

APPENDIX D

Southwestern Offsite Seeps Assessment

Memorandum

Date: December 31, 2019
To: The Chemours Company FC, LLC
From: Geosyntec Consultants of NC, PC
Subject: Southwestern Offsite Seeps Assessment

INTRODUCTION AND OBJECTIVES

Geosyntec Consultants of NC, PC (Geosyntec) has prepared this memorandum for The Chemours Company FC, LLC (Chemours) for the Fayetteville Works facility in Bladen County, North Carolina (the Site). The purpose of this memorandum is to describe the findings of the Southwestern Offsite Seeps Assessment. Groundwater seeps are a common hydrogeological feature in areas of sloping terrain. Onsite four groundwater seeps (Seeps A, B, C and D; Figure 1) were identified in early 2019 (Geosyntec, 2019a). These onsite seeps informed the overall conceptualization of per- and polyfluoroalkyl substances (PFAS) mass transport from the Site to the Cape Fear River. The assessment described in this memorandum was undertaken to identify and sample the groundwater seeps located between the Old Outfall 002 and Georgia Branch Creek to assess Table 3+ PFAS concentrations and Table 3+ PFAS signatures (i.e. aerial vs. process water signatures).

METHODS

The southwestern offsite seeps were identified by observation from a boat along the west shore of the Cape Fear River from the Old Outfall 002 to Georgia Branch Creek (Appendix A). The shoreline was observed for any surface water runoff, ground water seeps or erosional features indicative of flowing water. A total of ten seeps were identified on the western shore of the Cape Fear River (Figure 1) along with one erosional feature which contained no flow of water. Nine of the ten seep (E to M) were sampled. Chemours obtained verbal agreement for sampling the seeps to the exception of the Lock and Dam Seep; Chemours is presently working towards obtaining a written access agreement to sample the Lock and Dam Seep which is immediately adjacent a boat launch ramp.

Once a seep was identified, it was sampled by submerging a 250 mL HDPE sampling bottle to capture the water flowing from the seep, facing into the direction of flow. Two bottles were

collected for each location and were composited together at the laboratory. Seeps E, F, J and L did not have enough flow to enable sampling by placing bottle in the flow of water; the seeps only had drops of water seeping from bank. Instead, these seeps (Seeps E, F, J and L) were sampled by collecting the trickle of water from a freshly cut section of the embankment. For Seep J, one bottle was collected from the seep and another from the wetland area upstream that is believed to feed the ground water of Seep J. While no above ground flow was observed between Seep J and the wetland area there was a continuous area of wetland vegetation connecting the seep and the wetland suggesting a hydrological connection. For Seep E and Seep F water was collected from an upstream pool of water along the seep channel rather than directly at the mouth. The highest flow was observed at Seep K which had clearly visible surface water flowing while low trickling flow was observed at Seeps G, H, I and M (Appendix B).

Seep samples were analyzed by the following methods:

- EPA Method 537 Mod (includes Hexafluoropropylene oxide dimer acid [HFPO-DA]) at TestAmerica Sacramento; and
- Table 3+ Standard Operating Protocol (SOP) at TestAmerica Sacramento

Seep PFAS signatures were assessed using hierarchical cluster analysis as described in the Corrective Action Plan (Geosyntec, 2019a).

DATA QUALITY

Analytical data were reviewed using the Data Verification Module (DVM) within the Locus™ Environmental Information Management (EIM) system, which is a commercial software program used to manage data. Following the DVM process, a manual review of the data was conducted. The DVM and manual review results were combined in a data review narrative report for each set of sample results, which were consistent with Stage 2b of the EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA-540-R-08-005 2009). The narrative report summarizes which samples were qualified (if any), the specific reasons for the qualification, and any potential bias in reported results. The data usability, in view of the project's data quality objectives (DQOs), was assessed and the data were entered into the EIM system. The data were evaluated by the DVM against the following data usability checks:

- Hold time criteria;
- Field and laboratory blank contamination;
- Completeness of QA/QC samples;
- MS/MSD recoveries and the relative percent differences (RPDs) between these spikes;

- Laboratory control sample/control sample duplicate recoveries and the RPD between these spikes;
- Surrogate spike recoveries for organic analyses; and
- RPD between field duplicate sample pairs.

The analytical results for the offsite seeps are presented in Table 1. Results are presented with all validation flags. The “J” and “UJ” flagged results indicate usable data, which should be considered as quantitatively estimated. The results are not necessarily within the laboratory’s criteria for accuracy and precision of the test method employed, but in the reviewer’s professional judgment are usable. Laboratory reports and data review narratives are provided in Appendix C. One field blank sample was analyzed for Table 3+ and Mod 537 PFAS compounds. All analytes were non-detect indicating there was no cross-contamination in the field blank.

RESULTS AND DISCUSSION

Total Table 3+ PFAS concentrations at the offsite seeps ranged from 2,600 ng/L at Seep J to 6,800 ng/L at Seep F (Table 1). The highest single compound measured was PMPA at Seep J with a concentration of 2,800 ng/L. The seeps with the highest concentration of total Table 3+ (Seep E and Seep G; 6,200 and 6,800 ng/L respectively) are located on the northern part of the study area, about 500 feet south of Old Outfall 002 (Figure 2). The other seeps have lower total Table 3+ concentration with the lowest (Seep J; 2,600 ng/L) is located in the middle of the study area, half a mile south of Old Outfall 002. The data gathered here shows an overall decreasing trend in total Table 3+ PFAS concentration while moving southward towards Georgia Branch Creek. The sample collected from Georgia Branch Creek in September 2019 (Geosyntec, 2019b) had a total Table 3+ concentration of 2,100 ng/L, similar to the concentrations found at Seep H through M. Compared to the onsite seeps and Old Outfall 002 the offsite seeps have lower concentrations of Total Table 3+ PFAS by one to two orders of magnitude (Figure 2).

