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PFAS CHARACTERIZATION SAMPLING PLAN

Process and Non-Process Wastewater and Stormwater

Prepared for

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ACRONYMS AND ABBREVIATIONS

CFRW – Cape Fear River Watch

DEQ – Department of Environmental Quality

DWR – Division of Water Resources

HFPO-DA – hexafluoropropylene oxide dimer acid

IXM – Ion Exchange Membrane

NCCW – non-contact cooling water

PFAS – per- and polyfluoroalkyl substances

PFCA – perfluorocarboxylic acids

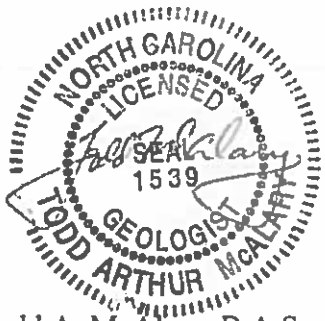
PFSA – perfluorosulfonic acids

PPA – Polymer Processing Aid

SOP – standard operating procedure

USEPA – United States Environmental Protection Agency

"I certify that I am personally familiar with the information contained in this submittal, including any and all supporting documents accompanying this report, and that the material and information contained herein is, to the best of my knowledge and belief, true, accurate and complete."



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1. INTRODUCTION

This sampling plan (the Sampling Plan) was prepared by Geosyntec Consultants of NC, P.C. (Geosyntec) for the Chemours Company FC, LLC (Chemours) to provide a plan for sampling and analysis of process wastewater, non-process wastewater (i.e., non-contact cooling water, [NCCW]) and stormwater at the Chemours Fayetteville Works, North Carolina site (the Facility, Figure 1). This Sampling Plan is intended to address requirements specified in Paragraph 11 in the proposed Consent Order dated 21 November 2018 between Chemours and the North Carolina Department of Environmental Quality (DEQ) with the Cape Fear River Watch (CFRW) as intervenor. Other parts of the Consent Order will be addressed separately by Chemours and Chemours contractors.

The purpose of this plan is to obtain more information on the concentrations and temporal trends of per- and polyfluoroalkyl substances ("PFAS") in the three water types identified above. The Sampling Plan may be updated at a later date as analytical methods are further improved.

1.1 Background

PFAS may be present in: 1) rainwater/stormwater, 2) as dry deposition from stack emissions that washes off with overland flow during rainfall events, 3) in groundwater that has been impacted by infiltration of PFAS to the subsurface, and/or 4) process wastewater or NCCW. Evaluation of the data collected to date indicate that PFAS present in the Cape Fear River are partially attributable to emissions from the Facility and partially attributable to other regional sources. Chemours has taken numerous actions to reduce releases of PFAS from the Facility, including the following partial list:

- Off-Site disposal of all Chemours process wastewater containing hexafluoropropylene oxide dimer acid (HFPO-DA) to reduce discharges to the Cape Fear River as quickly as possible;
- Installation of air emissions abatement controls in May, October, and December 2018; and
- Extraction and off-Site disposal of groundwater with elevated PFAS concentrations from the perched aquifer.

Chemours continues to work towards further reducing PFAS emissions to air and water by designing and installing enhanced PFAS abatement systems.

1.1.1 Water Usage at the Facility

The Facility is adjacent to the Cape Fear River and draws water from the Cape Fear River and returns over 95% of this water via Site Outfall 002 after being used primarily as NCCW. Rainfall at the Facility that does not infiltrate to groundwater runs off through a series of storm drains and ditches. Figures 1 and 2 show the known drains and ditches.

The Facility has four chemical production areas, shown in Figure 1 and listed below:

- Chemours Monomers Ion Exchange Membrane (IXM) Area;
- Chemours Polymer Processing Aid (PPA) Area;
- Kuraray America northern and southern leased areas (Kuraray Area); and
- Dow-DuPont leased area (DuPont Area).

1.1.2 Analytical Methods

Three analytical methods have been employed to analyze PFAS, which include all the compounds listed in Attachment C of the proposed Consent Order:

- EPA Method 537 Mod (Laboratory-specific standard operating procedure [SOP]) – perfluorocarboxylic acids (PFCAs), perfluorosulfonic acids (PFSAs) and others
- EPA Method 8321A (USEPA, 1996) – HFPO-DA
- Table 3 Lab Standard Operating Procedure (SOP; a method developed by Chemours) - perfluoroalkyl ether carboxylic acids (PFECAs) and perfluoroalkyl ether sulfonic acids (PFESAs). This SOP was developed by Chemours and modified and implemented by the analytical laboratories.

PFAS to be analyzed by the three methods listed above will include all the PFAS listed in Attachment C of the proposed Consent Order in addition to additional analytes reported by these methods, as summarized in Table 1. Additional samples will be collected and archived as part of this sampling program for analysis by potential future analytical methods developed as part of the proposed Consent Order.

1.2 Scope and Rationale

This Sampling Plan addresses requirements in Paragraph 11 as listed in the proposed Consent Order. Chemours will conduct bimonthly sampling events for one year for the Initial Characterization and provide quarterly reports and prepare a final Initial Characterization Report within 18 months of NCDEQ approval of this Sampling Plan.

Chemours will continue bimonthly sampling events and quarterly reports during the Ongoing Sampling for a period of two years (i.e., 12 events).

