



Emerging Compounds – GenX Case History

Mike Abraczinskas, Director,
North Carolina Division of Air Quality
November 15, 2018

Department of Environmental Quality



Emerging Compounds – GenX Case History

What do we mean when we say Emerging Compounds?

- **No specific limit in environmental regulations.**
- **Sparse knowledge about how they behave in the environment.**
- **Little known about their effects on human health and environment.**
- **Significant challenge for regulatory agencies.**
- **How to prioritize? Research? Minimize impacts? Communicate?**



Are GenX and Other Chemicals in the Air Near Chemours?



GENX IN FOOD? HIGH LEVELS OF CONTAMINATION FOUND IN FARMER'S HONEY

Toxin taints CFPUA drinking water

By Vaughn Hagerty StarNews Correspondent

Posted Jun 7, 2017 at 10:31 AM

Updated Jun 8, 2017 at 10:38 AM

Utility can't filter out chemical produced upriver at Fayetteville plant

WILMINGTON -- A chemical replacement for a key ingredient in Teflon linked to cancer and a host of other ailments has been found in the drinking water system of the Cape Fear Public Utility Authority (CFPUA), which cannot filter it.

North Carolina Science Advisory Board meets with DEQ about GenX

GenX Response: Activist Groups Unite Forces

08/30/2017 by Allison Ballard



GenX is a big story, and getting bigger

Chemours told to cut fluorocarbon air pollution from North Carolina plant

Tainted rain, contaminated drinking water linked to air emissions, state says

By Cheryl Hogue

Experts: Toxic GenX may never disappear from the Cape Fear



Emerging Compounds – GenX Case History

- EPA monitoring, 2013-2015 via the Third Unregulated Contaminant Monitoring Rule (UCMR)
 - 28 chemicals including PFOA, PFOS and 1,4-Dioxane.
- EPA and NCSU, 2014-2016, study PFOA, PFOS and other per- and poly-fluorinated chemicals in the Cape Fear River.
- DEQ 2014-2016 study on 1,4-Dioxane, focusing on the Cape Fear River after results indicated higher concentrations than other river basins.
- EPA National Exposure Research Laboratory (NERL) published a report in 2015.
- Research findings published in Nov. 2016 on PFOA/PFOS, GenX and other related chemicals attributed to the Chemours (formerly DuPont) facility just south of Fayetteville, NC.
- Techniques and lab capabilities advanced.



