

**“A \$150 Water Analysis Could Have Saved  
\$57,000 in Capital and RO Cleaning Costs”**

by

Joseph Urbans – Sales Engineer

*Res-Kem Corp.*

PO Box 1059  
Media, PA 19063

800-323-1983  
610-358-0717

[www.reskem.com](http://www.reskem.com)

“A \$150 Water Analysis Could Have Saved \$57,000 in Capital and RO Cleaning Costs”  
By Joseph Urbans – Sales Engineer

**Summary:**

After being called in to diagnose a major problem with a three week old reverse osmosis (RO) system specified, built, and installed by others, Res-Kem found that a simple \$150 water analysis would have clearly shown the need for greensand filters with clean water backwash, and a larger carbon pretreatment unit prior to the RO.

If the system had been designed correctly from the start, Res-Kem conservatively estimates the savings to be \$57,000:

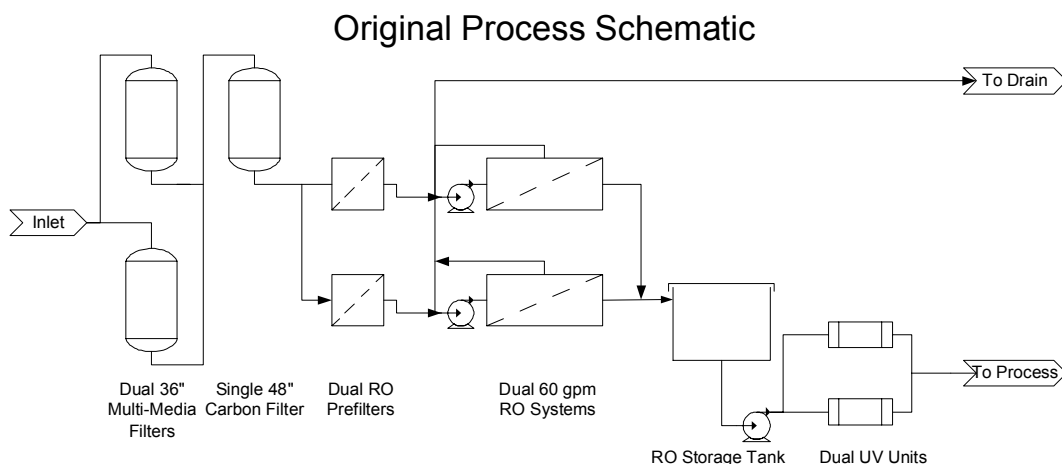
- Total capital and installation costs of original system \$52,000
- Membrane cleaning costs of \$5,000

In addition, if the RO membranes cannot be cleaned, the cost will be \$15,000 for new membranes plus installation service.

**The Problems:**

After spending \$52,000 in capital and installation for water treatment equipment, technical and service personnel from Res-Kem Corp were called in to diagnose a major problem with a three week old reverse osmosis (RO) system specified, built, and installed by others. Upon investigation, an inlet water analysis may never have been done, or at least no one could produce the analysis used to originally size the plant. It appears the engineering firm sized and designed this project without one.

The water system receives its raw water from common well system in an industrial park. This area is known for high iron content. The original RO pretreatment consisted of dual parallel operating 36-inch multi media filters followed by a single 48-inch activated carbon filter. Currently, the multi media filter and the carbon filter that are in service are being backwashed by the raw water so they're fouling their beds on the backwash cycle as well.



