

ROY COOPER

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MICHAEL S. REGAN

Secretary

LINDA CULPEPPER

Director



NORTH CAROLINA  
Environmental Quality

April 30, 2019

Mr. Frank Skee  
Pretreatment Coordinator  
City of Greensboro  
PO Box 3136  
Greensboro, NC 27402

Dear Mr. Frank Skee,

Several emerging compounds have been found in North Carolina waters, specifically, 1,4-dioxane and a group of chemicals known as perfluoroalkyl and polyfluoroalkyl substances (PFAS, also referred to as PFCs). Data reviewed as part of the UCMR (Unregulated Contaminant Monitoring Rule) has indicated elevated concentrations for these compounds in the Cape Fear River Basin. In addition, ambient monitoring performed by DWR's Water Sciences Section have confirmed the presence of these compounds in the Cape Fear River Basin (<https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/1-4-dioxane>).

### Background

1,4-dioxane is a clear liquid that is highly miscible in water. It has historically been used as a solvent stabilizer and is currently used for a wide variety of industrial and manufacturing purposes. The compound can be found in industrial solvents, paint strippers, and varnishes and is often produced as a by-product of chemical processes to manufacture soaps, plastics, and other consumer products.

The U.S. EPA has not established a maximum contaminant level for 1,4-dioxane in drinking water but has characterized it as "likely to be carcinogenic to humans" and has established a drinking water health advisory of 35 ug/L. North Carolina has a calculated human health surface water criterion with an associated estimated lifetime cancer risk of one in one million at a concentration for 1,4-dioxane of 0.35 ug/L in water supplies and 80 ug/L in all other waterbodies (15A NCAC 02B .0208).

PFAS compounds are most often associated with nonstick coatings, plating operations, firefighting foams, and stain- and water-resistant treatments for clothing, furniture and carpeting.

PFAS has been found to have adverse effects in laboratory animals and humans when ingested. To provide Americans with a margin of protection from a lifetime of exposure to PFAS from drinking water, EPA has established the health advisory levels of 70 ng/L individually and combined for two of the most common PFAS compounds: PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate).

### Required Actions

To assess the levels of these compounds throughout the Cape Fear and to assist DWR in developing a Management Strategy to address and reduce levels of these emerging compounds, POTWs with approved Pretreatment Programs are hereby required to perform investigative monitoring at the treatment plant influent for 1,4-dioxane and total PFAS monthly for three consecutive months starting in July 2019. Such investigative actions can be required under 15A NCAC 02B .0508 (b)(2) and G.S. 143-215.66.



North Carolina Department of Environmental Quality | Division of Water Resources  
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Samples collected should be representative of the typical wastewater flow to your facility. Sufficiently sensitive test methods shall be used.

- To locate a lab capable of performing the PFAS analysis, please visit <https://www.denix.osd.mil/edqw/accreditation/accreditedlabs/> and search by method "PFAS by LCMSMS Compliant with Table B-15 of QSM 5.1 or Latest Version".
  - Grab samples are required to avoid cross-contamination and ensure consistency.
  - Please refer to Attachment B for the analyte list. Each facility shall provide results for as many of the PFAS compounds as possible, specifically including PFOA and PFOS.
- To locate a lab certified to perform 1,4-dioxane analysis using EPA Method 624.1, please visit <https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/certified-laboratory-listings>. Be sure to specify 1,4-dioxane by EPA method 624.1 when contacting the labs.
- All sample results shall be submitted to PERCS by October 31, 2019 and shall be sent to the following email address (please include the lab sheets with the test results): [Pretreatment.Results@ncdenr.gov](mailto:Pretreatment.Results@ncdenr.gov). Please include your NPDES permit number in your subject heading.

Attachment A outlines recommended actions on how to assess potential sources, monitor, and work with your industries to reduce potential sources of these compounds. You are not required to implement these actions until you have received notification from the Division to do so. However, if your influent samples exceed the human health surface water criteria for 1,4-dioxane pertaining to your receiving stream classification, contact your DWR Pretreatment Program coordinator to discuss your facility's allowable discharge concentration. If your influent levels exceed your facility's allowable discharge concentration, you should take proactive steps to begin reducing or eliminating 1,4-dioxane discharges to your facility.

The PFAS drinking water health advisory of 70 ng/L is the target concentration for the sum of sample results for PFOA and PFOS. Therefore, actions to reduce these compounds will be required for facilities with influent levels greater than a total PFAS value of 70 ng/L if there are water supply intakes downstream of your facility's discharge. Again, you are not required to implement actions in Attachment A until you have received notification from the Division to do so. Please be aware that criteria are being developed for PFAS compounds and are likely to be lower than the current drinking water advisory level. Results for PFAS that do not currently require action may trigger reduction activities in the future.

