Cape Fear Public Utility Authority

Project update for the period covering December 1, 2017 through January 18, 2018

Notice:

Where an authentic standard is not available the concentrations must be considered semi-quantitative. When interpreting the molecular formulas generated by high resolution mass spectrometry, caution is advised when considering health impacts, if any, until a complete structural elucidation and appropriate health studies are performed.

Weekly sampling of raw and finished waters began November 15, 2017 and has continued through the week of January 15th, 2018. Targeted quantification of perfluoroalkyl substances (PFAS) are presented in table 1 where authentic standards are available for each of the compounds. The concentration of GenX varied in the finished water samples collected. All but one (12/21/17) were below the health advisory goal of 140 ppt. We are currently analyzing the duplicate sample that was collected and will report that analysis when it is complete. The raw water in several of the samples was elevated in concentration compared to the finished drinking water. There appeared to be a spike in the concentration of GenX in the sample collected 11/28/17 and a decrease over the following two weeks. The raw water collected 1/3/18 appears to be increasing in concentration as well.

There were also other PFAS compounds detected in both the raw and finished waters that have been reported previously. The concentrations of these non-targeted compounds should be considered semi-quantitative since no authentic standards are available. This is an important consideration given the different response factors for the unknown compounds relative to

GenX. The concentrations reported were determined using equation number 1 (EPA report to NC DEQ 2017) :

Equation 1: $$[Unknown] = [GenX] * \frac{Unknown\ peak\ area}{GenX\ peak\ area}$$

where:

[Unknown] is the concentration of non-targeted analyte in ng/L
[GenX] is the concentration of GenX in ng/L

Figures 2 through 6 compare the concentrations of the individual non-targeted compounds in the raw and finished drinking water. The compound concentrations were variable in the raw and finished waters over the time frame collected so far. Caution, however, is advised in that the raw and finished water samples may not represent the exact same water mass as it moves through the facility.

No PFAS were detected in the field and laboratory blanks illustrating no contamination took place for each sampling event. Sample processing and QA/QC procedures were followed as described in Nakyama et al. (2010)[1] and Strynar et al. (2015)[2]. Briefly, external calibration curves using authentic standards, when available, were used to quantify each analyte by LC-MS/MS. Each sample was spiked with a recovery surrogate standard; recoveries ranged from 65 to 111%.

Table 1: Concentrations of targeted PFAS compounds in raw (RW) and finished (FW) waters collected at the Sweeney Water Treatment Plant. Structures for each of the compounds can be found in the appendix. The date refers to when the sample was collected and bdl is below detection limit.

	11/15/17		11/28/17		12/6/17		12/13/17		12/21/17		12/27/17		1/3/18	
ng/L	RW1	FW2	RW3	FW4	RW4	FW5	RW5	FW7	RW6	FW9	RW7	FW11	RW8	FW13
PFMOBA	bdl	bdl	0.6	0.9	0.2	5.2	5.3	3.8	5.6	bdl	bdl	5.8	4.9	6.3
PFPrOPrA	8	41	999	52	94	83	606	17	62	253	110	66	363	137
PFOA	bdl	1	40	40	28	11	72	7	21	103	38	bdl	10	27
PFOS	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl

Figure 1: The concentration of PFPrOPrA (GenX) in raw and finished water collected at Sweeney Water Treatment Plant.

