DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

FALL 2017 GRAD SEMINAR SERIES

DATE: WEDNESDAY, SEPTEMBER 27, 2017

WHERE: CENTRAL KING BUILDING - 204
TIME: 2:30 PM

GUEST SPEAKER

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New Jersey Department of Environmental Protection

TOPIC

Occurrence and Risk Assessment of PFAS in New Jersey

ABSTRACT

Perfluorinated chemicals (PFCs), part of a larger group called per- and polyfluoroalkyl substances (PFAS), are synthetic organic chemicals that have been used industrially and in consumer products for over 50 years. PFCs are of current interest because of their widespread presence in drinking water and human blood serum, and their potential to cause adverse health effects. PFCs do not break down in the environment, and long-chain PFCs are persistent in the human body, with half-lives for excretion of several years. Unlike most other persistent, bioaccumulative, and toxic (PBT) compounds (e.g. dioxin, PCBs), PFCs and other PFAS are water soluble, and drinking water can be an important exposure route.

The New Jersey Department of Environmental Protection (NJDEP) has focused on both the occurrence and the human health risk assessment of PFCs in drinking water for over 10 years. NJDEP conducted two statewide occurrence studies of PFCs in New Jersey public drinking water systems (PWS) in 2006 (perfluorooctanoic acid [PFOA]; perfluorooctane sulfonate [PFOS]) and 2009-10 (ten PFCs); data from additional PWS have subsequently been obtained. PFOA was the most frequently detected PFAS in NJ, and perfluorononanoic acid (PFNA) was found at a higher level in NJ than reported elsewhere in the U.S. or the world. The USEPA Unregulated Contaminated Monitoring Rule 3 (UCMR3) required monitoring of all large and some small PWS in the U.S. for six PFCs in 2013-15. In UCMR3, PFOA and PFNA occurred much more frequently in NJ PWS than nationally.

The New Jersey Drinking Water Quality Institute (NJ DWQI), an advisory body to NJDEP, has developed risk assessments for PFOA and PFNA in drinking water, and PFOS is currently being evaluated. In experimental animals, these PFCs cause toxicity to the liver, the immune, endocrine, and male reproductive systems, and the developing fetus and neonate.

PFOA and PFOS caused tumors in rats, while PFNA has not been evaluated for carcinogenicity. Low-dose effects include persistent delays in mammary gland development (perfluorooctanoic acid; PFOA) and suppression of immune response (perfluorooctane sulfonate; PFOS). In humans, even general population level exposures to some PFAAs are associated with health effects such as increased serum lipids and liver enzymes, decreased vaccine response, and decreased birth weight, and exposure to PFOA in drinking water has been linked to testicular and kidney cancer. Ongoing exposures to even relatively low drinking water concentrations of long-chain PFAAs substantially increase human body burdens, which remain elevated for many years after exposure ends. Notably, infants are a sensitive subpopulation for PFAA's developmental effects and receive higher exposures than adults from the same drinking water source. This information was considered in the development of health-protective and scientifically sound risk assessments for PFAAs in drinking water by NJ DWQI.

NJ DWQI has recommended Maximum Contaminant Levels (MCLs; drinking water standards) for PFNA (13 ng/L) and PFOA (14 ng/L) to NJDEP, and the MCL for PFNA has been proposed as a regulation by NJDEP. A recommendation for PFOS is in progress. In developing MCLs, analytical limitations and the availability of treatment removal technology are considered, in addition to the health-based value. The MCLs for these PFCs are based on the health-based values, since the health-based values are achievable with available analytical and treatment removal methods.

BIOGRAPHY

Gloria Post has been a Research Scientist in the New Jersey Department of Environmental Protection (NJDEP) Division of Science, Research and Environmental Health since 1986. Her responsibilities include human health risk assessment and toxicology support for NJDEP programs. Since 2006, she has been a member of the New Jersey Drinking Water Quality Institute, an advisory body established by New Jersey law to recommend drinking water standards to NJDEP. Dr. Post has developed risk assessments for many well-known drinking water contaminants including chlorinated volatile organics, methyl tertiary butyl ether (MTBE), and perchlorate. She is the first author of the chapter on "Health and Aesthetic Effects of Drinking Water Contaminants" in the American Water Works Association *Handbook of Water Quality & Treatment* used by drinking water treatment plant personnel. Dr. Post and her colleagues have focused on the evaluation of perfluorinated chemicals in drinking water for over 10 years, and she has published five papers on this topic. Dr. Post has been a Diplomate of the American Board of Toxicology since 1990, and she is a member of the Society of Toxicology and its Mid-Atlantic Regional Chapter. She has served on several EPA Science Advisory Board panels and represents NJDEP on the New Jersey Governor's Council for Prevention of Developmental Disabilities. She holds an A.B. with honors in Biochemical Sciences from Princeton University, a Ph.D. in Pharmacology from Thomas Jefferson University, and did post-doctoral research at Duke University. In 2010, she was the first recipient of the NJDEP Gail P. Carter Memorial Award for a major contribution to environmental science and/or use of scientific expertise to improve New Jersey's environment. In 2014, she received the New Jersey Section of the American Water Works Association annual award for ongoing contributions to drinking water research.

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