Semi-Annual Progress Report on 1,4 dioxane in the Cape Fear River Basin

EMC Water Quality Committee Meeting, January 11, 2023

Jenny Graznak, Assistant Regional Supervisor, Winston Salem Regional Office

Michael Montebello, Chief, NPDES Program Branch, Division of Water Resources

Semi-Annual 1,4 Dioxane Progress Report

- Ongoing and planned surface water and discharge sampling efforts, including results (Jenny Graznak)

- Identification of point sources dischargers of 1,4-dioxane in the Cape Fear River Basin upstream of any drinking water intake (Michael Montebello)

- Update on the actions DEQ is taking to reduce 1,4-dioxane concentrations in the Basin, including incorporation of limits into NPDES permits, an explanation of DEQ's reasoning, and an expected time for completion (Michael Montebello)

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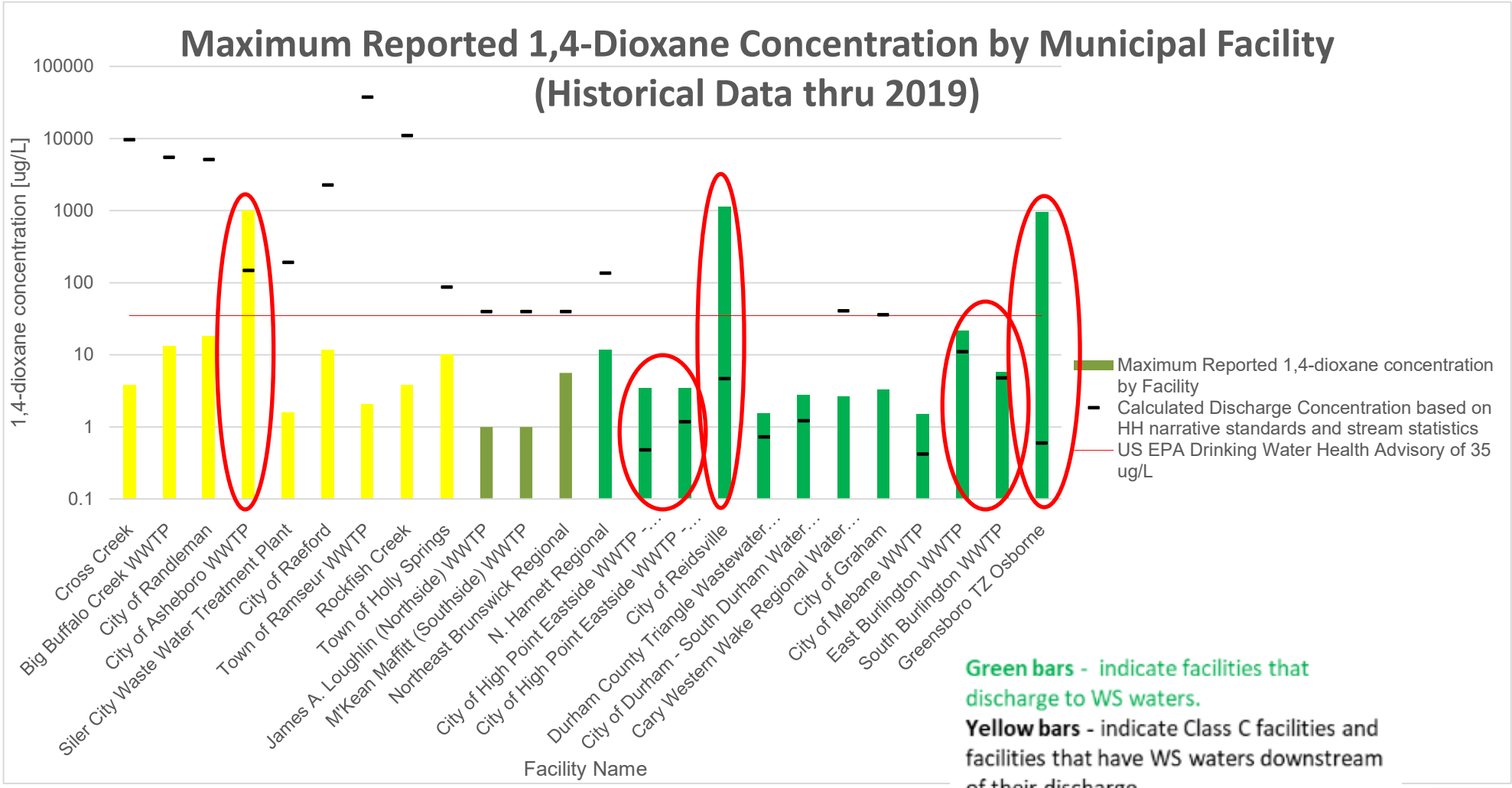
DWR 1,4-dioxane DWR Sampling
and
POTW Discharge Sampling Efforts

Maximum Reported 1,4-Dioxane Concentration by Municipal Facility (Historical Data thru 2019)



28 requests, all submitted data

23 POTWs showing data on chart

(High Point Eastside has two outfalls)

1- no discharge (Columbus)

4- POTWs ND (<400-1000)

Green bars - indicate facilities that discharge to WS waters.

Yellow bars - indicate Class C facilities and facilities that have WS waters downstream of their discharge

Blue bars – are dischargers in Class SW waters with no downstream WS intakes

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DWR 1,4-dioxane Surface Water Sampling

- **2023 surface water monitoring plan for 1,4-dioxane:** Monthly monitoring will continue in the Cape Fear, Neuse, and Yadkin River basins. 2022 data will be added to the online dashboard for viewing and downloading. The 30 RAMS stations monitored in 2021-2022 will be deactivated and 30 new randomly-selected stations will be activated statewide.

Cape Fear River Basin 1,4-Dioxane (µg/L) results, November 2017 – December 2021.

Year	# Stations	# Results	# Nondetects	% Detects	Minimum	Median	Maximum
2017	9	9	0	100	<1	5.7	1000
2018	52	251	111	56	<1	1.4	210
2019	22	183	82	55	<1	1.1	170
2020	26	188	132	30	<1	<1	900
2021	28	262	181	31	<1	<1	150

[1]DWR laboratory practical quantitation limit (PQL) for 1,4-dioxane is 1 µg/L.

DWR 1,4-dioxane Discharge Sampling

- WSRO collects/collected weekly grab & composite samples at:
  - Greensboro TZ Osborne WWTP
    - October 2019 through April 2021 (when original SOC became effective)
  - Reidsville WWTP
    - October 2019 through Present
  - Burlington East WWTP
    - November 2019 through April 2020 (when City entered agreement with Haw River Assembly that included routine sampling)
  - Asheboro WWTP
    - July 2021 through Present
  - High Point Eastside WWTP
    - June 2022 through Present