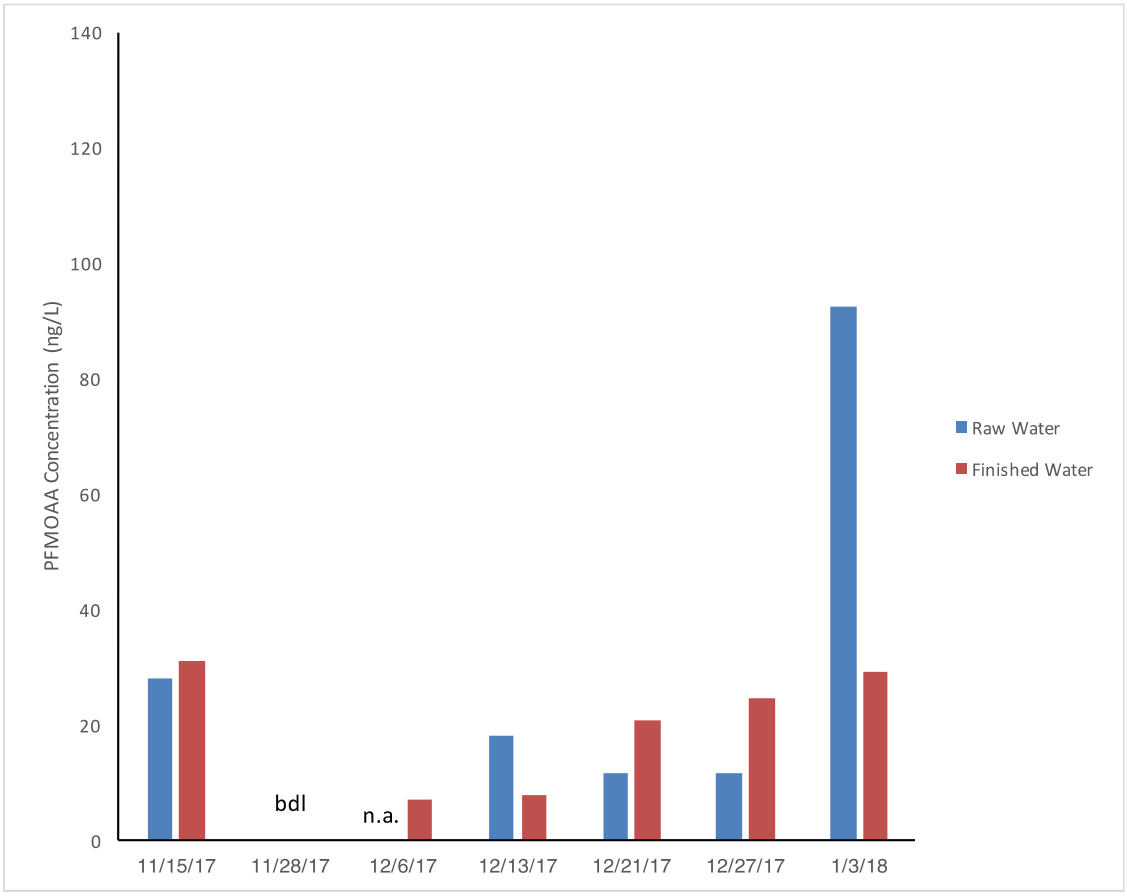


Figure 2: Semi-quantitative concentrations of other non-targeted perfluorinated compounds detected in raw and finished waters collected at Sweeney Water Treatment Plant. (bdl= below detection limit and n.a. is not analyzed)

