

The StarNews reported on June 7<sup>th</sup> that researchers from NC State and US EPA discovered the presence of the perfluorinated compound GenX (C-6), and other “novel” perfluoroalkyl ether carboxylic acids (PFECAs) in the Cape Fear River. (Sun et.al, Legacy and Emerging [PFASs].... In the Cape Fear Watershed, 11/16)

We are in the 1<sup>st</sup> chapter of the GenX water crisis. To provide some background perspective, I share this. Scott Hook and I, along with representatives from CFPWA, New Hanover County, and Brunswick County attended an informational session on June 30<sup>th</sup>. The legal team that represented the Parkersburg, WV community against Dupont for discharges of PFOA (C-8) made a presentation and stated to our group that the GenX story is beginning to unfold just as the C-8 story unfolded in Parkersburg. I did some digging and found a couple of parallels. Here is one example, an intra-office email between DuPont executives read .... “Our story is not a good one, we continued to increase our emissions into the river in spite of internal commitments to reduce or eliminate the release of this chemical into the community and the environment because of our concern about biopersistence of this chemical.” The parallel..... Chemours announced on June 20<sup>th</sup> they would eliminate all discharges containing GenX. Last week (3 weeks after they committed to eliminate GenX discharge), Chemours announced they found additional sources of GenX discharges to the Cape Fear River.

Another example. A DuPont executive, in an email, speaking to punitive damages related to C-8 emissions “Actual damages should be minimal, unless the court lets in junk science, like we caused someone to have cancer, when that seems unlikely with this chemical”. The parallel, “Chemours says the amounts of GenX in the Cape Fear River found so far have been well below the health screening level announced by the North Carolina Department of Health and Human Services on June 12. The company says it believes the emissions from its Fayetteville facility have not impacted the safety of drinking water”.

The Chemours folks that attended the closed-door meeting with area leaders on June 15<sup>th</sup>, were some of the same folks to be deposed in the Parkersburg, WV C-8 case.

As stated, researchers from NC State and US EPA discovered the presence of the perfluorinated compound GenX (C-6), and other “novel” perfluoroalkyl ether carboxylic acids (PFECAs) in the Cape Fear River. (Sun et.al, Legacy and Emerging [PFASs].... In the Cape Fear Watershed, 11/16)

Six of those “novel” or new PFECAs discovered in the research study have similar molecular structures to GenX. (Dr. Detlef Knappe)

Over a 4-month sampling period in 2013, raw sampling data for GenX levels ranged from 55 ppt to 4,560 ppt, averaging 651 ppt. (Dr. Detlef Knappe)

Of the newly discovered, or “novel” perfluoro compounds, PFMOAA was found at levels 50 to 100 times higher than GenX, a di-ether compound, PFO2HxA was 10 times higher than GenX, and a tri-ether compound PFO3OA was 2 times higher than GenX. (Dr. Detlef Knappe)

According to Dr. Knappe, co-author of the research paper, GenX represents one-half of one-percent of the total perfluoro compounds found in the Cape Fear River. (Dr. Detlef Knappe)

Ten legacy perfluorinated compounds, including PFOA (C-8) and PFOS are still present in the Cape Fear River. (Sun et.al, Legacy and Emerging [PFASs].... In the Cape Fear Watershed, 11/16)

As Dr. Larry Cahoon stated, we are drinking a cocktail of toxins.

Chemours claims they have been discharging GenX since 1980. I don't know if there is any way to confirm that claim. I don't know if that discharge contained other PFECAs.

GenX does bioaccumulate, however it is not possible to reach a conclusion on the human bioaccumulation potential in the absence of data on the human clearance time. (Beekman, RIVM BR 2016-0174)

There are no carcinogenicity studies related to GenX. GenX, however, is a suspected human carcinogen. (Beekman, RIVM BR 2016-0174)

There are zero combined toxicity studies related to multiple perfluoro compounds found in the drinking water.

There are zero synergistic toxicity studies related to GenX and other perfluoro compounds found in drinking water.

Toxicity studies take years to complete.

At this time, there are no analyte standards for the newly discovered perfluoro compounds to quantify their levels in samples taken from our drinking water. According to the Mei Sun, Et. al research study, those "novel" PFECA levels are significantly great than GenX.

GenX and the other perfluoro compounds, like C-8, are bio-persistent. If, as Chemours claims, the discharge of GenX is stopped, it is likely these perfluoro compounds will continue to bleed into the river from river sediments and backwaters tributary to the Cape Fear River. Flooding, storms, hurricanes, any disturbance to the river, could lead to elevated levels of GenX and other PFECAs in the river water for decades. Dr. Knappe is researching river sediments at this time.

CFPUA's evaluation of GenX and other PFAS treatment options has found that GAC, IX, and RO/NF are treatment options that have been successful at removing PFASs but that information is limited; almost no information is available on applying water treatment processes specifically to GenX removal. CFPUA's preliminary evaluation would be applicable to Brunswick County's NW water treatment plant. (Black & Veatch, CFPUA Technical Memorandum, July 2017)

Dr. Detlef Knappe, stated at the June 29<sup>th</sup> GenX forum, "Changing out the filter medium with activated carbon would last for a short time before the carbon had to be changed out, but the other compounds that were published in the paper are essentially non-absorbable by activated carbon, and that would be the same for home systems that rely on activated carbon only. RO Systems, in my opinion, would remove GenX and the other ethers very well, based on the removal of compounds that are structurally similar and similar in size."

H2GO's first sample of finished water taken on June 27<sup>th</sup>, showed the GenX level to be 66 ppt. Brunswick County samples taken on June 29<sup>th</sup> showed GenX levels at 64 ppt.

