What's on the Horizon? 2011 Industry Forecast

Industry leaders' take on the coming year

The past year has presented challenges, but looking back, everyone in the water treatment industry can be proud of what they contributed. There will always be storms, of course, but the industry has weathered some serious squalls in the recent past and has come out stronger than ever, with new solutions and innovative approaches to serious water quality concerns. **Water Quality Products** *asked four industry leaders to share their predictions on the most important opportunities and challenges we will face in 2011.*

Joseph F. Harrison, PE, CWS-VI
Water Quality Consulting Services
joseph.harrison67@gmail.com
847.513.4178

I am not the best prognosticator of the economic and market futures. Many are working hard to make that better than what we have seen the past two years and I believe we will see marked improvements in 2011. But let me focus on more definite new information I expect we will learn in 2011 on two significant industry issues. Both of these findings will be the result of research funded by the Water Quality Research Foundation (WQRF):

1. Does water softening still save soap with today's modern soaps and detergents?; and

2. What is it that may be happening when regulators see an impact on septic tanks from water softener regeneration discharges?

Softened Water Soap Savings With Modern Detergents

In 2009, WQRF commissioned Scientific Services S/D Inc. and its president, George C. Feighner, to conduct a comprehensive "Investigation of the Enhancement of Performance of Laundry Detergents and Dishwashing Detergents by the Use of Soft Water." This study has investigated water hardnesses from zero to 30 grains per gal, detergent levels from zero to 100% of recommended dosages, water temperatures from 60˚F to 100˚F, different representative detergent brands, nine stains (blood, catsup, ground-in clay, coffee, dust-sebum, grass, lipstick, red wine and baby food) in laundering of cotton and polyester fabrics and seven soils (baked-on egg yolk, baked-on macaroni and cheese, corn starch slurry dried, baked-on spinach slurry, baked-on milk residue, cooked cereal and tea) in dishwashing. The study will be completed in 2011. However, data is already beginning to show that softening hard water for laundry washing is perhaps up to three to five times more effective in improving cleaning than raising the water temperature from 60˚F to 100˚F and may be more effective than increasing the detergent dose from 50% of recommended dose to 100% of recommended dose.

Scientific Services is planning to run additional tests with 25% of recommended detergent dosages (so as to not have to rely on linear extrapolations). In the end the numbers may be tempered somewhat, but it seems we may be looking to substantiate that softening hard water will overcome losses in cleaning performances with lower detergent amounts and losses in performance with cold water, too. The research also has looked at comparing the results of automatic dishwashing detergents at 0, 257 and 513 ppm of water hardness and at three dishwashing detergent dosages. The data for both spot/film performance and for soil removal look good. Scientific Services will calculate the ratios of performance change versus water hardness and dosage for dishwashing as well as for the laundry detergents.

Look for these positive new results; the final research report should be completed in 2011.

Water Softeners & Septic Tanks

Approval to go forward with this research study is pending agreement from the National Onsite Wastewater Recycling Assn. (NOWRA) and the State Onsite Regulators Alliance (SORA) to participate with Water Quality Assn. (WQA) on a joint steering committee for the project. I expect this will happen and that a university research investigation may be approved to get underway in 2011. Although final completion of the study will not come until 2012, we may perhaps see some preliminary validation as early as 2011 as to whether the cation ratio premise has merit.

I have been on the annual program at NOWRA's and SORA's annual conferences since 2005. Be assured that our industry has been branded by many of them as being detrimental to onsite wastewater systems. The belief against water softener discharge is practically universal among wastewater regulators, even without proof of adverse effects. Everybody knows that in the majority

of cases a water softener discharge is not adverse to septic tank systems. But regulators are under pressure to reduce septic system failures, and most seem to agree with what was said by the state of Delaware: that "even if only 1 in 100 septic tank problems are related to water softeners, that is too many and reason enough for regulatory restrictions." Regulators' thinking is that when faced with uncertainty, it is better to err on the side of safety and keep the water softener discharges out. Promulgated regulation restrictions on water softener discharges to septic tanks exist in more than a dozen states. The bans are absolute in states like Connecticut, Delaware and Massachusetts.