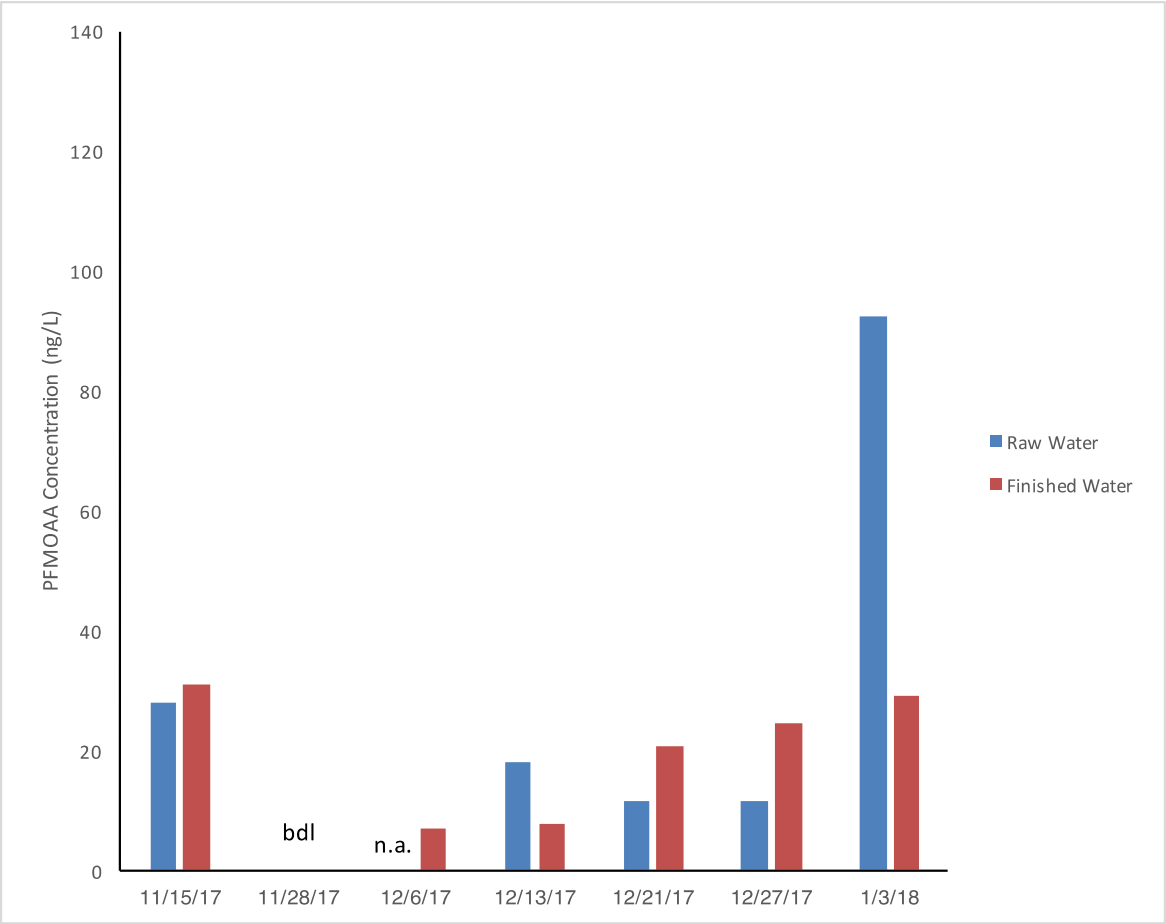


Figure 3: Semi-quantitative concentrations of other non-targeted perfluorinated compounds detected in raw and finished waters collected at Sweeney Water Treatment Plant. (bdl= below detection limit and n.a. is not analyzed)