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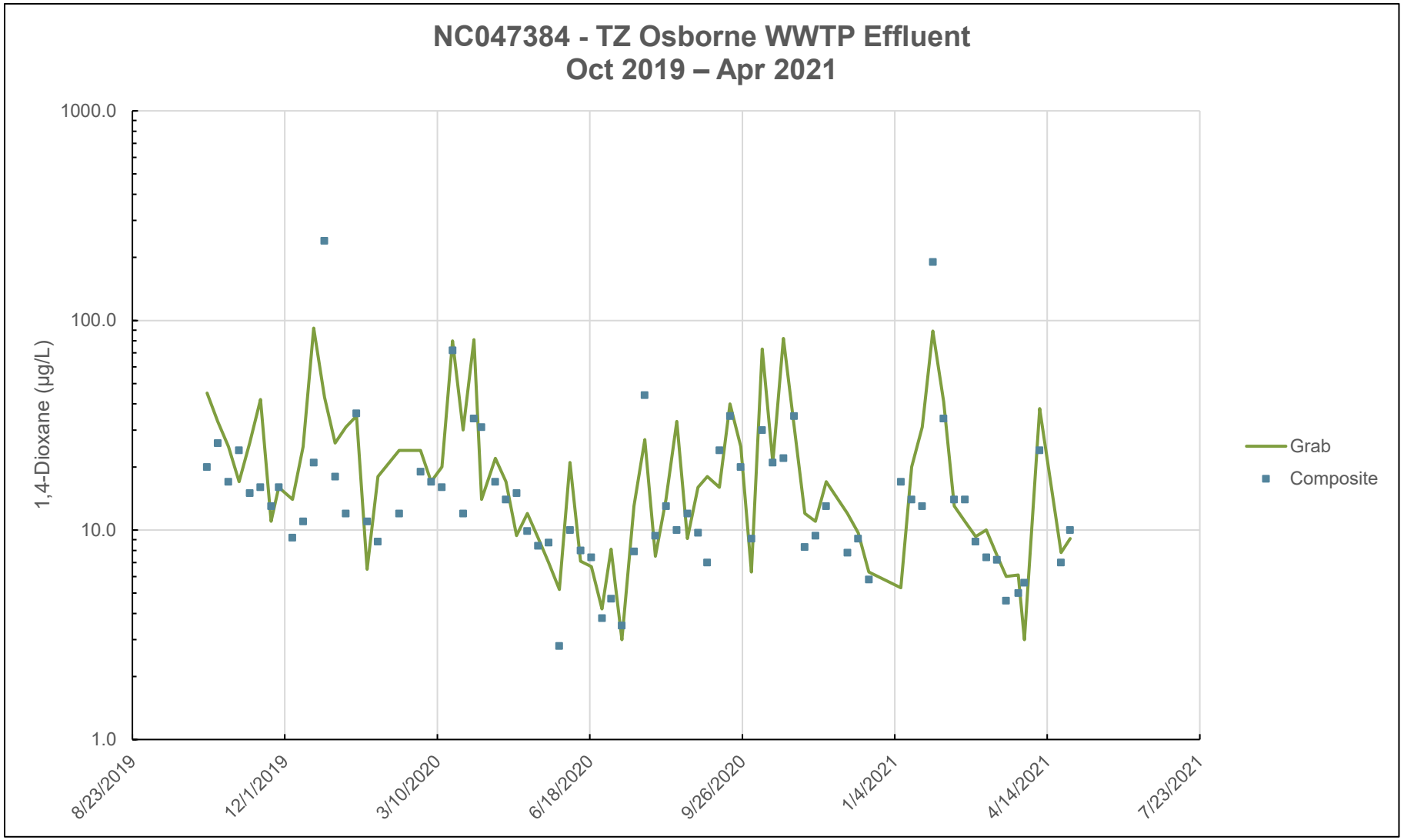
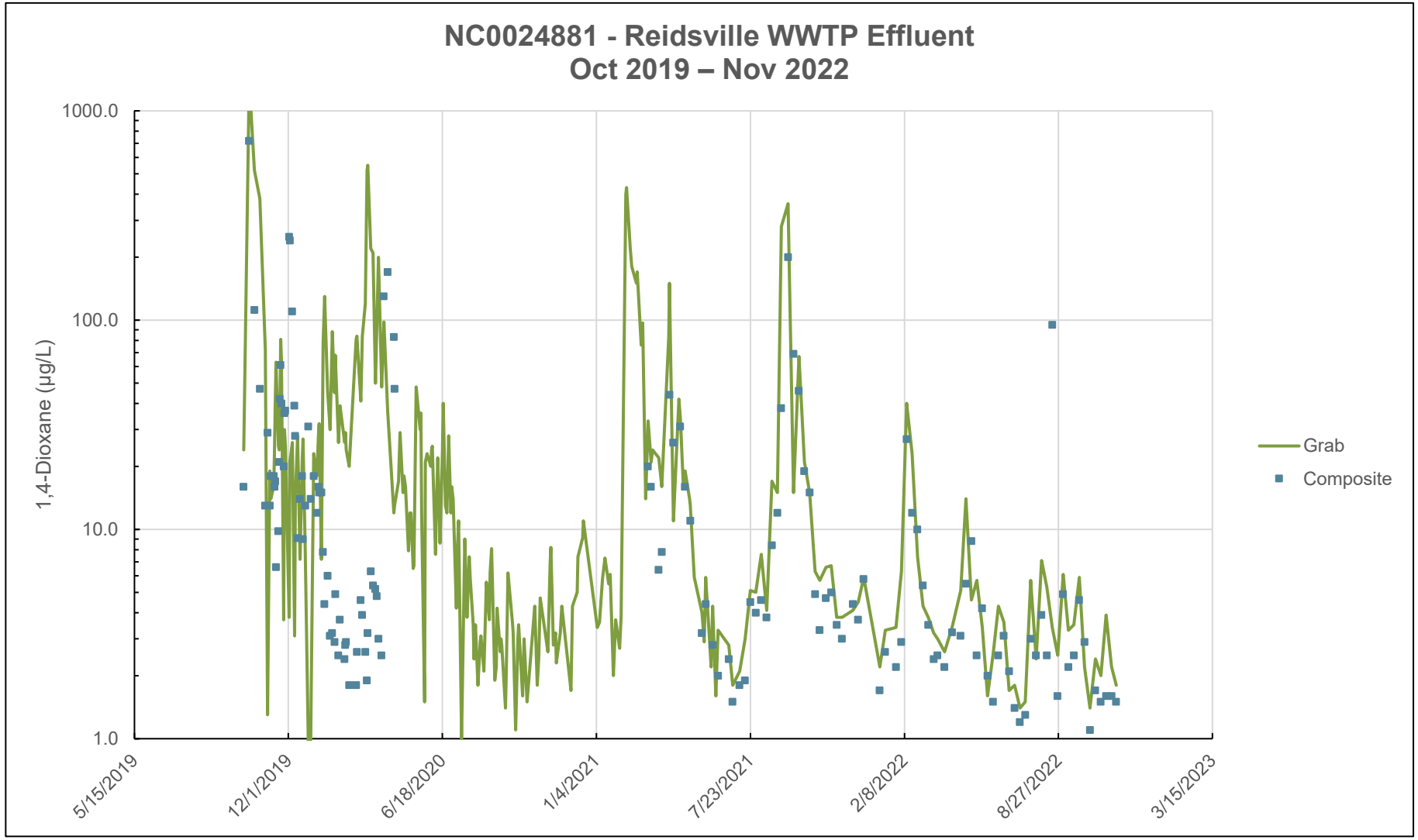
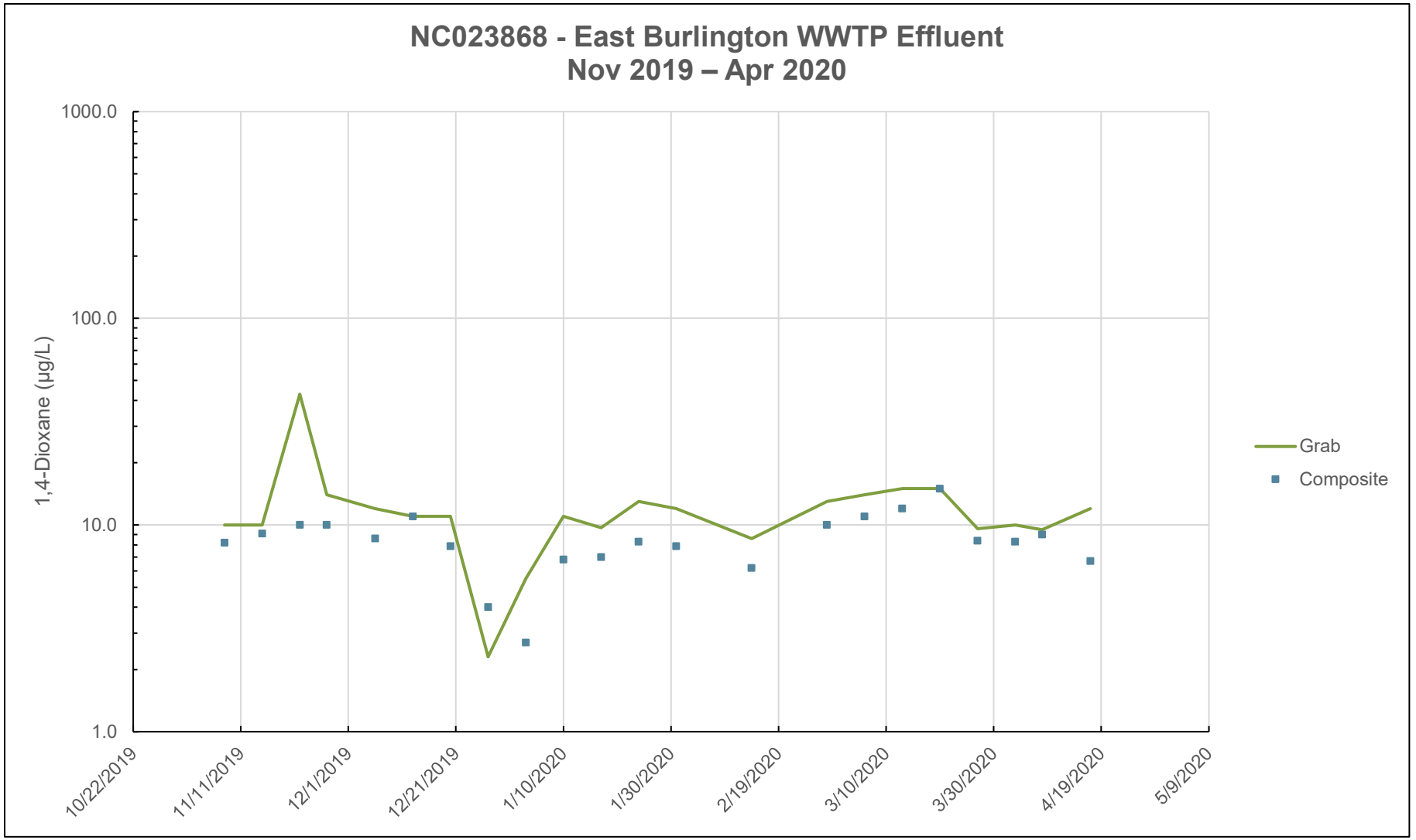
DWR 1,4-dioxane Sampling Data – Greensboro