What is the cation ratio concept and why might it be so important? The premise of the ratio of monovalent to divalent and polyvalent cations (the M/D cation ratio) effects was introduced by Dr. John T. Novak of Virginia Tech University at the Water Environment Research Foundation workshop in November 2009. It is recognized by all that heard Novak as the most enlightening and potentially promising revelation put forward to date toward explaining what septic system pumpers and regulators are reporting from field observations of onsite wastewater system performances. Novak has found in municipal wastewater treatment plants that the ratio of monovalent cations (such as sodium and potassium) to divalent and polyvalent cations (such as calcium, magnesium, iron and aluminum) has a dramatic affect on whether the wastewater treatment system effectively separates solids from liquids and performs as it should or does not perform and fails.

The M/D ratio may likewise hold a critical key to understanding the septic tank/water softener issue. Since monovalent cations are characteristically dispersers of solids and the divalent and polyvalent cations are known coagulators of suspended solids, it makes sense that an out-of-balance M/D ratio could be a cause of reported symptoms like "homogenized milk shake appearance," "plugged effluent filters" and "substances in the drain field laterals." If it is a significant cause, this would likewise be an education to the septic tank regulatory and service communities. If the proper cation ratio is the answer to successful septic tank performances with regard to water softeners, states would welcome this knowledge. I feel they would also welcome solutions that avoid adversarial rules against water softeners.

The proposed Virginia Tech study by Novak is designed to objectively and scientifically demonstrate whether the M/D ratio of cations is a true and significant factor in anaerobic and softened water septic tank performances. It will give data and validation to whether this is a real factor contributing to the problems that have been attributed to water softeners. It has potential to lead to solutions without restricting water softener discharges and to the relaxing of regulator attitudes and rules toward restrictions of water softener discharges.

With the options available to dealers for water softener designs and installations, successful M/D cation ratios can be adjusted and met (when it is otherwise outside of a proper balance) without diverting the water softener discharges away from the septic tank. States will welcome these defined corrections to failing septic tanks. If the outcome is consistent with Novak's beliefs and his previous findings, this study has the potential to reverse anecdotal-based restrictions by states and counties against water softener discharges to onsite wastewater systems.

Tom Bruursema
General Manager
Drinking Water & Wastewater Treatment Units Program
NSF Intl.
bruursema@nsf.org
800.NSF.MARK

One year ago, I highlighted the growing opportunities in water reuse. While not a new subject then, the pace of activity was accelerating. That momentum has been sustained throughout 2010, focused in large part on the infrastructure that will allow for the broader application and resulting benefits of treated reuse waters.

While not a well-defined term, reuse is relatively self-explanatory. Waters that are collected, treated and distributed to communities as drinking water utilize a substantial amount of time, cost and resources. High-quality water for consumption is critical to public health safety. Water of that quality, however, is generally not considered necessary for many other applications including toilet flushing, car washing, lawn irrigation, decorative fountains and other non-potable uses. When you consider the volume of water used in these applications, it becomes obvious why there is interest in looking toward other options. Reuse of water already available at the residence is one such option.

The primary emphasis today on reused waters is in the treatment of wastewater. Residential wastewater is a culmination of several common sources, including laundry, bathing, kitchen and toilet water. All of these introduce contaminants of different types and concentrations. The first two, laundry and bathing, are classified as graywater, whereas the latter two generally fall into what is referred to as blackwater. The classifications provide somewhat an obvious gradation of quality, and thus contaminant loading. However, all are available for reuse. What differs is in the treatment needed to reach reuse quality.

