November 19, 2016

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New Jersey Department of Environmental Protection
Trenton, New Jersey

Re: Report on the Proposed DWQI Development of a Practical Quantitation Level for Perfluorooctanoic Acid (PFOA) in Drinking Water

Please find enclosed a technical analysis prepared by Fardin Oliaei, MPA, PhD, and Don Kriens, Sc.D., P.E. of Cambridge Environmental Consulting commissioned by Delaware Riverkeeper Network and submitted on behalf of the organization and its membership on the Drinking Water Quality Institute's document **Development of a Practical Quantitation Level for Perfluorooctanoic Acid (PFOA).**

Also attached is a PDF containing the Curriculum Vitae for Dr. Oliaei and for Don Kriens, Sc.D., P.E.

Delaware Riverkeeper Network submits these comments advocating that the public be protected from PFOA contamination and that New Jersey's drinking water be required to be treated to a safe level based on the best available scientific evidence.

We support the recommendations and findings made by Dr. Oliaei and Cambridge Environmental Consulting in this technical analysis regarding a Practical Quantitation Level (PQL) for PFOA. We support the utilization of the most accurate measurements of PFOA in water that can be achieved at the lowest reporting limits. Since the MCL recommended by Dr. Oliaei and Don Kriens is 1 ng/L, Delaware Riverkeeper Network supports using the most sensitive measurement method.

There are two methods recommended as alternatives to the EPA technique "Bootstrap Estimate of a Confidence Interval of a Mean". Using the method detection limit (MDL) approach, Dr. Oliaei's and Don Krien's calculations yielded a PQL of 3.0 ng/L. To use the minimum reporting level (MRL) approach to determine a PQL for PFOA, Dr. Oliaei and Don Kriens propose a MRL of 2 ng/L.

Thank you for the opportunity to comment on the PQL for PFOA.

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Sincerely,

Maya van Rossum
the Delaware Riverkeeper

Tracy Carluccio
Deputy Director

Attachments: Technical Analysis of Proposed DWQI Development of a Practical Quantitation Level for Perfluorooctanoic Acid (PFOA) in Drinking Water, Fardin Z. Oliaei, Don Kriens, Cambridge Environmental Consulting, Nov. 18, 2016

Technical Analyses of New Jersey Drinking Water Quality Institute

Development of a Practical Quantitation Level for Perfluorooctanoic Acid (PFOA) in Drinking Water

prepared by

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Cambridge Environmental Consulting

November 18, 2016

PREFACE

The opinions in this report are stated to a reasonable degree of scientific probability. The methods and principals used in forming these opinions are generally accepted within the scientific community and are consistent with their regular application within the scientific community. Qualifications of the authors, including publications where applicable, are summarized in the attached resumes. We reserve the right to modify or supplement opinions stated in this report.

** The views expressed in this report do not necessarily reflect those of the Harvard T.H. Chan School of Public Health, Harvard University, of which the author is affiliated as a Research Fellow.*

Technical Analysis of Proposed NJDWQI Development of a Practical Quantitation Level for Perfluorooctanoic Acid

by

Cambridge Environmental Consulting

Introduction

Different laboratories, programs and methods have different terminology for similar concepts. In general, the Method Detection Limit (MDL) and derivative Practical Quantitative Level (PQL) are used to estimate the limits of performance of analytical methods for measuring contaminants. The MDL is the minimum detection capability of a particular method reported by each laboratory and defined as the concentration of a contaminant (with true value greater than zero) that can be measured and reported with 99% confidence. The PQL is the lowest concentration for which the contaminant can be reliably quantified within specified limits of precision, accuracy and acceptable limits of uncertainty. There are also method specific Minimum Reporting Levels (MRL) which are similar in concept to a PQL. Analytical methods are changing and improving over time, thus, lowering the values of MDL, MRL, and PQL.

