



The Chemours Company
Fayetteville Works
22828 NC Highway 87 W
Fayetteville, NC 28306

August 8, 2019

Linda Culpepper
Director, Division of Water Resources
1611 Mail Service Center
Raleigh, NC 27699-1611
linda.culpepper@ncdenr.gov

Re: PFAS Observations at Chemours Fayetteville Works Cape Fear River Intake and Outfall 002 in May and June 2019

Dear Ms. Culpepper,

Following up on your discussion with Kevin Garon of Chemours on Thursday, July 25, please find enclosed a memorandum and associated data table and figures prepared by our consultant Geosyntec Consultants of NC, P.C. (Geosyntec) regarding elevated PFAS concentrations observed during routine surface water sample collection at Fayetteville Works in late May and early June 2019. As noted in Geosyntec's memorandum, the elevated PFAS concentrations have since declined, and Chemours is implementing a number of actions to enhance data for future monitoring.

If you have any questions, please contact me at Brian.D.Long@chemours.com.

Sincerely,

A handwritten signature in blue ink that reads 'Brian D. Long'.

Brian D. Long
Plant Manager
Chemours – Fayetteville Works

Enclosure

Geosyntec Memorandum

Cc:

Sheila Holman, DEQ

William F. Lane, DEQ

Francisco Benzoni, NC DOJ

Michael Abraczinskas, DAQ

Michael Scott, DWM

David C. Shelton, Chemours

John F. Savarese, WLRK

Kemp Burdette, CFRW

Geoff Gisler, SELC

Memorandum

Date: 7 August 2019
To: The Chemours Company FC, LLC
From: Geosyntec Consultants of NC, P.C.
Subject: Observations of Elevated PFAS Concentrations at the Cape Fear River Intake and Outfall 002 Sample Locations in May and June 2019

1 INTRODUCTION

Geosyntec Consultants of NC, P.C. (Geosyntec) has prepared this memorandum for The Chemours Company FC, LLC (Chemours) to discuss elevated per- and polyfluoroalkyl substances (PFAS) concentrations observed during routine surface water sample collection at the Chemours Fayetteville Works, North Carolina site (the Site) in late May and early June 2019. Chemours collects a 3.5-day composite sample twice per week from Outfall 002, and approximately once per week Chemours collects a grab sample of river water directly from the Cape Fear River within 100 feet of the Site inlet pipe (the Intake sample) where water is pumped from the Cape Fear River for use at the Site (Figure 1). Given that the Intake sample does not sample water drawn in through the inlet pipe by the intake pumps, Intake and Outfall 002 sample results have the potential to not be correlated if a transient local disturbance occurs near either the inlet pipe or Intake sample locations. Both the Intake and Outfall 002 collected samples are analyzed for PFAS by the Table 3+ Laboratory Standard Operating Procedure (SOP) and EPA Method 537 Mod by North Carolina Department of Environmental Quality (NCDEQ) approved laboratories. Between late May and early June 2019, samples collected at these locations were observed to have increases in concentrations of several Site Associated PFAS. These increased concentrations have since declined.

2 OBSERVATIONS – MAY AND JUNE 2019

Time series concentrations of PFAS analyzed in Intake and Outfall 002 samples collected in 2019 are shown in Figures 2 to 21. Two datasets exist for Outfall 002. Samples collected at Outfall 002

are split with one portion analyzed by an external commercial laboratory and the other portion analyzed by the Chemours onsite laboratory. Data presented here from the onsite laboratory are considered preliminary. They are useful to assess trends in the Outfall 002 samples. Trends observed in data from the onsite laboratory are consistent with trends in data from the commercial laboratories. PFAS data provided by the external laboratories after June 6, 2019 are considered preliminary pending data validation. They are included in this memorandum and attached figures for the purposes of evaluating trends associated with the elevated concentrations. Additionally, the different laboratories reported data to different practical quantitation limits (PQLs). The sample data, PQLs for non-detect data and laboratory used for each sample result are listed in Table 1.

In Outfall 002 samples, PFAS concentrations have been non-detect for many of the compounds at the associated laboratory reporting limits for most of 2019. At the end of May, increases in concentrations were observed for several compounds (See Figures 2 to 21 and Table 1), analyzed by the Table 3+ SOP (PFMOAA, PFO2HxA, PFO3OA, PFO4DA, PFO5DA, Byproduct 4, Byproduct 5, PFESA-BP2 and NVHOS). On May 28, 2019, concentrations at Outfall 002 were reported at the highest concentrations to date in 2019, followed by lower concentrations on May 30 and 31, 2019. Concentrations either returned to prior values, returned to non-detect or continued to decline for all PFAS analyzed by the Table 3+ SOP. This observation appears in data from both the commercial laboratory and the onsite laboratory.

In Intake samples, PFAS concentrations have been low to non-detect at the associated laboratory reporting limits for most of 2019. In the sample collected on June 6, 2019, elevated concentrations were observed for several compounds (see Figures 2 to 21; Table 1), analyzed by the Table 3+ SOP (HFPO-DA, PFMOAA, PFO2HxA, PFO3OA, PFO4DA, PFO5DA, PEPA, PFESA-BP1, PFESA-BP2, Byproduct 4, Byproduct 5, Byproduct 6, Hydro-EVE Acid, R-EVE and NVHOS). In the sample collected the following week and thereafter, concentrations returned to levels observed before June 6, 2019.

3 DISCUSSION

The present Intake sample collection point is near to the inlet pipe but does not collect water drawn through the inlet pipe. This could lead to the May 28, 2019 Outfall 002 sample with elevated PFAS concentrations not indicating a correlation to prior Intake samples, or the elevated Intake sample on June 6, 2019 not resulting in corresponding increases in subsequent results of Outfall 002 samples.

The distribution of PFAS in the elevated Intake and Outfall 002 samples suggests these increases may be associated with the same phenomenon. The distribution of PFAS detected in the elevated May 28, 2019 Outfall 002 sample and the June 6, 2019 Intake sample are similar to each other,

with the exception of Byproduct 5 being detected in the Intake sample at a higher relative level than the May 28, 2019 Outfall samples as shown in the table below.

PFAS Detections in Elevated Outfall and Intake Samples

<i>Compound (µg/L)</i>	<i>Outfall 002 May 28, 2019</i>	<i>Intake June 6, 2019</i>
HFPO-DA	0.076	0.15
PMPA	<0.57	0.14
PEPA	<0.047	0.066
PFMOAA	5.5	14
PFO2HxA	1.4	3.5
PFO3OA	0.61	1.9
PFO4DA	0.34	2.0
PFO5DA	0.15	1.9
PFECA-G	<0.041	<0.0041
PFECA B	<0.06	<0.006
R-EVE	<0.07	0.31
EVE Acid	<0.024	0.0034
Hydro-EVE Acid	<0.028	0.12
NVHOS	0.16	0.90
PES	<0.046	<0.0046
PFESA-BP1	<0.027	0.085
PFESA-BP2	0.22	4.8
Byproduct 4	<0.16	3.1
Byproduct 6	<0.015	0.10
Byproduct 5	1.1	17

A preliminary review of Site activities in Spring 2019 was conducted to identify potential causes contributing to the elevated PFAS concentrations observed at the Intake and Outfall 002. Chemours conducted a review of operating logs, checked with the manufacturing groups and reviewed daily audio, visual and olfactory monitoring reports. No spills or upsets were recorded or noted. The table below lists other activities noted by Chemours facility staff. Specifically, the Site used rental pumps to supplement water supply as two of the three pumps at the intake were temporarily inoperable. Rental pumps are infrequently used at the Site; for example, in the prior seven years the only other time rental pumps were used was September to December 2016.

Date	Activity / Observation
5/13/2019	<ul style="list-style-type: none"> Maintenance performed on two of three pumps (pump #2 and pump #3) in the intake cove. Pump #3 temporarily shut down.

	<ul style="list-style-type: none"> • Maintenance reported that the drain valve on pump #2 had failed and this resulted in pump house water being directed back to the Cape Fear River upstream of intake cove. • Rental pumps would need to be used to provide sufficient non-contact cooling water to the facility.
5/16/2019	<ul style="list-style-type: none"> • Suction piping placed in intake cove in anticipation of using rental pumps as replacements for pump #2 and pump #3.
5/28/2019	<ul style="list-style-type: none"> • Pump # 2 failure occurred.
5/28/2019 to 5/30/2019	<ul style="list-style-type: none"> • Two rental pumps temporarily put online.
5/28/2019	<u>Elevated Site Associated PFAS Detections in Outfall 002 Sample</u>
5/30/2019	<ul style="list-style-type: none"> • Water sample collection and flow measurements in Willis Creek as part of the evaluation of PFAS mass loading in seeps and creeks.
6/3/2019	<ul style="list-style-type: none"> • Pump # 2 drain valve replaced.
6/6/2019 to 6/7/2019	<ul style="list-style-type: none"> • Testing and priming of rental pumps, suction lines rinsed.
6/6/2019	<u>Elevated Site Associated PFAS Detections in Intake Sample</u>
6/7/2019	<ul style="list-style-type: none"> • Two rental pumps go online to supplement pump #1.
6/7/2019 to 6/26/2019	<ul style="list-style-type: none"> • Rental pump use continues; • Site associated PFAS detections in Outfall 002 either become non-detect, return to prior values or continue to decline.

The increases in PFAS concentrations observed in Outfall 002 data and the Intake data on May 28th and June 6th both occurred at times when rental pumps were in use. Rental pump use continued throughout the month of June, and over this time period the PFAS concentrations reported in the Intake samples and the Outfall 002 samples declined.

Together the sequence of these detections in both the Outfall 002 May 28, 2019 sample and Intake June 6, 2019 sample appear associated with the rental pump startup activities. These activities may have disturbed local conditions resulting in transient increases in PFAS. For instance, this could come from potentially increased groundwater contributions containing PFAS in these samples. Chemours has recently installed additional groundwater wells in the vicinity of the intake and has collected sediment samples in the vicinity of the intake. These data are not yet available but will be considered as appropriate as part of the Onsite and Offsite Assessment report due by September 30, 2019.