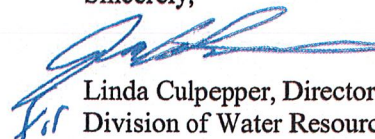
### More Information

DWR will be holding a technical informational session on May 21, 2019 from 10 am to 3 pm at the Herbert C. Young Community Center, 101 Wilkinson Ave., Cary, NC. At this time registration for this workshop is limited to approved Pretreatment Program POTW staff due to space limitations. Please register at <http://tinyurl.com/NCECTIS>.

The Department looks forward to working closely with you on this important public health issue. Data from the UCMR and other sources will continue to be evaluated to determine next steps to reduce the discharge of 1,4-dioxane and PFAS throughout the State.

Please contact the appropriate PERCS staff member if you have any questions or concerns: Deborah Gore 919-707-3624, Monti Hassan 919-707-3626 or Vivien Zhong 919-707-3627 or via email ([firstname.lastname@ncdenr.gov](mailto:firstname.lastname@ncdenr.gov)).

Sincerely,



Linda Culpepper, Director  
Division of Water Resources, NCDEQ

Cc: Dana Satterwhite, WSS

1,4-Dioxane eDMR data	
Date Sampled	Effluent (ug/L)
12/14/2017	26.3
1/11/2018	18.2
2/15/2018	26.7
3/8/2018	27
4/12/2018	21
5/2/2018	229
5/25/2018	41.5
5/30/2018	665
6/20/2018	16.7
7/25/2018	11.6
8/16/2018	408
9/26/2018	8.1
10/25/2018	25
11/16/2018	14.2
12/19/2018	9.9
1/10/2019	8.7
2/13/2019	11.1
3/14/2019	24.2
4/24/2019	397.5
5/23/2019	14.7
6/12/2019	62.6
7/8/2019	9.7
8/7/2019	957.5
8/20/2019	429.7
8/26/2019	17.5
9/17/2019	6

POTW Name:	Greenboro - Tz Osborne WRF	NPDES #:	N0047384					
			Influent Grab (ng/L)		Effluent Grab (ng/L)		Lab Qualifier(s)	
CAS Number	Analyte Name	Acronym	7/8/2019	8/7/2019	9/17/2019	Lab Qualifier(s)	Lab Qualifier(s)	
375-22-4	Perfluorobutanoic acid	PFBA	3.1	27.3	13.0			
375-73-5	Perfluorobutanesulfonic acid	PFBS	2.5	39.3	25.0			
335-77-3	Perfluorodecanesulfonic acid	PFDS	ND	ND	ND	U (<10.2)	U (<7.1)	
335-76-2	Perfluorododecanoic acid	PFDDA	2.9	ND	0.8	U (<10.2)		
307-55-1	Perfluorododecanoic acid	PFDDA	ND	ND	ND	U (<10.2)	U (<7.4)	
375-97-8	Perfluorooctanesulfonic acid	PFH8S	ND	ND	ND	U (<10.2)	U (<1.70)	
375-85-9	Perfluorooctanoic acid	PFH8A	6.5	22.3	7.4			
355-46-4	Perfluorohexanesulfonic acid	PFH6S	9.4	19.6	15.3			
307-24-4	Perfluorohexanoic acid	PFH6A	24.7	54.6	18.0			
68259-12-1	Perfluorononanesulfonic acid	PFNS	ND	ND	ND	U (<10.2)	U (<1.70)	
375-95-1	Perfluorononanoic acid	PFNA	ND	ND	ND	U (<4.1)	U (<2.57)	
754-91-6	Perfluorooctanesulfonamide	PFOSA	ND	ND	ND	U (<2.56)	U (<18.0)	
2991-50-6	2-(N-Ethylperfluorooctanesulfonamido) acetic acid	N-EFOSA	ND	ND	ND	U (<4.1)	U (<15.0)	
2355-31-9	2-(N-Methylperfluorooctanesulfonamido) acetic acid	N-MFOSA	ND	ND	ND	U (<4.1)	U (<15.0)	
2706-90-3	Perfluoropentanesulfonic acid	PFPeS	ND	ND	ND	U (<2.56)	U (<1.70)	
376-06-7	Perfluoropentanoic acid	PFPeA	22.0	66.9	20.0			
72629-94-8	Perfluorotridecanoic acid	PFTeA	ND	ND	ND	U (<2.56)	U (<7.4)	
2058-94-8	Perfluoroundecanoic acid	PFTrA	ND	ND	ND	U (<2.56)	U (<7.4)	
335-67-1	Perfluorooctanoic acid	PFOA	11.2	24.7	14.9			
1763-23-1	Perfluorooctanesulfonic acid	PFOA	25.6	36.2	47.1			
	Sum of PFOA and PFOS		36.8	60.9	62.0			
	Total PFAS		107.9	290.9	161.5			
1,4-Dioxane*			9.73	468.2	5.98			

\*An Enforcement Order is under consideration for the City of Greensboro in order to limit and enforce reductions of 1,4-Dioxane in their discharge.

\*\*Monthly Average (3 samples), see 1,4-Dioxane eDMR data.

Lab Qualifiers

ND - Analyte concentration is not detected above the detection limit.

U - The sample was not detected in the sample at the Reporting Limit.