Emerging Compounds – GenX Case History

GenX Sampling Results



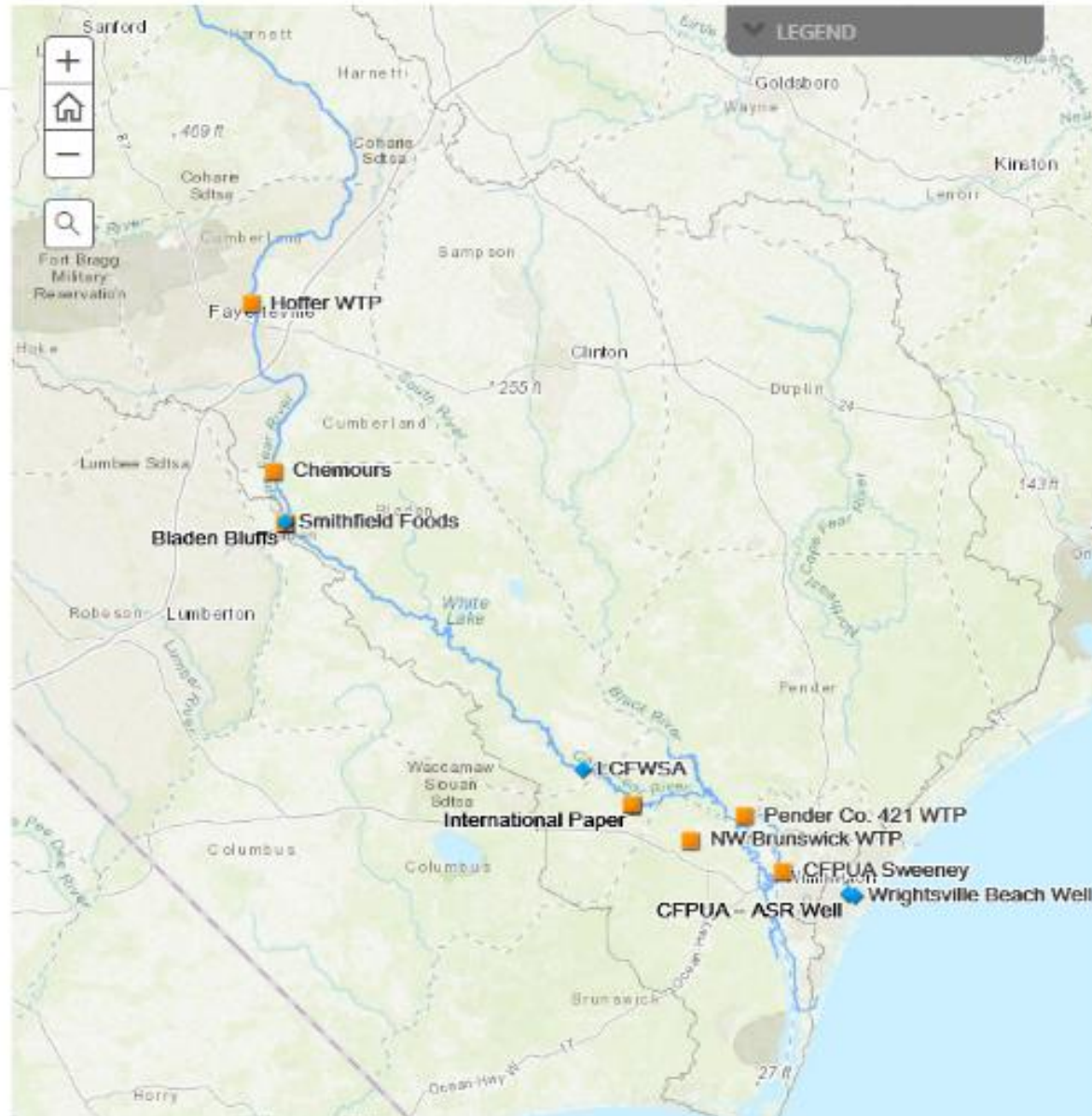
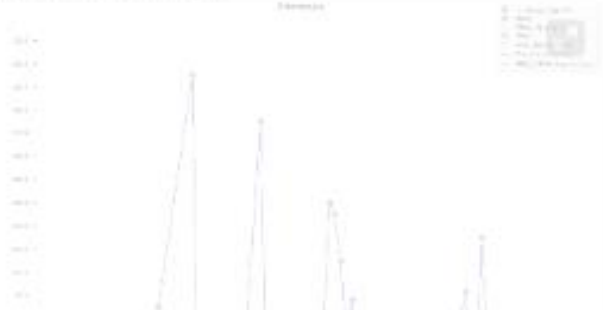
GenX Sampling Results

On June 19, 2017, DEQ began collecting water samples from the Cape Fear River.

Scroll down to see sampling result graphs for the facilities. All results are measured in parts per trillion (ppt).

Chemours

Results are in ppt.



Emerging Compounds – GenX Case History

Unregulated compounds: What do you do?

- **National regulatory standards (EPA)**
- **State Standards (DEQ/Environmental Management Commission)**
- **National health advisories or other health values (EPA, CDC)**
- **Other governmental guidance (other states or countries)**
- **If all of the above are not available... can consider establishing a state-specific health goal**

NC DHHS health goal established for GenX = 140 ppt

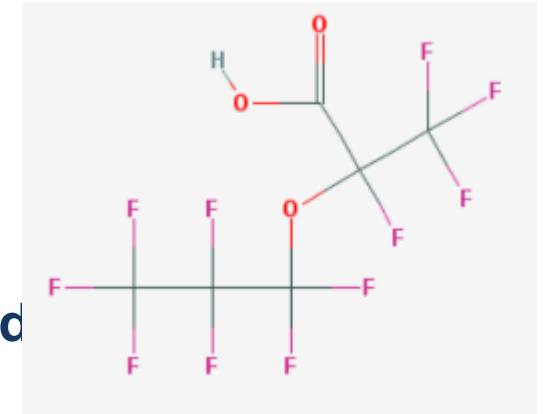
For drinking water



Emerging Compounds – GenX Case History

What is GenX?

- C3 Dimer Acid, $C_6HF_{11}O_3$
- GenX is a trade name for a man-made and unregulated chemical used in manufacturing nonstick coatings and for other purposes.
- Chemours' facility (formerly DuPont) near Fayetteville began producing GenX commercially in 2009 as a replacement for Perfluorooctanoic acid (PFOA).
- The same chemical is also produced as an intermediary during other manufacturing processes at Chemours and it may have been present in the environment for many years before being produced commercially as GenX.