4 SUMMARY AND RECOMMENDED ACTIONS

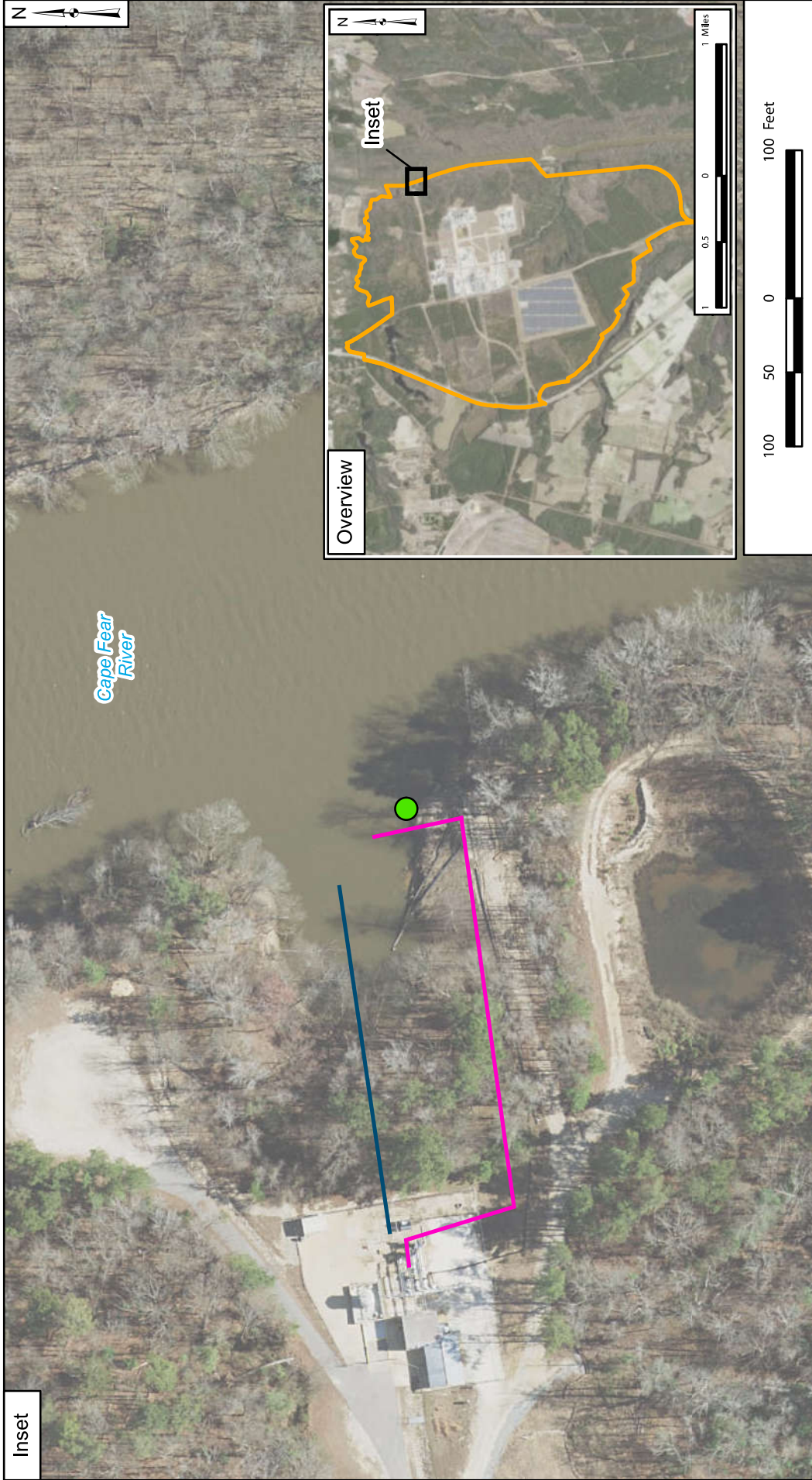
Following elevated PFAS concentrations at the Intake and Outfall 002, PFAS concentrations at both locations have either returned to prior concentrations, are non-detect or are declining. The elevated concentrations both occurred when rental pump use was initiated, suggesting that this activity temporarily disturbed the local environment and led to the elevated PFAS. The rental pumps continued to be used for the month of June and in this period the Site Associated PFAS concentrations at Outfall 002 either declined or became non-detect.

Chemours is implementing a number of actions in connection with its identification of elevated PFAS concentration excursions to enhance data for future monitoring. On a routine basis Chemours will collect samples from the flow of water collected through the inlet pipe, potentially from where the intake pumps draw water. Also, Chemours has requested Geosyntec to routinely review PFAS concentration data from the Onsite laboratory during the same 18-month assessment period as provided for in Consent Order Paragraph 11(c) initial characterization, to assess PFAS concentration changes. Onsite laboratory data allow for a more expeditious assessment than what is possible using current reporting timelines from the external laboratories. In the future if supplemental intake suction piping is used the piping should be suspended in the water column to avoid potential disturbances to the local environment.

ATTACHMENTS

- Figure 1: Intake Sample Location
- Figures 2 to 21: River Intake and Outfall 002 Site Associated PFAS Concentrations
- Table 1: River Intake and Outfall 002 2019 PFAS Concentrations

