

For several years we have worked with environmental engineering firms in Kansas. Our compiled records indicate that over 7.5 billion gallons of groundwater has been remediated using RSC antiscalants. Our company has provided antiscalant products for a variety of remediation systems. We have treated systems as large as 1400 GPM and as small as 1-3 GPM. The RSC antiscalants have been formulated to prevent calcium carbonate and iron deposits in remediation systems, including pump and treat air strippers.

Our work has brought us into contact with many dedicated and professional environmental engineers, geologists and technicians. Their work has made reaching this milestone possible.

An interesting note--the population of the earth is estimated in 2014 at 7.5 billion. "One gallon of remediated Kansas groundwater per person." A little help for a cleaner world.

## CEI- A New Way To Look At Membrane Autopsy

Avista Technologies, KWT's partner in providing RO chemistry in Kansas has developed technology to enhance membrane autopsies. The use of Avista's Chromatic Element Imaging (CEI) technology has greatly improved laboratory autopsy reports. Check out the bulletin describing the benefits of CEI. The file is at our KWT website.

Autopsy analyses are important service tools to troubleshoot membrane problems. Fouling, scaling, microbiological fouling, and chemical incompatibilities are characterized by a good autopsy analyses. CIP (Clean in Place) procedures can often be improved by good autopsy analyses.

The advantage of CEI enhanced autopsy reports is that elements identified by SEM (Scanning Electron Microscopy) and EDX (Energy Dispersive X-ray) on a membrane surface can now be identified by color. This shows not only the amount of each element on the surface but also shows the layering and relationships of various foulants. This information is critical for determining root causes of membrane failures and determining procedures for the cleaning of fouled membranes.

- [CLICK HERE](#)

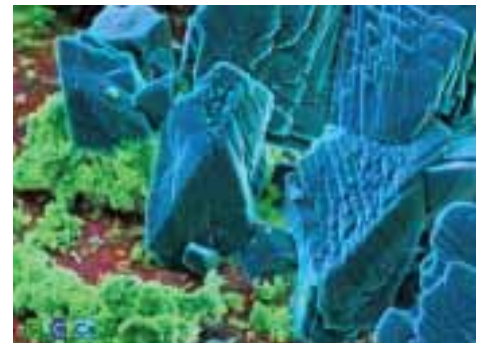
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*An Example of CEI showing both carbonate and silica deposition on a membrane surface. Antiscalant recommendations were adjusted to prevent future fouling*



## Reconfiguring RO Skids Can Provide Significant Benefits

Because of restrictions on mineral content in the cooling water blowdown a western Kansas power plant has been using RO permeate for cooling tower makeup. Two 450 GPM RO skids were providing the makeup to the cooling tower.

After several years of operation, plant personnel determined that membrane life and CIP effectiveness needed to be improved. After a review of possible modifications to the ROs a design for reconfiguring the skids was determined. Dow's ROSA projection software was used to confirm optimal flowrate design and new distribution headers were engineered and assembled. The original 3-stage RO with a 9:6:3 array was converted to a 2-stage RO with 12:6 array. The new configuration also allows operating flexibility of valving the RO to operate as a smaller 8:4 or even a 4:2 array.

Benefits of these reconfigured ROs are increased membrane life expectancy and less frequent and more effective CIP. The plant has also seen the following since the Skids were reconfigured:

1. Increased permeate production.
2. Lower feed pressure and lower differential pressures. (Less chance for impaction of the membranes)
3. CIP flowrates were improved and are now all within the recommended design

## Interpreting LSI Values

Langelier Saturation Index (LSI) is a commonly used tool for determining the scale forming or corrosivity of particular water. LSI is "a derived expression relating to the to the saturation point of calcium carbonate." It is important tool but at the margins (-.5 to +.5 LSI units) there is a zone of uncertainty were the water may be either corrosive or scale forming. In general as the LSI increases from 0.0 to +3.0 the water has a tendency for scaling. As the LSI decreases from 0.0 to -3.0 the water has a tendency for corrosivity.

LSI is derived from water analyses and does not take into account the free ion species, which can affect both corrosion and scale formation. Computer analyses taking into account the combined and free common ion affects is available as more sophisticated and accurate analyses are required. KWT & RSC use both LSI analyses and the computer analyses to project water treatment results.

- [CLICK HERE](#) for an excel spreadsheet that can be used to calculate LSI.



*Reconfigured Skid showing central distribution headers to inlet of 1st Stage pressure vessels (Note that the each vessel was rotated 90 degrees to align to header)*

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