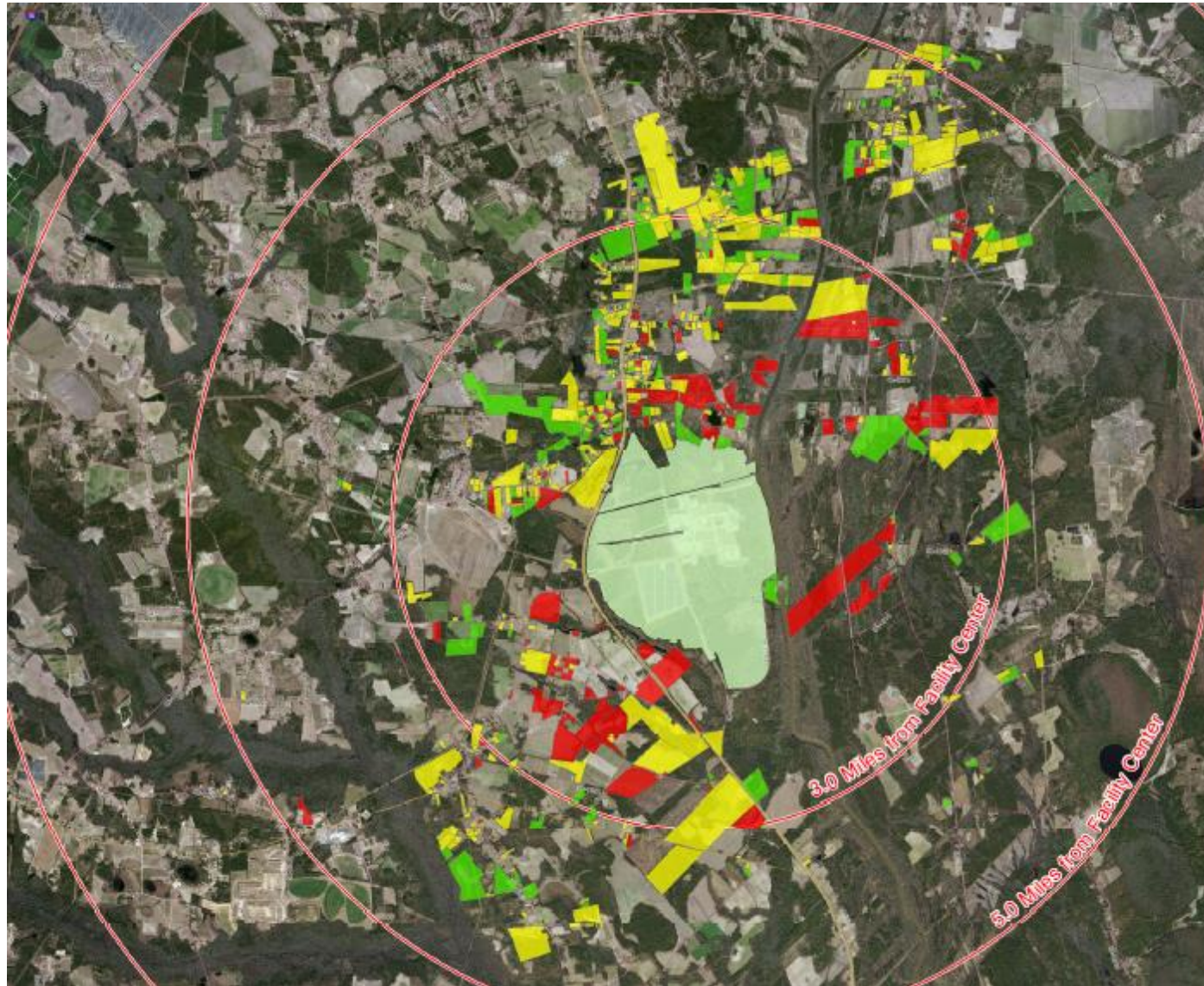


Emerging Compounds – GenX Case History

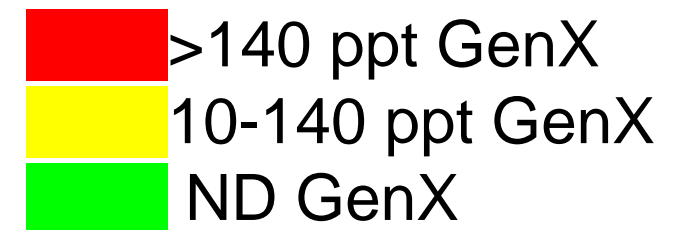
- **Early-mid 2017:** focus on surface water issues
- **Mid 2017:** groundwater issues discovered
- **Mid-late 2017:** air emission contributions