* * * * *



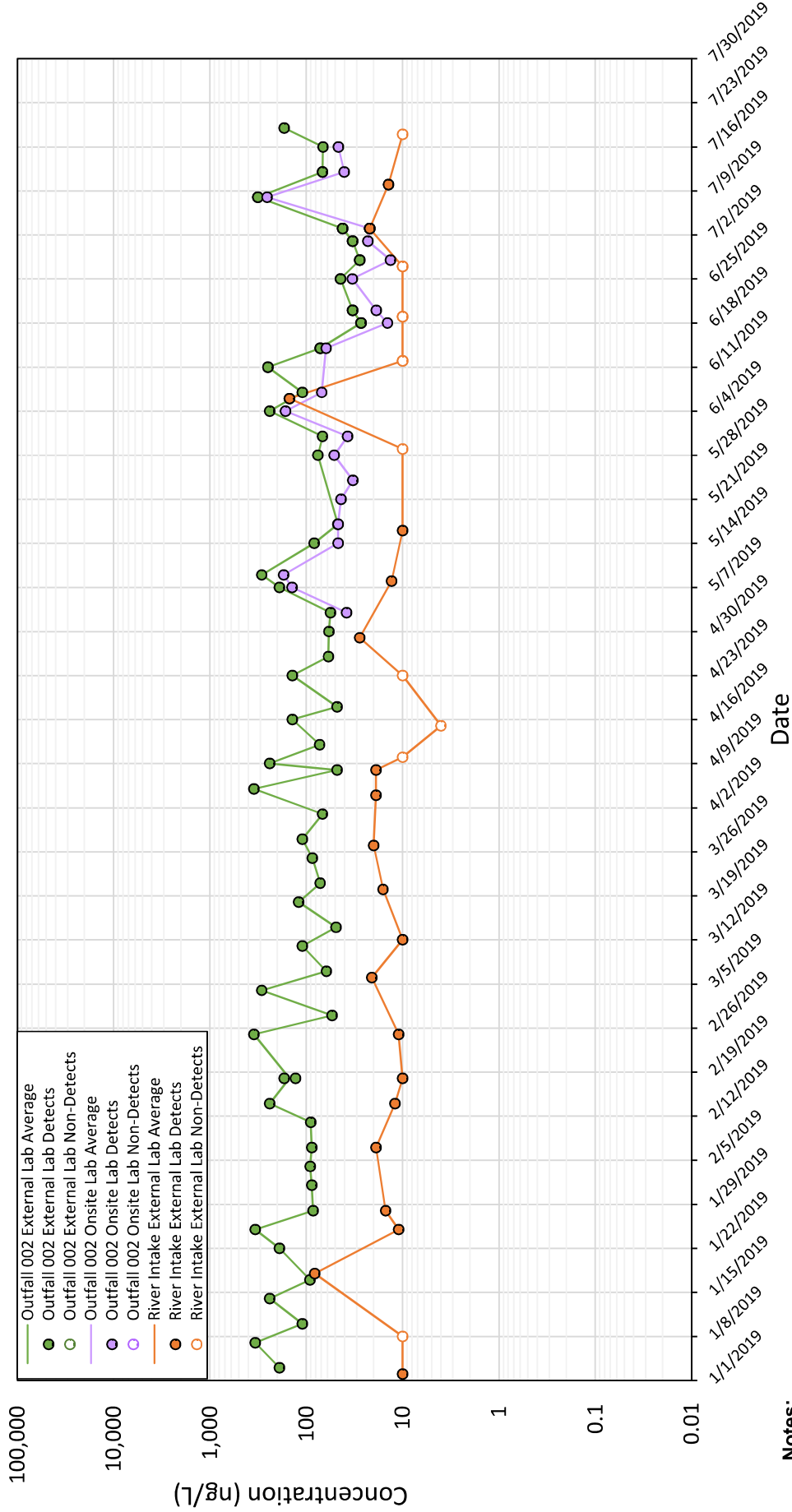
River Water Intake

Chemours Fayetteville Works, North Carolina

Geosyntec
Consultants of NC, PC
NC License No.: C-3500

Raleigh August 2019

Figure
1



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - HFPO-DA

Chemours Fayetteville Works, North Carolina

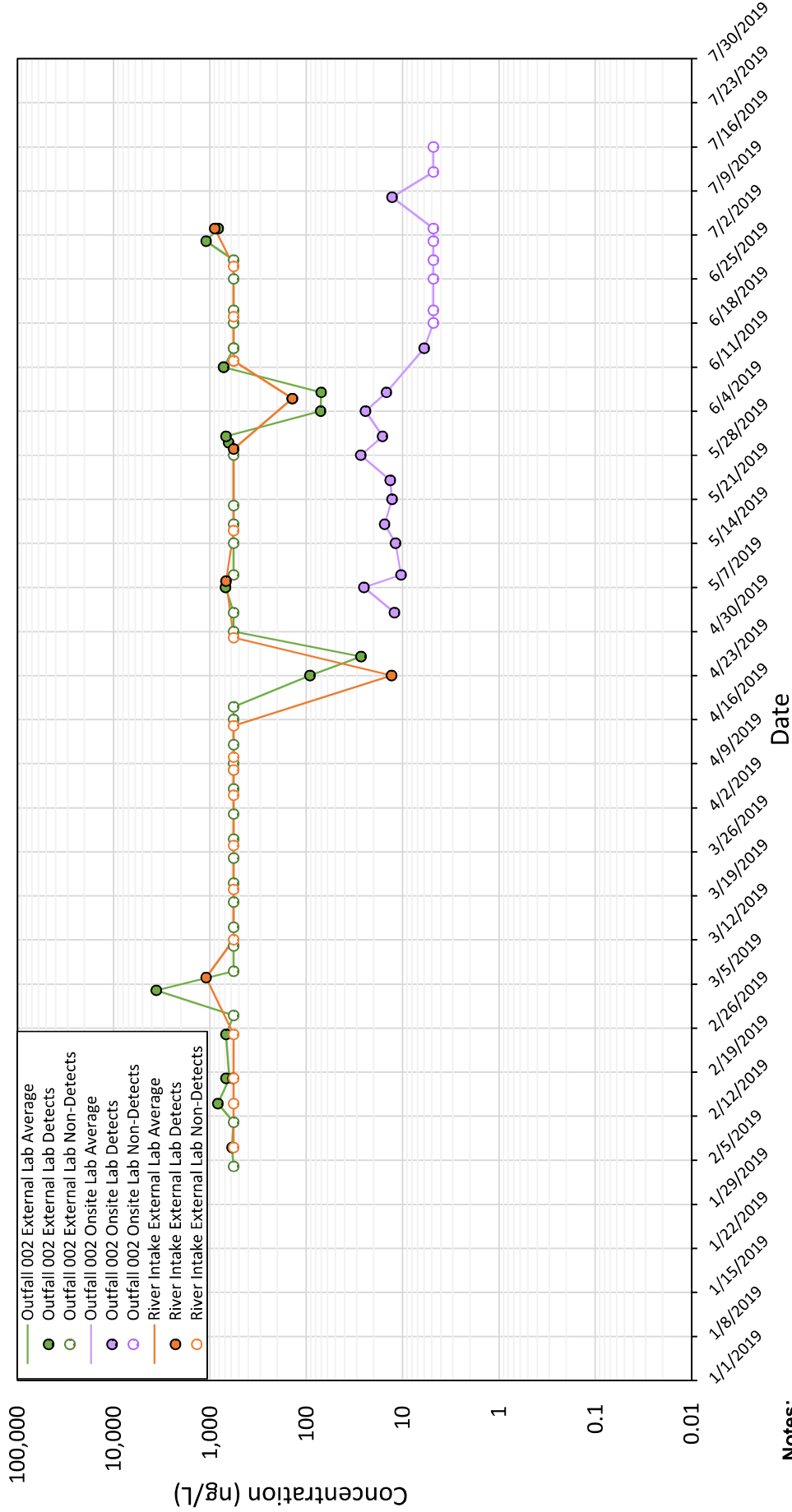


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Figure

2



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PMPA

Chemours Fayetteville Works, North Carolina

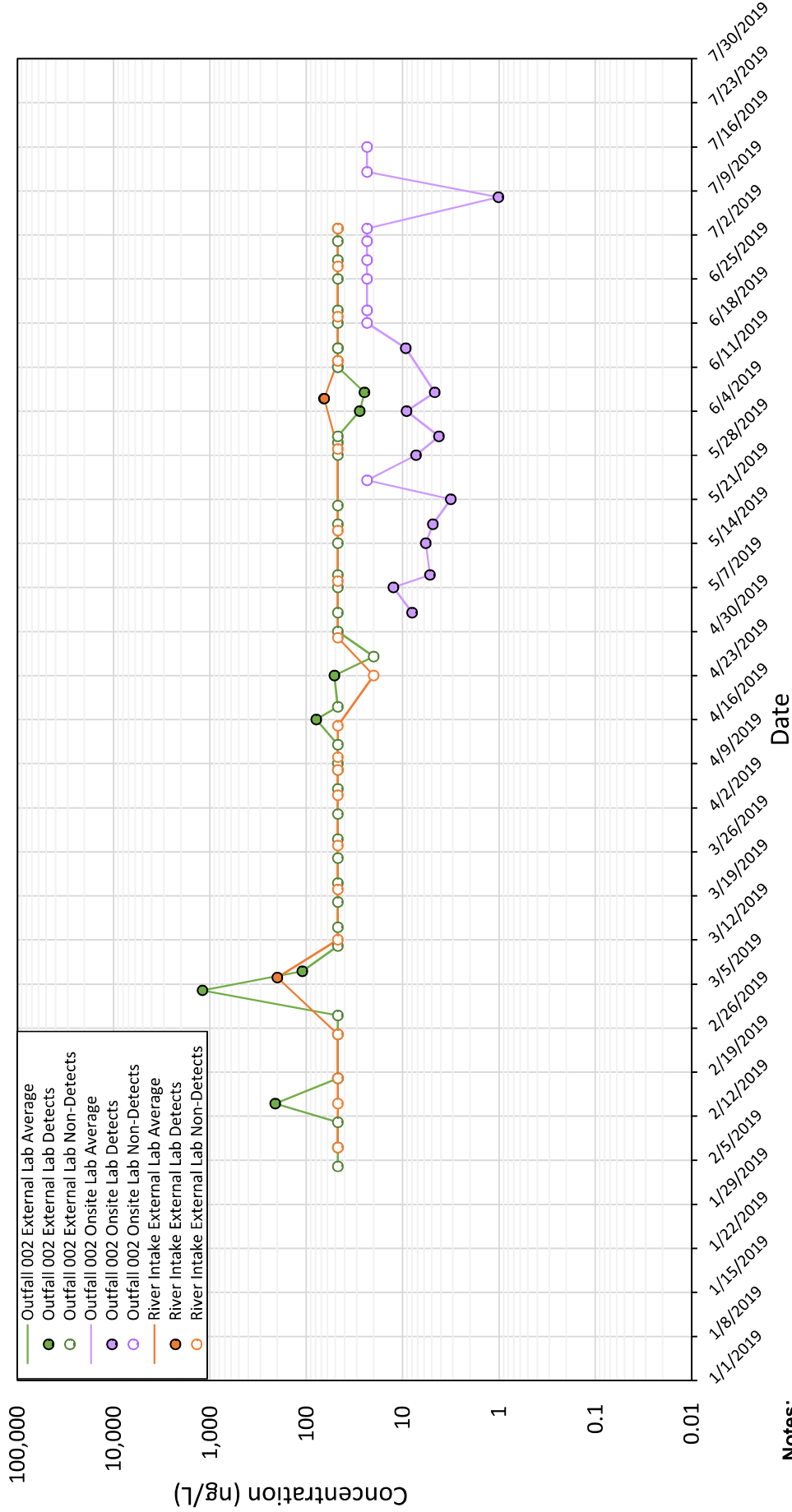


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Figure

3



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PEPA

Chemours Fayetteville Works, North Carolina

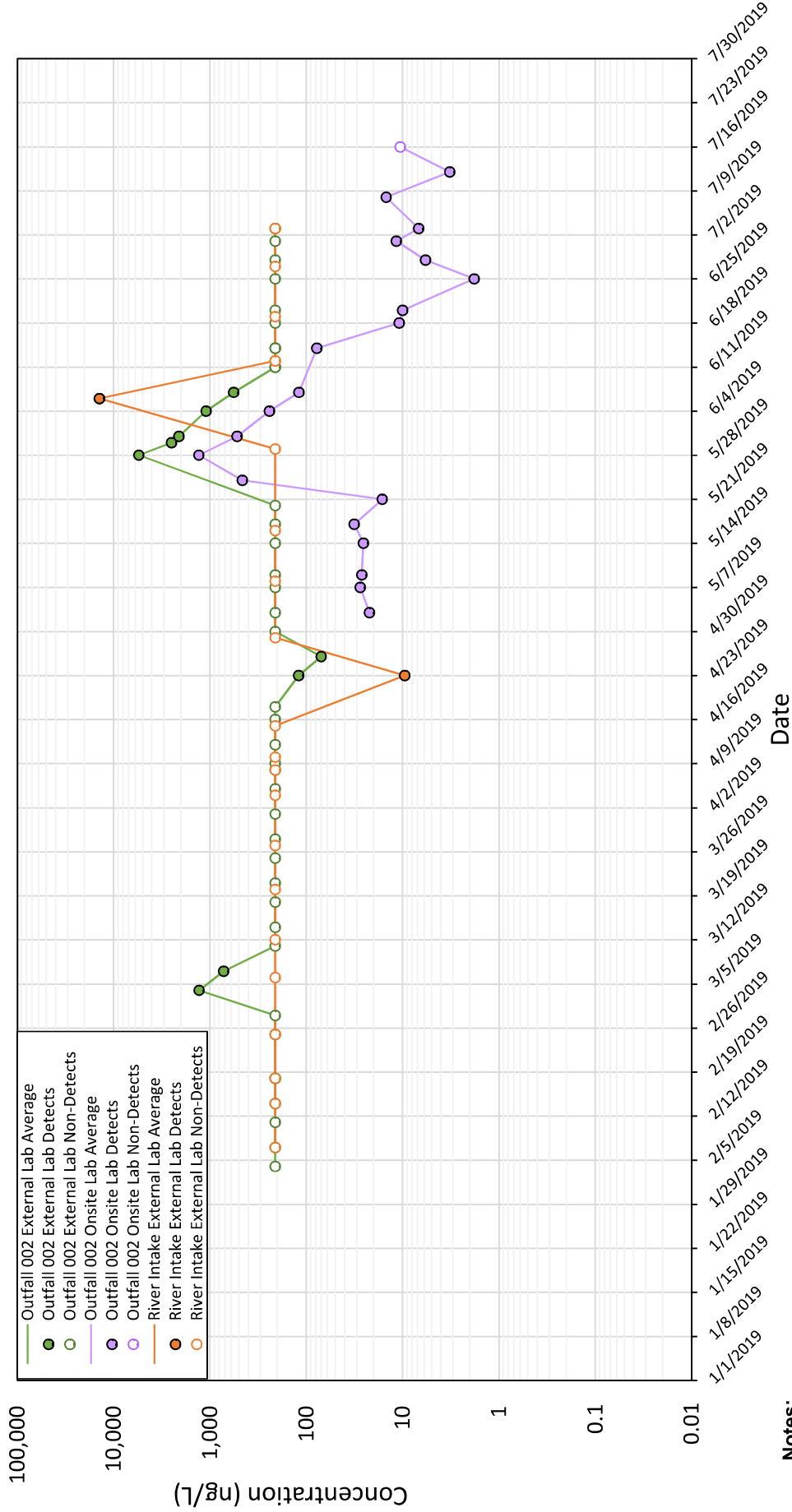


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Figure

4



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

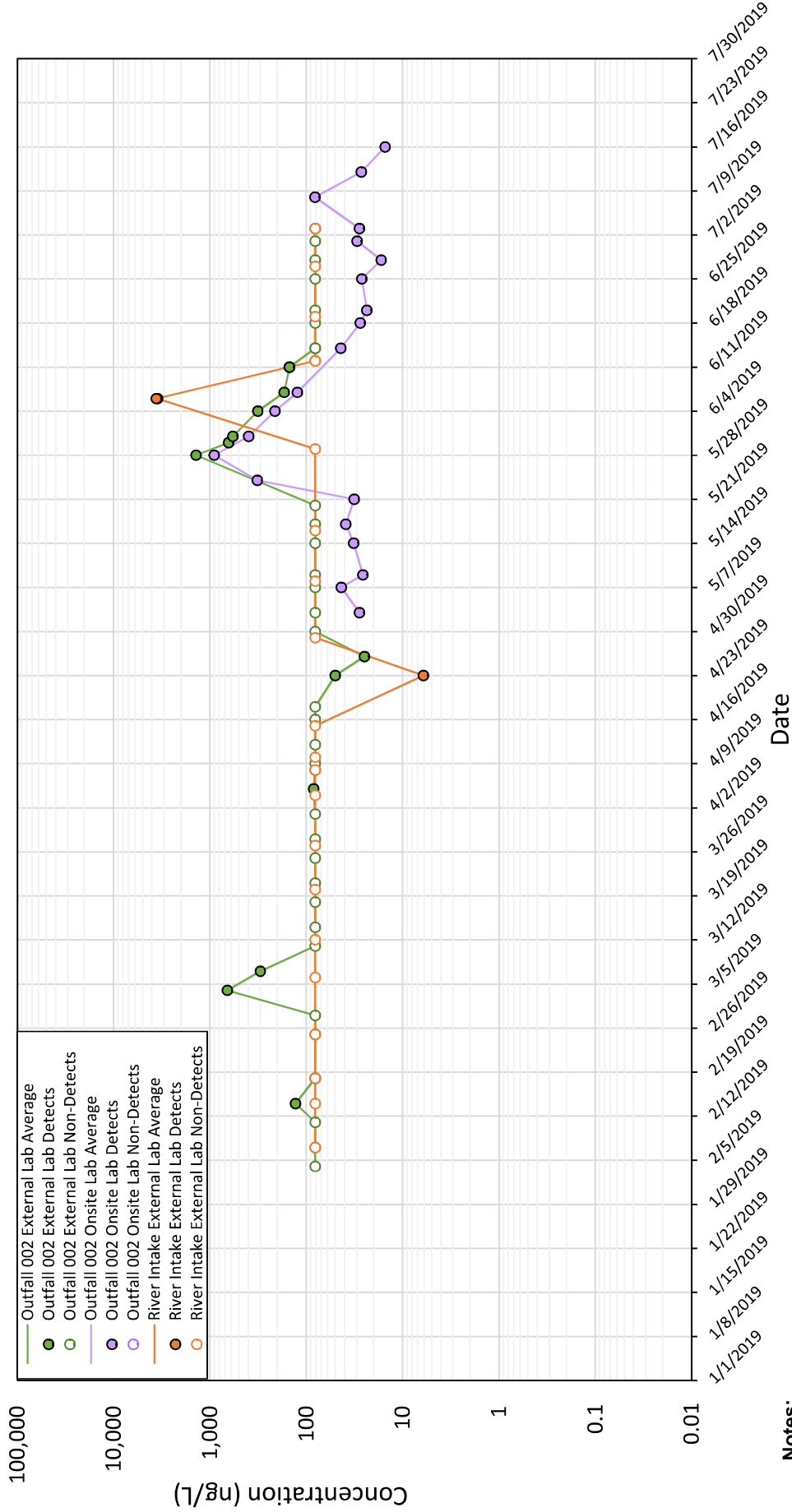
ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFMOA
 Chemours Fayetteville Works, North Carolina



