

Date: 7 August 2018
To: Tessa Fojut, State Water Board
From: Jörg E. Drewes, Technical University of Munich
Subject: PFOS and PFOA NLs

Dear Tessa,

On behalf of the Panel, and in response to your questions regarding adding PFOS and PFOA considering the latest NLs to the list of monitoring requirements for drinking water augmentation projects, please see below for the Panel's responses.

1. Would the Panel recommend the California notification levels (NLs) for PFOS and PFOA are used as the monitoring trigger levels for these compounds?

Panel Response: While the toxicological basis for the new notification levels is not without some toxicological debate and discussion, they are not unique to California and are consistent with the recent trend of decreasing allowable daily intakes for these compounds. Moreover, in the discussion of hierarchy of sources for PNECs, we give greatest weight to California NLs (see discussion on page 37 of our final report). Thus, considering the latest information available and following the Panel's suggested approach, we would use the new NLs to derive MTLs for both of these compounds.

2. The measured environmental concentration (MEC) for PFOS (20 ng/L) cited in the Panel's Final Report exceeds the PFOS NL (13 ng/L). Based on this comparison, would the Panel recommend adding PFOS to the list of health-based indicators for all indirect potable reuse applications?

Panel Response: Triggered by your question, the Panel acquired and reviewed more recent nationwide occurrence data for both PFOS and PFOA in secondary/tertiary treated effluents¹. For utilities where occurrence data were available for multiple years, we confirmed the general trend also reported by others that PFOA concentrations in treated effluent seem to be declining. However, occurrence data for both PFOA and PFOS were quite variable. Based on the sources available we considered 72 data points for PFOS and derived a 90th percentile effluent concentration (MEC) of 23 ng/L, which is similar to the MEC reported in the Final Report. With the decrease in notification level and assuming the revised MEC, the MEC/MTL ratio is greater than 1 and PFOS should be included on the list of health-based indicators.

3. For PFOA, the MEC is 10 ng/L and the NL is 14 ng/L. Based on this information would the Panel continue to recommend that PFOA does *not* need to be monitored as a health-based indicator?

Panel Response: Based on the review of additional nationwide occurrence data, the Panel compiled data from 45 sampling locations and derived a revised MEC of 15 ng/L for PFOA. Assuming the revised MEC and new MTL for PFOA are as described in question 3, given our decision tree, PFOA should also be included on the monitoring list.

¹ Sedlak et al. (2018); WE&RF (2016); WRF (2018); WRRF (2015); B. Bernados (personal communication).

4. If the Panel recommends that PFOS should be on the monitoring list based on the new NL, what is the recommended reporting limit for PFOS?

Panel Response: Based on a query to a commercial laboratory in California, an MRL of 2 ng/L seems possible for both PFOA and PFOS following EPA method 537.

Concluding remarks by the Panel:

The State Water Board is certainly aware that the use of perfluorinated compounds (PFs) is changing. It seems that shorter chain PFs are replacing longer chain PFs such as PFOA and PFOS. Following this trend, the Panel would expect concentrations of the latter to decrease (and likely already have been decreasing over the past decade) and of the shorter chain PFs to increase (as their use in consumer products increases). Given these trends but also lack of preliminary occurrence and toxicity data the Panel recommends the issue of shorter chain PFs be specifically called out for consideration during the next periodic review. In the meantime, the State is encouraged to look into available standardized methods for shorter chain PFs (analyte lists, MRLs, etc.).

Literature cited

Bernados, B. Personal Communication, July 27, 2018.

Sedlak, M., Sutton, R., Wong, A., Lin, D. (2018) Per and polyfluoroalkyl substances (PFASs) in San Francisco Bay: synthesis and strategy. RMP Contribution No. 867. San Francisco Estuary Institute, Richmond, CA. 130 pgs.

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Water Reuse Research Foundation (WRRF). (2015) Formation of nitrosamines and perfluoroalkyl acids during ozonation in water reuse applications. Final Report 11-08 prepared by the Southern Nevada Water Authority