Similar to Georgia Branch Creek, all of the offsite seeps exhibited an aerial PFAS signature (Figure 3). These results indicate that the PFAS in these offsite seeps likely originated from aerial PFAS deposition. The PFAS then subsequently infiltrated to groundwater and eventually discharged from these seeps to the Cape Fear River.

REFERENCES:

Geosyntec, 2019a. On and Offsite Assessment. September 30, 2019.

Geosyntec, 2019b. Corrective Action Plan. 2019.

* * * * *

Enclosures:

- Tables
- Figures
- Appendix A: Field Logs
- Appendix B: Field Photo Logs
- Appendix C: Data Review Narratives and Laboratory Reports

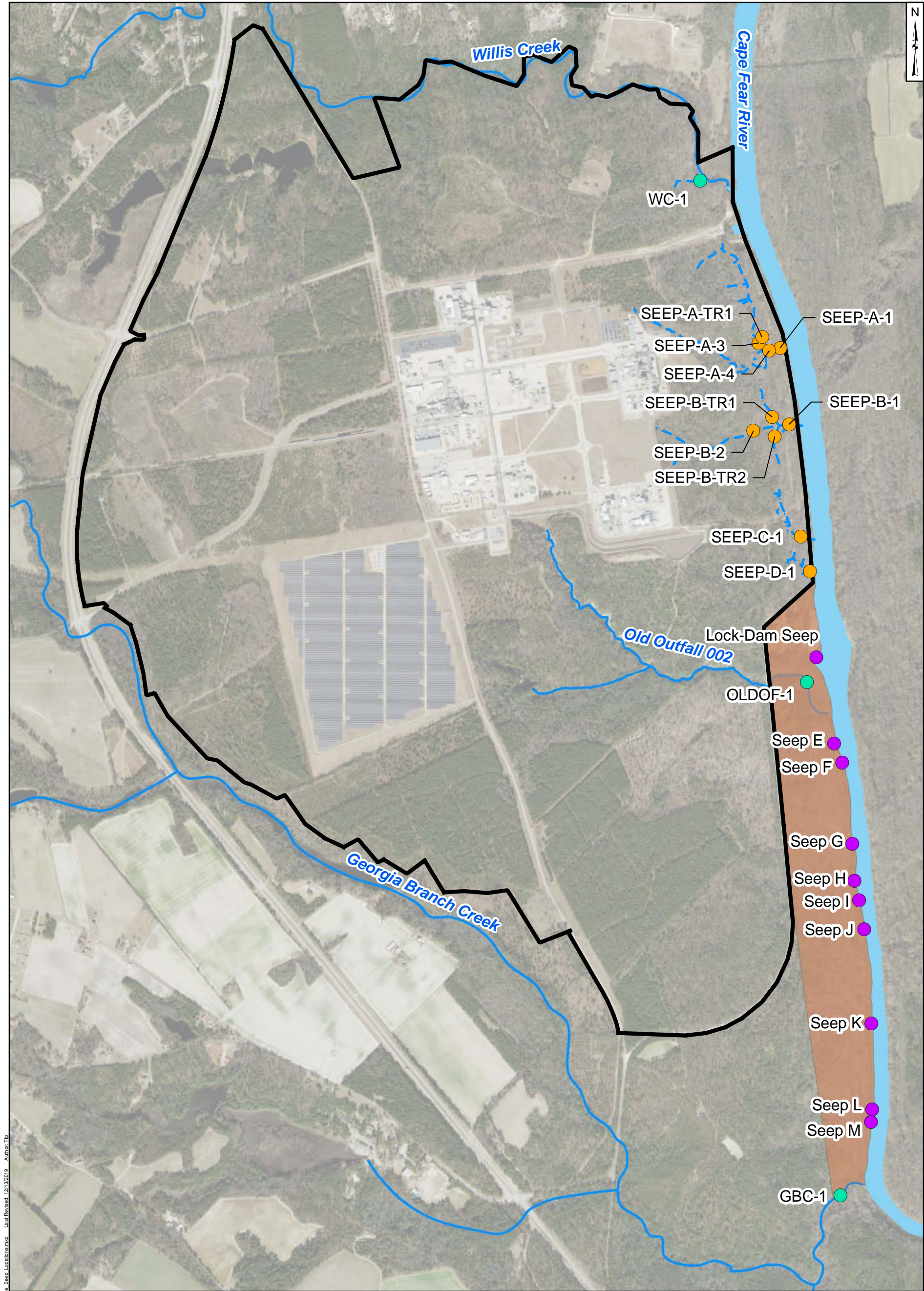
TABLES

TABLE 1
Southwestern Offsite Seeps Analytical Results
Chemours Fayetteville Works, North Carolina