Emerging Compounds – GenX Case History



Private groundwater wells

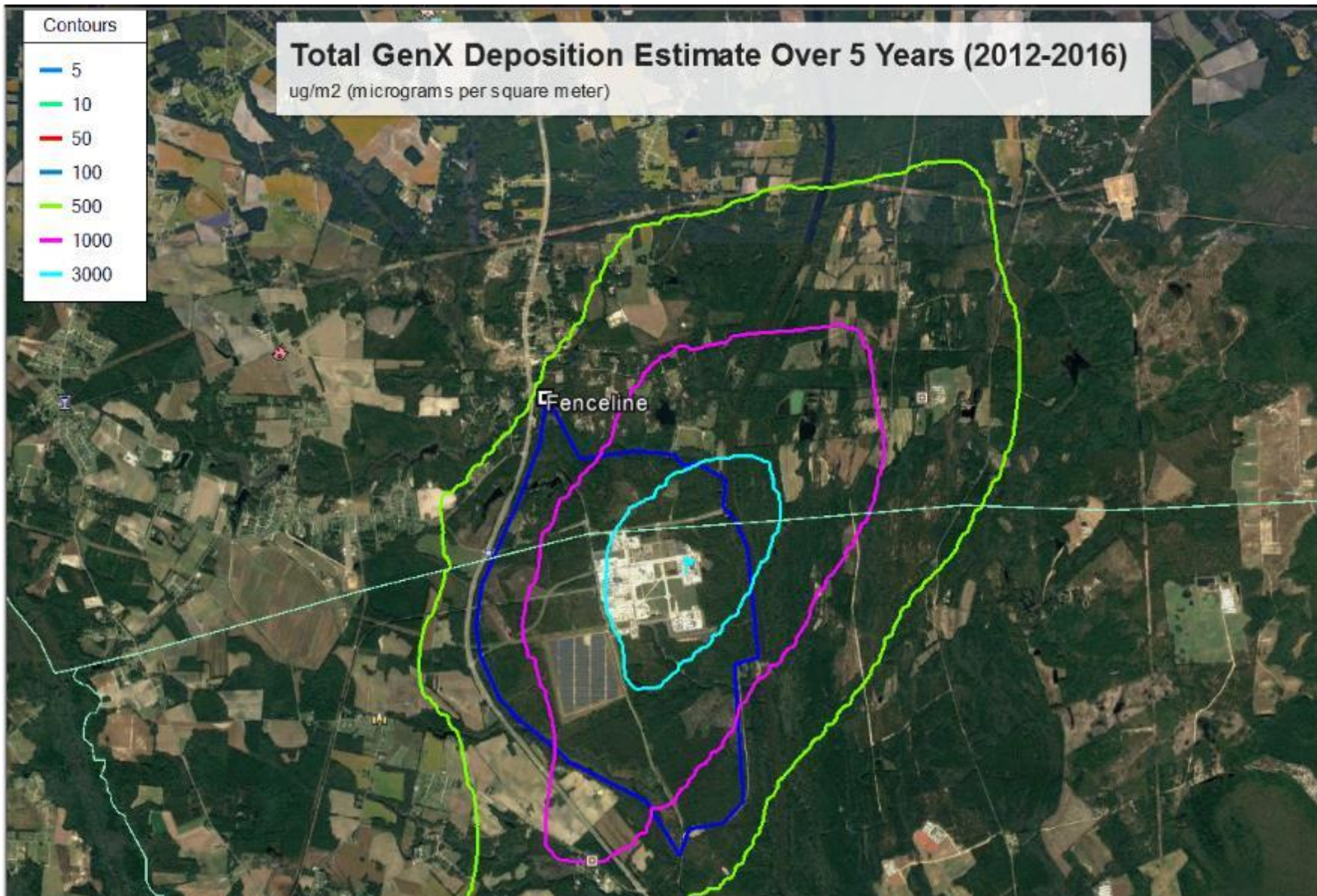


Angry, frustrated crowd of 350 demands GenX answers



Public outcry at GenX info session: 'Enough is enough'

Emerging Compounds – GenX Case History



Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

- **GenX emissions data**
 - Started with only estimates
 - Required stack tests
 - Method development
 - First of its kind measurements

Chemours 2016 emissions estimates as originally reported to DAQ	Chemours revised 2016 emissions estimates as of October 2017	Latest calculations, including January through April 2018 stack test measurements
66.6 lb/yr	594 lb/yr	2758 lb/yr

Department of Environmental Quality



Emerging Compounds – GenX Case History

Air Emissions Testing or “Stack Testing”

- Target compound – C₃ Dimer Acid (GenX)
- Week of:
 - January 8 – PPA & Vinyl Ethers (VE) North
 - January 22 - PPA & VE North
 - February 26 - PPA & VE South
 - March 19 - VE North, Polymers, Semiworks
 - April 3 – VE South & VE North for HFPO
 - April 23 – VE North HFPO
 - May 14 – Polymers for E1
 - June 11 – PPA & VE North Carbon bed
 - July 16 – PPA scrubber efficiency
 - VE North carbon bed & Scrubber
 - July 23 – PPA scrubber &
 - carbon bed efficiency