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Figure
5



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFO2HxA

Chemours Fayetteville Works, North Carolina

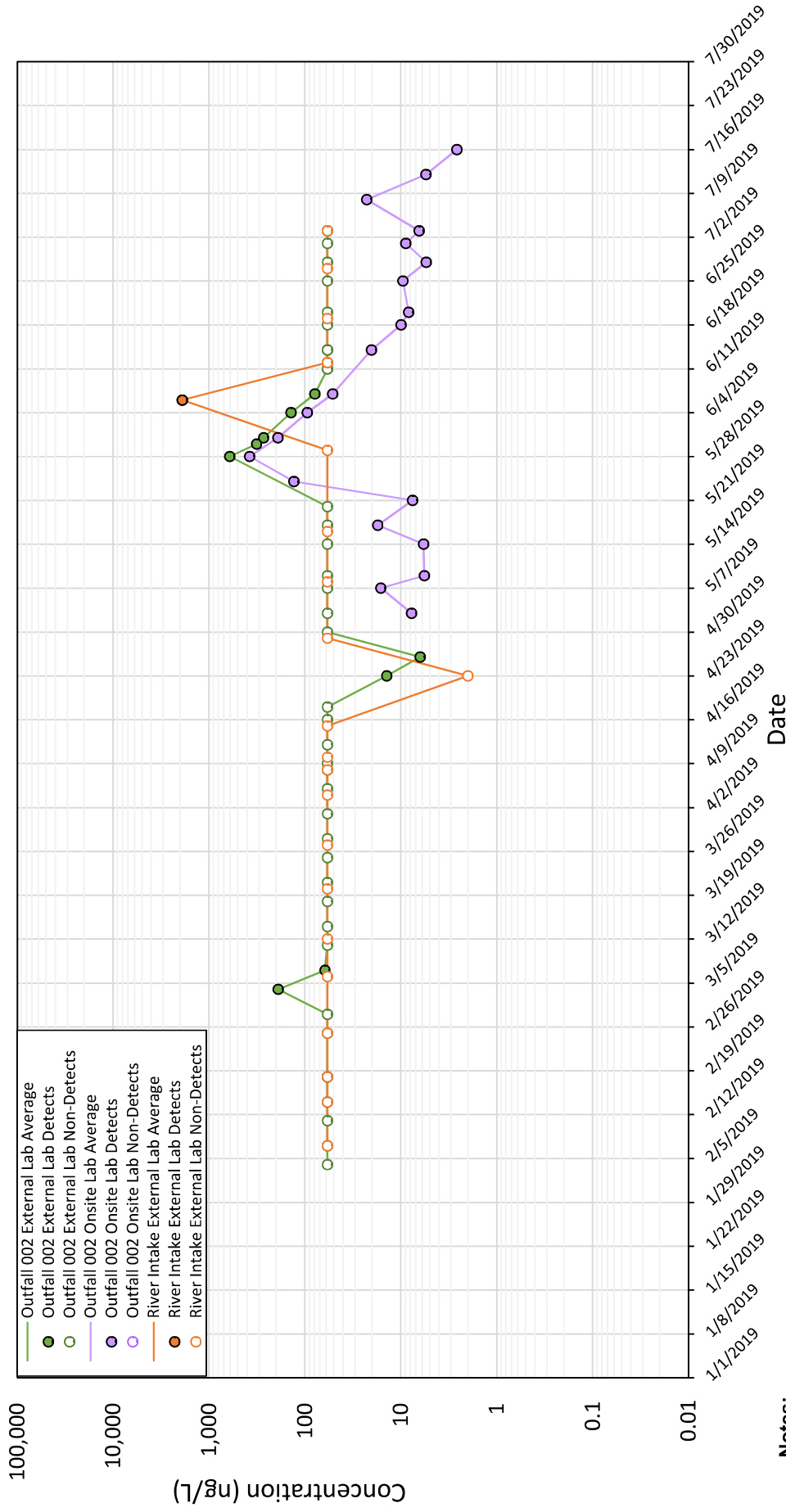


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Figure

6



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFO30A

Chemours Fayetteville Works, North Carolina

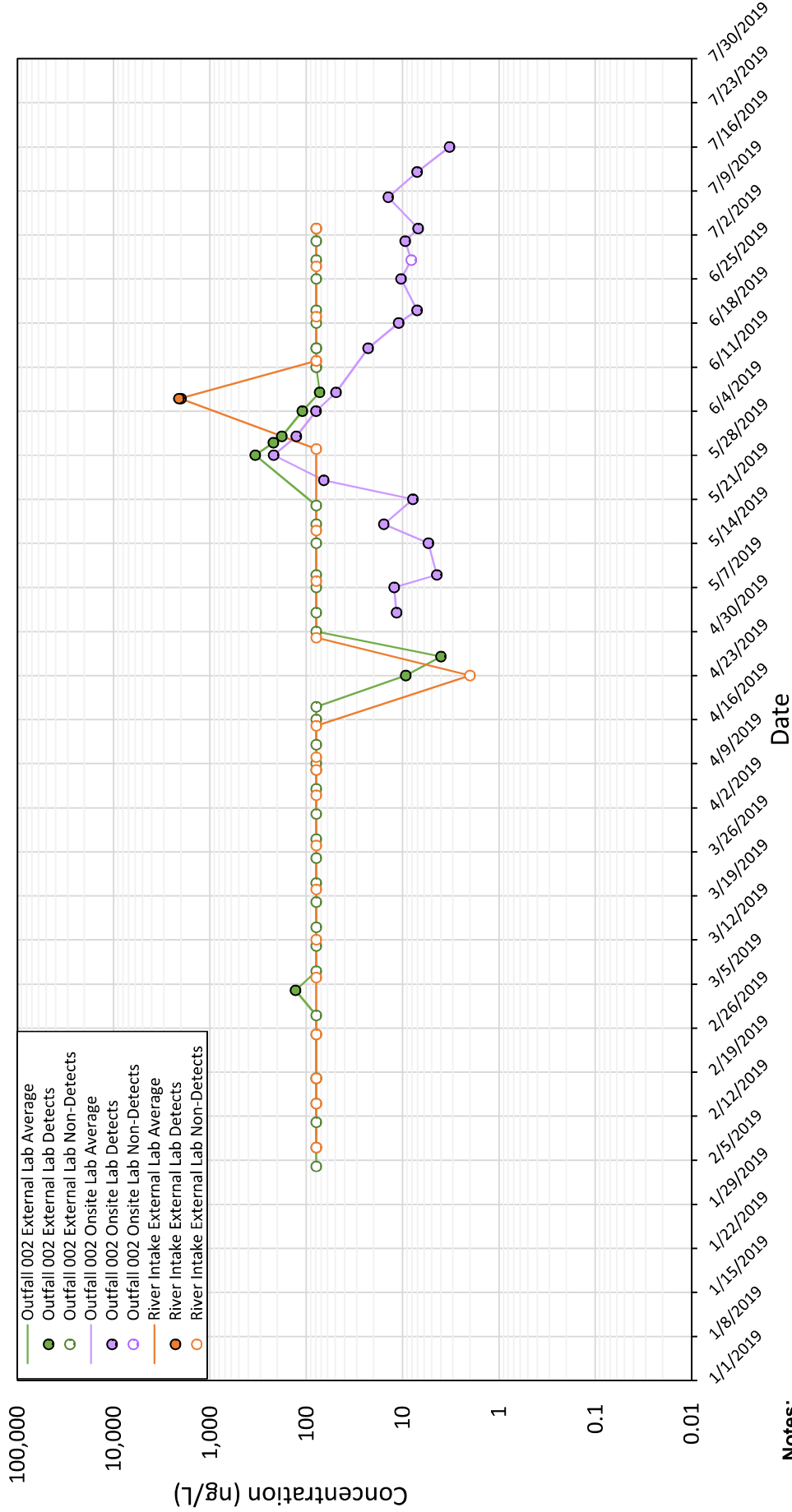


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Figure

7



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFO4DA

Chemours Fayetteville Works, North Carolina

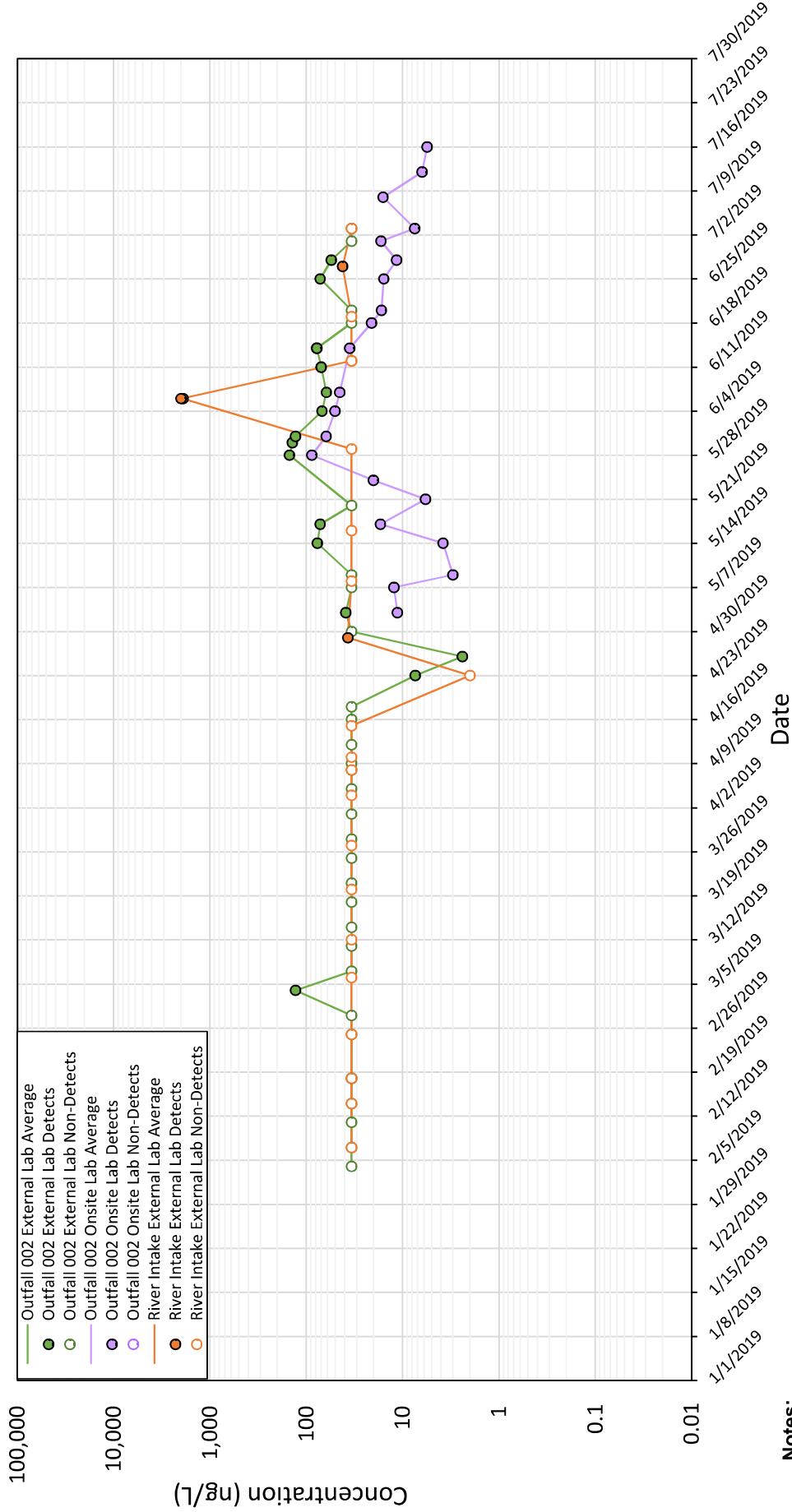


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Figure