2. DATA QUALITY OBJECTIVES

Data quality objectives are established here to provide data of known and sufficient quality to accomplish the following:

- Characterize concentrations of PFAS in process wastewater, non-process wastewater (a.k.a. NCCW), and stormwater at the Facility;
- Assess PFAS concentration trends over time in process water, NCCW, and stormwater; and
- Document intake water quality to elucidate the components of PFAS originating at the facility from PFAS originating from other sources.

The criteria for achieving the data quality objectives are provided in Table 2.

3. SAMPLING PLAN

3.1 Sampling Locations

Twenty investigative samples will be collected during each of the Initial Characterization events at locations shown on Figure 2 and listed in Table 3.

3.2 Sampling Schedule

The proposed sampling and reporting schedule is provided in a Gantt Chart (Figure 3).

3.3 Sampling Procedures

3.3.1 General Field Procedures

All equipment will be inspected by the field program on-Site supervisor and calibrated daily prior to use in the field according to the manufacturer's recommendations. Calibration information will be recorded. Field parameters will be measured with a water quality meter prior to sample collection and then recorded. Field parameters will include the following:

- pH;
- Temperature (degrees Celsius; °C);
- Specific conductance [SC] (micromhos, µmho);
- Dissolved oxygen [DO] (milligrams per liter; mg/L);
- Oxidation/Reduction Potential [ORP] (millivolts; mV);
- Turbidity (nephelometric turbidity units, NTU);
- Color; and
- Odor.

3.3.2 Sample Collection Procedures Common to All Locations

Sample types to be collected as part of this Sampling Plan include storm water samples, Cape Fear River water intake samples, outfall samples, NCCW samples, and process wastewater samples. Sample collection procedures common to all sample types are outlined below and summarized for each sample type specified in Table 4.

The sample bottles will be 250 milliliter (mL) high density polyethylene (HDPE) with a wide-mouth screw-cap. For all samples, bottles pre-cleaned by the vendor will be used to minimize the risk of unplanned sample contamination from the sample container.

Field parameters will be measured by filling a flow-through cell from the 250 mL HDPE bottle. Following field parameter measurement, the sample bottle will be filled and the cap securely fastened after sample collection. For each sample type, sufficient water will be collected to fill nine bottles (two for EPA Method 537 Mod, two for EPA Method 8321A, and one for Table 3) and 4 bottles to be archive for potential future analyses. Each sample will be labelled with a unique sample identification number, date, time and location of sampling, the initials of the individual collecting the sample and a field form will be used to record information regarding additional items such as quality assurance/ quality control (QA/QC) sample identifications, color, odor, turbidity, and other field parameters.

Some samples will be collected as grab samples (i.e., instantaneous) and some samples will be collected as composite samples (e.g., temporal or spatial). Table 3 lists the sampling method for each sampling location. Grab samples are appropriate where temporal variability over the course of one day is not expected at the sampling location. Composite samples are appropriate where variability is expected within a short time frame (e.g., one day). Temporal composite samples will be collected for stormwater, intake and outfall samples. Stormwater, which will contribute to intake and outfall samples as well, can have highly variable dissolved and suspended constituents loads over short time periods. Composite samples will be collected using a Hach SD900 composite sampler or similar with a composite sampler dedicated to each location. The duration over which composite samples are collected will be selected to coincide with the duration of the storm event to the extent practical or to a maximum of 2 days. Spatial composite grab samples will be collected for non-contact cooling water. The sampling method may be modified if information acquired during the monitoring program indicates an opportunity for improved sample quality (representativeness, reproducibility, and/or reliability).

Stormwater Sampling

Stormwater samples will be collected at Locations 2-5, 7, 10-13 and 15. Locations 2, 3, 5, and 11 are stormwater only. Locations 4, 7, 10, 12, 13, and 15 are a combination of stormwater and treated process and non-process water. Sampling of stormwater will be scheduled to coincide with storm events as defined in 40 C.F.R. 122.21(g)(7)(ii), provided the storm event resulted in enough rain such that water is present at all sampling locations in the stormwater drainage network, otherwise no sample will be collected at dry locations.

Cape Fear River Intake and Outfall Sampling

Intake Sampling Point - Excess River Water Discharge Point

Intake water will be collected as a composite sample at the point where Excess River Water (Location 1) discharges into the Site Drainage Network. Excess river water is withdrawn from the Cape Fear River, but not used as process water or NCCW. It represents the chemical composition of river water prior to use as process and non-process water.

Outfall 002

Outfall 002 water will be collected as a composite sample from the Open Channel just before entering the pipe to the river (Location 20). Outfall 002 is where stormwater, NCCW and treated, non-Chemours process wastewater combine prior to discharge to the Cape Fear River.

Non-Contact Cooling Water

NCCW samples will be collected as spatial composite samples from the NCCW discharge points before these waters flow into the Site Drainage Network for Kuraray, Chemours and DuPont manufacturing areas (Locations 6, 9 and 14). There are multiple NCCW discharges from each of these areas to the Site Drainage Network, therefore multiple individual grab samples will be collected within the reach of each location shown on Figure 2. Individual grab samples will be collected using 250-mL HDPE bottles and will be composited in a decontaminated stainless-steel vessel producing one spatial composite sample per location.