Future testing:
August 20 & 27 Scrubber efficiency



Emerging Compounds – GenX Case History

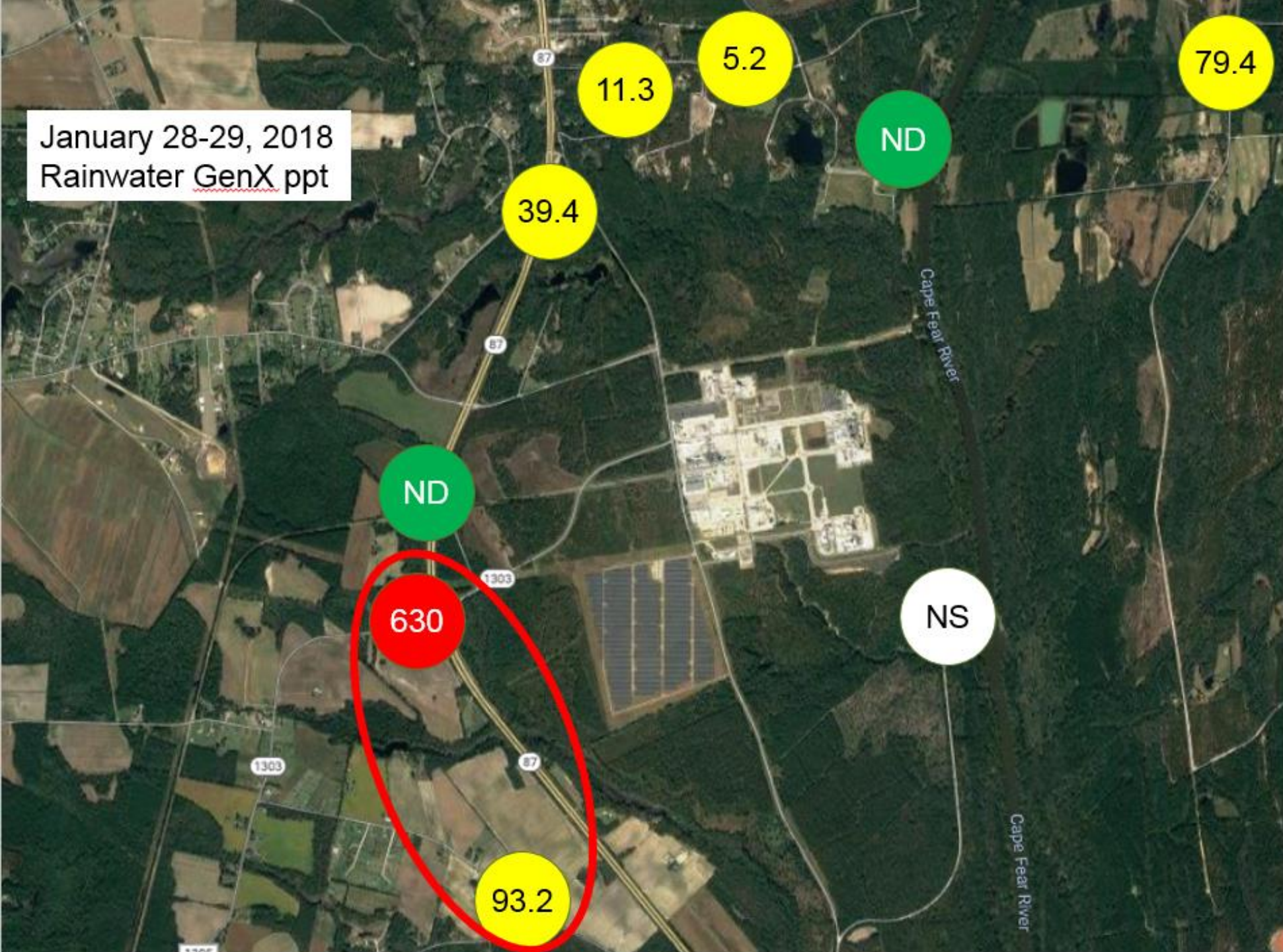
Needed information immediately

- **Purchased temporary rain collection equipment.**
- **Used lab protocols to prepare equipment.**
- **Split the samples... sent to EPA for full PFAS analysis.**