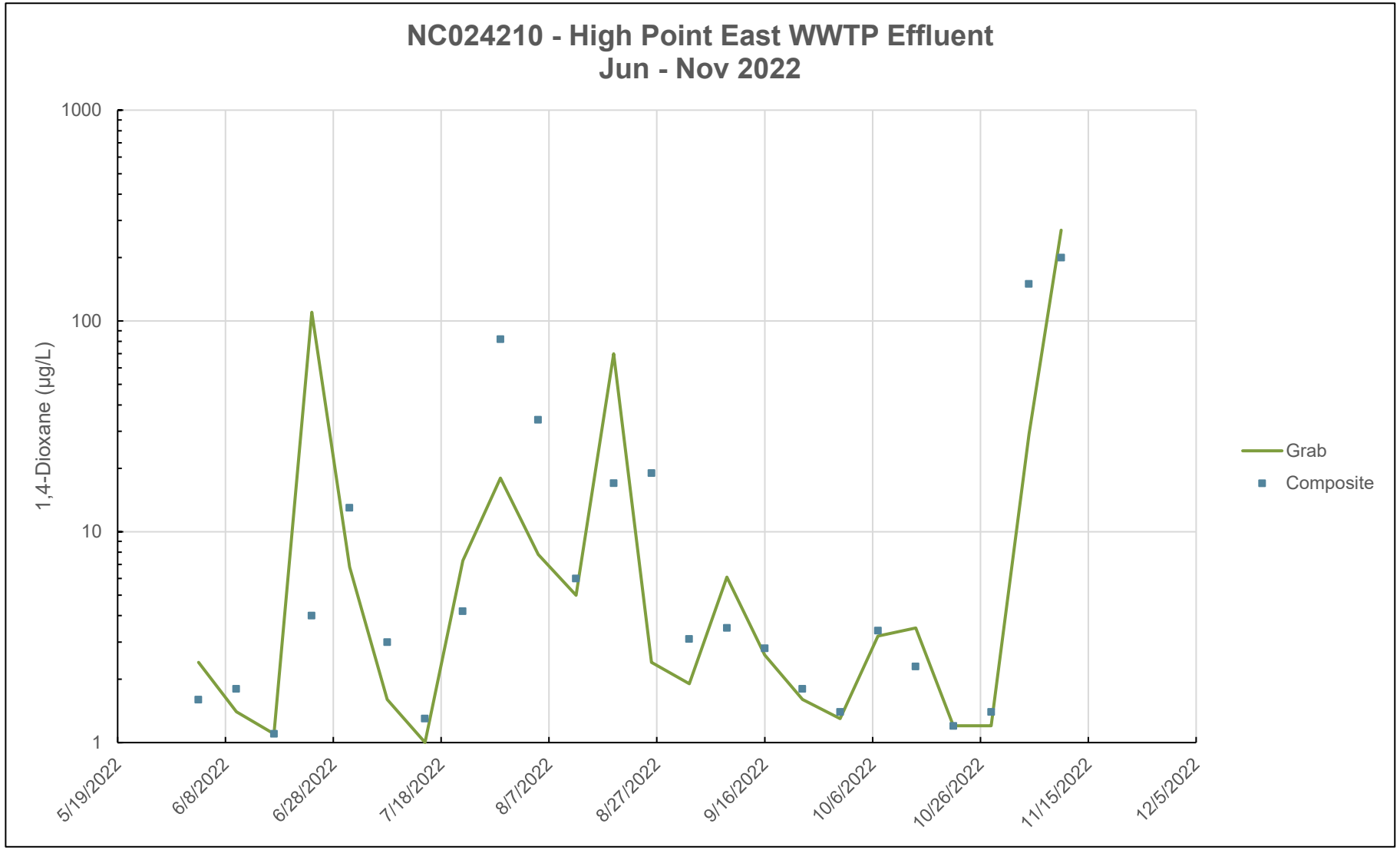
DWR 1,4-dioxane Sampling Data – Reidsville



