

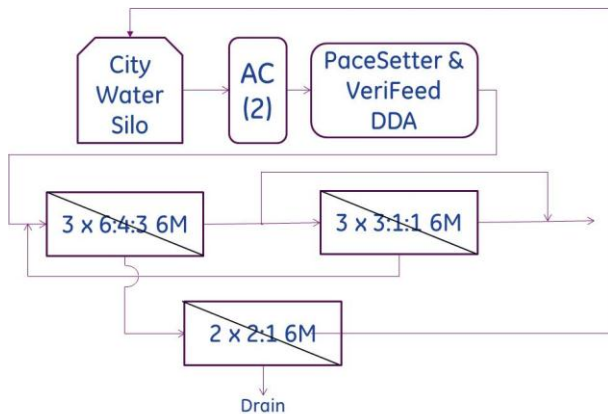
# PaceSetter\* VeriFeed\* System with Hypersperse\* Chemistry Optimizes Cost to Treat at Beverage Plant

A U.S. beverage plant producing bottled water through a reverse osmosis (RO) system wanted to optimize antiscalant dosing to control operating cost, while maintaining asset protection and ensuring continued production rates. The customer was interested in:

1. Reducing operating cost
2. Maintaining or increasing system performance
3. Replacing tagged molecules with an alternate process for chemical feed verification

Background: The plant operates five reverse osmosis systems, which include three two-pass primary systems and two brine recovery units. The first pass recovery is 80%, second pass 90%, and the recovery units operate at 50% recovery. Fifty percent of the first pass permeate is blended with the product of the second pass permeate. This blend is the product water. The concentrate from the second pass is recycled to the primary RO feed. Permeate from the brine recovery is recycled to the city water holding tanks and the concentrate is sent to drain.

A general schematic for the system is shown below:



A typical concentrate water analysis:

Element	mg/l ion	Element	mg/l ion
Calcium	557	Aluminum	0.15
Magnesium	140	Chloride	378
Sodium	67	Sulphate	232
Potassium	13	Bicarbonate	1330
Iron	0.25	Nitrate	227
Manganese	0.05	Fluoride	0.32
Barium	0.23	Silica	98
Strontium	1.68	Phosphate	0.00
pH	8.40	LSI	2.58

## Challenge

1. Accurate control of antiscalant with feed verification
2. Maintain high level of RO system performance, as indicated by permeate flow and water quality, at a lower operating cost

## Solution

PaceSetter VeriFeed was installed to meet the customer's need. Using uniquely engineered software, electronics, and equipment, the PaceSetter VeriFeed technology controller continuously:

- 1) Measured the amount of chemical fed against the calculated set point and
- 2) made adjustments to ensure feed accuracy.



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PaceSetter VeriFeed uses a drawdown assembly to constantly monitor the actual volumetric output of a pump and correct for any deviations from the expected output by adjusting the speed of the pump.

Features of the PaceSetter VeriFeed:

- 1) Determines the actual chemical delivery of the feed pump
- 2) Self-correcting circuitry maintains the appropriate amount of chemical needed by compensating for pump variations and the effects of head pressure in the process stream and chemical storage tank

The PaceSetter Platinum controller regulates the operation of the drawdown assembly. The amount of correction calculated can be viewed on the PaceSetter display.

A typical PaceSetter VeriFeed installation is shown at the bottom of the page.

The second customer challenge after verified dosing was that there would be no negative impact on the RO system performance. Normalized data showed that there was no increase in fouling or scaling following the switch to the Hypersperse antiscalant. Further, the customer was not required to make changes to their cleaning program. The RO's are rinsed weekly for one hour at 175°F (80°C). In the last four years, the RO's have been cleaned twice using an acidic solution and have never been cleaned with an alkaline cleaner. There has been no decrease in actual flow and no interruption in production.

## Results

Switching to the GE solution of using PaceSetter VeriFeed to continuously measure and monitor Hypersperse dosage resulted in a significant reduction in chemical operating cost, with the PaceSetter VeriFeed system included. The solution has proved to be a reliable, cost-effective means of delivering verified antiscalant feed. High RO performance was maintained at a significantly lower cost.

After a year of operating with the PaceSetter VeriFeed system, there was a change in the customer's critical to quality (CTQ) factors, which necessitated a change in antiscalants. GE was able to quickly respond with an alternate Hypersperse product that met this changing need. An additional advantage of the PaceSetter VeriFeed solution is that it is not limited to any specific chemistry and not reliant on tagged molecules, as the customer was formerly using.