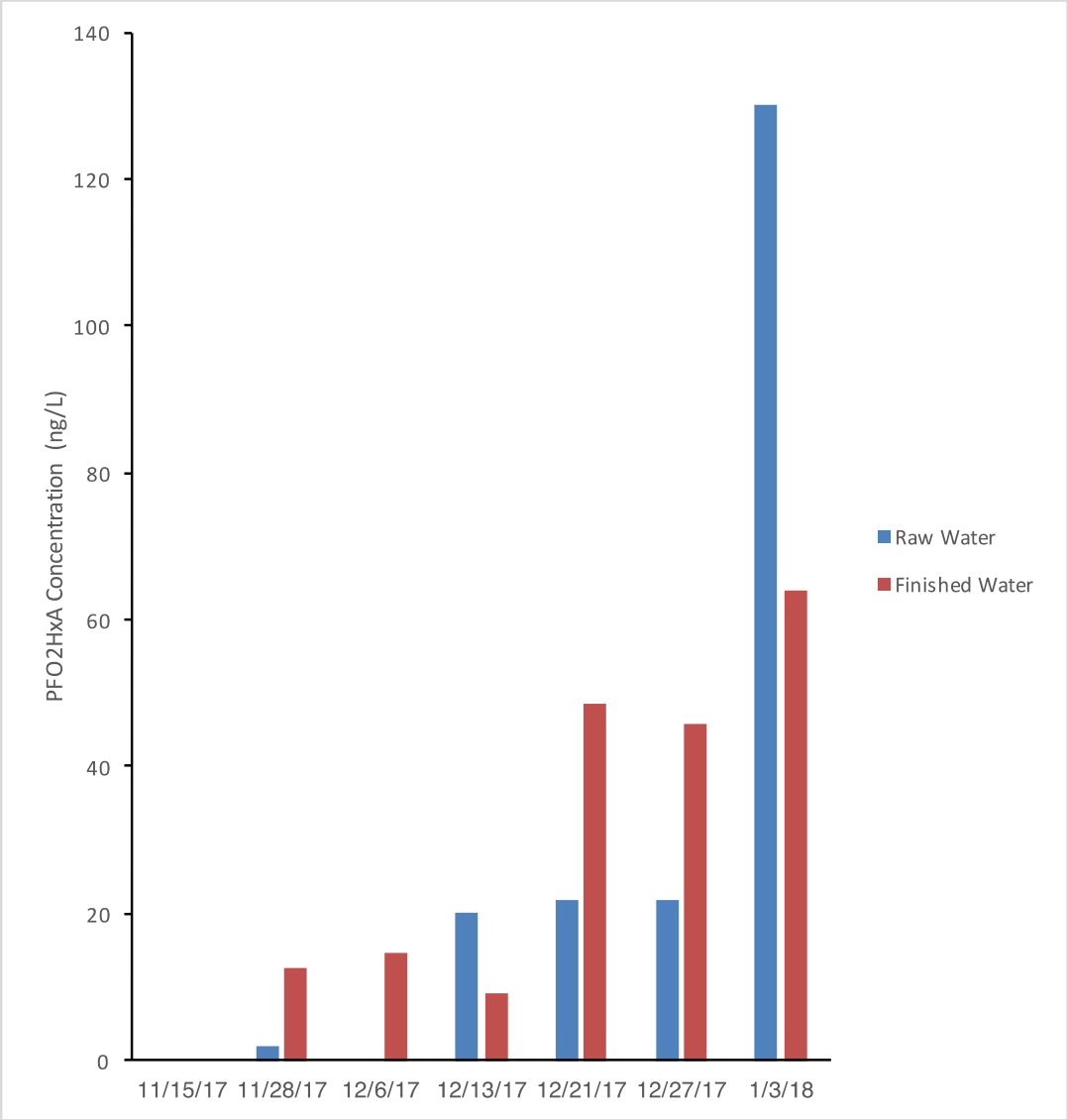


Figure 4: Semi-quantitative concentrations of other non-targeted perfluorinated compounds detected in raw and finished waters collected at Sweeney Water Treatment Plant. (bdl= below detection limit and n.a. is not analyzed)

