Compiled by Stephanie Harris

POUs for PFCs


Phil Olsen

A recent third-party study by Minnesota-based Water Science & Marketing (WSM), LLC, identified commercially available point-of-use (POU) treatment devices as effective for removing perfluorochemicals (PFCs) from drinking water supplies. Stephanie Harris, managing editor of Water Quality Products, *recently spoke Phil Olsen, partner and project manager for WSM, about the findings of this study.*

***Stephanie Harris:** Provide an overview of the recently completed PFC study.*

Phil Olsen: With new and ongoing environmental studies, and with advances in analytical technology, information is continually emerging about the presence of natural and synthetic chemicals people and industries use and dispose of within our ground and surface water supplies. PFCs are a group of contaminants being addressed with increased scrutiny by public health officials regarding toxicity and potential health effects.

Two years ago, residents in communities of Minnesota were informed concentrations of multiple PFC compounds had been detected in their groundwater and municipal water supplies. In response, people living within the affected areas addressed the Minnesota Department of Health (MDH) with concern for these contaminants and what type of water treatment devices could be used to remove them from their drinking water. Given the absence of accepted health standards for concentrations of PFCs in drinking water, and the absence of product certification standards for PFC removal, these questions could not be addressed with a level of confidence the MDH desired.

The MDH initiated the POU study to secure reliable performance data for PFC removal. In doing so, the MDH formed a multidisciplinary workgroup to help establish and review test methodologies WSM applied throughout the study.

The study consisted of three major tasks. The first included device identification and selection. This entailed contacting OEMs of POU devices to identify all products believed to be effective for PFC removal and determine what manufacturers were willing to commercially support associated performance claims. Products generally represented two categories; devices incorporating the single PFC removal technology of activated carbon (AC) filters, and devices incorporating multiple technologies including reverse osmosis (RO) and AC (RO/AC). In the end, 14 devices (six AC, eight RO/AC) were selected by MDH's PFC workgroup.

The second task represented performance screening and characterization. This entailed challenging each device with elevated concentrations of PFCs to establish comparative differences in performance between devices and component technologies (i.e., AC and RO). Test protocols were based on NSF/ANSI standards 53 and 58. This task was conducted at the Water Quality Association's laboratory.

The final task involved field-testing and was intended to determine the effects of PFC removal from use over time with the same ground-water chemistry found in the region affected by PFCs and to show operational differences between the POUs. Devices demonstrating the most promise for PFC removal from the screening test were selected.

Two municipal systems—one in St. Paul Park with only PFBA, one in Oakdale with a mixture of three PFCs—served as the test sites for field-testing. Automated test stations were designed and fabricated by WSM to support continuous testing of devices over the entire test period.

While the results of this study suggest AC and AC/RO devices can be used to effectively remove PFCs from drinking water supplies, they also suggest the same cannot be said for all such devices. Three of the 14 devices (two AC and one AC/RO) originally included in this study would not be recommended. It is also noted that current NSF/ANSI product certification standards for the removal of organic contaminants cannot be used to suggest performance for PFC removal.

***Harris:** What are the dangers of PFCs and where are they found?*

Olsen: The PFC family of chemicals is relatively new and is the focus of active scientific research. In laboratory animal studies, high concentrations of PFCs cause harmful changes in the liver and other organs. Developmental problems such as delays in growth and maturation have been seen in the offspring of rats and mice exposed to PFCs while pregnant.

PFCs are stable chemicals that do not change or break down in the environment. As a result, they may be found in soil, sediments or water. Some experts have suggested that PFCs can travel long distances in air, deposit on soil and leach into groundwater.

PFCs have been found in the blood of many species of wildlife around the world, and various studies suggest that nearly all people have some PFCs in their blood, regardless of geographic location and age. The way PFCs get into human blood is not completely understood at this time. People could be exposed through food, water, use of commercial products or from the environment. The half-life of PFCs within a human body will range from weeks to years.

Within the U.S., PFCs have been detected in drinking water supplies in Minnesota, Ohio and West Virginia. Due to the number of years of widespread use of products containing PFCs—such as Teflon and Scotchgard—measurable concentrations are likely to be found in drinking water supplies throughout the U.S. and worldwide.

***Harris:** What was the importance of this first-of-its-kind study?*

Olsen: This study represents the first third-party performance evaluation of POU devices of its kind initiated by a public health protection agency for the removal of one of the emerging health-effect contaminants of specific concern. Prior to this study there were no third-party test results, nor established test protocols to evaluate PFC removal performance of POU water treatment devices. In addition, with continued discovery of such contaminants in our environment, and subsequently within our public drinking water supplies, options for centralized municipal treatment will be studied. It is questionable to what degree technologies proven effective for PFCs will be considered viable for centralized treatment applications. As a result, alternative treatment approaches including the use of supplemental POU treatment may be considered. *wqp*

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