



Emerging Contaminants

An “emerging contaminant” is defined by the U.S. Environmental Protection Agency (EPA) as a chemical or material that is characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards. We will use compound interchangeably with contaminant in this article. A compound may also be emerging because a new source or a new pathway to humans has been discovered, or a new detection method or treatment technology has been developed. EPA maintains a list of emerging compounds in the drinking water that may warrant further possible study and regulation.

The sources of drinking water — both tap and bottled water — include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Compounds that may be present in source water include:

- Microbial compounds, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife;
- Inorganic compounds, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agricultural, urban stormwater runoff and residential uses;
- Organic chemical compounds, including synthetic and volatile organic chemicals such as pharmaceuticals and personal care products, byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems; and
- Radioactive compounds, which can be naturally-occurring or be the result of oil and gas production and mining activities.

The Northern Kentucky Water District (NKWD) provides advanced treatment processes of granular activated carbon and ultraviolet disinfection as part of a multi-barrier approach that also includes coagulation, sedimentation, filtration, and chlorine disinfection. This approach is effective in treating broad categories of compounds.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some of these compounds. Their presence does not necessarily indicate that water poses a health risk. A trace amount is measured in parts per billion or parts per trillion. A part per billion equals 1 gallon of water in 1,514 Olympic sized swimming pools or 1 second in 32 years. A part per trillion equals 1 gallon of water in 1,514,570 Olympic sized swimming pools or 1 second in 32,000 years. The ability to



test compounds at these minute levels is relatively new. Detection levels for analytical methods used are typically 100 to 1,000 times lower than State and Federal standards and guidelines for drinking water.

There is an established process in place within the appropriate federal agencies to provide further guidance to water utilities on testing and treating for emerging compounds. The U.S. Environmental Protection Agency (EPA) maintains a list of emerging contaminants referred to as the Contaminant Candidate List (CCL) that is reviewed every 5 years by EPA to identify its top priorities. The EPA will issue a "shortlist" of up to 30 unregulated compounds for which designated public water systems must monitor. The shortlist of compounds selected from the list for further monitoring is conducted as part of the Unregulated Contaminant Monitoring Rule (UCMR). Based on the monitoring data collected from drinking water systems throughout the country, EPA decides if the compound will be added to the list of compounds for possible new drinking water standards. Simply being included on the list does not impose any regulatory requirements on public water systems beyond the sampling and analysis.

The first list developed by EPA in 1998 contained 10 microbial candidates and 50 chemical candidates. EPA later determined that 9 of the 60 on the list did not need regulatory action and thus were removed from the list. EPA selected 1 microbial candidate and 24 chemical candidates to be monitored by drinking water systems as part of the first UCMR. The second list developed by EPA in 2005 included the same 9 microbial candidates and 42 chemical candidates from the first list. EPA then determined that 11 of the 51 compounds on the second list did not need regulatory action and were dropped from further consideration. Of the 40 remaining compounds, EPA selected 25 chemical candidates to be monitored by drinking water systems as part of the second UCMR. The NKWD completed monitoring requirements for both rounds of the UCMR, the first in 2002 and the second in 2009. There were no detections above the laboratory's minimum reporting limit for any of the 50 contaminants on these lists in NKWD's water. The EPA has not proceeded with regulating any of the contaminants on the first two CCL/UCMR lists.

EPA broadened the process for identifying emerging compounds when it developed the third list. EPA selected 116 candidates for the third CCL in 2009 after considering approximately 7,500 potential candidates. From this list, the EPA determined that four did not need sampling and were removed from the list. The third UCMR contained a total of 30 contaminants, 28 of which we were required to monitor in 2014 and 2015. The results are included in the Consumer Confidence Report located on our website. EPA's fourth CLL published in 2016 included 12 microbial compounds and 97 chemical compounds. Monitoring for EPA's fourth UCMR list of 30 compounds is underway, with sampling being conducted between 2018 and 2020.

Two emerging compounds that appeared starting on EPA's CCL in 2009 and that were included in monitoring under the third UCMR list that you may have read or heard about are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). These are part of a group of man-made chemicals used to make household and commercial products that people use daily such as fire-fighting foams,



coating additives for non-stick cookware (Teflon™), paper and cardboard food packaging (microwave popcorn bags), dental floss, stain-resistant carpets and fabrics, and cleaning products. Currently there are over 600 of these per- and polyfluoroalkyl substances (PFAS) that the EPA has approved for sale or import into the United States. These compounds may be released into the air, soil, and water, including sources of drinking water. Studies show that human exposure to PFOA and PFOS is widespread and that most people have some level in their blood. These compounds may be referred to as “forever chemicals” because they do not break down readily and can be present in the human body for years after exposure. While it was agreed by manufacturers that the production of PFOA and PFOS would be phased out in the United States by December 2015, some areas near manufacturing plants using these compounds have reported elevated levels of PFOA in their local water supply well above the published health advisory level. While the EPA does not have an enforceable drinking water standard for PFOS and PFOA in drinking water, a provisional health advisory was established in 2009. The 2009 guideline was 200 nanograms per liter for PFOS and 400 nanograms per liter for PFOA for short-term exposure. A lifetime health advisory was issued by EPA in May 2016 that established a combined PFOS and PFOA level of 70 nanograms per liter (parts per trillion). The health advisories reflect reasonable, health-based concentrations above which action should be taken to reduce exposure to unregulated contaminants in drinking water. The EPA has deemed that granular activated carbon, which is used by NKWD, is the best-available technology for removing PFOA and PFOS. The NKWD completed monitoring for PFOS and PFOA in the finished water in 2014 and 2015 as part of the third UCMR list. PFOA and PFOS were not detected. While PFOA and PFOS remain on EPA’s fourth CCL, they were not included in the monitoring being conducted under UCMR4.

While the production of PFOA and PFOS has declined over the past decades, these compounds are being replaced with short-chain perfluorinated chemicals that are expected to be less persistent or may pose less of a health risk. GenX is a trade name for a technology that is used to make a short-chain perfluorinated compound that has been used as a PFOA alternative. Limited studies have been performed on human health effects of GenX, and the EPA has not yet published a health advisory level for it. The Kentucky Division of Water collected finished water samples from the District’s two plants treating water from the Ohio River in June 2019 and analyzed them for eight PFAS compounds. While PFOA and PFOS and five other PFAS were not detected, GenX was detected at below 12 parts per trillion. EPA indicates that granular activated carbon can remove 99% of PFOA and PFOS, but for other PFAS such as GenX, the removal rates can vary from 77% to 99%.

Another compound included in UCMR3 is 1,4-dioxane. It is an odorless, colorless chemical that is used in the manufacturing and processing of paper, cotton, textile products, automotive coolant, cosmetics, and shampoos. NKWD completed monitoring in the finished water in 2014 and 2015. The results can be found in our water quality monitoring report. There are currently no regulations for this compound. While 1,4-dioxane remains on EPA’s fourth CCL, it was not included in the monitoring being conducted under UCMR4.



NKWD's takes drinking water quality very seriously, and we will continue to review the status of emerging compounds. Our water consistently meets state and EPA requirements, and we will continue to look to the State and EPA for further information and guidance on important issues such as emerging compounds.

For more information please call (859) 578-9898.

Additional information on emerging compounds may be found at the EPA's website <http://www.epa.gov> or by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791, and the American Water Works Association's sponsored website <http://www.drinktap.org/water-info/whats-in-my-water>.