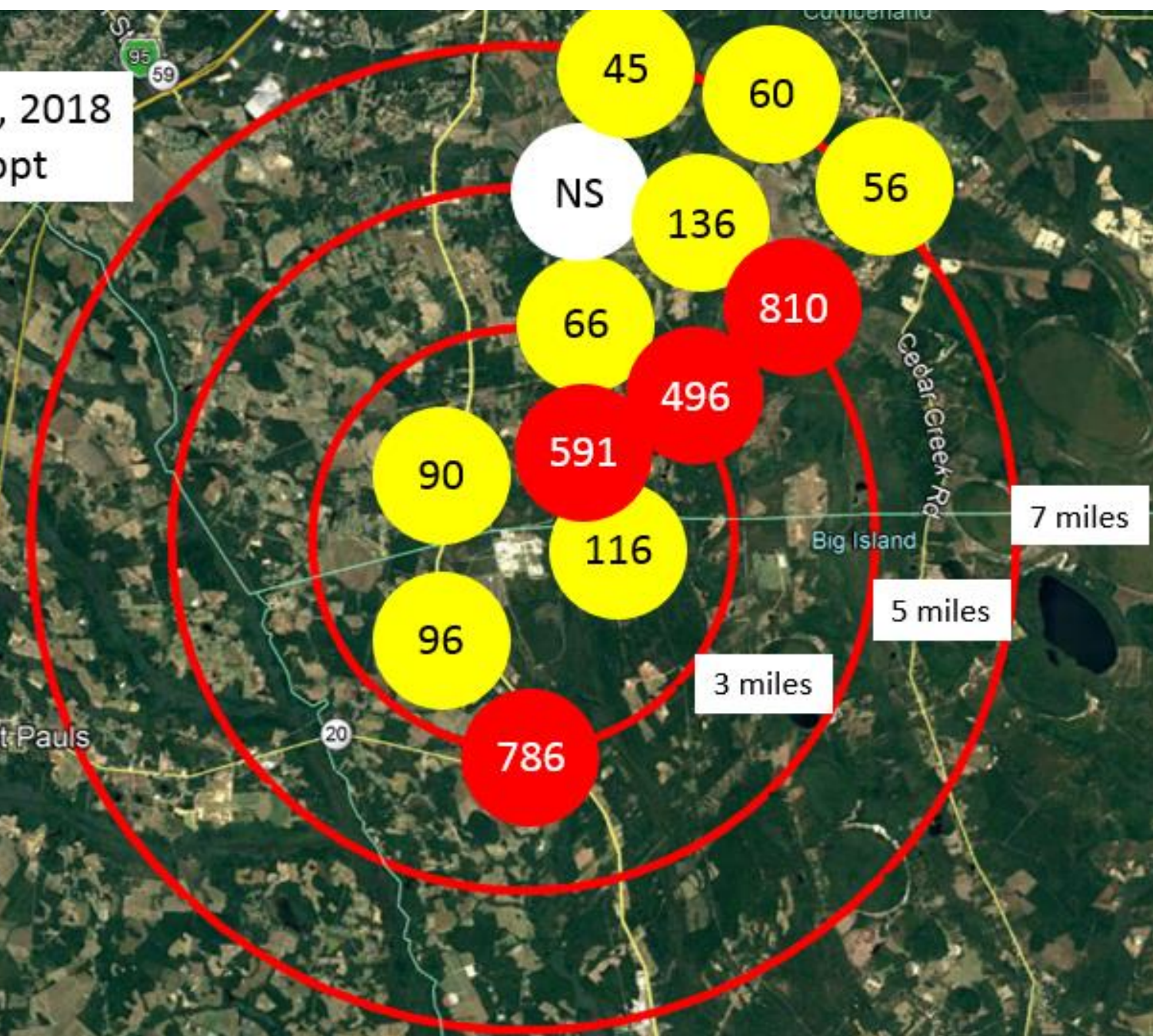




January 28-29, 2018
Rainwater GenX ppt



Feb 28 – March 2, 2018
Rainwater GenX ppt



Emerging Compounds – GenX Case History

- **GenX**
- **Wet deposition data - first of its kind**
- **7 separate rainfall catch and analysis**
 - **Near facility**
 - **Distance of 3, 5, 7 miles**
 - **Distance up to 20 miles**
 - **Rainfall and vegetation throughfall**



Emerging Compounds – GenX Case History

Ambient Air Quality Monitoring

- Network of wet deposition monitors deployed.
- Goal: Capture and analyze rainwater for GenX / PFAS deposition
- Nearfield - Monitor for reductions as facility controls are implemented
- Background - Quantify “background” amounts of PFAS in rainwater.

Source-oriented sites near Chemours

2 northeast of facility
2 southwest of facility
1 west of the facility

Background sites

Asheville
Raleigh
Candor
Wilmington





Emerging Compounds

DAQ's investigation involving GenX and other PFAS from Chemours

Summary of facts:

- The measured air emissions of GenX compounds are significantly higher than previously understood and reported.
- DAQ has measured GenX deposition through rainfall as far as 20 miles from the facility.
- The evidence of atmospheric deposition of GenX shows a geographic footprint that is similar to the detection of GenX in groundwater samples.



