Leader of the Pack

The travails of California's water conditioning industry are likely to be experienced by a large portion of the U.S. in the near future. As the most populous state in the country, California often leads the way when it comes to activist legislation.

By Jerry Horner

Working to make water softeners more efficient

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In June 2009, at the behest of the Obama administration, the U.S. Environmental Protection Agency (EPA) approved California's request to set their own tighter vehicle emissions standards. Following on the coattails of California, 13 other states and Washington, D.C., subsequently adopted the same or similar tentative emissions standards. These standards are expected to become federal law by 2016.

Water Legislation

As more restrictive water-improvement legislation comes out of California, expect the entire country to take notice and likely follow the state's lead. This article will specifically discuss point-of-entry (POE) automatic-regenerating water softeners; however, watch for future regulations that may target portable-exchange water softeners and point-of-use (POU) reverse osmosis (RO) systems.

Whether said legislation is good, bad or ugly is immaterial. The West Coast is on the leading edge of enacting feel-good laws that look appealing from the outside, but may result in unexpected, severe real-world economic and environmental consequences.

Salts in wastewater make water recycling more difficult as the resulting higher total dissolved solids (TDS) levels may have to be reduced for agricultural, industrial or potable use. There is no doubt that traditional onsite automatic water softeners add to the effluent salt loads, but softeners are a small portion of the problem. Other significant TDS sources include agricultural runoff, road deicing and various natural factors. Activities such as washing clothes, building homes or manufacturing also contribute to the TDS load. Unless we are prepared to cease all human activity, eliminating wastewater salts is not an option. Rather, how to limit the amount of effluent salts is the key question to be answered.

It is intriguing that the state of California is continually trying to limit the use of softeners by the masses, yet the state operates some of the largest, least-efficient, salt-gobbling softeners on the planet. It is clear that the state realizes the benefits and need for softeners in their own facilities, but strives to restrict their citizens from the same pragmatic and additional aesthetic benefits.

The water softener legislation barrage by California lawmakers has been active for decades. Softeners are often a legislative priority for the simple reason that the water improvement industry is relatively underfunded, making it an easy target. The following examples of bills focus on water softeners:

- In 1978, the state legislature passed SB 2148, which essentially found that due to dramatically varying water quality throughout the state, residential water softeners meeting specific efficiency standards should remain available. In the mid 1990s, the Water Quality Association was instrumental in overturning more than 130 local softener bans that had singled out water softeners without accounting for the many other TDS sources.
- In 2003, SB 1006 increased softener efficiency requirements to 4,000 grains removed per pound of salt and allowed local agencies to restrict the use of automatic water softeners based on certain specific conditions. These requirements ensured that softeners would not be the sole target of water regulators and that sound science and unambiguous facts would rule the day. Subsequently, the Santa Clarita and Fillmore communities successfully passed softener effluent restrictions based on the SB1006 guidelines.
- Dodging a bullet in 2008, the California water improvement industry survived AB 2270 when Gov. Schwarzenegger vetoed the legislation, citing that "current law already includes provisions that allow local agencies to regulate water softeners." He further noted that the bill would have "unduly limited choices for consumers and small water systems, with potentially little positive impact given the relatively limited contribution of water softeners to our salinity problems."
- This year brings us AB 1336, which is almost identical to the vetoed 2008 AB 2270 legislation.

Most of these proposed laws do not consider the wide range of positive effects resulting from softening water. The quantity of cleaning soaps and chemicals is greatly reduced when softened water is incorporated. The environmental impact of using significantly less energy based on the reduced scale barrier of water heating appliances is another example.

Acting as an insulator, precipitated hardness impedes heat-transfer efficiency. Softened water extends the life of boilers, heaters, dishwashers

and other related products. Not only is landfill space conserved but also demand for raw materials to manufacture replacement items is reduced.

With all the new magnetic, electronic and catalytic devices, why do consumers still demand softeners? It is because softeners simply continue to perform best at a relatively low environmental and fiscal impact. Other conditioning devices may have their place, but no better alternative has been found to take the place of ion-exchange water softening.

Someone will eventually design a way to efficiently soften water without the use of salt or other similar nocuous regenerants but until that time, we need to do the best we can with the available technologies.

Softening Efficiencies

The truth is that we as an industry are not doing our best to make softeners as efficient as reasonably possible. Residential systems are still commonly set to regenerate with 8 lb of salt or more per cubic foot of resin. Most influent conditions for residential applications can facilitate settings of 6 lb or less per cubic foot.

Inaccurate test kits are used to approximate hardness, or worse, a "guesstimate" of the hardness, without a test to determine the calculated capacity. Poor capacity and hardness calculations may lead to premature hardness, but most often will cause the softener to regenerate too early, resulting in excessive water and regenerant use.

Time-clock-initiated softeners are almost always inefficient but are still sold, usually to reduce the up-front cost by a few dollars. Even single-meter-initiated systems can suffer from poor production compared to salt use. Low-capacity, undersized single-metered systems require a relatively high reserve capacity, often making them no more efficient than those operated via time clock.

Some single-metered controllers offer an immediate regeneration mode allowing full capacity depletion prior to regeneration. This method can result in regeneration at any time with the obvious hard water issues as the unit regenerates during normal water-use periods.

More advanced features like proportional brining help to mitigate these issues with single metered systems. Proportional brine systems refrain from filling the brine tank until shortly before a delayed regeneration is initiated. This allows the system to fill the brine tank with a quantity of water that will produce only the amount of brine needed, regenerating the resin bed proportional to the amount of capacity that has been used. Sensor-initiated systems can help smooth out fluctuating hardness levels by initiating regeneration only when the resin bed is nearly exhausted. Twin-alternating systems theoretically allow full hardness capacity to be used with the immediate regeneration of the depleted system as the standby tank is brought on line.

Poor training leaves technicians, salespeople and consumers without the tools needed to make the best choices. Get involved by resolving to do your part and more. Join your local water quality association to promote education, training and involvement. We have science and the facts on our side, but we must take care not to be defeated by our own apathy. *wqp*

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