Process Wastewater

Process wastewater samples will be collected as grab samples from the Chemours Monomers IXM Area, Chemours PPA Area, Kuraray and DuPont (Locations 16 to 19). The project team is working with Chemours, Kuraray and DuPont facility staff to identify and access the appropriate sampling points for the combined process wastewater from each of these areas.

Wastewater Treatment Plant Discharge

The discharge from the wastewater treatment plan (WWTP) will be collected at Outfall 001 (Location 8) as a composite sample. WWTP discharge consists of treated Kuraray and DuPont process wastewater and treated facility sanitary and utility water.

3.3.3 Decontamination Procedures

Sample containers will be new and used only once for each sample and disposable equipment (e.g., gloves, tubing, etc.) will not be reused, therefore; these items will not require decontamination.

All non-dedicated or non-disposable sampling equipment (i.e., the stainless-steel compositing vessel(s), flow-through cell, and aluminum rod) will be decontaminated between sample locations in the following manner:

- Tap water rinse;
- Scrub with tap water containing non-phosphate detergent (i.e., Alconox®);
- Tap water rinse;
- De-ionized water rinse; and
- Rinse three times with water to be sampled before sample collection.

3.4 Sample Shipping, Chain of Custody, and Holding Times

Upon sample collection, each containerized sample will be labelled and placed as soon as possible into an insulated sample cooler with ice. The cooler will serve as a shipping container and will be provided by the laboratory along with the appropriate sample containers. Chemours will request that samples be analyzed by the laboratory within the holding times specified in Table 4. The additional samples collected at each location for potential future analyses will be stored under chain of custody in a secured, refrigerated location on site.

Prior to shipment of the samples to the laboratory, a chain of custody (COC) form will be completed by the field sample custodian. Sample locations, sample identification numbers, description of samples, number of samples collected, and specific laboratory analyses to be performed on each sample will be recorded on the chain-of-custody form. The COC will be signed by the field personnel relinquishing the samples to the courier and will be signed by the laboratory upon receipt of the cooler. The cooler will be taped shut and signed across the lid of the cooler, and the laboratory personnel will confirm the signature is intact upon receipt.

3.5 Quality Assurance/ Quality Control

QA/QC activities will be performed in the field and in the laboratories to document the data quality. Each are described in the subsections below and summarized in Table 4.

3.5.1 Field QA/QC

Field QA/QC samples will be collected and analyzed along with the investigative samples to determine the potential bias and variability introduced in sample collection, storage, handling and shipping. Data quality objectives for field QA/QC samples are summarized in Table 3. During the Initial Characterization period four types of field QA/QC samples will be collected: equipment blanks, trip blanks, field blanks and field duplicates.

Equipment Blanks

Equipment blanks (field rinsate blanks) are used to evaluate equipment cleaning or decontamination procedures. At the sample location, laboratory-supplied analyte-free water will be poured over or through the clean, non-dedicated sampling equipment, and collected in a sample container. The equipment blank samples will then be shipped, stored and handled with the other samples and will be analyzed for the same parameters as other samples collected using the same device. Equipment blanks will be collected at a frequency of one per day during the Initial Characterization, then their frequency and the need for other blanks will be re-evaluated for Ongoing Sampling.

Trip Blanks

Trip blanks are used to assess whether samples might be inadvertently contaminated during shipment and handling. The trip blanks will consist of a series of new containers filled with analyte-free water prepared by the laboratory analyzing the samples and will travel to the Facility with the empty sample bottles and back from the Facility with the investigative samples. Trip blanks will not be opened in the field. Trip blanks will only be analyzed if there are detections above the practical quantitation limit (PQL) in the equipment blanks in the six sampling events of the Initial Characterization.

Field Blanks

Field blanks are used to assess whether field conditions pose a potential for bias or variability in the results of analysis. The field blank will be collected by transferring laboratory-supplied analyte-free water into a sample container without contacting any other sampling equipment. Field blanks will only be included if there are detections above the PQL in the equipment blanks in the six sampling events of the Initial Characterization.

Field Duplicates

Duplicate samples are collected to assess the precision of the laboratory analysis through calculation of the relative percent difference (RPD) between duplicate samples. The equation for calculating RPD is shown below:

$$RPD(\%) = \frac{|(Sample\ 1 - Sample\ 2)|}{\left[\frac{(Sample\ 1 + Sample\ 2)}{2}\right]} \times 100\%$$

Duplicates will be collected in the same manner as investigative samples and the duplicate samples will be analyzed for the same parameters as the co-located investigative sample. Duplicates will be numbered sequentially with investigative samples so they are not identifiable by the analytical laboratories (i.e., "blind" duplicates). Field duplicate samples will be collected at a frequency of one duplicate for every 20 investigative samples (i.e., one duplicate for every sampling event).

3.6 Documentation

The project field team will keep a daily record of field activities during the execution of field work including sampling notes and observations, instrument calibration records, measured field parameters, sample COC and shipping records. All field collected data will be furnished to Chemours within 10 business days of the conclusion of the field event.

4. TEST METHODS AND LABORATORY STANDARDS

4.1 Analytical Methods

Collected samples will be analyzed by the following three laboratory methods:

- EPA Method 537 Mod (Laboratory SOP);
- EPA Method 8321A (USEPA, 1996); and
- Table 3 Lab SOP.