Location ID	SEEP-E	SEEP-F	SEEP-G	SEEP-H	SEEP-I	SEEP-J	SEEP-K	SEEP-L	SEEP-M	FBLK
Field Sample ID	SEEP-E-0930	SEEP-F-0923	SEEP-G-0911	SEEP-H-0905	SEEP-I-0856	SEEP-J-0843	SEEP-K-0835	SEEP-L-0825	SEEP-M-0818	FIELD-BLANK-1-20191021-1050
Sample Date	22-10-19	22-10-19	22-10-19	22-10-19	22-10-19	22-10-19	22-10-19	22-10-19	22-10-19	21-10-19
QA/QC	--	--	--	--	--	--	--	--	--	Field Blank
SDG	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1	320-55576-1
Lab Sample ID	320-55576-1	320-55576-2	320-55576-3	320-55576-4	320-55576-5	320-55576-6	320-55576-7	320-55576-8	320-55576-9	320-55576-10
<i>Table 3+ Lab SOP (ng/L)</i>										
HFPO-DA	1,200	1,100	700	550	570	580	640	520	570	<4
PFMOAA	480 J	900	190	140	130	180 J	160	130	100	<5
PFO2HxA	800	810	470	350	300	350 J	320	220	190	<2
PFO3OA	170	130	57	28	17	120 J	41	18	15	<2
PFO4DA	83	7.3	9	<2	<2	58	11	2.7	<2	<2
PFO5DA	46	<2	<2	<2	<2	20 J	4.8	<2	<2	<2
PMPA	2,300	2,800	1,500	1,200	1,200	810 J	1,300	1,200	1,300	<10
PEPA	710	870	490	360	390	260	400	350	410	<20
PFESA-BP1	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
PFESA-BP2	90	9.6	22	16	12	37	70	44	28	<2
Byproduct 4	220 J	92	79 J	39 J	53 J	110 J	130 J	120 J	78 J	<2
Byproduct 5	2.1 J	<2.9	<2	<2	<2	<2	<2	<2	<2	<2
Byproduct 6	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
NVHOS	15	12	5.4	4.3	4.4	8.1 J	5.2	5.9	5.6	<2
EVE Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Hydro-EVE Acid	7.7	2	<2	<2	<2	2.7	3.5	<2	<2	<2
R-EVE	76	60	39	21 J	23 J	16	46 J	44 J	26 J	<2
PES	<2	<2.3	<2	<2	<2	<2	<2	<2	<2	<2
PFECA B	<2	<3	<2	<2	<2	<2	<2	<2	<2	<2
PFECA-G	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
<i>Other PFAS (ng/L)</i>										
10:2 Fluorotelomer sulfonate	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
11Cl-PF3OUdS	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	<20	<20	<20	<20	<20	<35	<20	<20	<20	<20
2-(N-ethyl perfluoro-1-octanesulfonamido)-ethanol	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-(N-methyl perfluoro-1-octanesulfonamido)-ethanol	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
6:2 Fluorotelomer sulfonate	<20	86	<20	<20	<20	<20	<20	<20	<20	<20
9Cl-PF3ONS	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ADONA	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
NaDONA	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1
N-ethyl perfluorooctane sulfonamidoacetic acid	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
N-ethylperfluoro-1-octanesulfonamide	<2	<2	<2	<2 UJ	<2 UJ	<2	<2	<2	<2	<2
N-methyl perfluoro-1-octanesulfonamide	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
N-methyl perfluorooctane sulfonamidoacetic acid	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Perfluorobutane Sulfonic Acid	<2	<2	<2	<2	<2	2.2	<2	<2	<2	<2
Perfluorobutanoic Acid	18	15	13	11	11	8.8	9.9	9.7	7.5	<2
Perfluorodecane Sulfonic Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorodecanoic Acid	8.3	<2	<2	<2	<2	4.1	<2	<2	<2	<2
Perfluorododecane Sulfonic Acid (PFDoS)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorododecanoic Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluoroheptane Sulfonic Acid (PFHpS)	<2	<2	<2	<2	<2	2.7	<2	<2	<2	<2
Perfluoroheptanoic Acid	5.5	<2	<2	<2	<2	13	<2	<2	<2	<2
Perfluorohexadecanoic Acid (PFHxDA)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorohexane Sulfonic Acid	4.3	<2	<2	<2	<2	8.2	<2	<2	<2	<2
Perfluorohexanoic Acid	5.4	4.5	3.4	2.7	2.8	8.4	3.8	2.4	2.3	<2
Perfluorononane Sulfonic Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorononanoic Acid	6	<2	<2	<2	<2	20	<2	<2	<2	<2
Perfluorooctadecanoic Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorooctane Sulfonamide	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluoropentane Sulfonic Acid (PFPeS)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluoropentanoic Acid	20	18	15	13	11	12	12	9.4	8.1	<2
Perfluorotetradecanoic Acid	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorotridecanoic Acid	<2.3	<2.6	<2	<2	<2	<2	<2	<2	<2	<2
Perfluoroundecanoic Acid	4.9	<2.2	<2	<2	<2	<2	<2	<2	<2	<2
Perfluorooctanoic Acid (PFOA)	15	<2	<2	<2	<2	55	3.7	<2	<2	<2
Perfluorooctanoic Sulfonic Acid (PFOS)	160	<2	<2	<2	4.4	270	7.6	4.1	2.7	<2

Notes:
Bold - Analyte detected above associated reporting limit
B - analyte detected in an associated blank
J - Analyte detected. Reported value may not be accurate or precise
ng/L - nanograms per liter
QA/QC - Quality assurance/ quality control
SDG - Sample Delivery Group
SOP - standard operating procedure
UJ – Analyte not detected. Reporting limit may not be accurate or precise.
< - Analyte not detected above associated reporting limit.

FIGURES



Path: P:\P\Projects\TR0725\Drawings and GIS\GIS\Corrosive Action Plan\TR0725_Offline Seep Locations.mxd Last Revised: 12/13/2019 Author: TJP
Projection: NAD 1983 StatePlane North Carolina FIPS 3200 Feet Units in Foot US

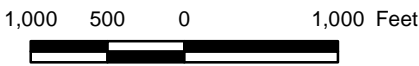
- Legend**
- Location of Offsite Seep Mouth at Cape Fear River
 - Onsite Seep Location
 - Tributary and Old Outfall Location
 - Observed Seep
 - Nearby Tributary
 - Site Boundary
 - Shoreline Surveyed for Offsite Seeps

Notes:

1. Seep E to M samples were collected where the seeps entered the Cape Fear River. Their locations on this figure have been slightly adjusted to facilitate interpretation so that they do not appear to be in the Cape Fear River.

2. The outline of Cape Fear River is approximate and is based on open data from ArcGIS Online and North Carolina Department of Environmental Quality Online GIS (MajorHydro shapefile).