Reuse quality itself is somewhat undefined, as there are no federal regulations governing reused residential wastewater for non-potable applications. However, this has not stopped many states in establishing such levels, with more and more moving in that direction. The contaminants and levels are focused around common measures of treated wastewater more so than drinking water. Some typical values include the following:

Contaminant	Non-potable treated effluent concentration
5-day Carbonaceous biochemical oxygen demand (mg/L)	10
Total suspended solids (mg/L)	10
Turbidity (NTU)	5
E. coli (MPN/100 mL)	14
pH (SU)	6.0 – 9.0
Storage vessel disinfection (mg/L as chlorine)	≥ 0.5 – ≤ 2.5

There are a number of wastewater treatment technologies on the market today that can deliver reuse water of this quality. They are likely to move easily into the broader applications of reuse water. There is an emerging treatment market that is focused more specifically on the graywater portion only. Again, there are existing technologies, but they are emerging as more of a hybrid involving drinking water and wastewater treatment technologies. They also vary in size, some dropping down to point-of-use (POU) capacities. Rather than categorizing this as a "septic tank market," it is being driven toward an appliance-type market that could very well lead to products commonly available in retail.

Key events in 2010 that will pave the way for 2011 and growth of the market include the following:

- Rule development for reuse treatment in several states, including North Carolina, Idaho and Washington. Many others have existing rules already adopted;
- Development and adoption of plumbing codes for reuse waters, including the International Assn. of Plumbing and Mechanical Officials and the International Code Council; and
- Development of national product standards in the U.S. (NSF Intl.), Canada (Canadian Standards Assn.) and the United Kingdom (British Standards Institution).

This rapid level of development and attention to one area of water use, quality and treatment is unprecedented. It truly has been a remarkable effort in a relatively short time, particularly when compared to the decades of development in drinking water and wastewater treatment. All of this would imply there is a need, and thus a market, for reuse treatment products, including plumbing components, treatment technologies and storage vessels. Whether the market will develop at the same pace is yet to be seen. One thing is for certain: this bridge between the residential drinking water and wastewater treatment market creates some new industry dynamics. Both have an opportunity to expand their markets and adapt to the changing environment of water treatment.

Peter Censky
Executive Director
Water Quality Assn.
info@wqa.org
630.505.0160

Technology, increased attention from public officials and new studies will all add up to unprecedented challenges—and opportunities—for our industry in 2011.

Let's start with the confluence of technology and increased focus from public officials.

POU Solution

Those inside and outside our industry know that science is showing more and more potential contaminants in drinking water. News reports are raising consumer awareness of problems, and this trend will only continue in 2011.

In an effort to anticipate public demand and official reaction, WQA and other industry leaders are making a conscious effort to ensure that point-of-use approaches will be understood as a part of the national solution.

To ensure that our industry is part of the dialogue early on, leaders in the water treatment industry have been meeting with top public officials in Congress to provide education on these issues, and we will ramp up this process in the coming year.

In sessions during early October 2010 and throughout the 2010 WQA Mid-Year Leadership conference, WQA staff and senior association members discussed how point-of-use technology should be included in long-term federal planning. Industry representatives met with senior Congressional staff from committees that oversee the environment and public works, science and technology, and energy and natural resources.

Industry representatives will continue to encourage public officials to consider that the most practical solution to water-related issues is to integrate POU and curbside systems into the current regulatory paradigm.

Our message is a simple and clear one: It is up to policymakers to invent new regulations and permissions to implement this new approach. As an industry, we have the framework capabilities, testing abilities and certification regime to meet the coming challenge. When regulatory changes and technology are joined, we will be well on our way to whole new systems that will transform our industry.

Final Barrier

To that end, at WQA Aquatech USA 2011, final barrier issues will take center stage. It is critical that we understand, as an industry, what our goals and options might be. The conference and exhibition will be held at the Henry B. Gonzalez Convention Center in San Antonio, Texas, from March 8 to 11, 2011. For more information and to register, go to wqa-aquatech.com.

At the 2010 conference and exhibition, we learned about the Battelle Study, a report showing how softeners can help make water heaters and other appliances more efficient. In 2011, more independent reports will be released, showing how effective and useful water treatment approaches are.

Incidentally, if you have not explored the new Battelle Report marketing tools, check them out at www.wqa.org. With these tools, you are able to print effective materials such as postcards, posters and flyers that display your company's information. With a few clicks, you will be merging your data with professionally designed marketing materials to produce what you need to make new sales at minimal cost.