8



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFO5DA

Chemours Fayetteville Works, North Carolina

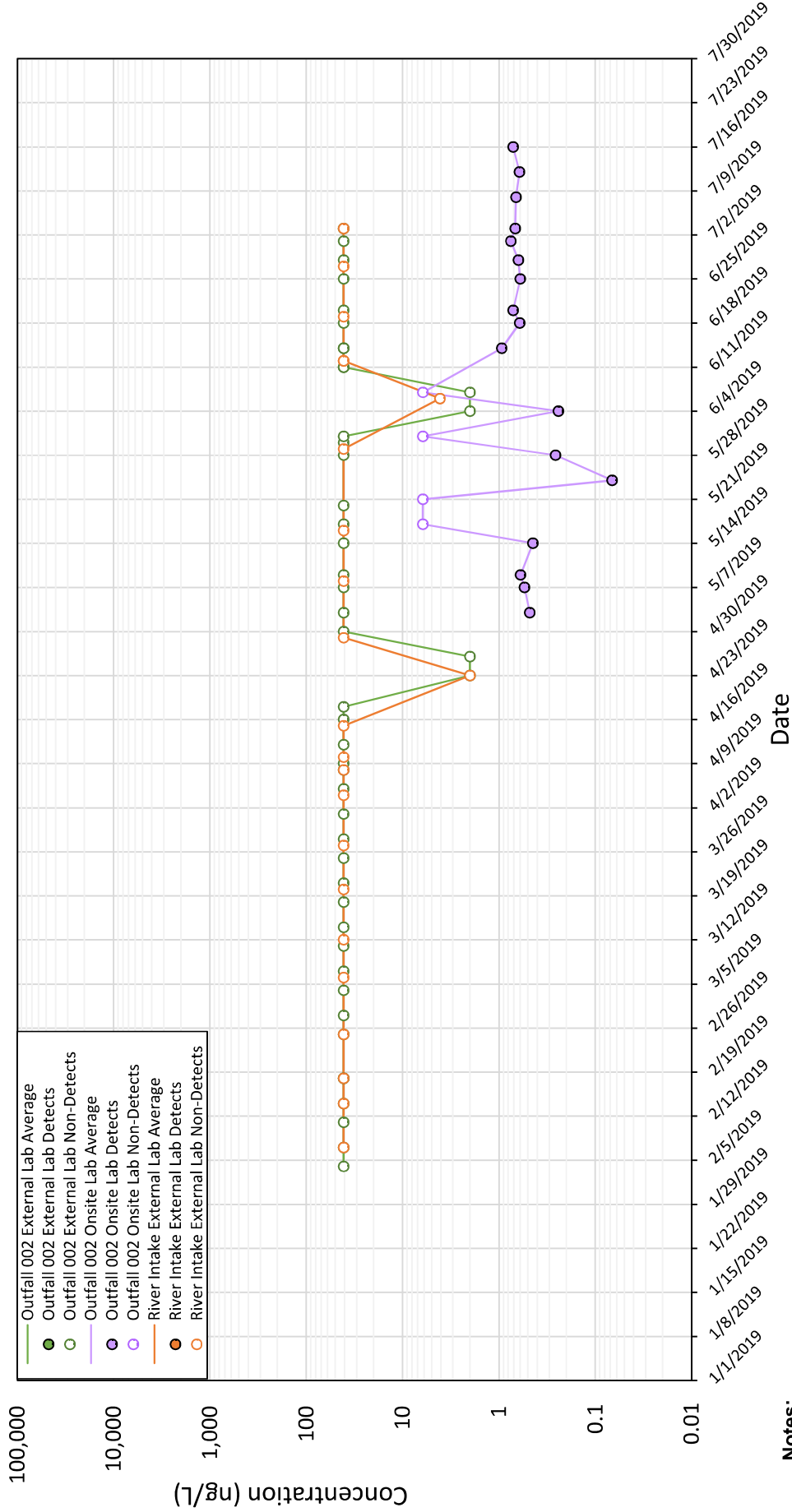


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Figure

9



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFCEA-G

Chemours Fayetteville Works, North Carolina

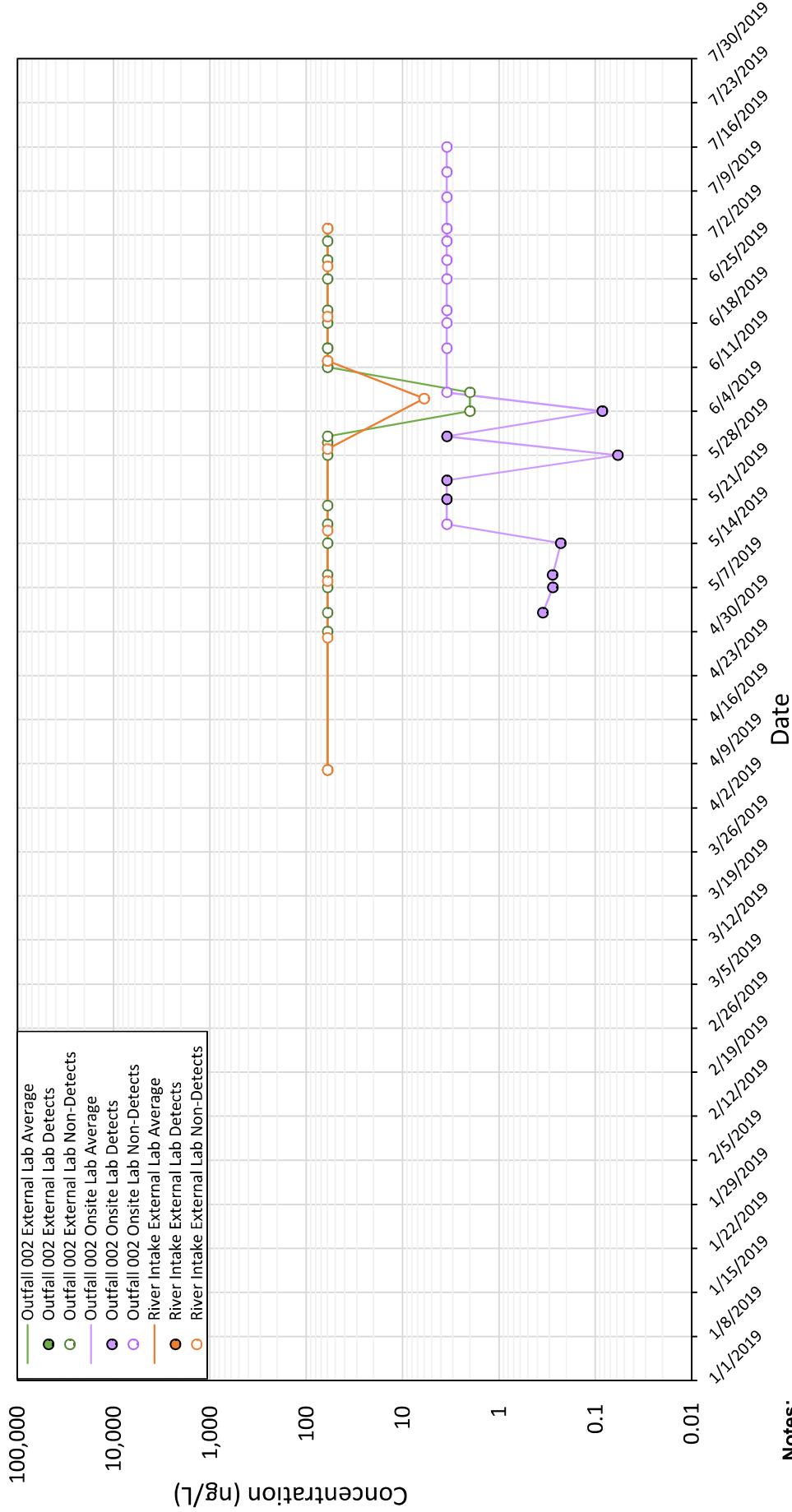


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Figure

10



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PFECA B
 Chemours Fayetteville Works, North Carolina

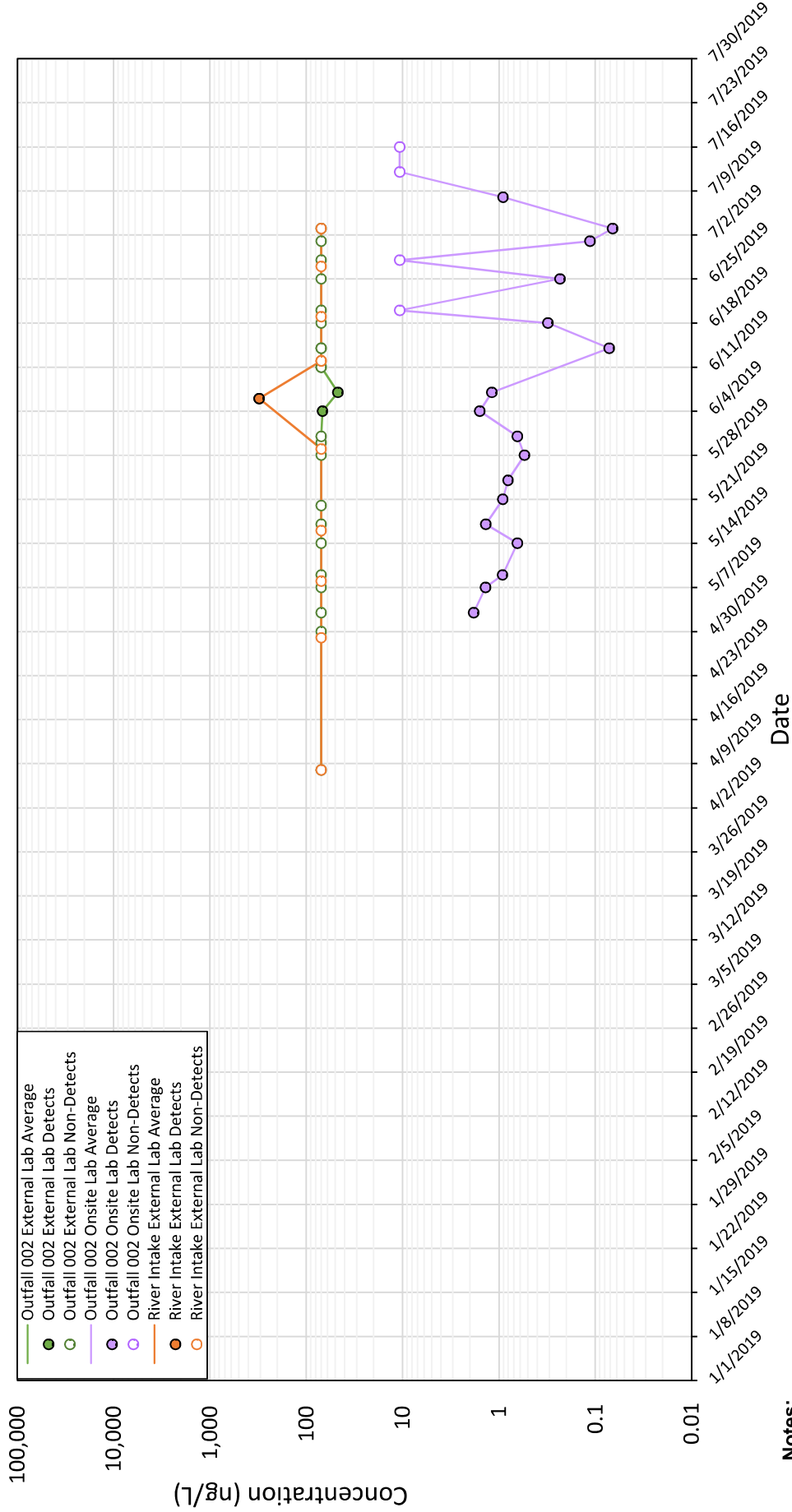
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Figure