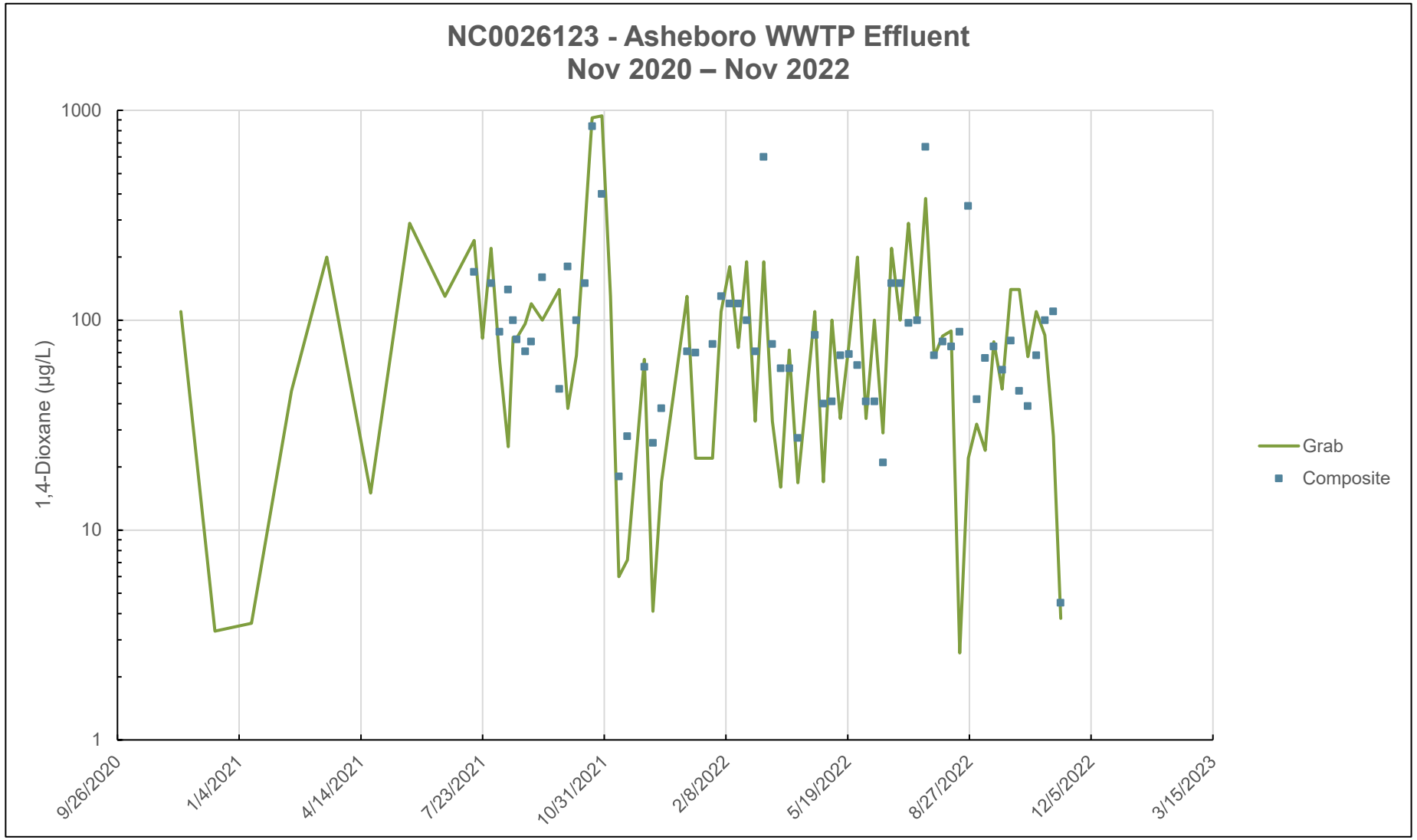
DWR 1,4-dioxane Sampling Data – Burlington



DWR 1,4-dioxane Sampling Data – High Point



DWR 1,4-dioxane Sampling Data – Asheboro



Brief Update on Greensboro Special Order by Consent:

Current status and recent actions

Greensboro SOC for 1,4-dioxane

- Original SOC approved by EMC in March 2021, with an effective date of May 1, 2021
  - Two Year SOC with Compliance Values: Year One: 45 ug/l, Year Two: 33 ug/l
- Fayetteville Public Works Commission and Haw River Assembly filed legal petition against SOC in April 2021
- Due to settlement negotiations, an amended SOC was approved by EMC in November 2021, with an effective date of December 1, 2021
  - Three Year SOC with lower Compliance Values:
    - Year One: 35 ug/l, Year Two: 31.5 ug/l, Year Three: 23 ug/l
- Part of that settlement included the requirement for these semi-annual progress reports to the WQC on DEQ 1,4-dioxane actions

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Greensboro's Ongoing Monitoring for 1,4-dioxane

- City's amended SOC monitoring plan has 58 sampling sites (includes addition of all Significant Industrial User (SIU) discharges as well as Pittsboro raw water intake)
- "Rush" laboratory analysis on weekly effluent 1,4-dioxane samples to allow notification to downstream users if necessary
- Composite samplers remain 24/7 at 4 trunklines within City's collection system
  - Samples collected/samplers maintained twice per week

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Additional Monitoring: Direct Sampling of SIUs

- As part of SOC Settlement Agreement, City conducts 1,4-dioxane composite sampling and analyses for each of 32 SIU discharges once in two consecutive quarters in all 3 years of SOC
  - All SIUs on Patton trunkline with concentrations >15 ug/l are required to collect and retain daily and weekly composite samples
- In Year One, any SIU with 1,4-dioxane discharge concentration of >100 ug/l was required to investigate and report back to City
  - City Identified 9 SIUs with discharge >100 ug/l
  - SIUs >31.5 ug/l in Year Two
  - SIUs >23 ug/l in Year Three

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Hallstar (formerly Lanxess): Organic Chemical Manufacturer

- Results from this SIU indicate they were definitively the source of the 1,4 dioxane April 2022 exceedance:
  - They identified a product that generated 1,4-dioxane as an unintended reaction by-product during the production process
  - SDS review of raw materials in this product did not indicate 1,4-dioxane presence
  - They typically only produced this product once per year
  - They also identified a sister product is manufactured only 1-2 times per year that may also generate 1,4-dioxane as an unintended byproduct

- **Manufacture of the suspected products at the Greensboro facility was halted until further notice, however...**

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City investigation of slightly elevated effluent 1,4 dioxane grab result – October 2022

- City received 1,4-dioxane result of **8.4 ug/L** for effluent grab sample collected on 10/25/22
  - Not an exceedance of Year Two SOC compliance value of 31.5 ug/L, but slightly higher than normal
- Patton Surveillance sample result from 10/21-24 was 27.3 ug/L
  - That is more elevated concentration than usually seen there
- City required the previously identified Patton trunkline SIUs to submit weekly composite samples for the week of 10/16-22 for analysis
  - Hallstar (new owner of former Lanxess) reported significantly higher than normal daily & weekly composite results during same time period
- Lanxess was sold to new company Hallstar in October 2022
- Hallstar attempted to manufacture one of the halted products and capture all resulting wastewater, but some was ultimately released to collection system