4.2 Laboratory QA/QC

Laboratory QA/QC procedures will be employed to document the quality of the data resulting from the analytical programs. Laboratory procedures will include method blanks, matrix spikes (MS), laboratory replicate samples, laboratory control samples (LCS), isotope dilution analytes (IDA), and continuing calibration verification (CCV) to verify and document the precision and accuracy of the results of analysis. The laboratory will prepare and analyze all samples according to their in-house Standard Operating Procedures (SOPs) and laboratory Quality Assurance Plans (QAPs). Data quality objectives for laboratory QA/QC samples are summarized in Table 4.

Method Blanks

Method blanks are used to evaluate laboratory contamination. Laboratory-supplied analyte-free water will be analyzed for the same parameters as investigative samples. Method blanks will be analyzed at a frequency of one per sample group up to 20 investigative samples at the laboratory. Method blanks with no detected target analytes are considered acceptable. If target analytes are detected in the method blanks, associated data for investigative samples will be B-qualified if the concentrations are less than 5-times higher than the concentration detected in the method blank.

Matrix Spike

A matrix spike (MS) is a subsample of an investigative sample to which the laboratory adds a spike containing target analytes at known concentrations prior to extraction/analysis of the sample to assess the effect of sample matrix on the extraction and analysis procedures. A matrix spike sample will be analyzed by the laboratory once for each sample group (of the same matrix) or at a minimum of one in every 20 samples analyzed. The percent recovery of the MS is calculated to document the accuracy of the method for the matrix. Percent recovery is calculated as follows:

$$\%\ Recovery = \left(\frac{Amount\ of\ Spiked\ Sample - Amount\ of\ Sample\ Before\ Spike}{Amount\ of\ Spike}\right) \times 100\%$$

Percent recoveries within the range of 70% to 130% indicate acceptable accuracy. If the percent recovery is greater than the range of acceptable accuracy, detected results will be J-qualified. If the percent recovery is lower than the range of acceptable accuracy, detected results will be J-qualified and non-detect results will be UJ-qualified. If the percent recovery is less than 10%, results may be R-qualified, pending evaluation by the data reviewer.

Laboratory Replicate Samples

Laboratory replicate samples are subsamples of the same investigative sample, split and analyzed by the laboratory to assess the precision of the laboratory analysis through calculation of the RPD. Laboratory replicate samples will be analyzed at a frequency of one per sample group, up to 20 investigative samples analyzed. RPD values less than 20% indicate acceptable precision. If the RPD is outside the acceptable precision range, associated results detected at or above 5 times the PQL will be J-qualified.

Laboratory Control Samples (Second Source Standard)

LCS (otherwise known as second source standards) are samples prepared by the laboratory with known concentrations of target analytes prepared from a source that is different than the standards used to calibrate the instrument. The percent recovery of the LCS is calculated to document the accuracy of the method. LCS samples will be analyzed at a frequency of one per sample group. Percent recoveries within the range of 70% to 130% indicate acceptable accuracy. If the percent recovery is greater than the range of acceptable accuracy, detected results will be J-qualified. If the percent recovery is lower than the range of acceptable accuracy, detected results will be J-qualified and non-detect results will be UJ-qualified. If the percent recovery is less than 10%, results may be R-qualified, pending evaluation by the data reviewer.

Isotope Dilution Analytes (IDA)

Isotope dilution analytes (IDA) consist of carbon-13 labeled analogs, oxygen-18 labeled analogs, or deuterated analogs of the compounds of interest, and they are spiked into the samples at the time of extraction. This technique allows for the correction for analytical

bias encountered when analyzing more chemically complex environmental samples. The isotopically labeled compounds are chemically similar to the compounds of concern and are therefore affected by sample-related interferences to the same extent as the compounds of concern. Compounds that do not have an identically labeled analog are quantitated by the IDA method using a closely related labeled analog. IDAs are added in known amounts to all (100%) investigative and quality control samples where appropriate IDAs are available. The percent recovery of the surrogate is calculated to document the accuracy of the method. Recoveries in the range of 25% to 150% indicate acceptable accuracy. If the percent recovery is outside the range of acceptable accuracy, detected results will be J-qualified. If the percent recovery is lower than the range of acceptable accuracy, detected results will be J-qualified and non-detect results will be UJ-qualified. If the percent recovery is less than 10%, results may be R-qualified, pending evaluation by the data reviewer.

Continuing Calibration Verification

CCV samples are samples prepared with known concentrations of target analytes from the primary standards used to calibrate the instrument. They are analyzed periodically to verify the instrument calibration is still acceptable before analyses are performed on investigative samples. A percent difference (%D) is calculated to document the continuing calibration of the instrument. %D values less than or equal to 30% indicate acceptable calibration. If the %D is outside the acceptable range, associated results detected at or above 5 times the PQL will be J-qualified.

5. DATA VERIFICATION

The analytical laboratory performing the analysis will provide all analytical data to Chemours' data verification contractor, AECOM's in-house Analytical Data Quality Management (ADQM) group. The data package will be reviewed by ADQM for compliance with the laboratory SOPs and usability. The laboratory will also deliver the analytical data electronically for upload to the Chemours Locus EIM™ database.

