the future of WATER SOFTENING

Recent pilot study offers cloudy results

By Stephanie Harris

Water treatment dealers and industry professionals filled the conference hall at the Mandalay Bay Convention Center in Las Vegas on March 26th, anxiously listening as Nancy Deal, extension associate with the North Carolina State University's Department of Soil Science, revealed the long-awaited results of last summer's Water Quality Association (WQA) and National Onsite Wastewater Recycling Association (NOWRA) joint pilot study on septic systems. The results: inconclusive.

The July 2007 study was accomplished through the leadership of Deal and Tom Konsler of the Orange County, N.C., Health Department. A willing neighborhood in Orange County was chosen as the testing grounds, presenting septic systems both with and without softener backwash addition. Deal and Konsler developed an extensive protocol to evaluate the performance of each septic tank and water softener as well as a household profile questionnaire.

Thirteen homes with septic tanks were surveyed—six of which used water softeners. Regeneration water from each of the softeners was collected, sampled and analyzed by a research team led by Deal and others with North Carolina State University.

The site sampling that was done included source water as well as septic tank effluents and contents at specified liquid horizons. Concerns voiced from manufacturers of onsite treatment systems regarding the question of whether water softener brine discharges cause a lack of defined layers of sludge, scum and clear zones in septic tanks led to this protocol.

"Because of this concern, I asked that they take samples at various depths of the septic tank—6 in. off the bottom, 6 in. above that and at succeeding depths all the way up," said Joseph Harrison, P.E., CWS-VI, technical director of the WQA. This way "we could see if there was any salt-water stratification effects in septic tanks receiving water softener wastes versus the others that did not have water

softeners discharging to them."

The field study was attended by onsite experts, a microbiologist, health department persons and representatives from the WQA. Although the results of this initial study were determined to be inconclusive, water treatment dealers and other industry professionals should not be discouraged.

"The North Carolina study was designed as a pilot to yield a pathway to a comprehensive study; for example, to show the investigators what was needed to achieve a good outcome in a larger study," said Matthew Byers, Ph.D., onsite manager for Zoeller Co. and NOWRA representative. "This goal has been achieved. As a pilot, conclusive results were not among the goals."

The study did, however, lead to smaller but also important conclusions. "We learned that the septic tank chloride levels from water softener discharges that were always in proportion to water usage flows (i.e., demand-initiated regeneration-(DIR) controlled softeners) stayed around 500 and less than 1,000 mg/L," said Harrison. "However, the chloride levels from time-clock water softeners in homes with very low water usages did build up to 2,000 to 3,000 mg/L in the study. It was not clear from the data collected that any of the water softener discharges, whether from DIR or time-clock units, had any adverse effects on the wastewater system performances."

A key determination from the study, according to Harrison, was that NOWRA and the WQA need to develop agreed septic tank performance markers that can be monitored in future research studies. With the pilot study complete, the WQA and NOWRA are on track to work together on future studies and to develop a guidance document based on what is now known concerning the issue.

"The pilot study was conducted to help determine procedures for representative research," said Harrison. "The study, however, did not encompass failing septic tanks nor did it represent a broad spectrum of septic tank conditions. The study did not show any adverse effects on septic tank performances from water softener discharges, but this study was only of a few homes in one small subdivision. It did not represent a broad spectrum of septic tank installations and conditions."

Where They Stand

The water softener issue at hand questions whether or not softeners are detrimental to septic systems, and data exists supporting both claims. Some concerns that are thought to occur include the belief that brine could potentially destroy concrete septic tanks, disrupt biological processes, affect stratification within the tanks or cause sludge to fail to settle and negatively affect treatment devices.

The WQA, according to Harrison, does not see evidence of adverse effects on the performances of onsite wastewater treatment systems. "More than 2,000 WQA water dealer members throughout North America can point to hundreds of thousands of water treatment discharges to operating septic tank systems for decades with no apparent signals of failures or malfunctions," said Harrison. "However, we also hear of anecdotal reports from some of the NOWRA members of adverse effects from water treatment equipment discharges that we must pay attention to. We have seen these reports of adverse impacts result in proposed regulations suggesting restrictions of water treatment discharges into onsite wastewater systems in about 18 states in just the past decade.

"The WQA can and has agreed to a

compromise requiring only DIR water softener units where the discharge is to conjectured susceptible wastewater systems to avoid more restrictive bans of water treatment equipment. DIR water softeners will cut salt discharges in half over those from time-clock-controlled water softeners. WQA will not agree to take the right to softened water away from consumers."

NOWRA, according to Byers, feels that the softener issue is a legitimate concern for both the water softener and septic industries. "NOWRA wants to provide end users with solid guidance, and so does the WQA," he said. "Together, as experts, we should be able to guide the consuming public."

Byers also believes that as more issues regarding the effects of water softener discharges are revealed and quantified, the manufacturers of onsite and softener systems will be able to technically address the issues.

Manufacturers of onsite systems, such as Orenco Systems, Inc., Sutherlin, Ore., have voiced their own concerns regarding the softener issue. "Our analytical data indicates that there is no concern with softened water passing through the wastewater treatment system, said Mark Gross, Ph.D., training manager for Orenco. "The only concern is with salty regeneration brine passing through the wastewater treatment system. Orenco is not in favor of banning water softeners, and could not support a ban on water softeners."

Orenco met with the WQA in May 2007 to discuss the issue and conceptualize a possible solution. "We agreed that a solution acceptable to both groups would be to recommend the installation of a separate pipe that directs the backwash brine around the treatment system into the soil dispersal system," said Gross. "This would allow the brine to receive the benefits of dilution without compromising the biochemical treatment processes in the septic tank. Moreover, this solution would adhere to regulations currently in the books in states that require water softener regeneration water to go into the wastewater treatment system."

What's Next?

With all parties working together to establish a conclusion and solutions regarding the effects of water softener discharges in septic systems, one thing has been agreed upon by all: more research needs to be conducted. But therein lies another issue—who is going to pay for this research?

"The industry needs to decide if it wants to learn the answer to the question. If so, it must pay to play," said Byers. "Funding is the issue. The North Carolina study was a good exercise in having WQA and onsite professionals working together for the first time. A definitive, larger study will be expensive, and the industry will need to come together and agree on a protocol, secure funding, agree on the investigators and then enjoy the results together, whatever is revealed."

In the meantime, the industry will continue to face the growing threat of water softener bans, which are becoming prevalent in areas of California, for example. "The water treatment industry, of course, does not want to see bans or restrictions of our equipment installations," said Harrison. "However, if adverse effects are found and the reasons for them and the extent of them are objectively defined, I believe we can be confident that innovations will be engineered to mitigate such adverse effects without restrictive bans or disruption to home water treatment services."

Several innovations, such as saltless alternatives, are already starting to make their way into the marketplace and water dealers are taking note. If further research concludes that water softeners do in fact have negative effects on onsite systems, it will be up to manufacturers to develop new technologies, or alter existing technology, that will work in compliance with any new findings. *wqp*

Stephanie Harris is managing editor for *Water Quality Products*. Harris can be reached at 847.391.1007 or by e-mail at sharris@sgcmail.com.

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