Message

**From**: Strynar, Mark [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=5A9910D5B38E471497BD875FD329A20A-STRYNAR, MARK]
**Sent**: 7/7/2017 5:53:09 PM
**To**: Lindstrom, Andrew [Lindstrom.Andrew@epa.gov]
**Subject**: FW: WECT/chemicals in the Cape Fear River

FYI,

Lots of technical questions being asked.

Mark

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**From:** Strynar, Mark
**Sent:** Friday, July 07, 2017 1:34 PM
**To:** 'Wissbaum, Brandon' <bwissbaum@wect.com>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Some clarification for our discussion. See below.
Mark

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Friday, July 07, 2017 12:56 PM
**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Subject:** Re: WECT/chemicals in the Cape Fear River

Sure, I'm out of the office at the moment, would 1:35 work for you to call my office number?

Sent from my iPhone

On Jul 7, 2017, at 12:54 PM, Strynar, Mark <Strynar.Mark@epa.gov> wrote:

Brandon,

I may be easier for me to call and explain. Can I call these numbers?

**Brandon Wissbaum**
Assignment Manager
WECT News
Office: 910.386.5477
Cell: 910.899.6035

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Friday, July 07, 2017 12:25 PM
**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Thanks for the input, here are some other questions/points of clarification if you don't mind:

Can you explain Figure 2 in Sun et al., 2016? I understand that Figure 2 (a) shows the concentration of GenX and legacy PFASs at the Sweeney WTP, and Figure 2 (b) shows the concentration not true; shows the area counts of GenX and the six other PFECAs at Sweeney.
I don't interpret figures like this too often, but the way I'm looking at it, in (a) it appears concentrations of other traditional PFASs were higher than GenX? It depends upon which location; IN community A (Pisttsboro YES; In community B (Fayetteville YES) in community C (Wilmington NO) It also appears the concentration of GenX in the finished water was approximately 475 ng/L, which is lower than the average concentration of 631 ng/L in Figure 1? Good catch I will explain further on the call.
In (b), the way I interpret the figure is that PF04DA at its peak was around 250,000 ng/L in finished water, and PFO3OA was around 240,000 ng/L at its peak in finished water? No this is not true. I see the line, "Moreover, three PFECAs (PFMOAA, PFO2HxA, and PFO3OA) exhibited peak areas 2–113 times greater than that of PFPrOPrA," which leads me to believe I am interpreting the data incorrectly. Yes I will explain on the call.

Your answer to question 1 should help with this, but looking to better understand the average concentration of traditional PFASs, specifically in community C. Figure 2 A shows poor removal of GenX in the Sweeny drinking water plant process; from raw water to finished drinking water. Thus I think it would be safe to say the average GenX concentration found in Figure 1 drinking water intakes likely reflects the average concentration finished drinking water concentration to community C.

You described the PFECAs as co-occurring contaminants – can you explain what exactly that means? Sorry, this simply means when two or more contaminants show up in a sample at the same time. They usually keep a constant ratio indicating they come from a common source (such as wastewater pipe, or other consistent input).

Do you know of a way to illustrate exactly how much GenX is in the water? For example, if I had a glass of water and wanted to illustrate 'x' amount is GenX and 'x' amount is believed to be a combination of other perfluorinated compounds – would that be possible? I've heard the analogy with the 631 ppt is equal to 631 drops per every Olympic size swimming pools of water, so this likely isn't possible, just wanted to see if you had any thoughts on how to illustrate. The best analogy I use is money. Most people get that. We are taking about an average concentration of $631 out of 1 trillion dollars. I know that seems small, however the health advisory for PFOA/PFOS is $ 70 dollars per 1 trillion dollars.

To make sure I am interpreting Figure 2 in Nakayama et al., 2007, correctly, PFOA concentrations in the Cape Fear River were relatively low (between 0 to 10) until approximately 140 km upriver, where it spiked to just over 50 ng/L? I hate this figure I will explain. It does not appear in this figure that the concentration in the Cape Fear River was ever over the 70 ng/L health advisory level set by the EPA last year (I realize prior to last year, the level was higher than 70 ng/l)? Not true.

Thanks again,
Brandon

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**From:** Strynar, Mark [mailto:Strynar.Mark@epa.gov]
**Sent:** Thursday, July 06, 2017 4:03 PM
**To:** Wissbaum, Brandon <bwissbaum@wect.com>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Good questions.

DuPont along with 7 other PFAS producers (Arkema, Asahi, BASF Corporation (successor to Ciba), Clariant, Daikin 3M/Dyneon, DuPont, Solvay Solexis) entered into a PFOA stewardship agreement with the EPA in 2006. As part of this agreement they committed to eliminate emissions and occurrence in products by 2015. As this company formerly

produced and used PFOA on this site I am guessing this is why they needed to monitor for on a month basis per the link below. I believe I saw an annual outfall mass of 13 lbs of PFOA leaving the plant per a media report. PFOA is already in the Cape Fear River and the company claims no additional PFOA is added, though I saw it was ascribed to Kurray. Recall we estimated a load of GenX to the Sweeney WTP at 13lbs/DAY from the Sun et al., 2016 paper.