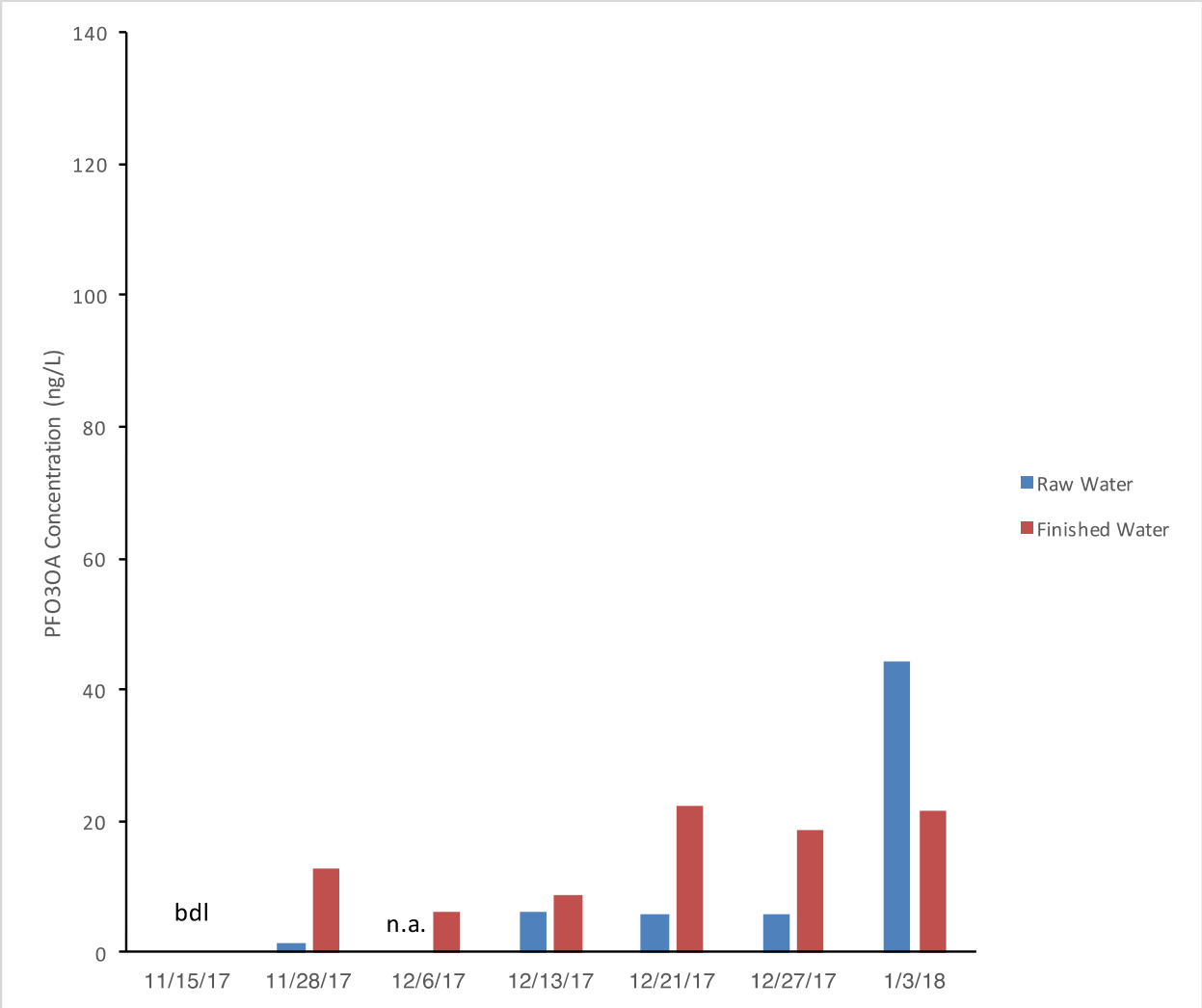


Figure 5: Semi-quantitative concentrations of other non-targeted perfluorinated compounds detected in raw and finished waters collected at Sweeney Water Treatment Plant. (n.a. is not analyzed)

