

Final Barrier

Looking Toward the Future

By Regu P. Regunathan

What exactly is final barrier? How does it work? Where does it fit into my business? These are questions asked by many dealers in the water treatment industry. The WQA Aquatech USA 2012 tradeshow, held March 6 to 9, focused on these questions with a mixture of presentations and a focus group discussion.

Protection From Disease

Dr. Charles P. Gerba is a well-known expert in the field of microbiology of water. He is a professor in the department of soil, water and environmental science at the University of Arizona. He has authored more than 11 books, written chapters in more than 80 other books and published more than 340 peer-reviewed journal articles. He gave a presentation at WQA Aquatech USA 2012 titled, "Final Barrier – Global Perspective."

According to Gerba, based on studies he has conducted or reviewed, from a microbiological point of view, there is a need for final barrier technology in countries in both the developing and developed worlds. He points out that in many countries or regions of the developing world, poor source water, inadequate or non-existent treatment and contaminated storage and distribution system intrusions lead to high incidences of disease.

Worldwide, there are 2.6 billion people without access to sanitation and 900 million people without access to safe water. According to the World Health Organization (WHO), during the last decade there were 132,000 cases of cholera, 16 million cases of typhoid and 4.6 billion cases of diarrhea per year worldwide. This led to 3 million deaths annually, mostly of young children. According to Gerba,

these facts emphasize the need for final barrier processes and devices for every family in the developing world.

When it comes to the developed world, there are a variety of factors that point to the need for final barrier technology as well. According to Gerba's research, waterborne pathogens cannot be removed 100% of the time by conventional water treatment processes in a central water treatment plant, and water-based pathogens often grow in distribution systems. Contamination of distribution systems through intrusion or main breakage also is being reported, and widespread occurrence of enteric viruses is being recognized in groundwater sources.

In regard to waterborne diseases, it was discovered recently that some chronic diseases are caused by waterborne and water-based pathogens. Sensitive populations, such as infants, children, the elderly, mothers, women of maternal age, immunocompromised individuals and the chronically ill require water with more enhanced quality than the rest of the population. Such populations are increasing, comprising 25% to 30% of the current population. The estimated number of endemic cases of waterborne illness in the U.S. is about 25 million per year. According to Gerba, all of these factors point to the need for final barrier devices in homes in developed countries as well.

Two microbiological guide standards have been developed to evaluate microbial final barrier devices, one by the U.S. Environmental Protection Agency (EPA) 25 years ago, and another by WHO in 2011. While there are some differences in the two guides, both approach the need for testing and evaluating these devices in a similar manner.

Small Systems Applications

Thomas Sorg, P.E., is another well-known expert in his field. He has worked with federal environmental programs for 47 years; the last 37 have been with EPA's drinking water research and development program. Sorg has been chief of the inorganics and particulate control branch of the drinking water research division for 25 years. He gave a presentation at WQA Aquatech USA 2012 titled, "Final Barrier – Small System Compliance."

Sorg focuses on the use of point-of-use (POU) and point-of-entry (POE) devices as final barriers in homes in small communities to comply with EPA's chemical contaminant regulations. According to Sorg, there are many issues associated with these applications.

EPA breaks small systems into three categories based on population: 25 to 500; 501 to 3,300; and 3,301 to 10,000. The agency lists POU as a small system compliance technology specifically in the radionuclide and arsenic rules because it is more affordable for small systems and can help them comply with these rules.

Approximately 40% of states allow POU for compliance purposes. Another 20% allow POU for compliance with varying levels of limitations. Application of POU is low, however: It is used in only eight states, and even then somewhat sparingly, in spite of its affordability.

According to Sorg, final barrier technology has large growth potential when it comes to arsenic in particular: 11 states have more than 20 small systems that are not in compliance with EPA's arsenic rule. Most of these systems serve less than 500 people. POU for arsenic treatment also is applicable to private water systems.

Final barrier technology is poised to provide treatment solutions around the world

An analysis of products currently certified for arsenic reduction by NSF Intl. and the Water Quality Assn. (WQA) indicates that the majority of them are reverse osmosis (RO) units. Due to cost considerations, there is a need for more media filters tested and listed under NSF/ANSI Standard 53 for arsenic removal.

A report on the use of POU, POE, packaged plants and modular units for small systems currently is being prepared by a task force formed by EPA as required by Congress. This report, along with alternate affordability criteria, will be used by EPA to create a plan to facilitate increased use of these alternate approaches in small systems.

An Ongoing Dialogue

The WQA Aquatech USA 2012 final barrier presentation series included a discussion panel titled "Launching the Final Barrier: Initial Focus Group Discussion," moderated by Pauli Undesser, director of technical and regulatory affairs for WQA. Gerba and Sorg, in addition to Regu P. Regunathan, technical consultant to WQA, and Richard Mest, member of the WQA board of governors, made up the panel.

The questions and discussions reiterated that there are several different applications for final barrier devices throughout the world. When POU or POE are used in many regions of the developing world for microbial protection, they are often the only barrier in place because of nonexistent or inadequate central treatment.

The same is true when they are used in private homes for microbial or chemical protection in developing and developed countries. When such units are used in homes or offices in cities and towns in developed countries, however, they are used as an adjunct to central treatment to reduce microbial or chemical contamination risks to the lowest levels feasible.

One of the main points raised was that it may be possible to estimate the costs and benefits of using POU or POE as final barriers in locations in U.S. or elsewhere by estimating the costs of the devices and the costs and benefits associated with illnesses avoided by their use. This topic may be of interest as a research approach.

Taking Action

According to Mest, who gave a follow-up presentation at the Dealer Section meeting at WQA Aquatech USA 2012, dealers must focus on final barrier. The concept is not new to them, and they use it every day, but they are not using it to the best of their

advantage. Dealers need to educate consumers on the importance of their responsibility for water quality in their homes, and what resources are available. A WQA consumer brochure was created to guide them in this education process. Dealers also need to look to the future, when regulations hopefully will allow the use of final barrier for municipal

compliance across the U.S., and they can be a resource for municipalities.

This is a high-profile WQA initiative that will take many years to come to full fruition, but final barrier can be utilized today for immediate success. This effort will require education at the local, state and federal levels and action by all WQA members. *wqp*

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