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



Onsite Seep, Offsite Seep, and Tributary Sample Locations

Chemours Fayetteville Works, North Carolina

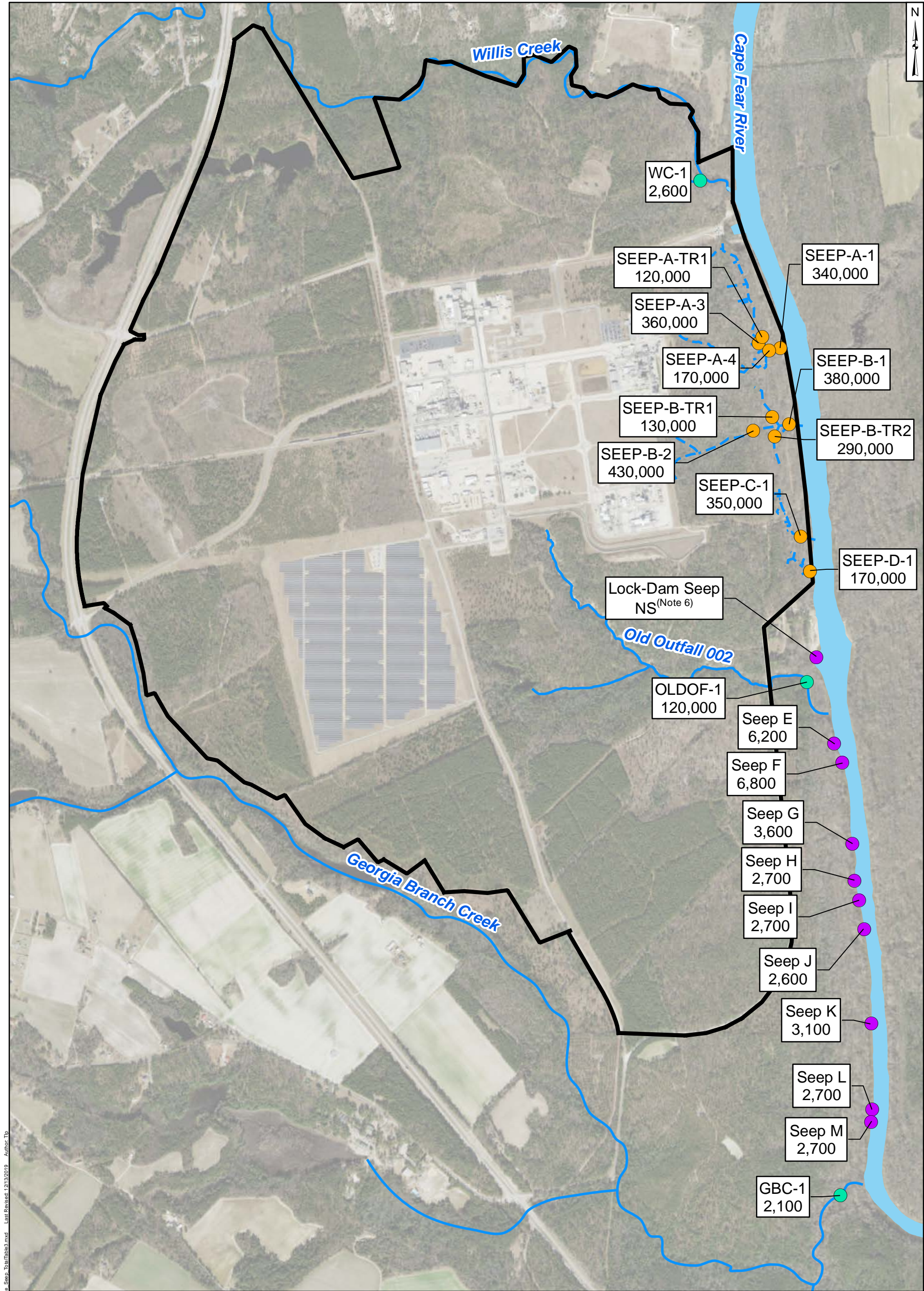
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NC License No.: C 3500 and C 295

Raleigh

December 2019

Figure
1



Path: P:\P\Projects\TR0725\GIS\Seep\Seep_TotalsTable3.mxd Last Revised: 12/13/2019 Author: TP

Legend

- Location of Offsite Seep Mouth at Cape Fear River
- Onsite Seep Location
- Tributary and Old Outfall Location
- Observed Seep
- Nearby Tributary
- Site Boundary

Notes:
NS = not sampled
1. All results are in ng/L (nanograms per liter).
2. Offsite seep samples were collected on Oct 22, 2019. All other samples were collected on Sept. 17, 2019.
3. HFPO-DA (hexafluoropropylene oxide dimer acid) is included in the total Table 3+ result, including HFPO-DA results evaluated by EPA Method 537 Mod.
4. Non-detect values were not included in the sum of total Table 3+ results.
5. Total Table 3+ results include J-qualified data.
6. Chemours is arranging for offsite access to sample this location due to the need to be near the active boat ramp to collect the sample.
7. Seep E to M samples were collected where the seeps entered the Cape Fear River. Their locations on this figure have been slightly adjusted to facilitate interpretation so that they do not appear to be in the Cape Fear River.
8. The outline of Cape Fear River is approximate and is based on open data from ArcGIS Online and North Carolina Department of Environmental Quality Online GIS (MajorHydro shapefile).
9. Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1,000 500 0 1,000 Feet

Onsite Seep, Offsite Seep, and Tributary Total Table 3+ Results
Chemours Fayetteville Works, North Carolina