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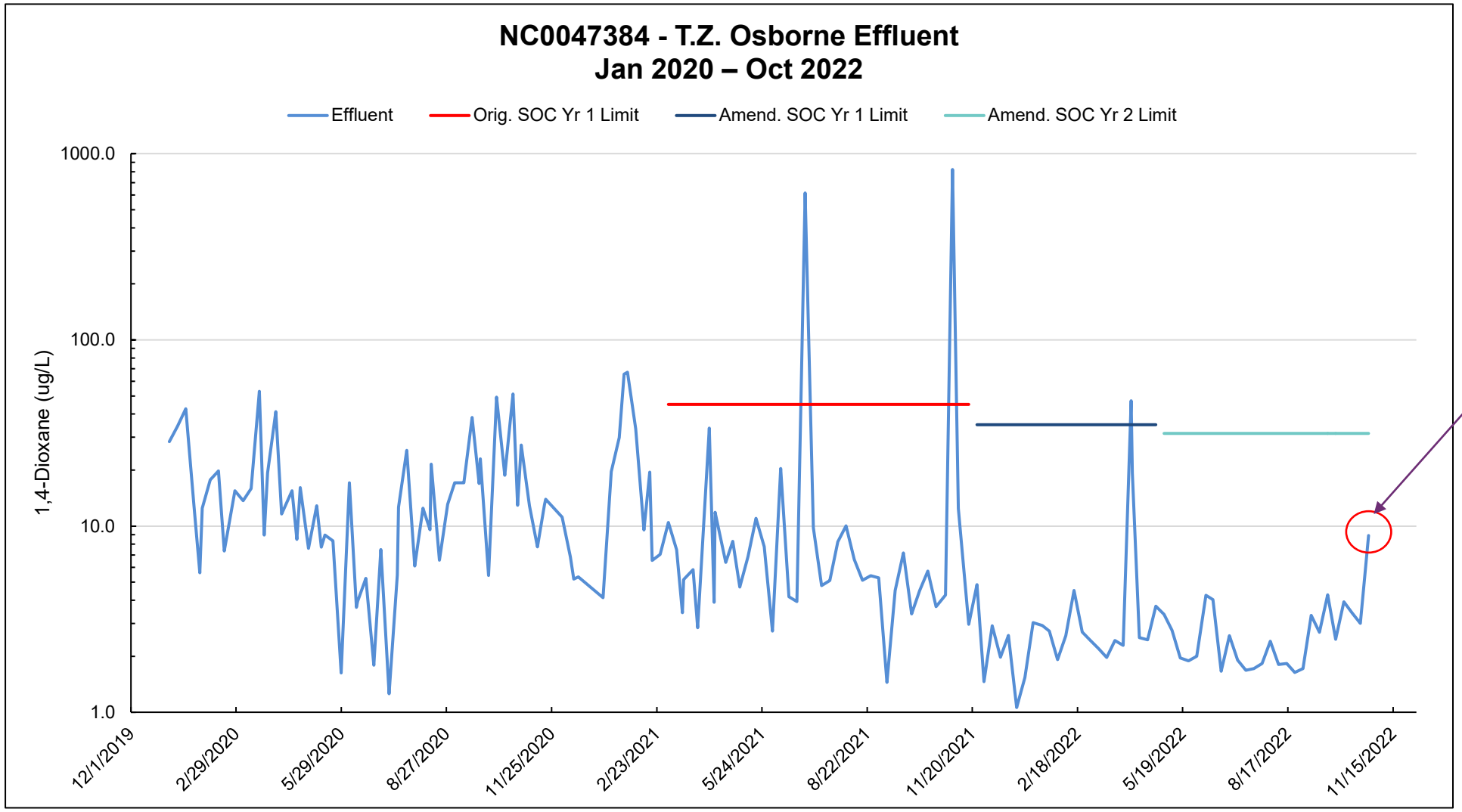
City's Investigation of slightly elevated effluent 1,4 dioxane grab result – October 2022

- City has a Local Pollutant Allocation for Hallstar
  - According to daily composite sample, they exceeded that on 10/20/22
  - City is currently pursuing enforcement action based on this exceedance
  - DWR will provide an update to WQC on these actions in next report
- City's voluntary investigation of the slightly elevated effluent sample resulted in discovery
  - Combined effluent data, collection system surveillance sampling, and SIU sampling to determine from where the elevated concentration originated
- Based on this information, the SOC process and other voluntary efforts by the City are working

eDMR Effluent 1,4-Dioxane concentrations with SOC compliance value (Jan 2020 – October 2022)



Year 2 SOC 31.5 ug/l
Began May 1, 2022

October 25, 2022
Elevated Value

Identification of Point Source Dischargers of 1,4-dioxane in the Cape Fear River Basin

NPDES Permitting-
1,4 Dioxane Permitting Update January 2023

NPDES Permits issued with 1,4-Dioxane requirements/conditions

- Nokia of America Corp. (NC0080853), issued 1/2/2018, effective 2/1/2018
  - 1,4-Dioxane – quarterly monitoring
  - Permit expires 6/30/2023, renewal application not yet received

- Stepan Company (Invista S-A-R-L LLC) (NC0001112), issued 2/23/2018, effective 4/1/2018
  - 1,4-Dioxane – quarterly monitoring
  - Permit expires 3/31/2023, renewal application received 9/27/2022

- Radiator Specialty Co. (NC0088838), issued 5/23/2018, effective 7/1/2018
  - 1,4-Dioxane – 80 ug/L limit with monthly monitoring
  - Facility reported no flow since August 2020
  - Permit expires 3/31/2023, renewal application received 10/4/2022

- DAK Americas LLC – Cedar Creek Site (NC0003719), issued 6/18/2018, effective 8/1/2018
  - 1,4-Dioxane – monthly monitoring
  - Permit expired 10/31/2022, renewal application received 5/5/2022

- Tar River Regional WWTP (NC0030317), issued 2/21/2022, effective 4/1/2022
  - 1,4-Dioxane – monthly monitoring

- Graham WWTP (NC0021211), issued 3/1/2022, effective 4/1/2022
  - 1,4-Dioxane – monthly monitoring

NPDES Permitting-
1,4 Dioxane Permitting Update January 2023

NPDES Permits issued with 1,4-Dioxane requirements/conditions

- Moncure Holdings West LLC WWTP (NC001899), issued 3/18/2022, effective 5/1/2022
  - 1,4-Dioxane – included in Closure Requirements parameter list
- Ramseur WWTP (NC0026565), issued 4/6/2022, effective 5/1/2022
  - 1,4-Dioxane – quarterly monitoring
- Triangle WWTP (NC0026051), issued 8/1/2022, effective 9/1/2022
  - 1,4-Dioxane – monthly monitoring
- Siler City WWTP (NC002664), issued 9/28/2022, effective 11/1/2022
  - 1,4-Dioxane – monthly monitoring
- Fayetteville – Rockfish Cr WRF (NC0050105), issued 9/29/2022, effective 11/1/2022
  - 1,4-Dioxane – monthly monitoring
- South Durham WRF (NC0047597), issued 12/12/2022, effective 1/1/2023
  - 1,4-Dioxane – monthly monitoring

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NPDES Permitting-
1,4 Dioxane Permitting Update January 2023

Permits public noticed with 1,4-Dioxane requirements or conditions

- Brenntag Mid-South, Inc – Greensboro GW Remediation Site (NC0078000), PN 7/27/2021
  - 1,4-Dioxane – monthly monitoring
- Daikin Applied Americas Inc. – *HeatCraft* Site (NC0083658), PN 5/3/2022
  - 1,4-Dioxane – quarterly monitoring
- Sanford – Big Buffalo WWTP (NC0024147), PN 9/22/2022
  - 1,4-Dioxane – monthly monitoring
  - Public Hearing requested & being scheduled for early 2023
- Dutchman WWTP (NC0024191, PN 10/18/2022
  - 1,4-Dioxane – quarterly monitoring
- Asheboro WWTP (NC0026123) – Public noticed on 12/6/2022, comments requested by 1/13/2023
  - 1,4-Dioxane – Phased limits with weekly monitoring
    - Phase I interim = 55.7 µg/L monthly avg, 127.6 µg/L daily max
    - Phase II interim = 35.0 µg/L monthly avg, 80.2 µg/L daily max
    - Final = 21.6 µg/L monthly avg, 49.4 µg/L daily max
    - Instream monitoring 2/month

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NPDES Permitting-
1,4 Dioxane Permitting Update January 2023

Permits being prepared by staff with proposed 1,4-Dioxane requirements or monitoring conditions

- Reidsville WWTP (NC0024881)
  - 1,4-Dioxane – proposed final limits with a phased schedule
- High Point – Eastside WWTP (NC0024210)
  - 1,4-Dioxane – proposed final limits with a phased schedule
    - Outfall 001 – Richland Creek (emergency use)
    - Outfall 002 – Deep River (Randleman Lake)
- Greensboro – TZ Osborne WWTP (NC0047384)
  - 1,4-Dioxane – proposed final limits with a phased schedule (post SOC)
    - Final = 0.54 µg/L monthly avg, 1.53 µg/L daily max
- East Burlington WWTP (NC0023868)
  - 1,4-Dioxane – proposed final limits with a phased schedule
- Albemarle – Long Creek WWTP (NC0024244)
  - 1,4-Dioxane – monthly monitoring
- Mebane WWTP (NC0024174)
  - 1,4-Dioxane – quarterly monitoring

