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**This Week's Feature**
**Published 2-21-18 by DRI**

# What's Emerging in the Drinking Water?

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Contaminated water supplies are causing quite the stir and creating headlines in local newspapers across the country. The increased attention and scrutiny is due to the detection of unregulated substances that may pose a risk to human health or the environment, referred to as "emerging contaminants." An "emerging contaminant" is a chemical or material characterized by a perceived, potential, or real threat to human health or the environment, or by a lack of a published health standard.

Emerging contaminants do not have a federal maximum contaminant level for drinking water, surface water, or groundwater under the Safe Drinking Water Act (SDWA). Maximum contaminant levels are one of the factors considered by the United States Environmental Protection Agency (EPA) when evaluating the appropriate remedial action at a contaminated groundwater site. Unless a state has promulgated a standard to address the particular emerging contaminant, water purveyors, companies performing remediation work, and environmental consultants can find themselves in a state of uncertainty regarding compliance for remediation projects.

So how does the EPA address emerging contaminants? Currently, the EPA issues non-binding health advisories that are sometimes used as default cleanup levels when there are no binding standards (i.e., maximum contaminant levels). There are problems with this approach, such as a lack of collaboration with states and municipalities when prioritizing contaminants for health advisories, a lack of communication with water purveyors, and a lack of clarification regarding the difference between a health advisory and a maximum contaminant level. In addition to health advisories, emerging contaminants are often placed on the contaminant candidate list, which is a list of unregulated contaminants that may

require regulation under the SDWA. However, the presence of these contaminants in the environment may already be widespread, and the promulgation process can be lengthy, as the regulators try to determine the safe level of exposure for these contaminants. The uncertainties that loom over emerging contaminants will likely lead to an increase in litigation over groundwater and drinking water contamination from emerging contaminants.

Chemicals such as 1,4-dioxane, and perfluorinated compounds, such as perfluorooctanoic acid (PFOA), and perfluorooctane sulfonate (PFOS), are continuing to gain attention in the regulatory community. The first—1,4-dioxane—is a likely contaminant at many sites contaminated with certain chlorinated solvents, such as TCA, because of its widespread use as a stabilizer in degreasers. It leaches readily from soil to groundwater, migrates rapidly in groundwater, and is relatively resistant to biodegradation in the subsurface. Its high solubility complicates treatment, and conventional pump-and-treat remediation is not effective for 1,4-dioxane. For example, 1,4-dioxane will not be removed by pumping and treating groundwater using an air stripper system.

The compounds PFOA and PFOS are water and lipid resistant because of their chemical properties. Historically, PFOA and PFOS were used in the United States in carpets, leathers, textiles, upholstering, paper packaging, and coating additives as waterproofing or stain-resistant agents. They are stable in environmental media because they are resistant to environmental degradation processes, such as biodegradation and hydrolysis. Because of their persistence, they can be transported long distances in air or water. Similar to 1,4-dioxane, conventional treatment that targets particulate contaminants is not generally effective. Granular activated carbon (GAC) treatment can be effective depending on the design of the system and type of carbon used.

There is no maximum contaminant level for 1,4-dioxane, PFOA, or PFOS, but the EPA has issued health advisories for all three contaminants. The compounds PFOA and PFOS are extremely persistent in both the human body and the environment, so the EPA concluded that the lifetime health advisory is applicable both to short-term and chronic risk-assessment scenarios. The EPA's position is that a maximum contaminant level is not necessary to determine a cleanup level, which creates uncertainty over what the cleanup standard will be for a groundwater remediation project. Some states are filling the void by promulgating water quality standards for these contaminants. On January 16, 2018, the New Jersey Department of Environmental Protection (NJDEP) enacted groundwater quality standards for 1,4-dioxane (0.4 ug/L), and perfluorononanoic acid (PFNA), another perfluorinated compound. In November 2017, the NJDEP issued an updated drinking water guidance value for PFOA and announced that it would accept the recommended health-based maximum contaminant level of 14 parts per trillion. Also in November 2017, California added PFOA and PFOS to its Proposition 65 list of substances, due to their expected reproductive toxicity. Governor Cuomo of New York appointed a 12-member Drinking Water Quality Council to discuss the risks posed by 1,4-dioxane, PFOA, and PFOS. Meetings took place in October and November of 2017, to discuss recommendations for state maximum contaminant levels for these contaminants in light of the EPA's failure to adopt any federal levels.

In short, these contaminants are persistent in the environment, difficult to treat, and can cause health effects that are not fully understood. Treatment data is thin, so emerging contaminant remediation projects will likely require treatability studies and pilot studies. More and more stories about contaminated public water supplies are splashing across local newspapers around the country. This will lead to a lot more litigation from people who have been exposed to these chemicals, as well as litigation regarding the costs for remediating contaminated groundwater and installing expensive treatment systems. Emerging contaminants can also create issues on remediation projects that are already underway, or even those close to completion. The detection of 1,4-dioxane, PFOA, or PFOS at levels that exceed state guidance or new state standards can send private parties and their consultants back to the drawing board on an appropriate remedial action.

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