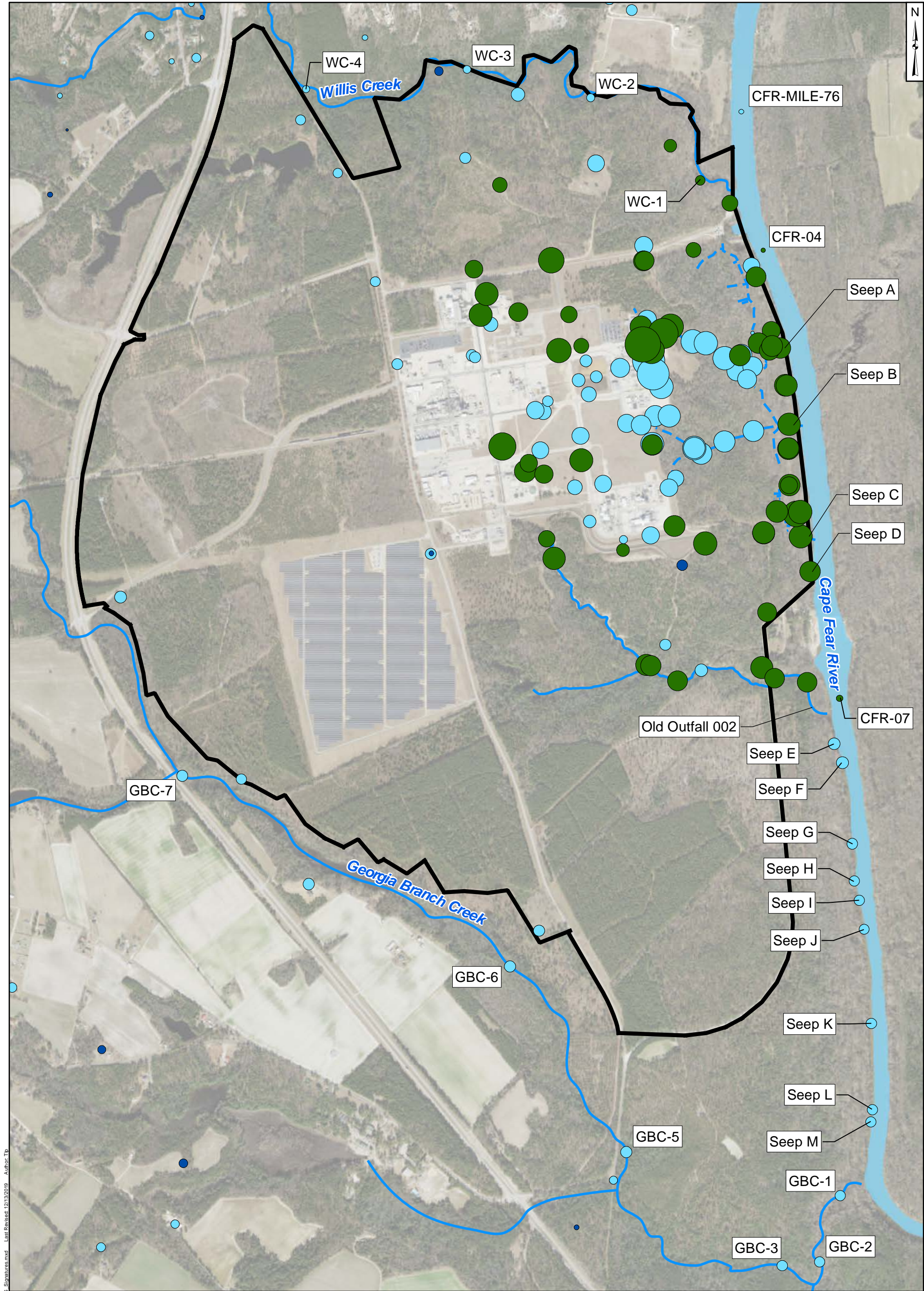
Geosyntec
consultants

Geosyntec Consultants of NC, P.C.
NC License No.: C 3500 and C 295

Raleigh

December 2019

Figure
2



Legend Signature <ul style="list-style-type: none">Aerial - Mixture of PFASAerial - Predominant PMPA or HFPO-DACombined Process Water - Predominant PFMOAAObserved SeepNearby TributarySite Boundary	Reference Scale <small>(Note 1)</small> (Total Table 3+, ng/L) <ul style="list-style-type: none">101001,00010,000100,0001,000,000	Notes: ng/L - nanograms per liter <ol style="list-style-type: none">The size of the symbol denotes the relative magnitude of Total Table 3+ concentrations and the color of the symbol denotes the proposed PFAS signature.Total Table 3+ concentrations were calculated using the 11 PFAS compounds listed in Attachment C of the Consent Order.Non-detect values were not included in the sum of total Table 3+ results.Total Table 3+ results include J-qualified data.Seep E to M samples were collected where the seeps entered the Cape Fear River. Their locations on this figure have been slightly adjusted to facilitate interpretation so that they do not appear to be in the river.Basemap source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.	<div>1,000 500 0 1,000 Feet</div> <div><div></div></div>		
			PFAS signatures in the vicinity of the Site Chemours Fayetteville Works, North Carolina		
			Geosyntec consultants	Geosyntec Consultants of NC, P.C. NC License No.: C 3500 and C 295	Figure 3
			Raleigh	December 2019	

Path: P:\P\Projects\TR729\Drawings and GIS\GIS\Corrosive Action Plan\TR729_PFS_Signatures.mxd Last Revised: 12/13/2019 Author: Tlp
Projection: NAD 1983 StatePlane North Carolina FIPS 3200 Feet Units in Foot US

APPENDIX A

Field Logs

DAILY FIELD REPORT

www.geosyntec.com

Project Name: Chemours Date: 10/22/19 Page, 1 of

Project Number: TRP795 Primary Activities: seep identification

Field Personnel: L. Eggenry, B. Peach,
A-10, and sampling of surface
S. Wolkoff water

Recorded By: S. Wolkoff

Weather: overcast, chilly, rain predicted

Daily Field Report

DAILY FIELD REPORT

Geosyntec[®]
consultants

www.geosyntec.com

Project Name:	chemours	Date:	10.22.19	Page	2	of	2
Project Number:	TR0795	Primary Activities:	seep identification				
Field Personnel:	B. Peach, A. W., L. Egginger	* surface water sampling					
Recorded By:	C. Vukoff						
Weather:	overcast						