I am guessing NCDEQ can give you a hard answer on this but this is my understanding.

https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfass#tab-3

The UCMR3 only ran from 2103 to 2015 as I recall so there would be no earlier data.

Mark

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Thursday, July 06, 2017 3:17 PM
**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Thank you, Mark for your answers and including your research. I'll likely have some follow-up/additional questions if that's alright? One immediate question, and you might not be able to answer this – it's my understanding DuPont agreed to phase out PFOA in 2005 after reaching a settlement with the EPA.

If that's the case, why would Chemours, a spinoff of DuPont, be permitted to discharge PFOA from outfall 002 with monthly sampling? This is likely a NCDEQ question, and I have asked their spokesperson this same question, but have not heard back yet.

For reference, here is Chemours' most recent, but expired, permit >> https://ncdenr.s3.amazonaws.com/s3fs-public/GenX/NC0003573%20Ownership%20Change2015.pdf. The information I'm referencing is on page 6.

Also, do you know where I could access EPA DMR data from the Fayetteville Works plant for the years 2007-2012? I found 2012 to current, but do not see any data prior to 2012.

Thanks again,

Brandon

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**From:** Strynar, Mark [mailto:Strynar.Mark@epa.gov]
**Sent:** Thursday, July 06, 2017 2:35 PM
**To:** Wissbaum, Brandon <bwissbaum@wect.com>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Brandon,

See my response below.

Mark

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Thursday, July 06, 2017 10:28 AM

**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Ok, here are some questions covering GenX and the other PFECAs found in the Cape Fear River, along with a couple about PFOA and PFOS. Thanks in advance for the help!

When did you and your team first discover GenX and the six (I believe this is correct?) other PFECAs in the Cape Fear River? We first discovered GenX in 2012 in some work I presented at a national meeting called Society of Environmental Toxicology and Chemistry (SETAC). In some follow-up efforts where we determined the additional chemicals found in the Cape Fear River were presented at a SETAC meeting in 2014. However, our first peer-reviewed publication of this work was in 2015 *"Identification of Novel Perfluoroalkyl Ether Carboxylic Acids (PFECAs) and Sulfonic Acids (PFESAs) in Natural Waters Using Accurate Mass Time-of-Flight Mass Spectrometry (TOFMS)Mark Strynar,*,† Sonia Dagnino,†,‡ Rebecca McMahen,†,‡ Shuang Liang,†,‡ Andrew Lindstrom,†Erik Andersen,† Larry McMillan,§ Michael Thurman,∥ Imma Ferrer,∥ and Carol Ball⊥" ES&T.*

If I remember correctly, in your 2016 paper titled "Legacy and Emerging Perfluoroalkyl Substances Are Important Drinking Water Contaminants in the Cape Fear River Watershed of North Carolina," the mean concentration of GenX in the Cape Fear River was 631 ppt – and that was from 2013-2014 samples. Have there been any more recent samples taken, and if so are the results available? NC DEQ has taken new samples and the samples are being analyzed currently (Test America – contract lab and my lab). They expect those results will be available by the end of the month. Can you provide when the samples were taken? My understanding is this week (July 3-6) is the 3rd week of sampling and each week previous for 2 weeks (June 26-29) and (June 19-22) respectively.

Can you provide the mean and max concentration of the other PFECAs found in the Cape Fear River at the time of the 2016 paper, and if possible any more recent concentration levels? I cannot provide this data, no chemical standards are available for purchase. These are needed to properly quantitate the additional PFECAs in the River. In the Sun et al., 2016 paper we make reference to the relative abundance which is an indication of contribution (see Figure 2).

I understand little is known about the six other PFECAs, and at the time of the 2016 paper they had not been named. Have they been named since that time? In the Strynar et al., 2015 refer to Table 1 for names. In the Sun et al., 2016 work refer to Table S1 in the supporting info document for names.

Do you have any historical information on these six other PFECAs, like GenX being a replacement chemical for PFOA – are these six other PFECAs replacements for PFOA, replacements for another chemical, a byproduct of something else, or something else? I have no information on this.

Is it believed these six other PFECAs are also being discharged from the Fayetteville Works plant? If so, do you know how? I have no information on this. However the compounds do not exist in the water upstream of the Chemours 002 outfall. They appear to be co-occurring contaminants.

Based on your research, what do you find most concerning about these unregulated chemicals in the CFR? No response. Check with the US EPA and/or NC DEQ desk statements on this question.