11



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - R-EVE

Chemours Fayetteville Works, North Carolina

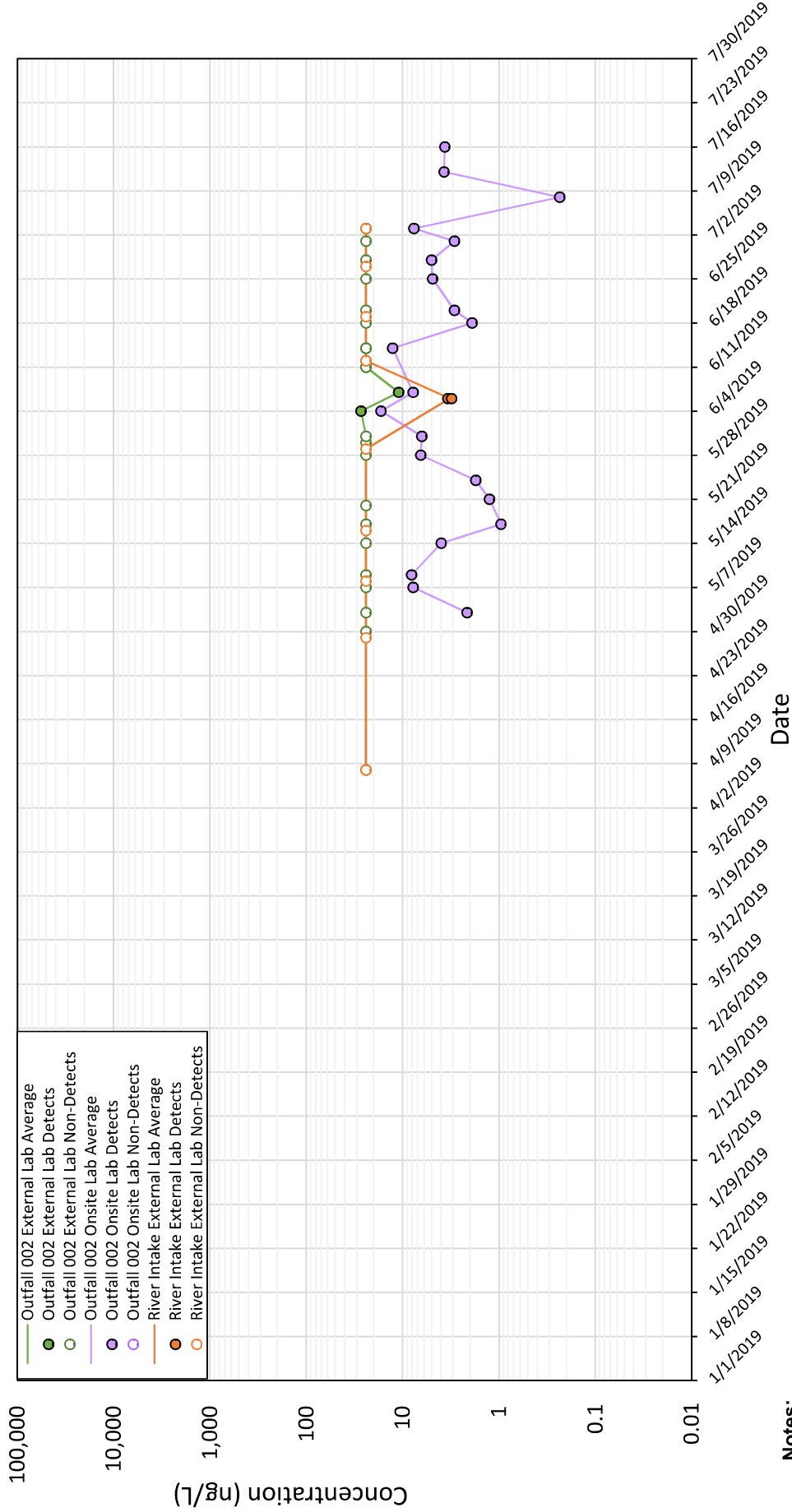
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Figure

12



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - EVE Acid

Chemours Fayetteville Works, North Carolina

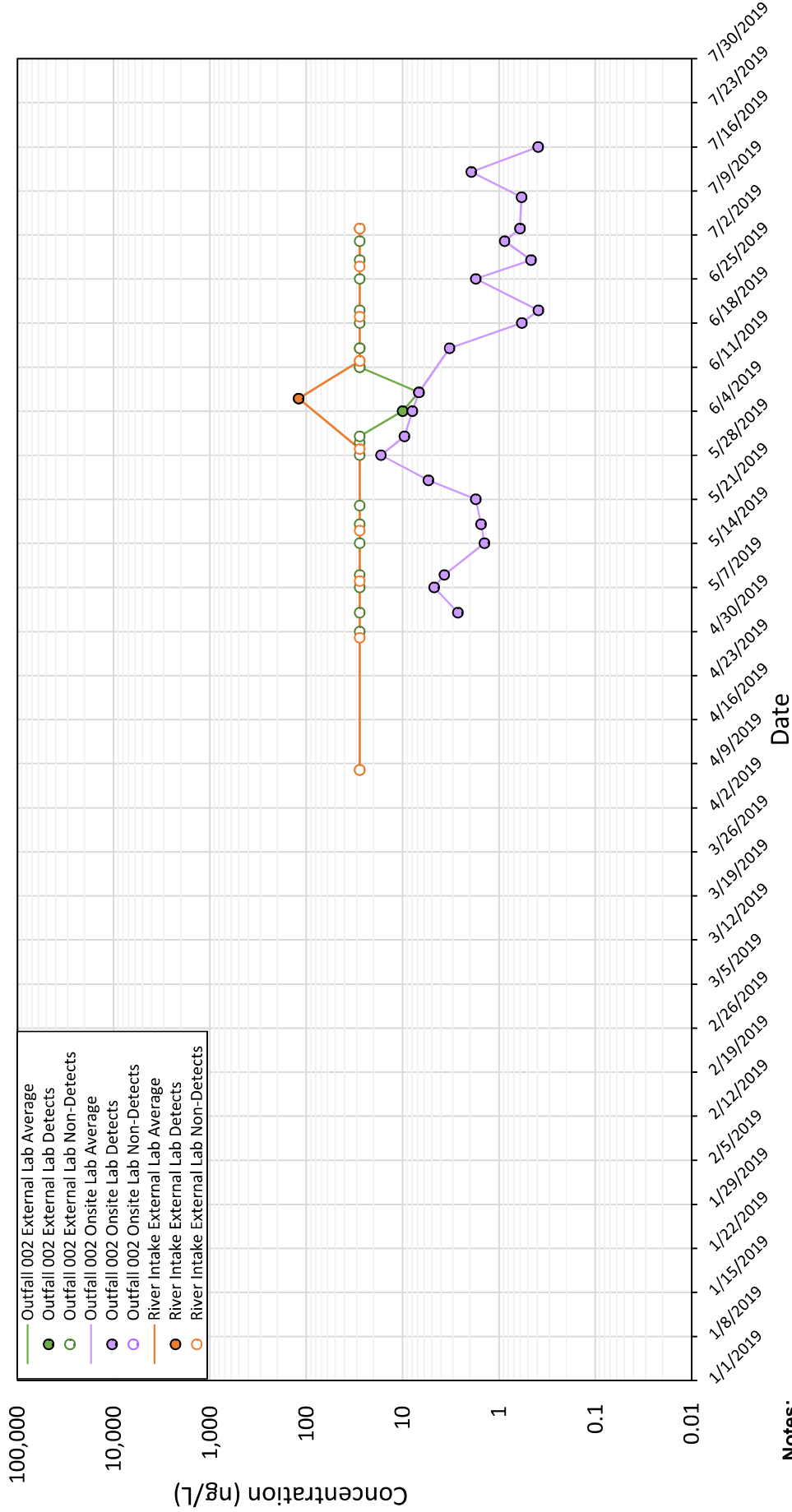


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Figure

13



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Hydro-EVE Acid
 Chemours Fayetteville Works, North Carolina

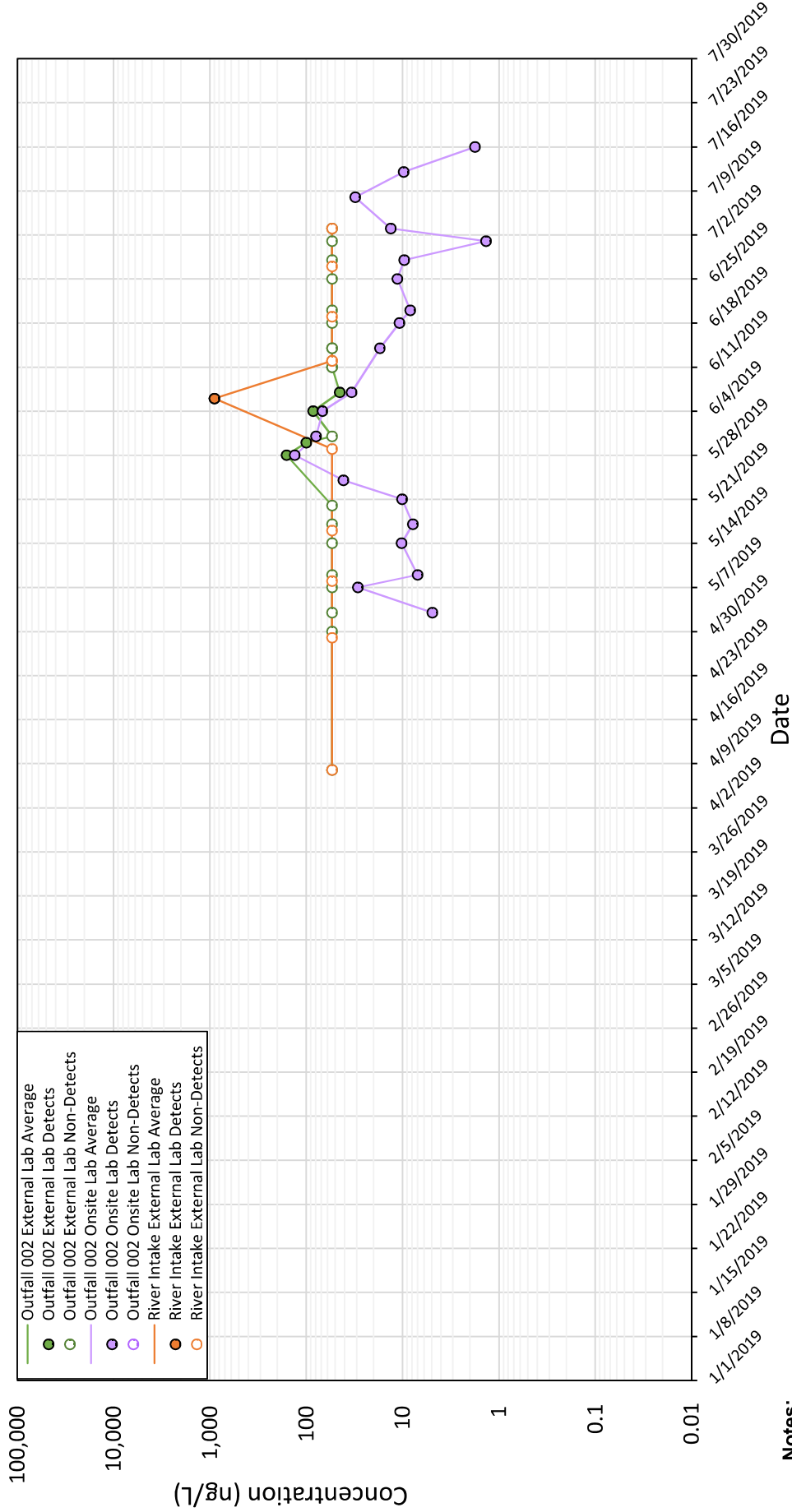
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Figure