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Update on DEQ actions to reduce 1,4-dioxane concentrations in the Cape Fear River Basin

NPDES Permitting-
1,4 Dioxane Permitting Update January 2023

Permits public noticed with final limits

- City of Asheboro, comment period ends 1/13/2023
  - Proposed 1,4-Dioxane effluent limit – weekly monitoring
    - Phased compliance schedule for 5 years
    - Phase I interim = 55.7 µg/L monthly avg, 127.6 µg/L daily max
    - Phase II interim = 35.0 µg/L monthly avg, 80.2 µg/L daily max
    - Final = 21.6 µg/L monthly avg, 49.4 µg/L daily max
    - Instream monitoring 2/month

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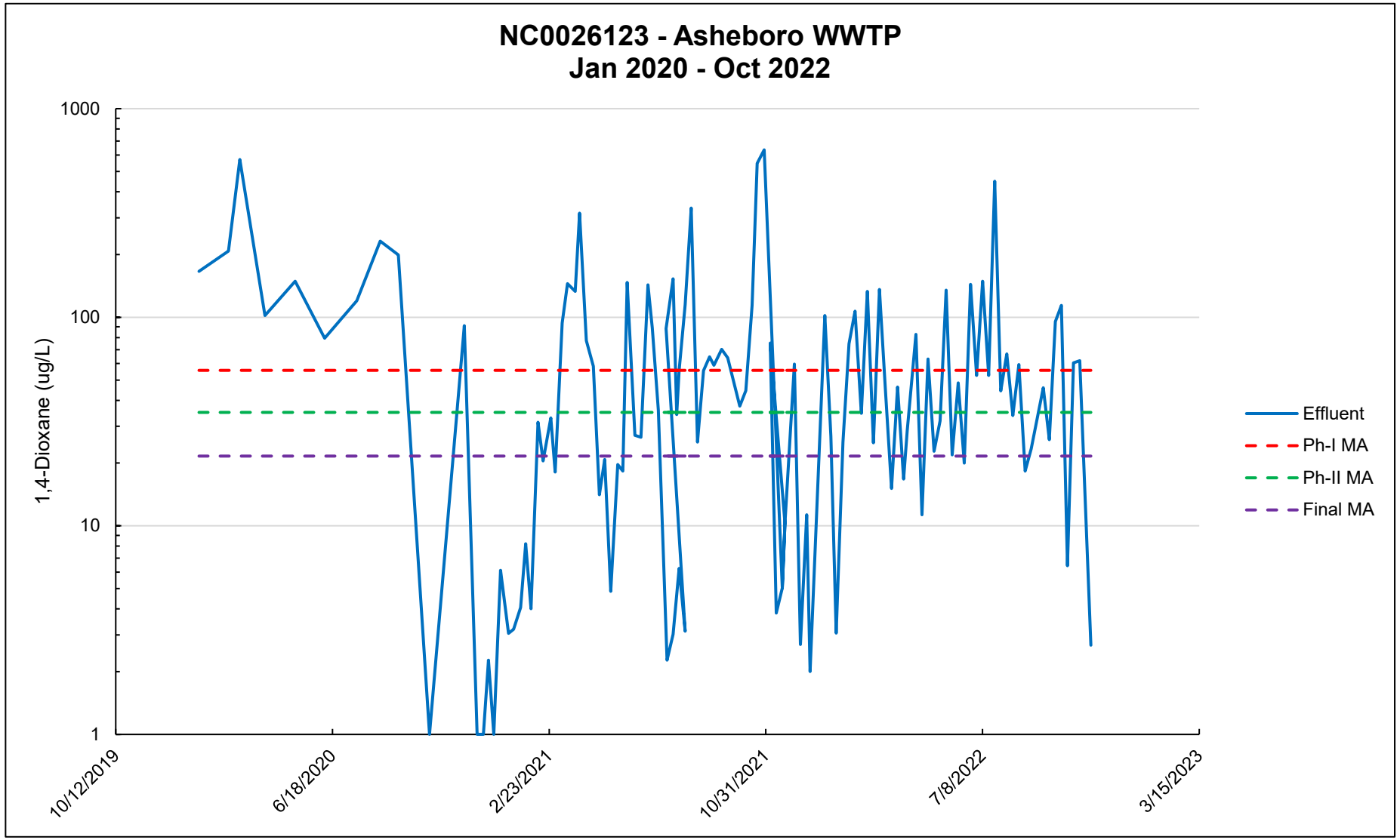
Asheboro WWTP 1,4-dioxane eDMR Effluent Sampling Data



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Update on recent actions – January 2023

- 1,4-dioxane permitting strategy-updated
- Emerging compounds website and related information

Additional NPDES point sources

- Addressing the next group of NPDES permits that would be expected to include effluent limitations for 1,4-Dioxane
- Taking NPDES permits in a step-wise approach
- Prioritizing permits based on both sampling results and discharge location
- Reviewing Chemical Addendum information being provided with NPDES permit applications

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A Brief Explanation of DEQ's Actions, Reasoning, and the Expected Time for Completion

POTW	NPDES Permit #	Permitted Flow [MGD]	Stream Classification	Permit expires	Drafting Status
Greensboro TZ Osborne	NC0047384	56	WS-V,NSW	6/30/2019	Draft shared with permittee
City of High Point Eastside WWTP - Richland Creek/Deep River (2 outfalls)	NC0024210	26	WS-IV (Lake Randleman)	12/31/2018	Staff drafting
City of High Point Eastside WWTP	NC0024211	32 (proposed expansion)	WS-IV (Lake Randleman)	same	Reviewing modeling
City of Reidsville	NC0024881	7.5 (with proposed reduced flow 5.5 MGD)	WS-IV,NSW	4/30/2016	Staff drafting
Burlington-South Burlington WWTP	NC0023878	12	WS-V, NSW	6/30/2019	Staff drafting
Burlington- East Burlington WWTP	NC0023868	12	WS-V,NSW	6/30/2019	Staff drafting

Estimated Time for Actions in 2023

- Draft permits for Cities of Burlington, High Point (including their proposed expansion) and Reidsville will be discussed with each permittee
- Summary of discussion will be included with next semi-annual WQC report in 2023
- Process will be similar to Greensboro and Asheboro NPDES permitting

Additional steps needed & future challenges

- Assessment of treatment technologies for permittees with NPDES permit limits that may require something equivalent to BAT
- Working with SIUs to assess alternatives like product substitution or relocation of specific manufacturing products
- Future challenges in permitting:
  - Emerging compounds that must be addressed: PFAS, new EPA guidance December 5, 2022

July 2023 – 3rd semi-annual progress report to WQC

Questions?