Can you provide when and at what concentration PFOA and PFOS were detected in the Cape Fear River? The earliest I've seen from your research was 2007, but did you find PFOA and PFOS in the Cape Fear River prior to that? If possible, can you provide the dates and concentrations from your research where PFOA and PFOS were found in samples from the CFR through today? The earliest work we did on the Cape Fear River was in Nakayama et al., 2007. Refer to Table 3 for that data. Sun et al., 2016 has the most recent data we have generated.

However, the UCMR3 data for Fayetteville, NC and Wilmington, NC from 2013-2015 would have PFOS/PFOA and 4 other PFAS reported out. Only water producers serving >10,000 people were included in the UCMR3 study.

https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule. Sweeny WTP (Wilmington) and Hoffer WTP (Fayetteville) should have provided this to their customers in the past few years in their consumer confidence report.

Adding on to that question – are you aware of any recent confirmation of PFOA and/or PFOS being found in drinking water in the lower cape fear area? See the above answer.

Is there a formula to determine the dilution of a chemical from effluent flow to river water? The reason I ask – I'm looking at recent data from Chemours discharge monitoring report on the EPA's website of PFOA levels in effluent flow, but want to determine how diluted it is when it enters the CFR. I would ask Detlef Knappe at NC State this question. He is better suited to answer.

Are there any topics that haven't been covered in the recent media reports that you think should be reported/explained? No, I think the media has done a very thorough job covering this topic. All I have read thus far has been very clear, concise and on point. Kudos.

Anything else you'd like to add? If there are other technical details you need clarified please do not hesitate to email or call. This is a very complex set of issues that I have been working on for over a decade. It is second nature to me but may not be for the majority. No question is too easy or too complex. I am here to help clarify if need be.

Brandon

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**From:** Strynar, Mark [mailto:Strynar.Mark@epa.gov]
**Sent:** Thursday, July 06, 2017 7:23 AM
**To:** Wissbaum, Brandon <bwissbaum@wect.com>
**Subject:** RE: WECT/chemicals in the Cape Fear River

No problem. I have been busy as well with this issue. Basic questions are fine and I am glad to help out.

Mark

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Wednesday, July 05, 2017 4:38 PM
**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Hi Mark,

Sorry for the delayed response, it's been a busy day. Thanks for following up, let me get my act together on questions and I will send them to you. Just let me know which ones you are unable to answer. Apologies if some of the questions are basic, I definitely want to be sure I have a clear understanding of everything.

Brandon

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**From:** Strynar, Mark [mailto:Strynar.Mark@epa.gov]
**Sent:** Wednesday, July 05, 2017 8:26 AM
**To:** Wissbaum, Brandon <bwissbaum@wect.com>
**Cc:** McAdams, Ann <amcadams@wect.com>
**Subject:** RE: WECT/chemicals in the Cape Fear River

Brandon,

Depending on the questions you have it may need to be routed through our PR group. If you stick to facts/explanations from our published efforts on the Cape Fear river in recent years I can answer them.

Concerning what Dr. Coin relayed to you. Once an analyte is discovered to be a source of human exposure the next logical step is to perform a human exposure or biomonitoring effort to understand the degree of exposure. The only way to do this is through the measurement of the analyte in a bio-fluid (serum blood or urine). As this has not yet been done for GenX in this region it seemed like the next logical step. We have tried to get efforts underway with American Red Cross blood donors and with our colleagues at NIEHS. Thus far this has not yet occurred, but we have been in discussions with multiple groups to answer these important questions.

Please let me know what questions you have and I can follow-up.

Mark

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**From:** Wissbaum, Brandon [mailto:bwissbaum@wect.com]
**Sent:** Monday, July 03, 2017 3:19 PM
**To:** Strynar, Mark <Strynar.Mark@epa.gov>
**Cc:** McAdams, Ann <amcadams@wect.com>
**Subject:** WECT/chemicals in the Cape Fear River

Good afternoon, Dr. Strynar,

I am a journalist with WECT News in Wilmington, NC. I've been working with Ann McAdams on unregulated chemicals in the Cape Fear River. Ann was communicating with Dr. Coin, who passed along your contact information, saying that you and your colleagues first identified GenX and other emerging polyfluorinated contaminants in the Cape Fear River.

Ann is out this week, but I was wondering if you'd be willing to Skype with myself and another reporter at any point this week, or if you'd be willing to at least answer some questions through email?

Dr. Coin also mentioned you and your team are hoping to get a study started to assess any human impact?

If I don't get a chance to speak to you before, hope you have a nice Fourth of July!

Best,

**Brandon Wissbaum**
Assignment Manager
WECT News
Office: 910.386.5477
Cell: 910.899.6035

<Data and Quality Assurance Internal Report for Alabama 10-2-08.doc>