“A \$150 Water Analysis Could Have Saved \$57,000 in Capital and RO Cleaning Costs”  
By Joseph Urbans – Sales Engineer

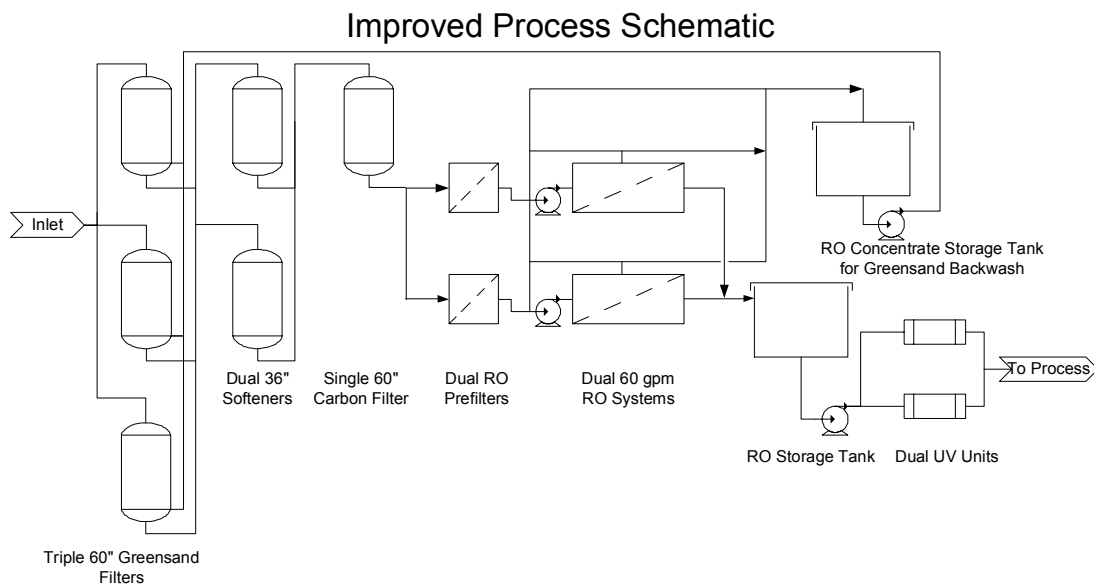
The original design of the water treatment system fed an antiscalant and sodium meta-bisulfite for chlorine removal prior to the RO system. This water was fed into two 60 gpm RO water systems operating simultaneously in parallel. The RO systems were placed in service and started out running as designed. Within a week, the RO system started to have increased pressure drop, low quality and low permeate production. Within three weeks, the system was taken off the line.

Very soon after start up, a “light out” alarm on the UV lights after the RO water system activated. The iron fouling was so great, the sleeves of the UV lights were coated with iron or manganese from the raw water creating the alarm on the UV system.

Finally, the company could not clean the RO membranes in place with chemical supplied by an RO membrane cleaning chemical company. Since the cleaning was inadequate, the membranes had to be removed from the RO pressure vessels and sent to this same RO chemical company where they can modify the cleaning regime and/or chemicals. Currently, the membranes are still there to be cleaned if possible. The membranes are 8 inch by 40-inch membranes.

**The Solution:**

As a result of the most recent water analysis, Res-Kem is quoting three 60-inch greensand filters followed by a dual 36-inch water softener and a single 60-inch activated carbon filter.



“A \$150 Water Analysis Could Have Saved \$57,000 in Capital and RO Cleaning Costs”  
By Joseph Urbans – Sales Engineer

With the Res-Kem design, the customer does have some options. To reduce capital cost, but increase operating costs, the customer can use the original design of the water treatment system feeding an antiscalant and sodium meta-bisulfite prior to the RO system. By using the antiscalant, they can potentially eliminate the water softener. By using sodium meta-bisulfite feed for chlorine removal, they could remove the carbon filter. The greensand filters must remain to remove the iron from the raw water. The customer may reduce the number of tanks to make the system a dual alternating greensand filter unit. This however will require our units to be placed out of service for each backwash because of the high backwash flow rate. Furthermore, Res-Kem is going to supply a concentrate recovery tank from the RO system so the customer will have a clean water source for backwashing the greensand filters.

**The Moral of the Story:**

Obviously, all the past and potential failures attributed to the pretreatment are the result of the lack of water analysis.