Extra Slides with POTW eDMR Effluent Sampling Data

POTW 1,4-dioxane eDMR Effluent Discharge Sampling

- Reidsville WWTP (proposed 5.5 & existing 7.5 MGD)
- Asheboro WWTP (9 MGD- on public notice thru 1/13/2023)
- High Point Eastside WWTP (existing 26 MGD and proposed expansion to 32 MGD)
- Greensboro TZ Osborne WWTF (56 MGD with existing SOC)

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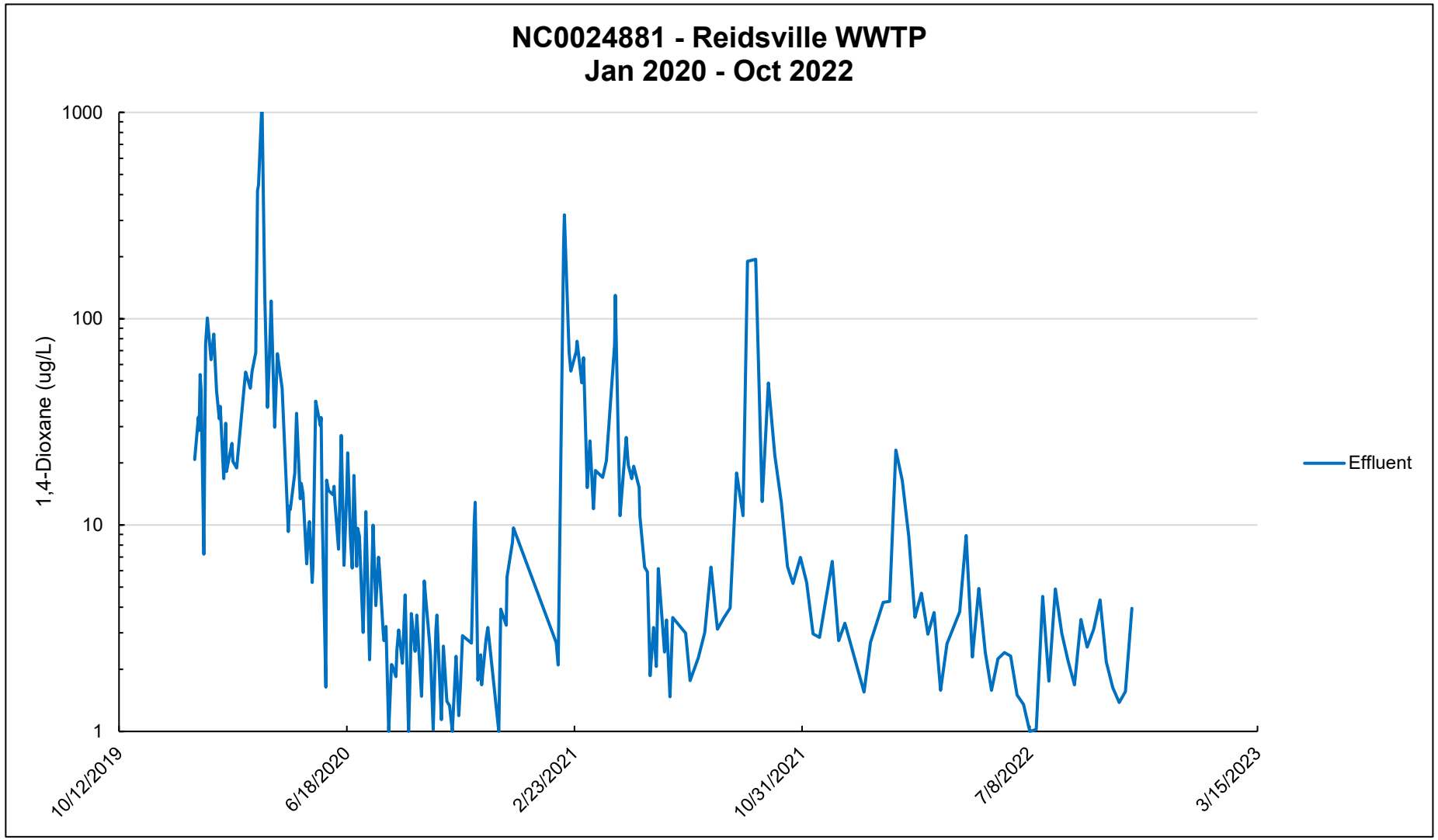
Reidsville 1,4-dioxane eDMR Effluent Sampling Data



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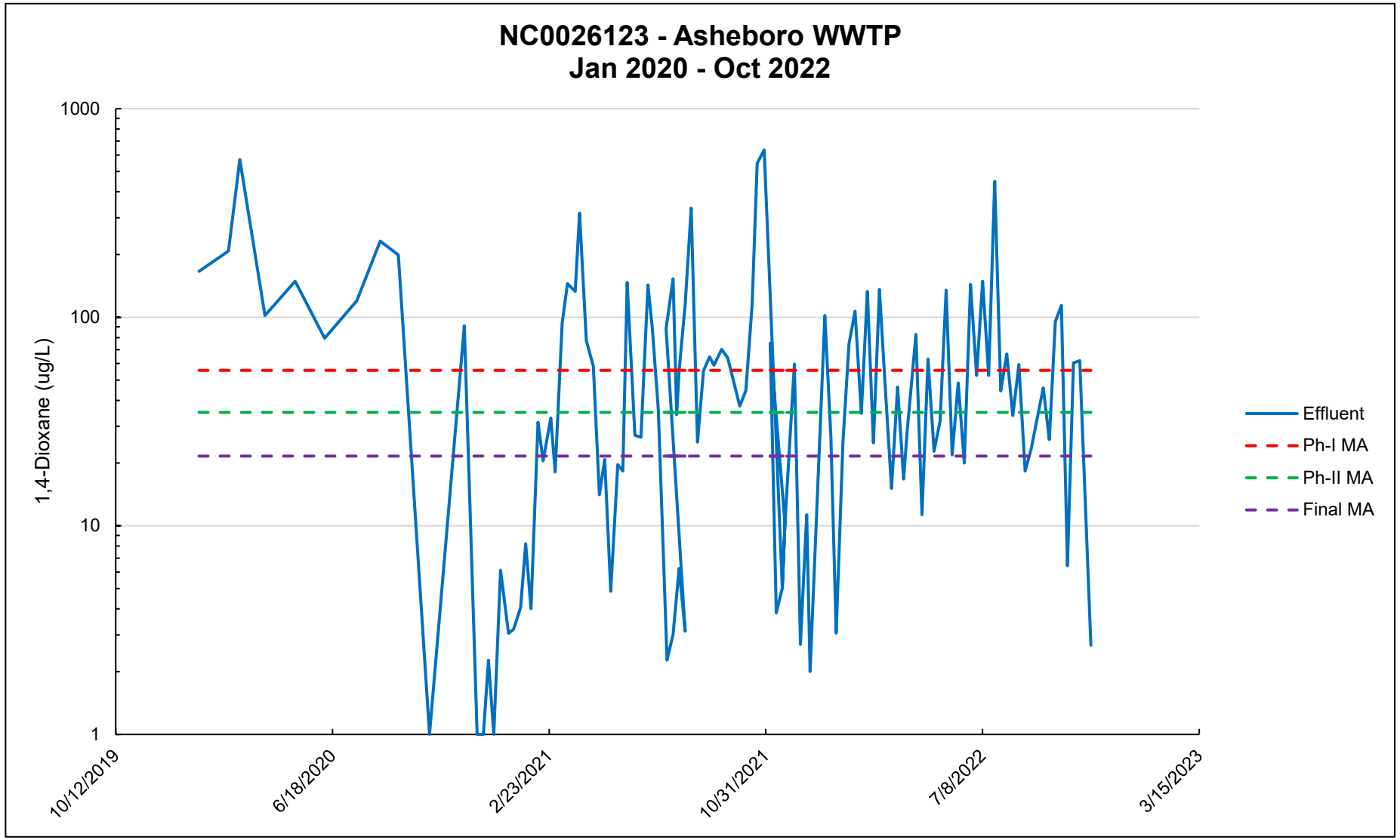
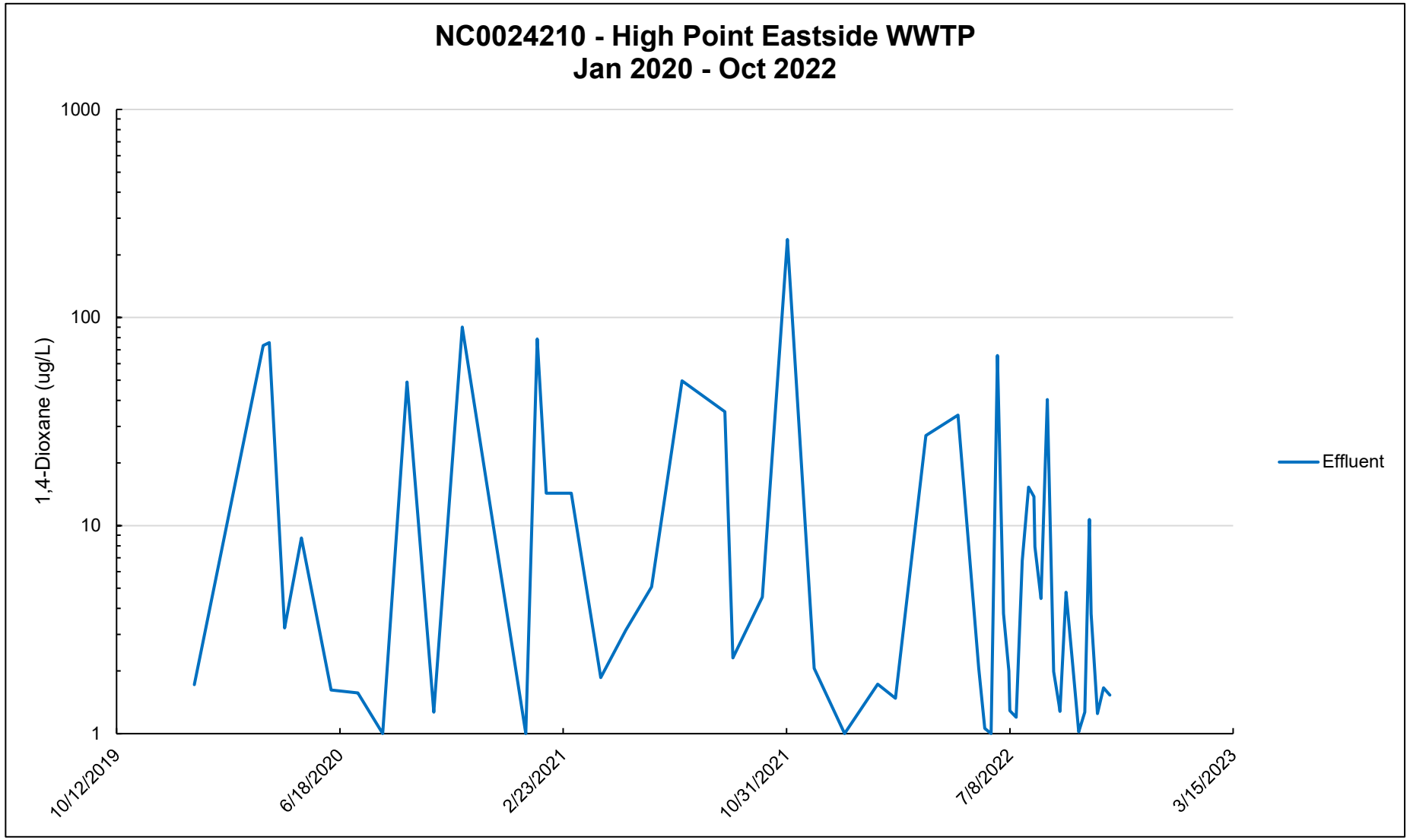
Asheboro 1,4-dioxane eDMR Effluent Sampling Data