All data will be reviewed using the Data Verification Module (DVM). The DVM is an automated database algorithm developed by the ADQM group that includes a series of data quality checks, which are binary (yes/no) and do not require professional judgement. Manual review is performed after the DVM process to address validation components that are not readily automated. The data are evaluated against the following data usability checks:

- Field and laboratory blank contamination
- USEPA hold time criteria
- Missing quality control samples
- MS recoveries to verify measurement precision
- LCS recoveries verify measurement precision
- Surrogate spike recoveries to verify measurement accuracy
- RPD between field duplicate sample pairs to verify field duplicate precision
- Completeness as a percentage of the planned samples actually collected and analyzed
- Sensitivity of the PQL compared to regulatory standards or screening levels

The DVM applies the following data evaluation qualifiers to analysis results, as warranted:

- R - Unusable result. Analyte may or may not be present in the sample.
- B – Not detected substantially above the level reported in the laboratory or field blanks.
- J – Analyte present. Reported value may not be accurate or precise.
- UJ – Not detected. Reporting limit may not be accurate or precise.

An individual DVM narrative report will be generated for each lot entered into the EIM™ database which will summarize any samples that are qualified, the specific reasons for the qualification, and the potential bias in reported results.

The DVM review process described above will be performed on 100% of the data generated for the sampling event. The DVM review process will be supplemented by a manual review of the instrument- related QC results for calibration standards, blanks, and recoveries to elevate the overall review process to be consistent with Stage 2b of the EPA Guidance for Labelling Externally Validated Laboratory Analytical Data for Superfund Use (EPA-540-R-08-005, 2009).

6. REPORTING

Quarterly reports will be submitted for the Initial Characterization as specified in subpart 11(c) of the proposed Consent Order. In compliance with Subpart 11(d), Chemours will report quarterly during the Ongoing Sampling period. Sampling of NCCW and process water will be performed every two months beginning within 30 days of approval of this Sampling Plan. The sampling and reporting schedule is summarized in Figure 3. Each quarterly report will include a map of sample locations, data tables of measured concentrations and data review summary.

7. REFERENCES

Chemours, 2017. Chemours Announces Voluntary Actions to Respond to North Carolina Community. http://pages.chemours.com/FayettevilleStatement.html. Accessed March 18, 2018.

Chemours, 2018 – May 2018 abatement measures.

TABLES

TABLE 1
PROPOSED CONSENT ORDER ATTACHMENT C PFAS AND ASSOCIATED METHODS
Chemours Fayetteville Works, North Carolina

Analytical Method	Attachment C PFAS						
	Common Name		Chemical Name		CASN		Chemical Formula
EPA Method 8321A	HFPO-DA / PFPrOPrA /"GenX"		2,3,3,3-Tetrafluoro-2 (1,1,2,2,3,3,3- heptafluoropropoxy)-propanoic acid)		13252-13-6		C6HF11O3
Table 3 Lab SOP	PFESA-BP1 / Nafion BP		Nafion Byproduct 1		66796-30-3; 29311-67-9		C7HF13O5S
	PFESA-BP2 / Nafion BP		Nafion Byproduct 2		749836-20-2		C7H2F14O5S
	PFECA-G		Hexanoic acid, 2,2,3,3,4,4,5,5,6,6-decafluoro-6-(trifluoromethoxy)-; Butanoic acid, 2,2,3,3,4,4-hexafluoro-4-[1,2,2,2-tetrafluoro-1- (trifluoromethyl)ethoxy]-		174767-10-3; 801212-59-9		C7HF13O3
	PFMOAA		Perfluoro-2-methoxyacetic acid		674-13-5		C3HF5O3
	PMPA	PFMOPrA	Perfluoro-2-methoxypropanoic acid	Perfluoro 3-methoxypropanoic acid	13140-29-9	377-73-1	C4HF7O3
	PFO2HXA		Perfluoro(3,5-dioxahexanoic) acid		39492-88-1		C4HF7O4
	PEPA	PFMOBA	2,3,3,3-Tetrafluoro-2-(pentafluoroethoxy) propanoic acid	Perfluoro-4-methoxybutanoic acid	267239-61-2	863090-89-5	C5HF9O3
	PFO3OA		Perfluoro(3,5,7-trioxaoctanoic) acid		39492-89-2		C5HF9O5
	PFO4DA		Perfluoro(3,5,7,9-tetraoxadecanoic) acid		39492-90-5		C6HF11O6
	TAFN4 / PF05DA		Perfluoro(3,5,7,9,11-pentadodecanoic) acid		39492-91-6		C7HF13O7
EPA Method 537 Mod	PFHpA		Perfluoroheptanoic acid		375-85-9		C7HF13O2

Notes:
PFAS - per- and polyfluoroalkyl substances
SOP - Standard Operating Procedure

