

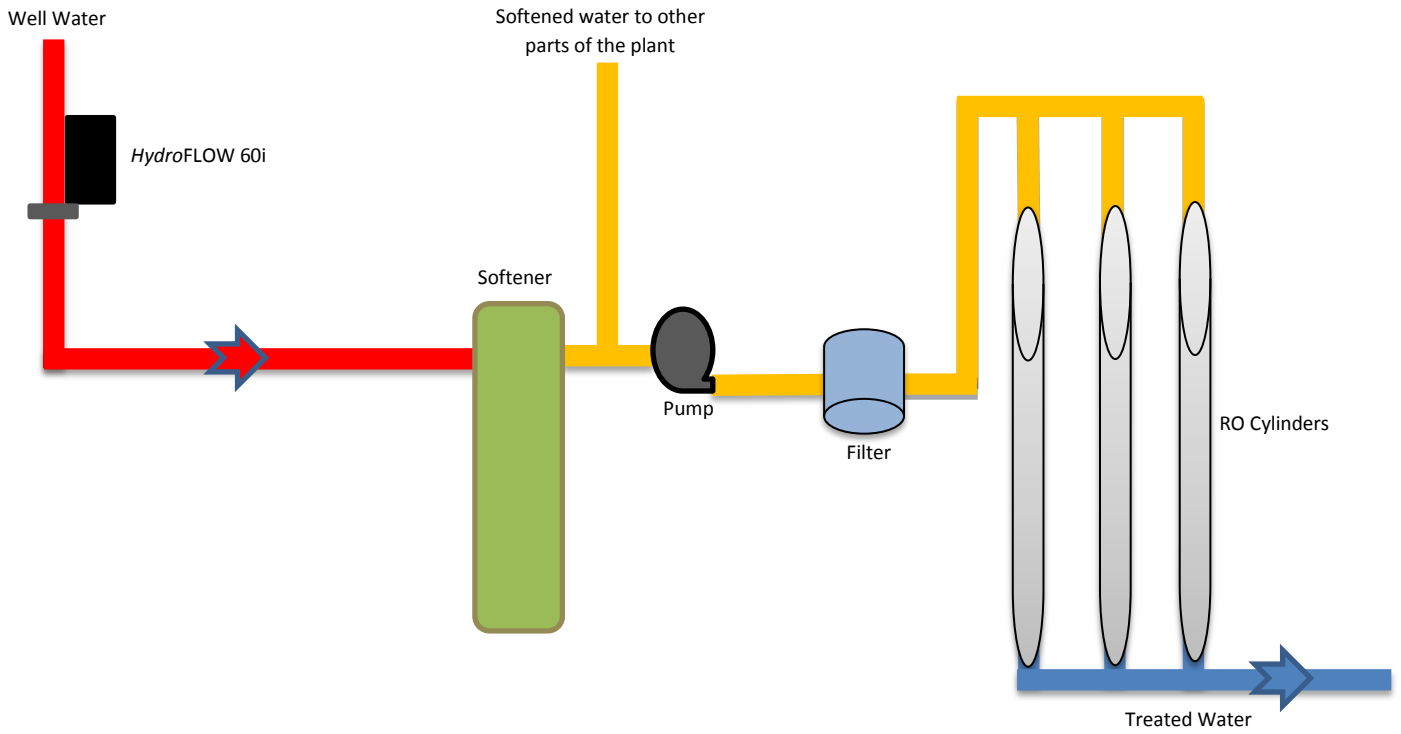


Case Study - Small Industrial Reverse Osmosis System - Scale

- Installer:** MBI Water Solutions, LLC. (*HydroFLOW Northwest*).
- Customer:** Chemical Factory in Wapato, Washington, USA.
- Application:** Industrial Reverse Osmosis System.
- Installed unit:** *HydroFLOW 60i* water conditioner.
- Water source:** Well water with Calcium Carbonate hardness of roughly 200 ppm.
- Installation date:** January 30, 2013.
- Existing condition:**
- A water softener is used to reduce CaCO₃ hardness.
 - A new membrane has a rejection percentage of 90-93%. A membrane that was acid cleaned has a rejection percentage of 96-97%.
 - Over a span of 6 months, rejection percentage gradually increases to 98.5%, which means the membrane is almost completely plugged-up and production water flow rate is greatly reduced.
 - At 98.5% rejection, the 8 foot tall (4,000 gallons) product water holding tank is usually 1 foot full by the end of the day, which means the RO system is barely able to keep up with the water demand of the factory.
 - Cost of maintaining the RO System is roughly \$10,000 per 18 months.
- Success factors:**
- Reduce rejection percentage to roughly 95%.
 - Extend time between membrane cleaning and replacement.
 - Reduce maintenance costs.
 - Increase production capacity - improve end of day water level in holding tank from 1' to 4'.
 - Possibly bypass the water softener.
 - Possibly improve the purified water quality (CaCO₃ PPM and CFU).



