

To be submitted for oral presentation at the 17th Annual Quality Assurance Conference, Dallas, TX, October 15–19, 2007.

Analytical Challenges to the Measurement of Perfluorinated Organic Compounds

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Abstract:

The perfluorinated organic compounds (PFCs) have many unique chemical and physical properties which have made them useful in industrial and consumer products for more than 50 years. The PFCs have been utilized in a great variety of products including repellent coatings for paper, carpets, and fabrics; paints; lubricants; cosmetics; fire-fighting foams; and polymerization aids. There is, however, increasing interest in this class of compounds due to recent studies which show that the PFCs are persistent, bioaccumulative, and toxic in experimental animals. While perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are the best known and most thoroughly examined PFCs, there are a number of other structurally related analogues that have yet to be adequately evaluated. There are also many precursor compounds which can degrade to related stable forms of the PFCs. Even though a number of publications show the measurement of these compounds in various kinds of environmental and biological samples, it is still a challenge to produce reliable data because of the unique chemical and physical characteristics of PFCs. Indeed, a recent international round-robin study reported poor inter-laboratory comparability with the analysis of some environmental and biological matrices. Background contamination, sampling and preparation errors, variability in techniques among researchers/laboratories, and instrumental errors should be properly identified and minimized to assure the certainty of data, which is especially important for regulatory agencies. Our efforts to cope with these issues will be outlined in this presentation.

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