14



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - NVHOS

Chemours Fayetteville Works, North Carolina

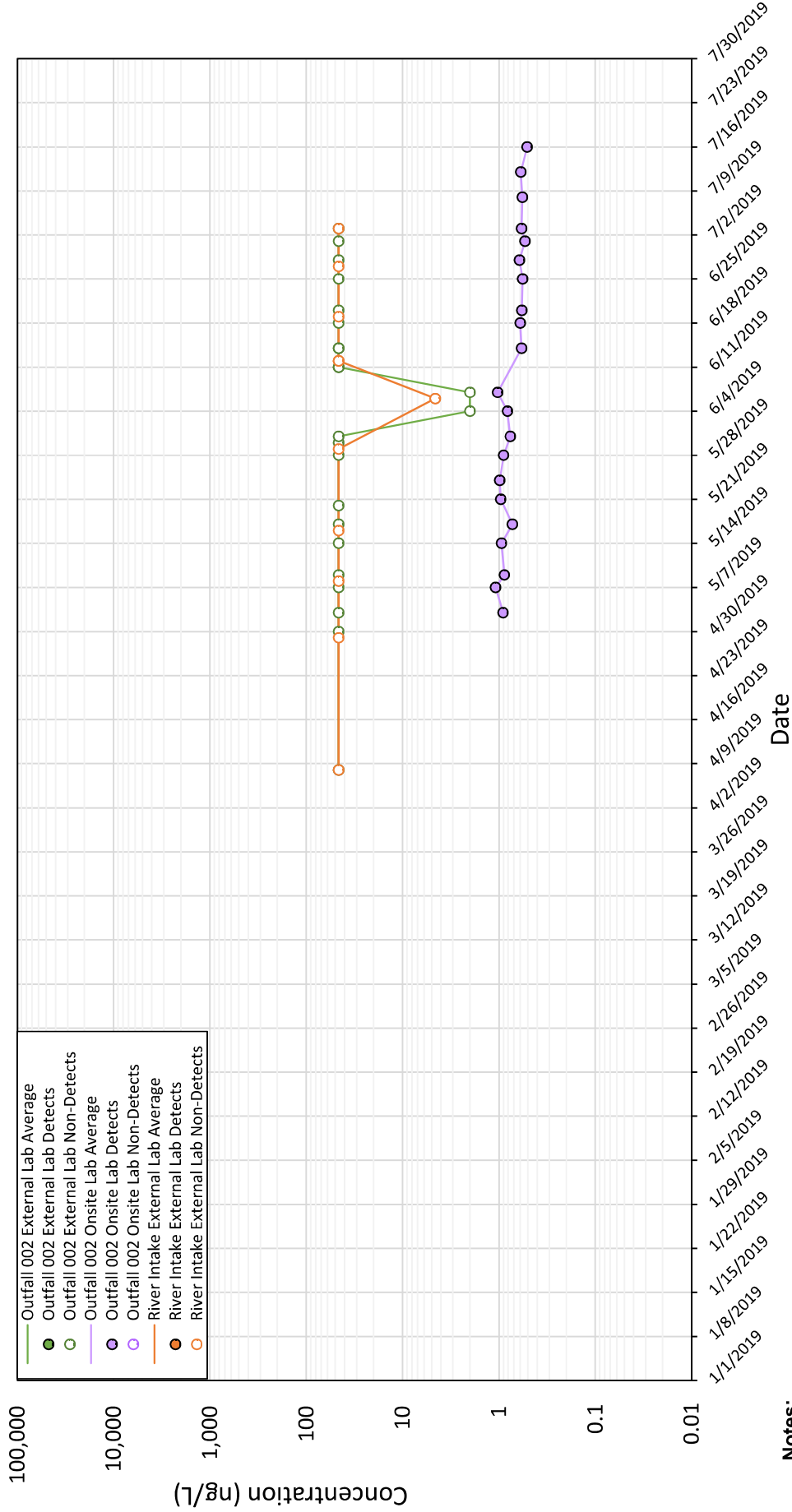


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Figure

15



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - PES

Chemours Fayetteville Works, North Carolina

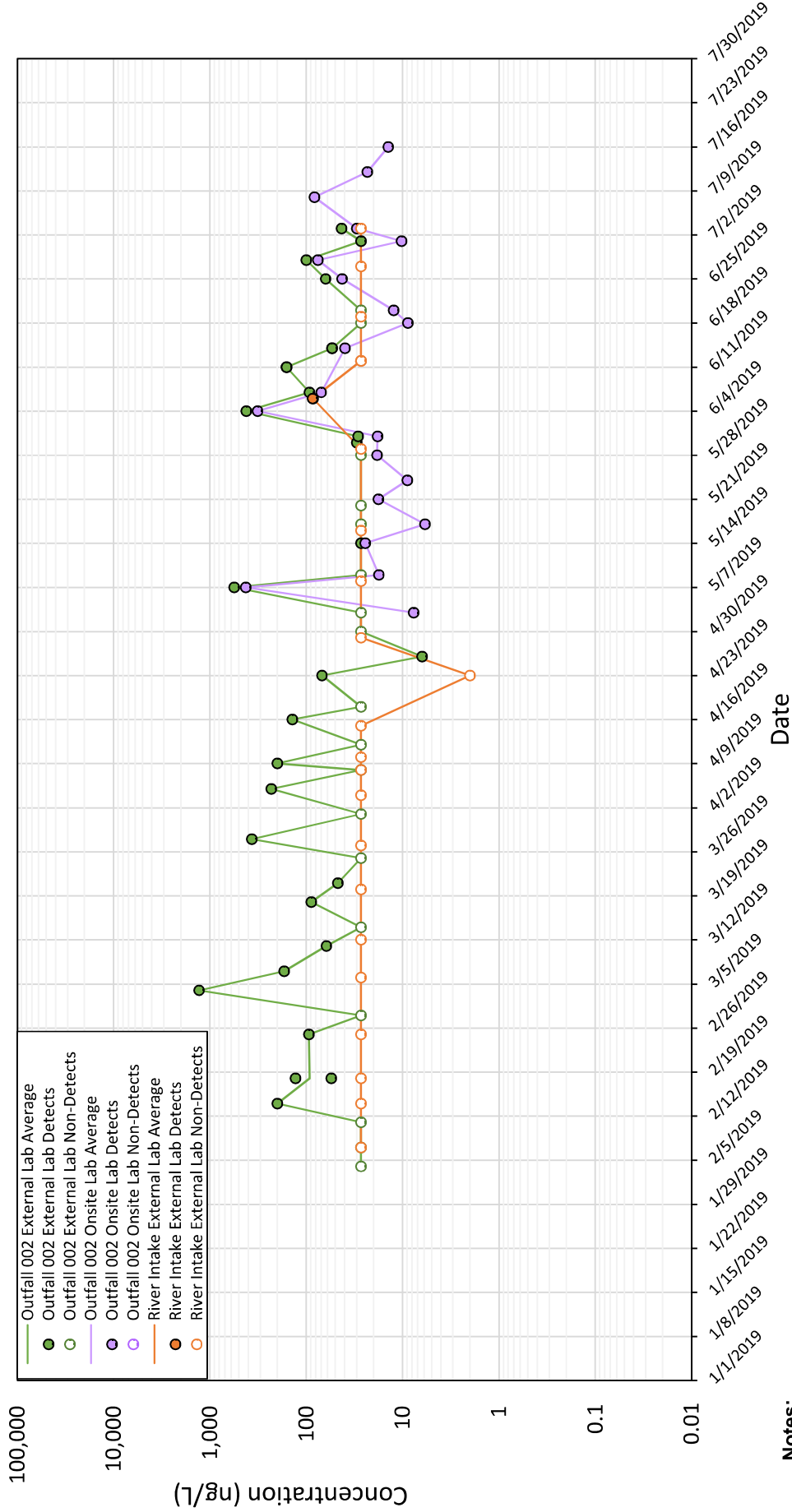
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 NC License No.: C-3500