TABLE 2
DATA QUALITY OBJECTIVES
Chemours Fayetteville Works, North Carolina

PFAS	Current PQL (ng/L)		Precision		Accuracy			Calibration	Completeness
	TestAmerica	Eurofins Lancaster	Field Duplicate RPD	Lab Replicate RPD	MS % Recovery	LCS % Recovery	Isotope Dilution Analyte % Recovery	CCV % Difference	% Complete
HFPO-DA / PFPrOPrA /"GenX"	8.6	1.7	20	20	70-130	70-130	25-150	60-140	90
PFESA-BP1 / Nafion BP #1	120	50	20	20	70-130	70-130	25-150	60-140	90
PFESA-BP2 / Nafion BP #2	95	50	20	20	70-130	70-130	25-150	60-140	90
PFECA-G	96	50	20	20	70-130	70-130	25-150	60-140	90
PFMOAA	95	50	20	20	70-130	70-130	25-150	60-140	90
PMPA	84	50	20	20	70-130	70-130	25-150	60-140	90
PFMOPrA	84	50	20	20	70-130	70-130	25-150	60-140	90
PFO2HXA	92	50	20	20	70-130	70-130	25-150	60-140	90
PEPA	100	50	20	20	70-130	70-130	25-150	60-140	90
PFMOBA	100	50	20	20	70-130	70-130	25-150	60-140	90
PFO3OA	88	50	20	20	70-130	70-130	25-150	60-140	90
PFO4DA	97	50	20	20	70-130	70-130	25-150	60-140	90
TAFN4 / PF05DA	110	100	20	20	70-130	70-130	25-150	60-140	90
PFHpA	1.7	0.88	20	20	76-140	67-137	25-150	60-140	90

Notes
Criteria may be replaced by statistical limits generated by the laboratory(ies).
CCV - continuing calibration verification
LCS - laboratory control sample
MS - matrix spike
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances
PQL - practical quantitation limit
RPD - relative percent difference

TABLE 3
DESCRIPTION OF SAMPLING LOCATIONS
Chemours Fayetteville Works, North Carolina

Sample Number	Sample Location Description	Sample Category				
		Sampling Method	Intake/ Outfall	Process water	Non-process wastewater (i.e., NCCW)	Stormwater
1	Discharge point of excess river water (i.e., water drawn from the Cape Fear River, but not used as process water or NCCW) to characterize background levels of PFAS	Temporal Composite	Intake			
2	Kuraray northern leased area stormwater discharge	Temporal Composite				✓
3	Chemours PPA area stormwater discharge	Temporal Composite				✓
4	Combined stormwater discharge from Kuraray northern leased area and Chemours PPA area	Temporal Composite				✓
5	Kuraray southern leased area stormwater	Temporal Composite				✓
6	Kuraray southern leased area NCCW discharge	Spatial Composite			✓	
7	Combined stormwater and NCCW discharge from western portion of the Facility	Temporal Composite			✓	✓
8	Outfall 001 non-Chemours process wastewater discharge to open channel to Outfall 002	Temporal Composite		✓	✓	
9	Chemours Monomers IXM NCCW discharge	Spatial Composite			✓	
10	Chemours Monomers IXM area stormwater discharge and NCCW	Temporal Composite			✓	✓
11	Decommissioned Chemours Teflon area stormwater discharge	Temporal Composite				✓
12	DuPont area southern drainage ditch stormwater discharge and NCCW	Temporal Composite			✓	✓
13	DuPont area northern drainage ditch stormwater discharge and NCCW	Temporal Composite			✓	✓
14	DuPont NCCW discharge	Spatial Composite			✓	
15	Combined stormwater and NCCW discharge from eastern portion of the Facility	Temporal Composite			✓	✓
16	Chemours Monomers IXM Area combined process wastewater	Grab		✓		
17	Chemours PPA Area combined process	Grab		✓		
18	Kuraray process wastewater sampling	Grab		✓		
19	DuPont process wastewater sampling	Grab		✓		
20	Outfall 002 pipe to Cape Fear River	Temporal Composite	Outfall			

Notes
Sample numbers refer to locations identified in Figure 2
NCCW - non-contact cooling water
PPA - polymer processing aid

TABLE 4
SAMPLING CONTAINERS, PRESERVATION, AND HOLDING TIMES
Chemours Fayetteville Works, North Carolina

Analytical Method	Container Type and Volume	Number of Containers	Preservation	Holding Times	
				TestAmerica	Eurofins Lancaster
EPA Method 537 Mod	250 mL HDPE	2	None	14 days to extraction, 40 days to analysis	14 days to extraction, 28 days to analysis
EPA Method 8321A	250 mL HDPE	2	None	14 days to extraction, 40 days to analysis	14 days to extraction, 28 days to analysis
Table 3 Lab SOP	250 mL HDPE	1	None	28 Days	14 days

Notes:
HDPE - high density polyethylene
SOP - Standard Operating Procedure

TABLE 5
QUALITY ASSURANCE/ QUALITY CONTROL SAMPLES
Chemours Fayetteville Works, North Carolina

Analytical Method	Field					Lab					
	Investigative Samples[1] (per event)	**Equipment Blank** (per day)	**Trip Blank**[2]	**Field Blank**[2]	**Field Duplicate** (per 20 samples)	**Method Blank** (per sample group)	**Matrix Spike** (per sample group)	**Lab Replicate** (per sample group)	**Lab Control Sample** (per sample group)	**Isotope Dilution Analytes**[1] (every sample)	**Continuing Calibration Verification** (beginning of each group)
EPA Method 537 Mod	20	1	1	1	1	1	1	1	1	20	1
EPA Method 8321A	20	1	1	1	1	1	1	1	1	20	1
Table 3 Lab SOP	20	1	1	1	1	1	1	1	1	N/A	1

Notes:

1 - Number of samples may be subject to change following Initial Characterization