To develop an appropriate PQL requires evaluation of analytical methods with adequate sensitivity to detect PFOA at or below a proposed health based Maximum Contaminant Level (MCL).

The PQL for PFOA has been determined as a result of performance data compiled from three selected data sources by the testing committee. The Testing Subcommittee considered the RLs, lowest calibration standards and MDLs from laboratories that meet at least one of the criteria below:

1. The laboratories that analyzed water samples for PFOA during the NJDEP 2006 and 2009 studies;
2. The laboratories must use PFOA methods that have been vetted by the NJDEP OQA, NELAP or EPA; and
3. The laboratories must be EPA UCMR3 approved and demonstrated capability of reporting PFOA lower than the UCMR3 MRL of 20 mg/L using EPA 537 or modifications of EPA 537.

The Testing Subcommittee evaluated the following three methods for deriving the PQL for PFOA:

A. Determination of the PQL using MDLs

According to Testing Subcommittee report, the determination of the PQL using MDLs requires a sample size of at least five MDLs from which to obtain an inter-laboratory MDL value. The

individual MDL value from each laboratory for a given method is used to obtain a median MDL value as a representative inter-laboratory MDL. According to Eaton, et. al. (1993), this inter-laboratory MDL can be multiplied by a factor of 4, 5, or 6 in order to yield a supportable PQL value. Although the Testing Subcommittee chose to use a multiplier of five to determine the PQLs, considering uncertainties around the PQL calculation and lower MCL value proposed for PFOA (1ng/l), we recommend using the lower factor of 4 instead.

Researchers from Harvard University who are investigating PFAS contamination in drinking waters reported a MDL of 0.2 ng/L for PFOA in their recent studies (Zhang et al, 2015).

In order to obtain more representative inter-laboratory MDL value we propose to remove the two unusually highest MDLs (SGS Accutest-Orlando with reported MDL of 8ng/L and Test America-Denver with reported MDL of 9.79 ng/L). The median for the remaining eleven MDLs (0.748 ng/L) multiplied by factor of 4 (0.748 ng/L X 4 = 2.992), results in a PQL of 3.0.

B. Determination of PQL Using Reporting Limits or Lowest Calibration Standards

The Minimum Reporting Level (MRL) is defined as the minimum concentration by which PFOA is reliably quantitated by the individual laboratory. The Testing Subcommittee also assessed PQL value using the MRLs that account for both accuracy and precision as opposed to MDLs that are mainly a measure of precision.

According to the Testing Subcommittee report, since 2007, laboratories have demonstrated that lower reporting limits are achievable. In fact, NYDEC contracted the services of a laboratory capable of providing a PFOA reporting limit of 2 ng/L. Studies in Southeast Queensland, Australia, reported the Minimum Reporting Levels (MRLs) for PFCs, including PFOA, ranged from 0.4 to 1.5 ng/l (Thompson et al, 2011).

In order to determine a PQL for PFOA based on minimum reporting levels we propose a MRL of 2 ng/L. This is a value that most credible laboratories are currently capable to achieve.

C. Bootstrap Estimate of a Confidence Interval of a Mean

The Testing committee also used an EPA technique called “Bootstrap Estimate of a Confidence Interval of the Mean.” This method was applied to generate a normal distribution and associated 95 % upper and lower confidence intervals from the inter-laboratory MDL values and the RLs or the lowest calibration standard. The PQL value of 6.5 ng/L derived from bootstrap analysis of the MDLs multiplied by 5, and the PQL value of 6.0 ng/L derived from the bootstrap analysis of the RLs are both higher the MCL proposed by the authors.

The testing Subcommittee recommended a PQL of 6 ng/L for PFOA to the Drinking Water Quality Institute. This is considerably higher than our proposed MCL of 1 ng/L.

Considering serious adverse health impacts of PFOA, uncertainty inherent in toxicological

studies to develop a protective MCL, and challenges in developing appropriate PQL, the best available control technology for removal of PFOA should be applied in order to protect public health.

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