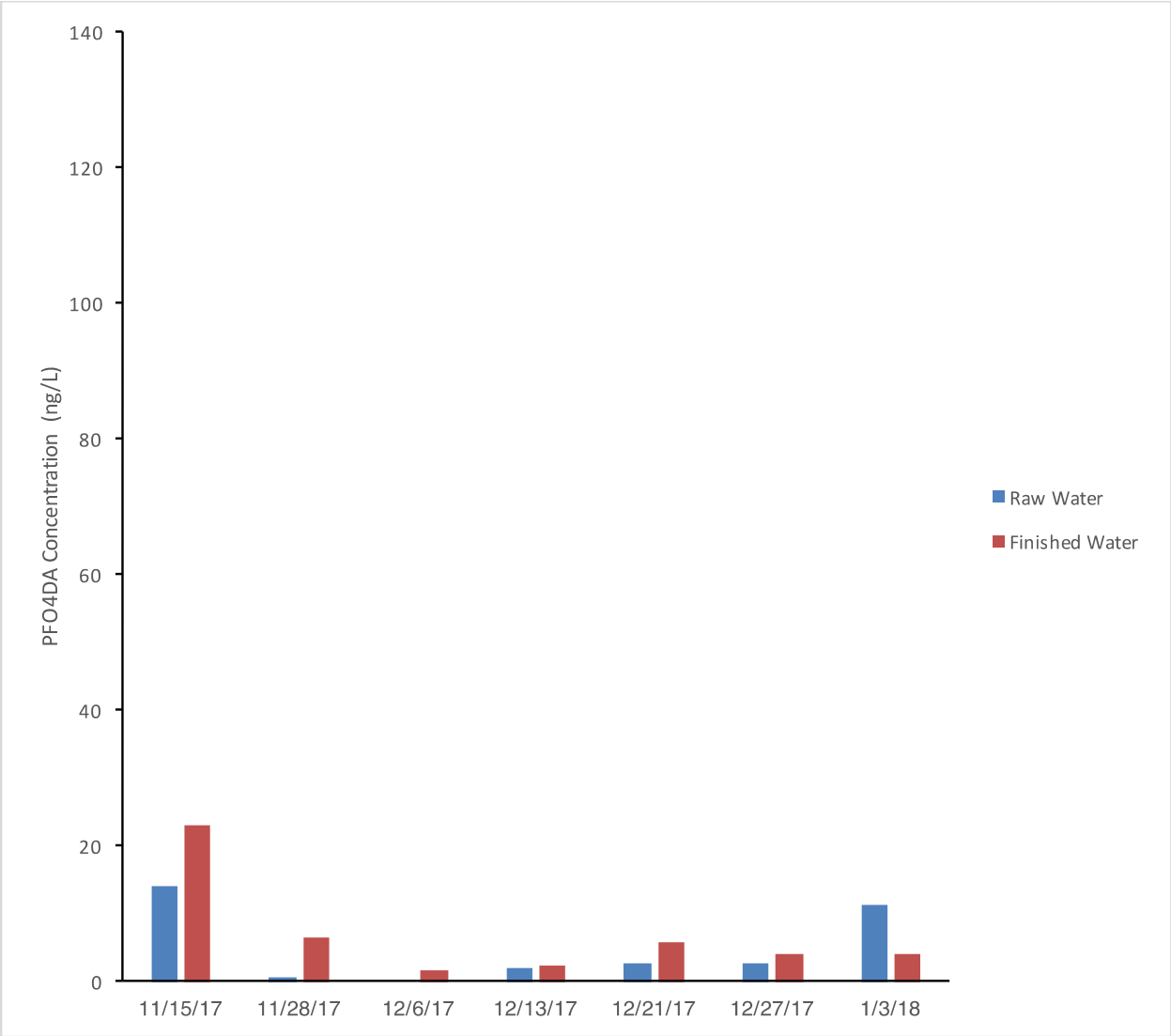
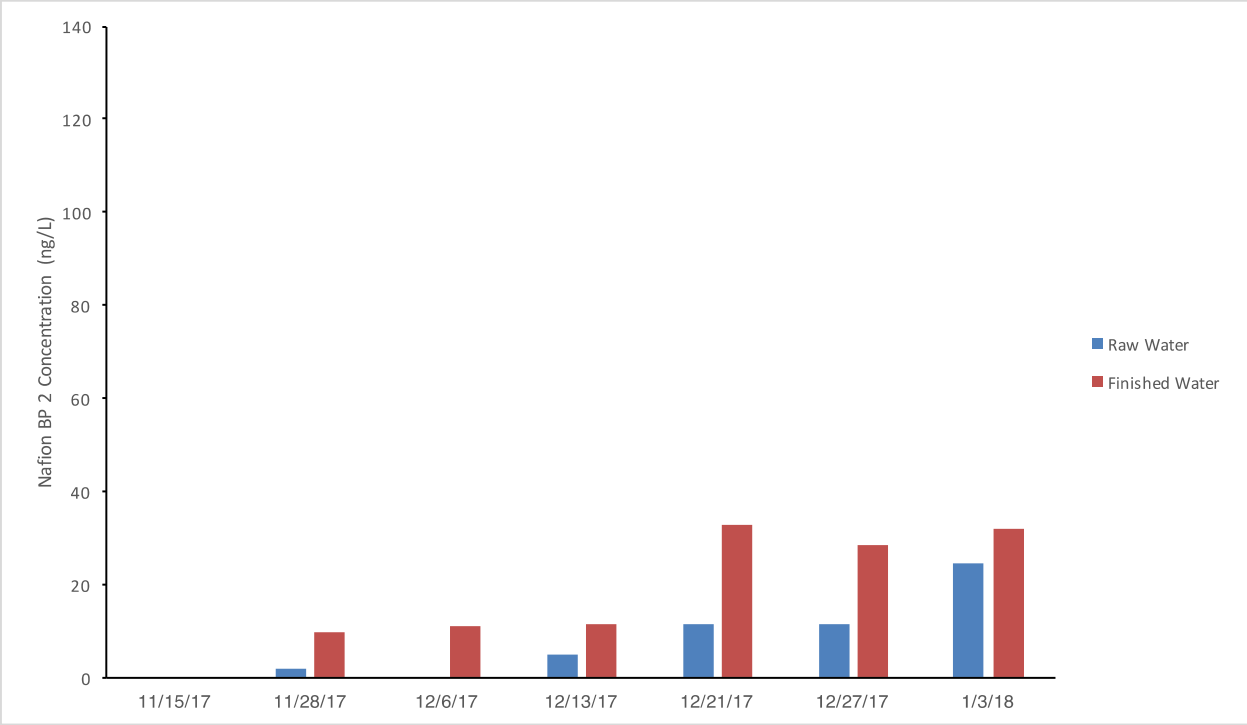
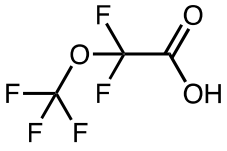