EPA & WaterSense

In 2011, also expect to hear much more about WaterSense. This is a program run by the U.S. Environmental Protection Agency (EPA) program, designed to encourage water efficiency through labeling. Products in our industry will be increasingly examined through WaterSense, providing some excellent opportunities for marketing.

The EPA will play another role in our industry in the coming months. The agency has been seeking a new approach to expand public health and safety by identifying better ways to address contaminants in groups rather than individual compounds. This approach has previously been used for a few classes of contaminants, such as gross alpha emitters, gross beta emitters and viruses. However, it has not been widely used in the evaluation process for the majority of contaminants.

EPA is looking at addressing contaminants as groups rather than one at a time, so that enhancement of drinking water protection can be achieved cost-effectively. The agency also seeks to foster development of new drinking water technologies to address health risks posed by a broad array of contaminants.

Frank A. Brigano, Ph.D.
Vice President of Technology
***WQP* Editorial Advisory Board Member**
Thomas A. Burke
Product/Marketing Manager
KX Technologies LLC
fbrigano@kxtech.com
203.764.2506

The Rising Importance of POU

Not a day goes by when we don't see news reports about contaminated water supplies making people sick and putting thousands at risk for waterborne diseases. When we assume such reports are sent from other countries, we are often incorrect. The U.S. is facing a rising occurrence of such incidences, often brought on by aging infrastructure, system failure, accidents, storms, errors, reports of contamination including *E. coli*, and in some isolated cases, issues such as knowingly drawing contaminated water into a municipal system (Crestwood, Ill.) or the falsification of water tests required by states (Northern Cambria Water Treatment Plant, Northern Cambria, Pa.). Millions of people may be at risk for serious disease in the U.S. because they often believe someone else is responsible for their drinking water quality.

Thousands of boil water alerts are issued throughout the U.S. on an annual basis. For 2010, we have formally tracked more than 900 through November—but our figure only includes those alerts for which we received a news report. Some boil water alerts occur but may not be picked up in the media.

What is most concerning are two distinct problems:

- Boil water alerts are issued after the fact—meaning people may have already been exposed to, and possibly ingested, suspect drinking water; and
- The people who do not receive the notices in time to prevent ingestion of suspect water.

Sufficient notification systems may not be in place in many locales; even with a good notification system, there is always the chance that a significant part of the population is not notified in time to take action. Is an 80% notification rate good enough? What about the 20% that did not receive the notification—are they willing to accept the possibility of ingesting contaminated water without knowing it? Of the 80% that did receive a notification, how many really understand what it means and what they are supposed to do, and for how long?

This is a global issue. Recent outbreaks of cholera, a waterborne bacterial disease that causes symptoms such as vomiting, diarrhea and stomach pain in both Haiti and Nigeria, are the latest examples of how serious, and how important, the need POU filtration is. Also, these two countries highlight how specific POU filtration systems need to be designed for specific locations. A filtration system that is designed to work with steady water pressures in the range of 60 psi in the U.S. certainly will not work in Haiti or Nigeria, where municipal systems, if in place, do not provide that level of water pressure on a consistent basis. A country such as Haiti may benefit more from a gravity-fed filtration system which can be used by a large part of the population, while a country such as Nigeria may require a filtration system designed to work at lower water pressures.

We see the rising importance of POU filtration systems on a global basis as requisite for the necessary delivery of clean drinking water. The need for consumers to understand their obligations for ensuring clean drinking water for their homes and families is paramount; it is no longer the province of some regulatory organization to ensure clean drinking water. In fact, the best any of these bodies can do is to set rules, laws, policies and guidelines and enforce them. But they cannot ensure that our drinking water is always clean and always safe; once water enters our homes, whether it is clean or contaminated, no matter what the source, the responsibility becomes ours alone. POU filtration may be one of the best solutions to ensuring we have clean drinking water no matter where our water comes from. Full access to POU filtration systems designed to work in the local areas to which they are marketed is quickly becoming a basic life necessity and should be fully supported as a viable solution to delivering clean and safe drinking water across the world. *wqp*

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