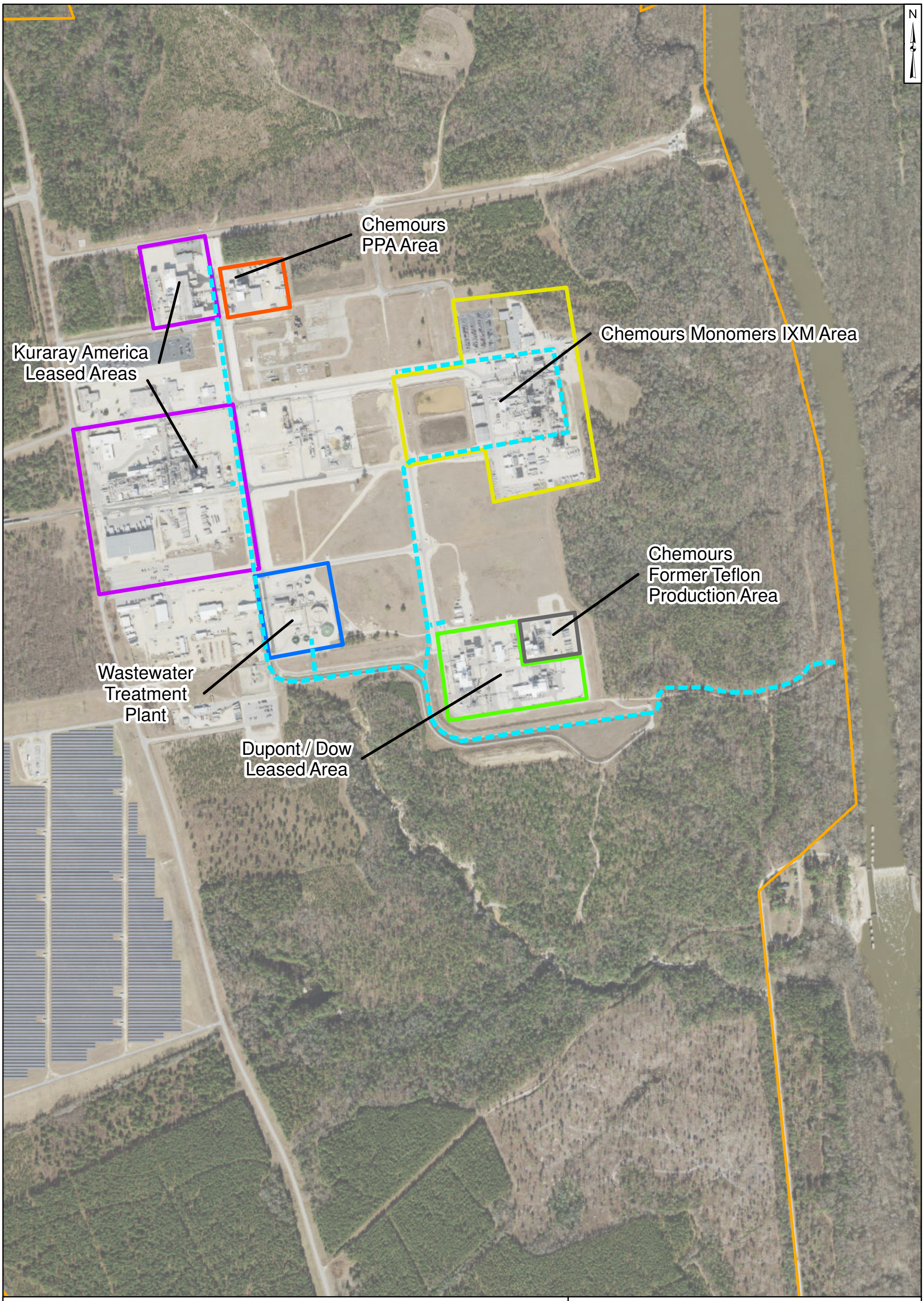
2 - Field blanks and trip blanks may be added to the sampling events if there are detects above the PQL in the equipment blanks

N/A - none available at present

SOP - Standard Operating Procedure

PQL - practical quantitation limit

FIGURES



Legend

- Drainage Network
- Site Boundary

Areas at Site

- Chemours Monomers IXM Area
- Chemours PPA Area
- Dupont / Dow Leased Area
- Chemours Former Teflon Production Area
- Kuraray America Leased Area
- Wastewater Treatment Plant

Notes:
Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

750 375 0 750 Feet

Site Location

Chemours Fayetteville Works, North Carolina

Geosyntec
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NC License No.: C-3500