Emerging Compounds

GenX — Review of Actions

April 6, 2018:

- **60 day notice of intent to modify Chemours' air permit:**
 - **Requires demonstration that emissions of GenX compounds do not or will not cause or contribute to violations of groundwater rules.**

The science and data collected informed this action.



Emerging Compounds

GenX — Review of Actions

April 27, 2018:

- **Chemours response to 60 day notice**
 - **Chemours committed to:**
- **Install & operate a Thermal Oxidizer by 2020**
 - **Expected 99% reduction of GenX emissions**



Emerging Compounds

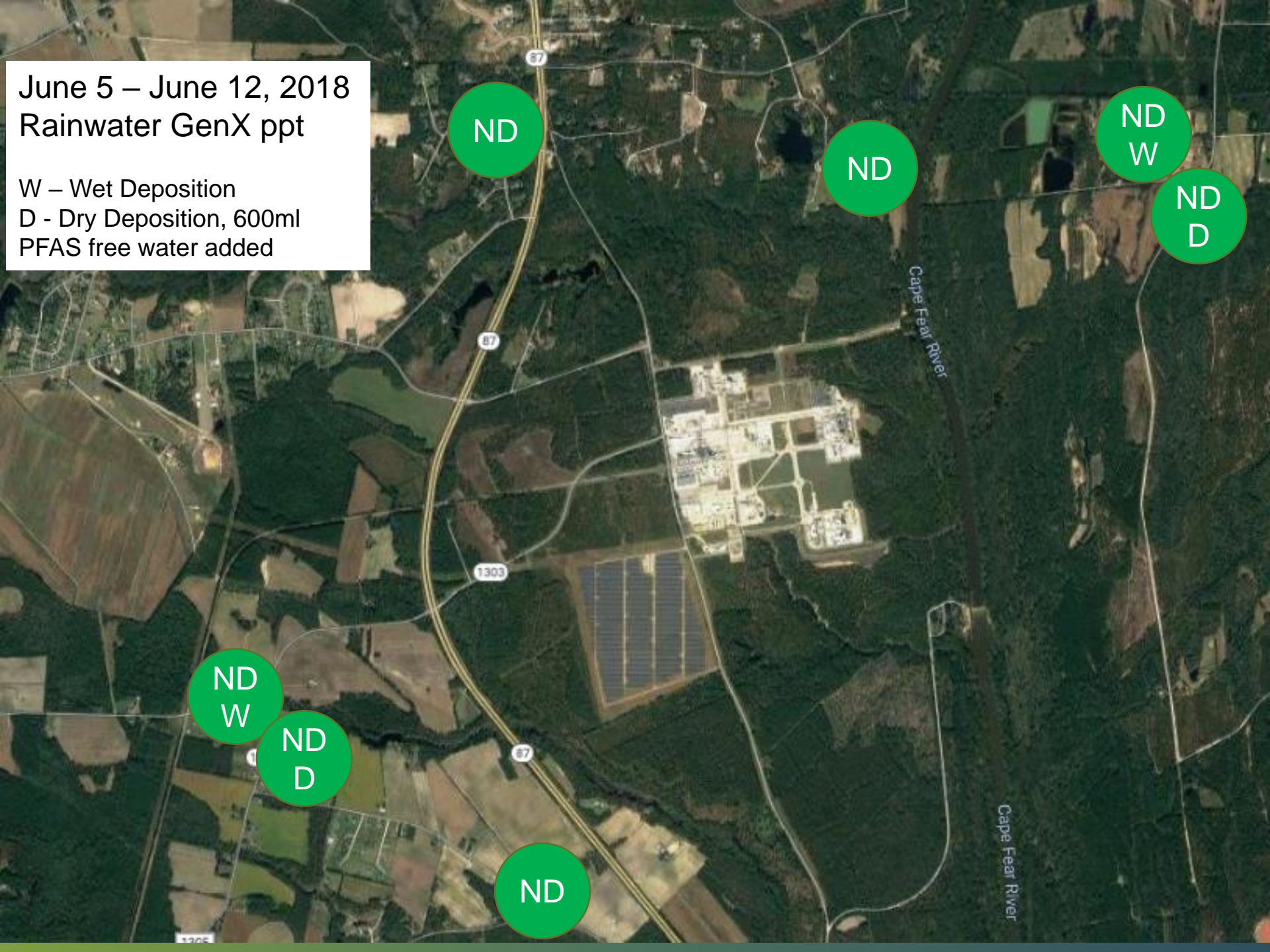
GenX - Recent Actions

Carbon Adsorbers in place – late May 2018

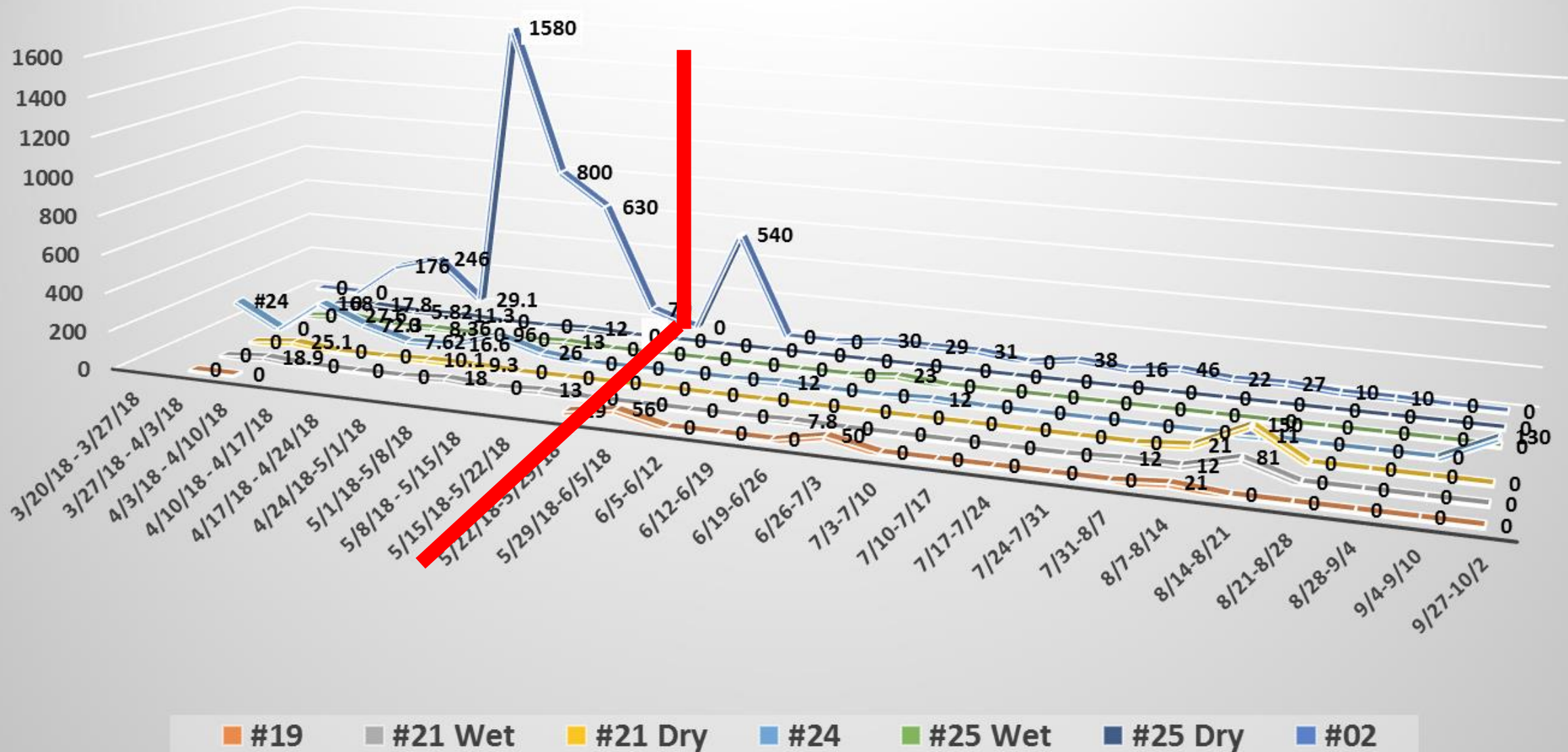


June 5 – June 12, 2018
Rainwater GenX ppt

W – Wet Deposition
D - Dry Deposition, 600ml
PFAS free water added



Gen X Deposition Concentrations - March-September 2018



Emerging Compounds

Take home message for:

- **EPA:** We need each other!
 - Emissions stack test method development
 - Source attribution starts with good emissions data
 - Ambient air monitoring
 - Does EPA have capabilities that states don't?
 - How to prioritize emerging compounds?
 - Prevalence, concentrations, toxicity.
- **Industry:** Know what is in your waste streams!
- **State:** Monitoring and surveillance is a must!
 - Get the resources in place!
 - Must look beyond GenX... What are the possible needs?
 - Do we have the lab and field equipment that we need?
 - Risk communication is a must !!!



Thank you!

Mike Abraczinskas, EIT, CPM
Director
NC Division of Air Quality
919-707-8447
Michael.Abraczinskas@ncdenr.gov

Twitter: @airmikeab

<http://deq.nc.gov/about/divisions/air-quality>

Michael Pjetraj, P.E.
Deputy Director
NC Division of Air Quality
919-707-8497
Michael.Pjetraj@ncdenr.gov

Department of Environmental Quality