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Figure

16



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Byproduct 1

Chemours Fayetteville Works, North Carolina

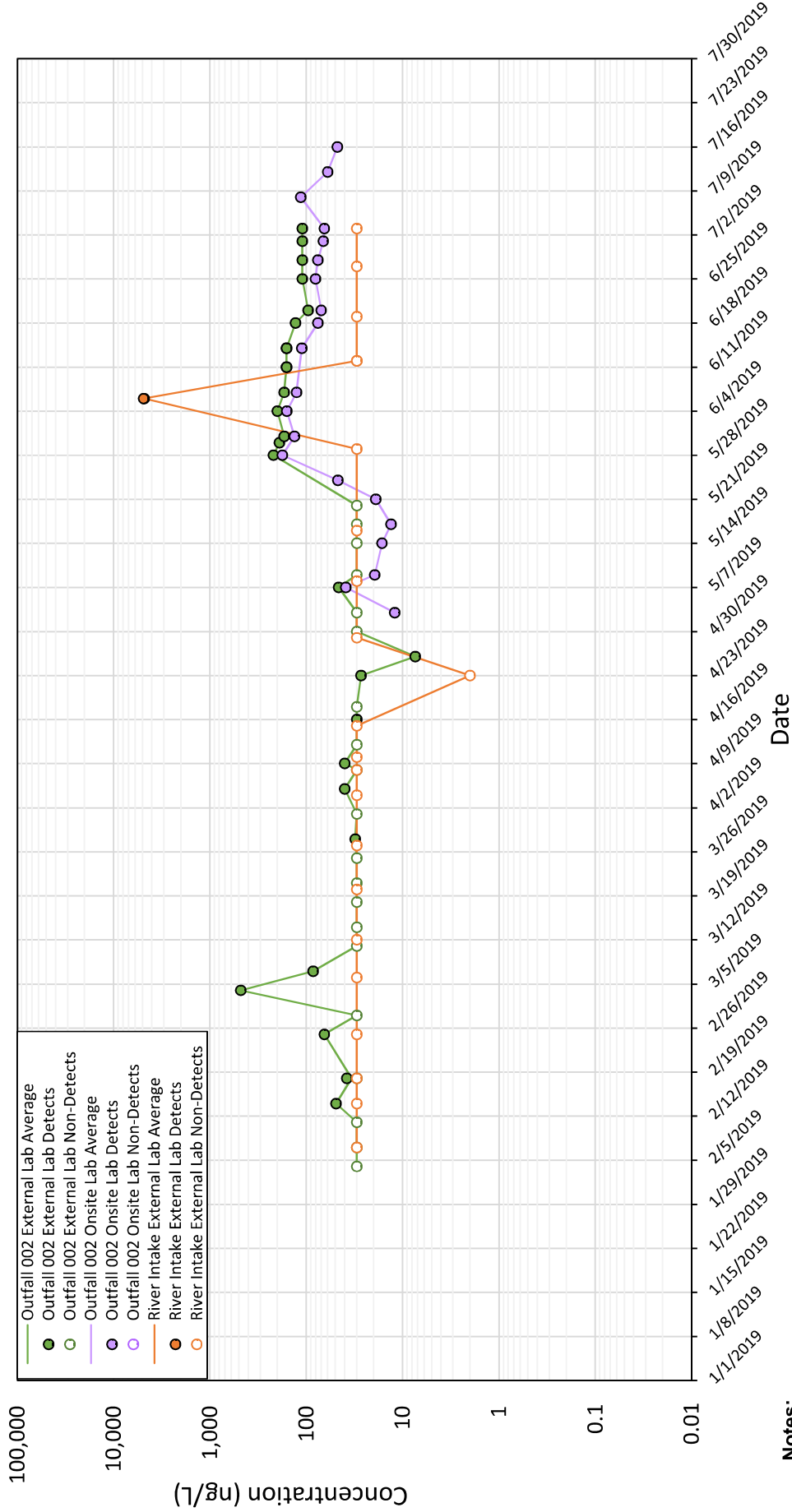


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Figure

17



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Byproduct 2

Chemours Fayetteville Works, North Carolina

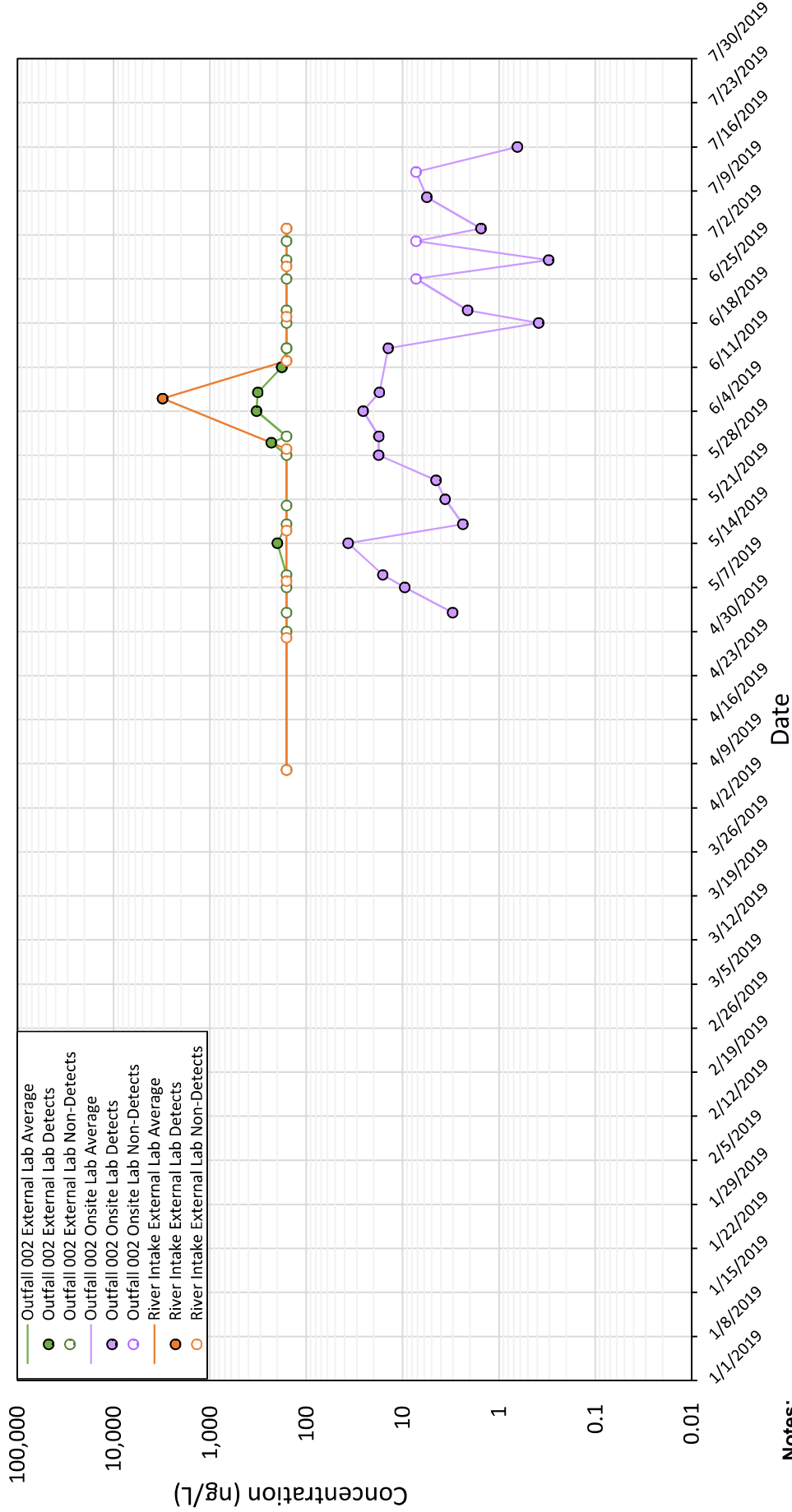


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Figure

18



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Byproduct 4

Chemours Fayetteville Works, North Carolina

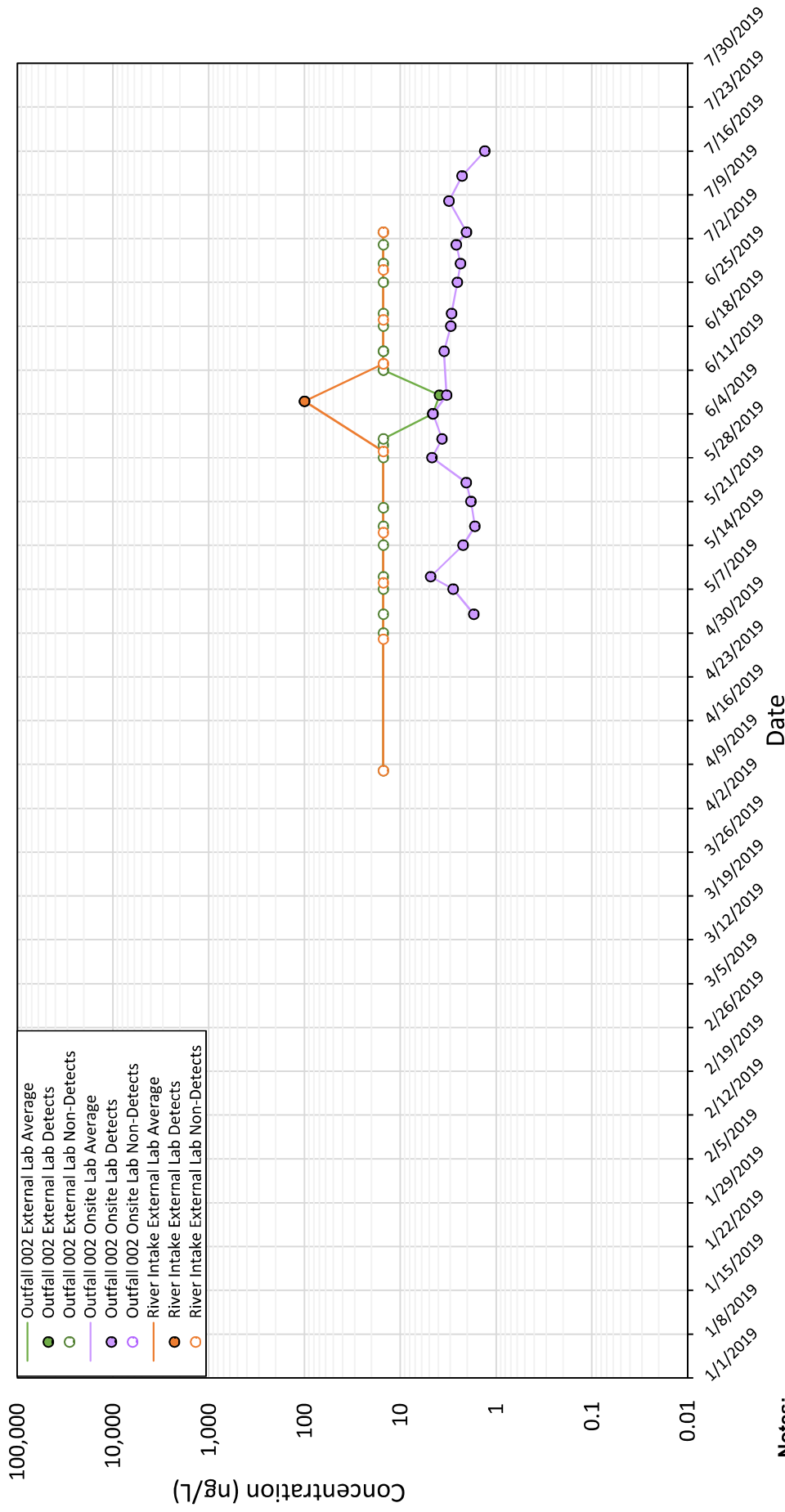
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Figure

19



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Byproduct 6

Chemours Fayetteville Works, North Carolina

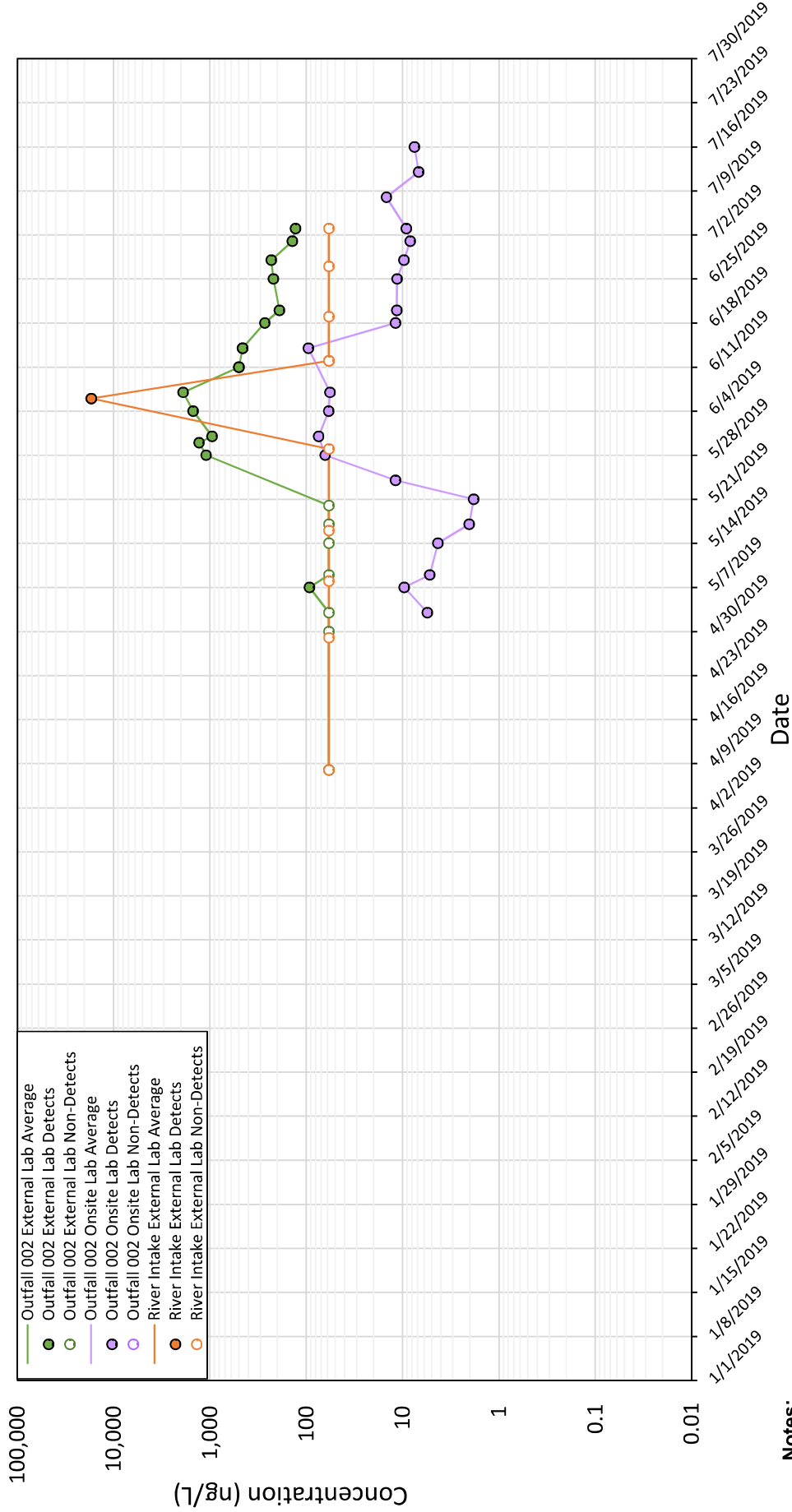
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Figure

20



Notes:

Outfall 002 samples are 3.5 day composite samples
 River intake samples are grab samples.

Acronyms:

ng / L: nanograms per liter

River Intake and Outfall 002 Concentrations - Byproduct 5

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Figure

21