Time	Description of activities - location of work, work performed, equipment & personnel used, incidental information
	Below William O'Huske dam @ Chemours site
0856	5 Seep collected (2 bottles) (Seep I) 34.824900 ; -78.821701
0905	6 Seep collected 2 bottles (Seep H) 34.825611 ; -78.821655
0911	7 Seep collected 2 jars (Seep G) 34.826967 ; -78.821884
0922	8 Seep ID collected 2 jars (Seep F) - iron along bank - difficult to collect sample from river; down flow - running water uphill 34.829940 ; -78.822158 - collected ~ 20ft uphill - side channel parallel to Cape Fear River
0930	9 SEEP collected 2 jars (Seep E) - uphill ~ 10ft collection - iron pool @ river 34.830635 ; -78.822418
0945	off-water
1000	LOCKDAM-SEEP (Lock Dam-seep) collected off-water, on land Coordinates: 34.833801 ; -78.823536

APPENDIX B

Field Photo Log

GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 1

Date: 10/22/2019

Comments: Facing West; Collector coordinates: 34.814662, -78.821366; Sample not collected; Site identified as Georgia Creek



Photograph 2

Date: 10/22/2019

Comments: View West; Collector coordinates: 34.816773, -78.820992; Sample ID: "Seep M"



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 3

Date: 10/22/2019

Comments: View Southwest;
Collector coordinates: 34.817228, -
78.820863; Sample ID: "Seep L"



Photograph 4

Date: 10/22/2019

Comments: View West; Collector
coordinates: 34.819482, -78.820947;
No sample collected because seep
was dry. Possibly caused by erosion
but maybe water upland.



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

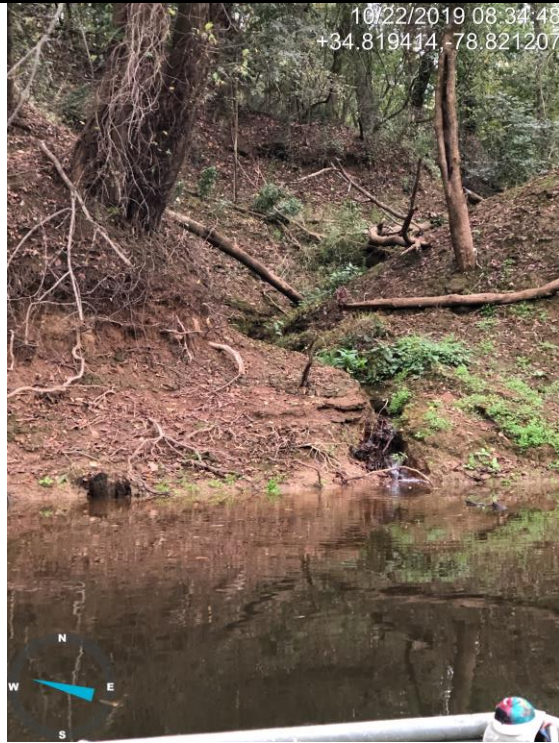
Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 5

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.820384, -78.820955; Sample
ID: "Seep K"



Photograph 6

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.823835, -78.821307; Sample
ID: "Seep J"; Samples are
composite of multiple slow
flowing holes and uphill there
is a pool of water. Coordinates
on picture are incorrect.



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

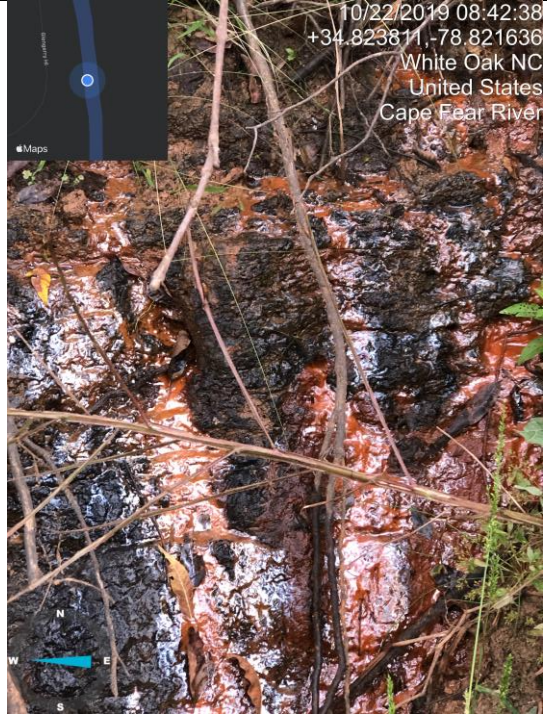
Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 7

Date: 10/22/2019

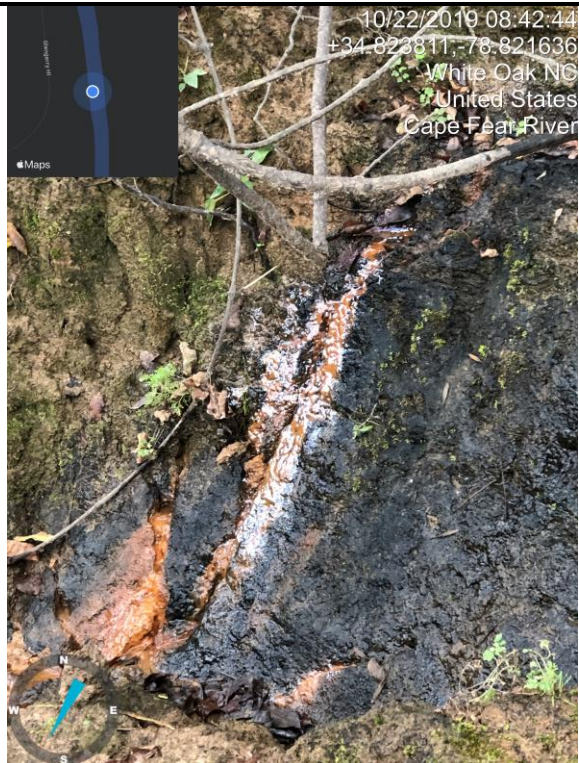
Comments: View West;
Collector coordinates:
34.823835, -78.821307; Sample
ID: "Seep J"; Samples are
composite of multiple slow
flowing holes and uphill there is
a pool of water.