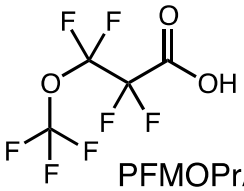
Figure 6: Semi-quantitative concentrations of other non-targeted perfluorinated compounds detected in raw and finished waters collected at Sweeney Water Treatment Plant. (bdl= below detection limit and n.a. is not analyzed)



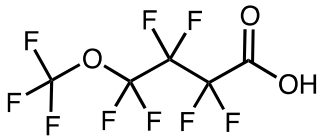
Appendix:



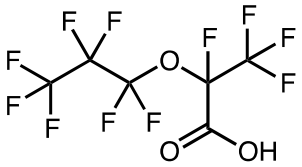
PFMOAA



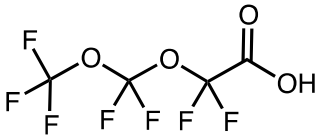
PFMOPrA



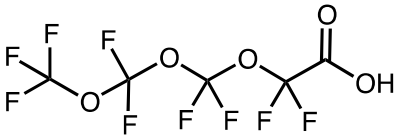
PFMOBA



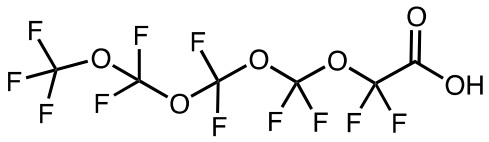
PFPrOPrA



PFO2HxA



PFO3OA



PFO4DA