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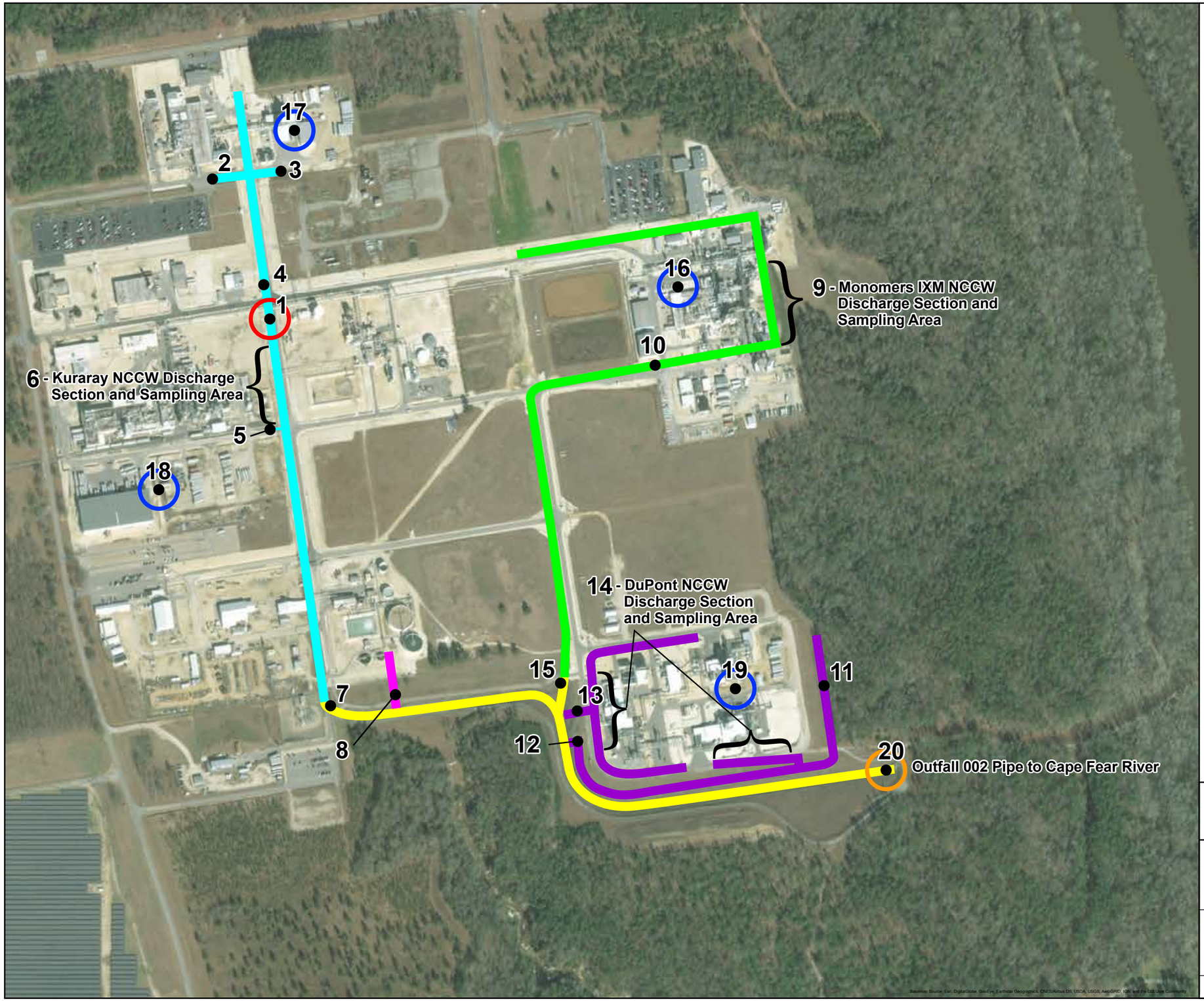
Figure

1



Legend

Ditch Types

- Wood Lined Trench
- Waste Water Treatment Plant Discharge
- Cooling Water Channel
- Open Channel to Outfall 002
- DuPont Area Ditches

1 Sample Location

Intake Water at Excess River Water Discharge

Outfall 002 Pipe to Cape Fear River

16: Chemours Monomers IXM Area Combined Process Water Sampling

17: Chemours PPA Area Combined Process Water Sampling

18: Kuraray Process Wastewater Sampling

19: DuPont Process Wastewater Sampling

NCCW - non-contact cooling water

N

500 250 0 500 Feet

Sample Locations

Chemours Fayetteville Works, North Carolina

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Figure **2**

Project Milestone/Deliverable	2019												2020												2021												2022				
	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05
Approval of Sampling Plan	✓																																								
Initial Characterization (IC)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--																							
IC Sampling Events		●		●		●		●		●		●																													
IC Quarterly Reports				O			O			O			O																													
Scope updates, regulatory approval													□																													
Initial Characterization Final Report																		♦																								
Ongoing Sampling (OS)														--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OS Sampling Events														●		●		●		●		●		●		●		●		●		●		●		●		●				
OS Quarterly Reports																		O			O			O			O			O			O			O			O			
Scope updates, regulatory approval																																								□		
Ongoing Sampling Final Report																																									♦

Notes:

This schedule is based on an assumption of 1 month for regulatory review and approval of the Sampling Plan, and will be modified accordingly if the approval date changes.

-- Timespan for major tasks

✓ Approval of sampling plan

● Bimonthly sampling event. This schedule assumes that storm events, as defined in C.F.R. 122.21(g)(7)(ii), will occur resulting in enough rain such that water is present at all sampling locations in the stormwater drainage network for the proposed sampling events.

O Quarterly reports

□ Scope updates and regulatory approval following Initial Characterization and Ongoing Sampling. The number of locations may be reduced following Initial Characterization, and the frequency of sampling events may be reduced following Ongoing Sampling.

♦ Final reports

Gantt Chart of Proposed Sampling Schedule
Chemours Fayetteville Works, North Carolina

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Figure
3