VIA EMAIL November 29, 2017

Dr. Timothy J. Buckley
Dr. Mark Strynar
Exposure Methods & Measurements Division
U.S. Environmental Protection Agency
109 T.W. Alexander Drive
Research Triangle Park, NC 27709

RE: Response to EPA's October 25, 2017 Memorandum

Drs. Buckley and Strynar:

I write on behalf of The Chemours Company FC, LLC ("Chemours") and in response to the U.S. Environmental Protection Agency's ("EPA") October 25, 2017 memorandum entitled "Laboratory PFAS Report No. 6 for NC DEQ: Chemours Process Samples" (the "October 25 EPA Memo"), in which EPA estimates concentrations of HFPO Dimer Acid (CAS No. 13252-13-6; referred to in the Memo as "GenX") and five other perfluorinated substances in various samples collected from Chemours' Fayetteville Works facility on September 18, 2017. As acknowledged in the October 25 EPA Memo, "an important limitation to [EPA's] non-targeted analysis [for the five perfluorinated substances] is that these results are considered semi-quantitative" and EPA "cannot know the exact concentration because no authentic standards are available for these chemicals." October 25 Memo at 2. EPA estimates that this semi-quantitative method produces estimates that "are accurate to within ~ 10-fold" the actual concentrations. *Id.* at 3.

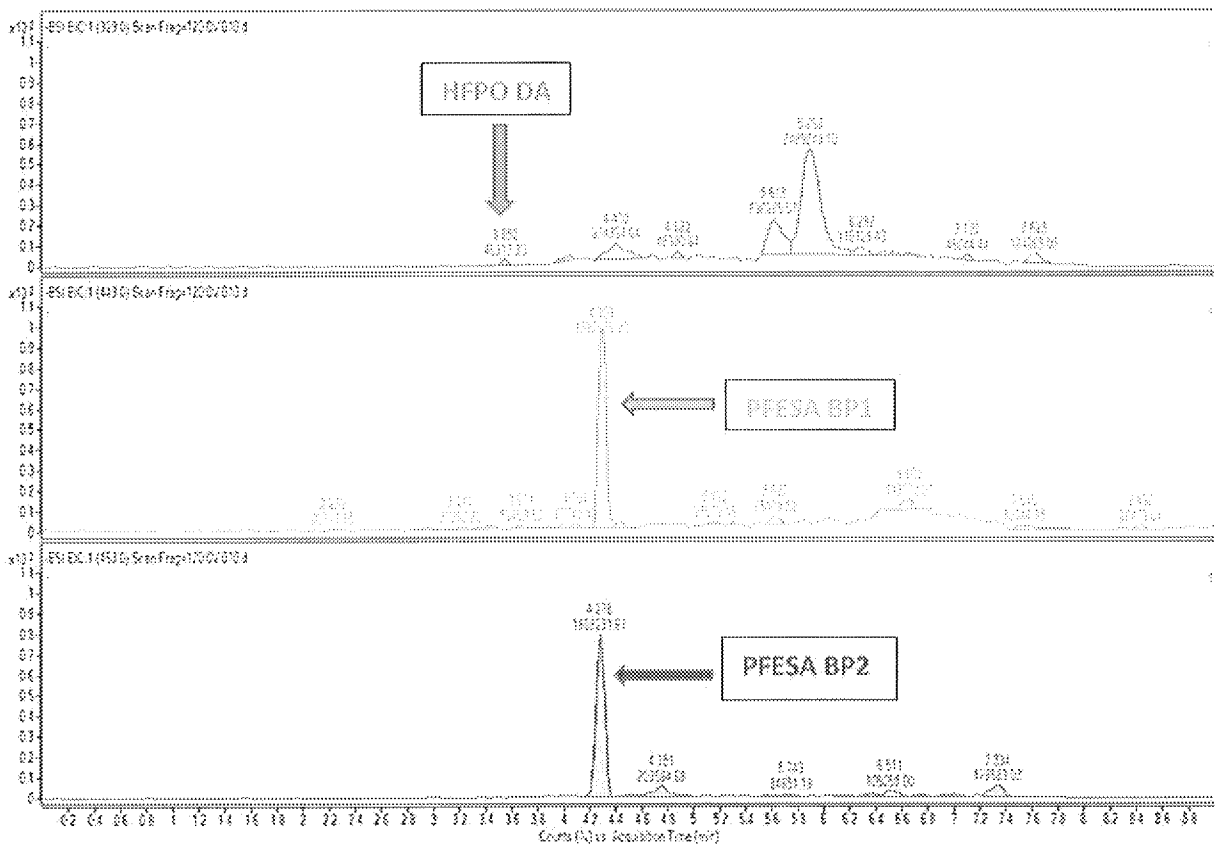
In accordance with a September 15, 2017 sampling plan Chemours provided to the North Carolina Department of Environmental Quality ("DEQ"), Chemours also collected samples from the Fayetteville Works on September 18th and analyzed them for HFPO Dimer Acid and the same five perfluorinated substances EPA analyzed and reported on in the October 25 EPA Memo. Table 1 at the end of this letter compares Chemours' and EPA's results.