System diagram:



HydroFLOW 60i water conditioner and RO system:



HydroFLOW 60i placed on water line feeding the RO system



RO System

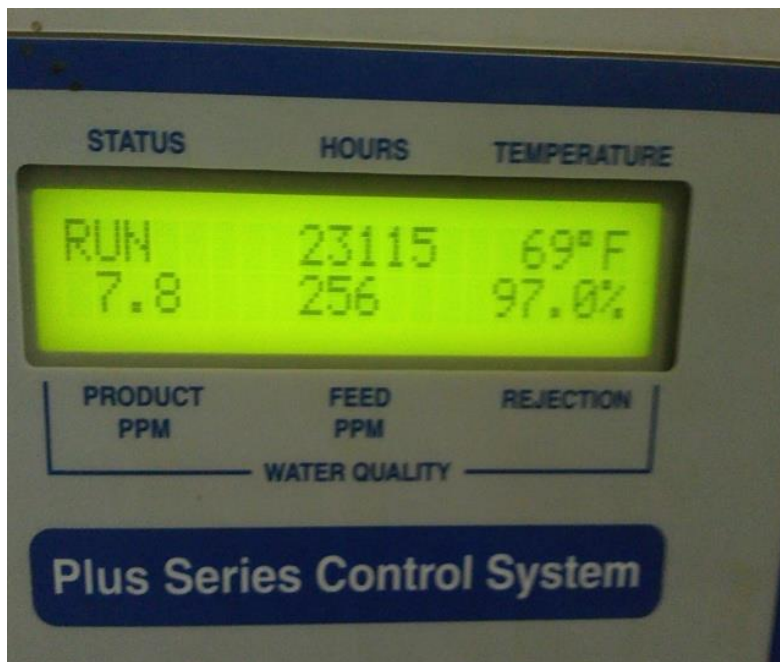


Pre *HydroFLOW* installation:



98% rejection

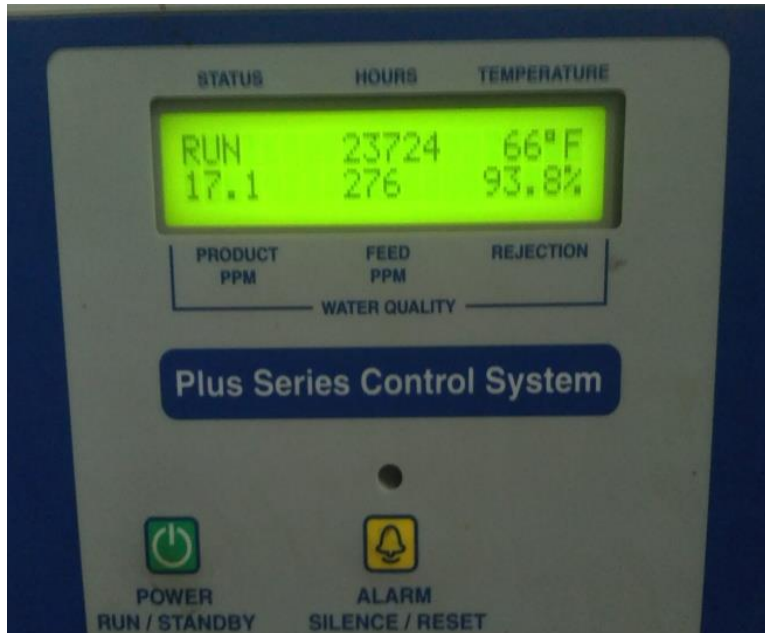
Two weeks post *HydroFLOW* installation (with softener still online):



97% rejection which shows membrane is becoming cleaner



Two and a half months post *HydroFLOW* installation (with softener bypassed for two months):



93.8% rejection which is close to the rejection percentage when the membrane is new

Results:

- A significant improvement in the production water flow rate was achieved within two weeks. Exceptional improvement was achieved as soon as the water softener was bypassed (end of day water level increased from 1 foot to 8 feet).
- Within a few weeks, production capacity went up from 12,000 to 18,000 gallons per day.
- The increased flow rate did not affect the production water quality in a negative manner.
- Savings due to lessened maintenance and lessened damage to the membranes is roughly \$8,000 per 18 months.
- As of October 31, 2013 (9 months from installation), the rejection percentage was maintained at 93.8%.

Note: Larger RO systems may require an additional *HydroFLOW* water conditioner prior to the RO membranes in order to boost the Hydropath signal.

Referral information:

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