High Point 1,4-dioxane eDMR Effluent Sampling Data



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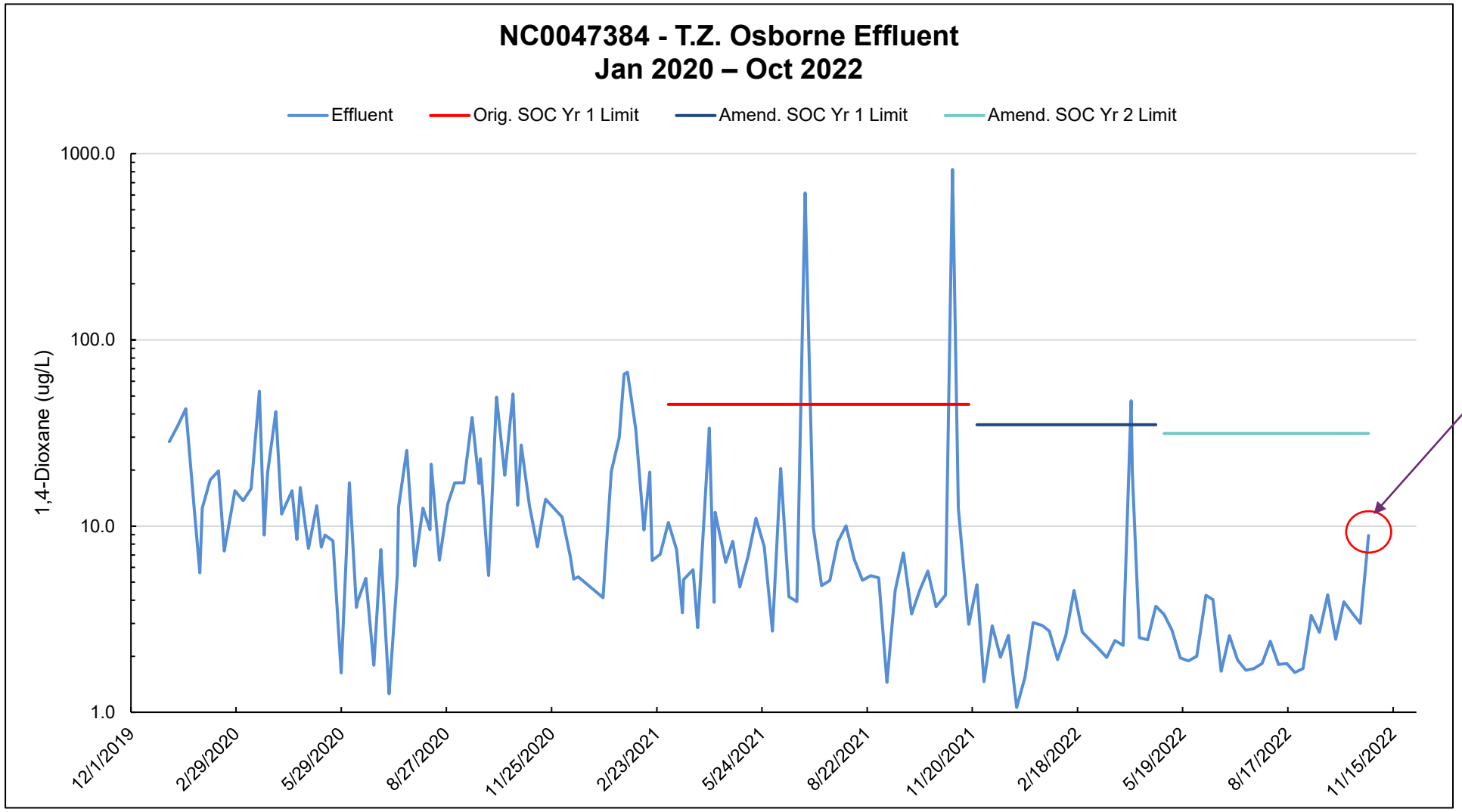
Greensboro 1,4-Dioxane eDMR Effluent concentrations with SOC compliance value (Jan 2020 – October 2022)



Year 2 SOC 31.5 ug/l
Began May 1, 2022

October 25, 2022
Elevated Value