As reflected in Table 1, Chemours' results (which were previously provided to DEQ and EPA) for the substances referred to in the October 25 EPA Memo as PFESA BP1 (CAS No.

29311-67-9) and PFESA BP2 (CAS No. 749836-20-2) are at least an order of magnitude lower than those reported in the October 25 EPA Memo. Chemours believes these differences are due to the fact that Chemours has obtained authentic standards for these compounds, and therefore was able to conduct a targeted analysis. Chemours explains below how its targeted analytical methods for these two PFESA compounds generate more accurate results than the non-targeted, semi-quantitative approach used to generate the data reported in the October 25 EPA Memo.

EPA's semi-quantitative approach approximates the concentration of PFESA BP1 and PFESA BP2 by using HFPO Dimer Acid as the calibration standard instead of the authentic standards of these PFESA compounds. This approach is not as accurate as Chemours' approach that used the authentic standards for PFESA BP1 and PFESA BP2 as the calibration standard because, among other reasons, different compounds behave differently within the mass spectrometric detector (e.g., fragmentation voltage; analyte ionization).

The Figure immediately below illustrates the "detector response" of 10 ppb standard solutions of HFPO Dimer Acid, PFESA BP1 and PFESA BP2 by monitoring the "parent ion" under identical LC/MS conditions—*i.e.*, what the peaks look like for 10 ppb of HFPO Dimer Acid, PFESA BP1, and PFESA BP2, respectively.



This Figure makes clear that EPA's method of extrapolating a concentration of PFESA BP1 and PFESA BP2 based upon these compounds' peak areas and the HFPO Dimer Acid's peak area at

a known concentration would vastly overestimate the concentrations of PFESA BP1 and PFESA BP2.

Without optimization of the LC/MS conditions specific to each compound, Table 2 at the end of this letter highlights the significant difference in integrated peak area observed between HFPO Dimer Acid ("HFPO DA") and the two PFESA compounds at the same concentration (10 ppb). Table 2 indicates that, by using HFPO Dimer Acid as the calibration standard for PFESA BP1 and PFESA BP2, EPA overestimated the concentrations of these compounds by a factor of 40 or more. Depending on the specific method conditions used, this over-estimation could be even more significant.

Indeed, Chemours' targeted analysis for PFESA BP1 and PFESA BP2 indicated that the results reported in the October 25 EPA Memo in fact overestimated the concentrations of these compounds by factors ranging from approximately 333 to 41. *See* Table 1. Chemours' results further illustrate that the non-targeted approach for PFESA BP1 and PFESA BP2 reflected in the October 25 EPA Memo can lead to significant over-estimation of the concentrations of these compounds.

As noted in a November 3, 2017 email to Dr. Strynar, Chemours has provided Dr. Strynar authentic standards of PFESA BP1 and PFESA BP2 so that EPA may conduct targeted analysis in line with what Chemours summarized above. Chemours remains willing to work with EPA on optimizing the method for the PFESA BP1 and PFESA BP2 compounds.

Sincerely,

Amber Wellman, Ph.D.

cc:

William F. Lane and Linda Culpepper
North Carolina Department of Environmental Quality

Francisco J. Benzoni
North Carolina Department of Justice

Rose Allison
U.S. Environmental Protection Agency, Headquarters

Verne George
U.S. Environmental Protection Agency, Region 4

Table 1: Comparison of EPA's and Chemours' Results from September 18, 2017 Samples (ug/L or ppb; level of quantification ("LOQ") limit of 0.2 ppb)[1]

EPA Name	PFESA_BP1		PFESA_BP2		PFMOAA		PFO2HxA		PFO3OA		GenX	
Molecular Formula	C7HF13O5S		C7H2F14O5S		C3HF5O3		C4HF7O4		C5HF9O5		C6HF11O3	
CAS No.	29311-67-9		749836-20-2		674-13-5		39492-88-1		39492-89-2		13252-13-6	
	EPA	Chemours	EPA	Chemours	EPA	Chemours	EPA	Chemours	EPA	Chemours	EPA	Chemours
Outfall 001[2]	14.70	0.44	134.5	2.19	14.5	44.2	23.35	25.5	2.9	4.82	0.30	0.46
Outfall 002	6.56	<LOQ	45.2	<LOQ	1.3	1.09	2.67	1.10	0.22	0.20	0.05	<0.10
Common Waste Tank	3.70	<LOQ	26.5	<LOQ	ND	<LOQ	ND	1.17	0.064	0.39	1.27	1.30

Table 2: Differences of Integrated Peaks at 10 ppb Standard

Sample	Analyte RT	Ion	Peak Area	Ratio to 329
HFPO Dimer Acid	3.5	329	48917	1.0
PFESA BP1	4.3	443	1922686	39.3
PFESA BP2	4.28	463	1698292	34.7

[1] Since Chemours first reported these results to DEQ, Chemours optimized its analytical method for the non-GenX compounds in Table 1 above, including performing spike recovery studies and altering the sample preparation procedures. This optimization has resulted in some revisions to these results.

[2] The October 25 Memo includes two sets of results for Outfall 001. The EPA result for Outfall 001 listed in Table 1 is the average of the two results provided in the October 25 Memo.

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