Photograph 8

Date: 10/22/2019

Comments: View Southwest;
Collector coordinates:
34.823835, -78.821307; Sample
ID: "Seep J"; Samples are
composite of multiple slow
flowing holes and uphill there is
a pool of water.



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 9

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.823835, -78.821307; Sample
ID: "Seep J"; Samples are
composite of multiple slow
flowing holes and uphill there is
a pool of water.



Photograph 10

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.824900, -78.821701;
Sample ID: "Seep I".
Coordinates on pictures are
incorrect.



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 11

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.825611, -78.821655; Sample
ID: "Seep H"



Photograph 12

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.825611, -78.821655;
Sample ID: "Seep H"



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

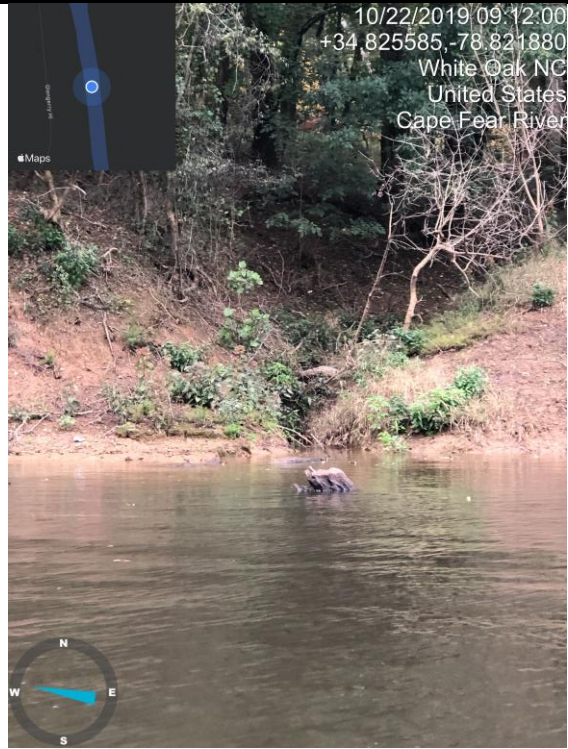
Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 13

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.826967, -78.821884;
Sample ID: "Seep G".
Coordinates on picture are
incorrect.



Photograph 14

Date: 10/22/2019

Comments: View West;
Collector coordinates:
34.829940, -78.822158; Sample
ID: "Seep F"; Sample collected
~20ft uphill in channel
positioned parallel to the Cape
Fear River.



GEOSYNTEC CONSULTANTS

Photographic Record

Client: Chemours

Project Number: TR0795

Site Name: Fayetteville Works

Site Location: Fayetteville, NC

Photograph 15

Date: 10/22/2019

Comments: View Northwest;
Collector coordinates:
34.830635, -78.822418; Sample
ID: "Seep E". Sample collected
~10ft uphill in iron pool.
Coordinates on picture are
incorrect.



APPENDIX C

DATA REVIEW NARRATIVES AND LABORATORY REPORTS

Data review narratives are included in this attachment. Due to file size limits, analytical laboratory reports will be provided separately with the hard copy of the report.

ADQM DATA REVIEW NARRATIVE

Site Chemours FAY – Fayetteville

Project 2019 OFFSITE SEEP SAMPLING

Project Reviewer Michael Aucoin, AECOM as a Chemours contractor

Sampling Dates October 21 - 22, 2019

Analytical Protocol

<u>Laboratory</u>	<u>Analytical Method</u>	<u>Parameter(s)</u>
TestAmerica - Sacramento	537 Modified	PFAS ¹
TestAmerica - Sacramento	Cl. Spec. Table 3 Compound SOP	Table 3+ compounds

¹ Perfluoroalkylsubstances, a list of 37 compounds including HFPO-DA.

Sample Receipt

The following items are noted for this data set:

All samples were received in satisfactory condition and within EPA temperature guidelines on October 23, 2019

Data Review

The electronic data submitted for this project was reviewed via the Data Verification Module (DVM) process.

Overall the data is acceptable for use without qualification, except as noted below:

- Some analytical results have been qualified J as estimated, and non-detect results qualified UJ indicating an estimated reporting limit, due to a poor surrogate or laboratory matrix spike recovery and poor lab replicate precision. See the Data Verification Module (DVM) Narrative Report for which samples were qualified, the specific reasons for qualification, and potential bias in reported results.

Attachments

The DVM Narrative report is attached. The lab reports due to a large page count are stored on an AECOM network shared drive and are available to be posted on external shared drives, or on a flash drive.

Data Verification Module (DVM)

The DVM is an internal review process used by the ADQM group to assist with the determination of data usability. The electronic data deliverables received from the laboratory are loaded into the Locus EIM™ database and processed through a series of data quality checks, which are a combination of software (Locus EIM™ database Data Verification Module (DVM)) and manual reviewer evaluations. The data is evaluated against the following data usability checks:

- Field and laboratory blank contamination
- US EPA hold time criteria
- Missing Quality Control (QC) samples
- Matrix spike(MS)/matrix spike duplicate (MSD) recoveries and the relative percent differences (RPDs) between these spikes
- Laboratory control sample(LCS)/control sample duplicate (LCSD) recoveries and the RPD between these spikes
- Surrogate spike recoveries for organic analyses
- RPD between field duplicate sample pairs
- RPD between laboratory replicates for inorganic analyses
- Difference / percent difference between total and dissolved sample pairs.