While the GenX levels are trending downward, variables like Chemours's production activities and streamflow will influence contaminant levels. Chemours has stated there are times of the year when their vinyl ether production is shut down completely.

Chemours' NPDES permit expired in October 2016, but Chemours can continue to discharge unregulated contaminants until action is taken by DEQ on the renewal permit. Chemours will most likely clean up their act over the next several months until the NPDES permit is renewed.

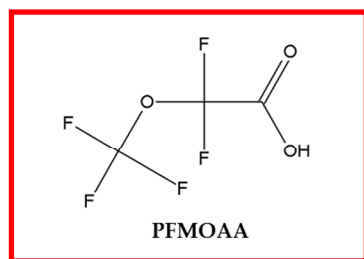
Our (H2GO) research provided to DHHS on July 10<sup>th</sup> showed the risk assessment calculation for GenX to be 147 ppt for drinking water (Smit, RIVM BR 2017-0045).

Last Friday, DHHS reduced their June 12<sup>th</sup> derived no effect level (DNEL) for GenX from 70,909 ppt to a health goal of 140 ppt – that's significant, more than a 500% reduction. The new DHHS health goal of 140 ppt for GenX is protective for non-cancer effects to bottle-fed infants, pregnant women, lactating women, children and adults.

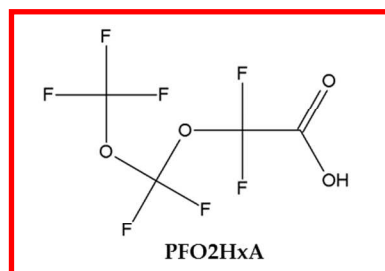
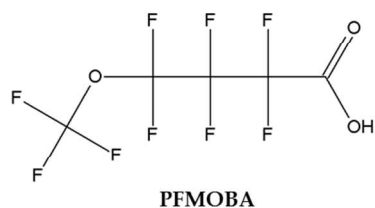
I'm troubled with the current risk assessment – it's a very, very limited assessment, and applies only to GenX. While the GenX levels are trending downward, we're neglecting 99.5% of the perfluoro contaminants and their potential toxicity in our water supplies. GenX makes up one-half of one-percent of the total perfluoro compounds found in the river. Other ether compounds with similar structures to GenX, were found at much greater levels than GenX, and we still can't quantify that data. There are zero toxicity studies on these "novel" PFECAs. There are zero combined toxicity studies, and zero synergistic toxicity studies when multiple perfluoro compounds are found our drinking water. In my opinion, EPA, NCDEQ, and DHHS should expand their risk assessment to include all perfluoro contaminants in our water supplies.

With so many unknowns regarding toxicity and potential health effects from these contaminants in our drinking water supplies, we, and others, should employ the Precautionary Principle. The precautionary principle states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus, the burden of proof that it is not harmful falls on those taking the action. In other words, until Chemours, EPA, NCDEQ, and DHHS can prove that our drinking water is safe, it isn't.

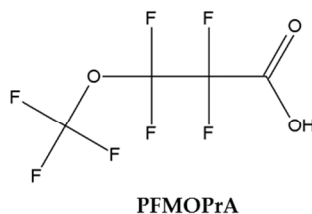
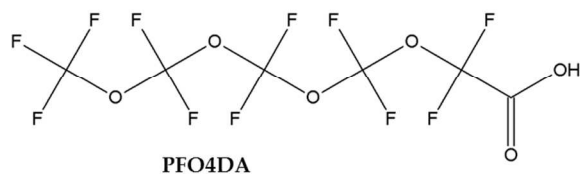
In my opinion, our customers have a right to know, and H2GO has an obligation to inform our customers of everything I just outlined. Our customers need this information to make individual decisions about their potential health risks from ingesting the current tap water.



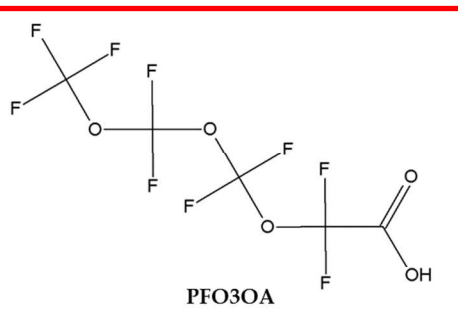
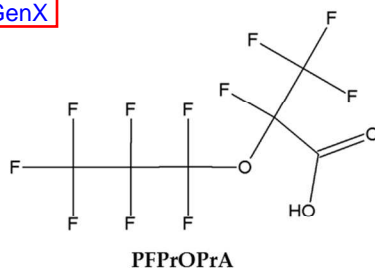
50 - 100 times GenX levels



10 times GenX levels



GenX



2 times GenX levels

Date	GenX (ng/L)
6/14/13	55.1
6/15/13	69.45
6/16/13	98.6
6/17/13	127.5
6/18/13	178
7/3/13	334
7/4/13	210.5
7/5/13	127
7/6/13	127
7/7/13	132.5
7/8/13	147
7/10/13	193.5
7/11/13	272
7/12/13	326
7/13/13	303
7/14/13	241.5
7/15/13	187.5
9/25/13	4560
9/26/13	3080
9/27/13	2200
9/28/13	1990
9/29/13	1575
9/30/13	863
10/1/13	567
10/2/13	577.5
10/4/13	368
10/5/13	369
10/6/13	334
10/7/13	354
10/8/13	307
10/9/13	327
10/10/13	275
10/11/13	266
10/13/13	305
max	4560
min	55
median	304
mean	631

Figure S1. Molecular structures of PFECAs evaluated in this study