There are two qualifier fields in EIM:

Lab Qualifier is the qualifier assigned by the lab and may not reflect the usability of the data. This qualifier may have many different meanings and can vary between labs and over time within the same lab. Please refer to the laboratory report for a description of the lab qualifiers. As they are lab descriptors they are not to be used when evaluating the data.

Validation Qualifier is the 3rd party formal validation qualifier if this was performed. Otherwise this field contains the qualifier resulting from the ADQM DVM review process. This qualifier assesses the usability of the data and may not equal the lab qualifier. The DVM applies the following data evaluation qualifiers to analysis results, as warranted:

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

The **Validation Status Code** field is set to “DVM” if the ADQM DVM process has been performed. If the DVM has not been run, the field will be blank.

If the DVM has been run (**Validation Status Code** equals “DVM”), use the **Validation Qualifier**.

DVM Narrative Report

Site: Fayetteville

Sampling Program: 2019 OFFSITE SEEP SAMPLING

Validation Options: LABSTATS

Validation Reason Only one surrogate has relative percent recovery (RPR) values outside control limits and the parameter is a PFC (Nondetects).

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
SEEP-I-0856	10/22/2019	320-55576-5	N-ethylperfluoro-1-octanesulfonamide	0.0020	UG/L	PQL		0.0020	UJ	537 Modified		3535_PFC
SEEP-H-0905	10/22/2019	320-55576-4	N-ethylperfluoro-1-octanesulfonamide	0.0020	UG/L	PQL		0.0020	UJ	537 Modified		3535_PFC

Site: Fayetteville

Sampling Program: 2019 OFFSITE SEEP SAMPLING

Validation Options: LABSTATS

Validation Reason Associated MS and/or MSD analysis had relative percent recovery (RPR) values higher than the upper control limit. The reported result may be biased high.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
SEEP-H-0905	10/22/2019	320-55576-4	R-EVE	0.021	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-H-0905	10/22/2019	320-55576-4	R-EVE	0.021	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-H-0905	10/22/2019	320-55576-4	Byproduct 4	0.039	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-H-0905	10/22/2019	320-55576-4	Byproduct 4	0.040	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-E-0930	10/22/2019	320-55576-1	Byproduct 4	0.22	UG/L	PQL		0.0032	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-E-0930	10/22/2019	320-55576-1	Byproduct 5	0.0021	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-G-0911	10/22/2019	320-55576-3	Byproduct 4	0.079	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-G-0911	10/22/2019	320-55576-3	Byproduct 4	0.074	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-I-0856	10/22/2019	320-55576-5	R-EVE	0.023	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-I-0856	10/22/2019	320-55576-5	R-EVE	0.022	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-I-0856	10/22/2019	320-55576-5	Byproduct 4	0.053	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-I-0856	10/22/2019	320-55576-5	Byproduct 4	0.051	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	Byproduct 4	0.11	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	Byproduct 4	0.10	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-K-0835	10/22/2019	320-55576-7	R-EVE	0.046	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-K-0835	10/22/2019	320-55576-7	Byproduct 4	0.13	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep

Site: Fayetteville

Sampling Program: 2019 OFFSITE SEEP SAMPLING

Validation Options: LABSTATS

Validation Reason Associated MS and/or MSD analysis had relative percent recovery (RPR) values higher than the upper control limit. The reported result may be biased high.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
SEEP-L-0825	10/22/2019	320-55576-8	R-EVE	0.044	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-L-0825	10/22/2019	320-55576-8	R-EVE	0.042	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-L-0825	10/22/2019	320-55576-8	Byproduct 4	0.12	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-L-0825	10/22/2019	320-55576-8	Byproduct 4	0.12	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-M-0818	10/22/2019	320-55576-9	R-EVE	0.026	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-M-0818	10/22/2019	320-55576-9	R-EVE	0.027	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-M-0818	10/22/2019	320-55576-9	Byproduct 4	0.078	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-M-0818	10/22/2019	320-55576-9	Byproduct 4	0.079	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep

Site: Fayetteville

Sampling Program: 2019 OFFSITE SEEP SAMPLING

Validation Options: LABSTATS

Validation Reason

Quality review criteria exceeded between the REP (laboratory replicate) and parent sample. The reported result may be imprecise.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
SEEP-E-0930	10/22/2019	320-55576-1	Byproduct 4	0.19	UG/L	PQL		0.0032	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	NVHOS	0.0081	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	NVHOS	0.0069	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-K-0835	10/22/2019	320-55576-7	R-EVE	0.053	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-K-0835	10/22/2019	320-55576-7	Byproduct 4	0.16	UG/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep

Validation Reason Associated MS and/or MSD analysis had relative percent recovery (RPR) values less than the lower control limit but above the rejection limit. The reported result may be biased low.

Field Sample ID	Date Sampled	Lab Sample ID	Analyte	Result	Units	Type	MDL	PQL	Validation Qualifier	Analytical Method	Pre-prep	Prep
SEEP-E-0930	10/22/2019	320-55576-1	PFMOAA	0.48	ug/L	PQL		0.0050	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-E-0930	10/22/2019	320-55576-1	PFMOAA	0.43	ug/L	PQL		0.0050	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PMPA	0.81	UG/L	PQL		0.010	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PMPA	0.80	UG/L	PQL		0.010	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO2HxA	0.35	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO2HxA	0.35	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO3OA	0.12	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO3OA	0.12	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO5DA	0.020	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFO5DA	0.022	ug/L	PQL		0.0020	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFMOAA	0.18	ug/L	PQL		0.0050	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep
SEEP-J-0843	10/22/2019	320-55576-6	PFMOAA	0.17	ug/L	PQL		0.0050	J	Cl. Spec. Table 3 Compound SOP		PFAS_DI_Prep