Town of Troy, NH
WWTF Copper & Nutrient Reduction

Troy Water & Sewer Commission Meeting Minutes

6:00 p.m. – Thursday, January 23rd, 2025

Attendees	Role	Representing
Justin Frazier	Superintendent	Troy Water & Sewer
~~Tobin Patenaude~~	~~Laborer~~	~~Troy Water & Sewer~~
Mike Leclerc	Commission Chairman	Troy Water & Sewer
Courtney Davis	Commissioner	Troy Water & Sewer
Ben Drugg	Commissioner	Troy Water & Sewer
Adam Hopkins	Commissioner	Troy Water & Sewer
~~Bill Coveno~~	~~Commissioner~~	~~Troy Water & Sewer~~
~~TJ Chasse~~	~~Chairman~~	~~Troy Board of Selectmen~~
Dave Mercier, PE	Project Manager	Underwood Engineers
Jordan Provencher	Project Engineer	Underwood Engineers

1. Project Schedule

From Scope:

Award Engineering Contract	May 2023
AO Report Preparation and Piloting	May 2023 - June 2024
Draft Report	July 2024
Report Review by Town/DES/EPA	August 2024
Final Report	September 2024

*Note a 1-Year Schedule Extension Request was approved by DES/EPA

Actual:

- Contract Signing — June 26, 2023
- Kickoff Meeting — July 12, 2023
- Alkalinity and PAC Feed Upgrades — October 30, 2024
- Sludge Transfer — January 4, 2025
- Complete Mix Restoration — TBD
- Piloting Period — Jan 2025 – Jan 2026
- Draft Report — TBD

**A second Schedule Extension Request should be made which DES said they would support.

2. Project Budget & Funding

- Project Budget
  - Funding source: $765,000 CWSRF loan ($266,250 principal forgiveness)

- Engineering
  - Design Phase: $130,000.00
  - Billed: $84,822.32
  - Balance: $45,177.68
- Construction:
  - Cell 2A Sludge Transfer: $237,750.00
    - Doesn't yet include CO for additional work (~$100k)
    - No payments have yet been made
  - Restore Complete Mix: $146,464.00
    - Includes CO for furnishing four new 7" sheaves
    - No payments have yet been made
  - Chemical Feed Upgrade: $107,604.00
    - Includes CO for solenoid valve and larger spill pallets
    - Paid except for 2% retainage
    - Pending CO for using flume ultrasonic to drive pumps
      - **Electrical contractor will need additional conduit to run from transmitter to control panel.**
- Purchase Orders:
  - Membrane and spare assembly from LEMNA: $12,600.00
  - Pilot equipment purchase from TriplePoint: $11,210.00
- Contingency
  - $21,236.00 (assuming $100k is CO'd to sludge removal)
  - See Item 7 regarding cost of new blower VFD.

3. Chemical Feed Pilot Implementation

- Final completion was 10/30/24.
- **Original chem feed system was taken offline the week of 12/11/24.**
  - **AI: Justin to confirm date.**
- Float switch has been activating pumps to run for excessive periods of time.
  - During installation when influent flow entered the headworks, water level didn't rise to a level high enough to trigger the float switch.
  - Location of float switch was moved to the pit downstream of the cascade in the influent channel.
  - Pit and lagoons are hydraulically connected. After influent flow stops, the water level in the pit remains high for a longer period of time, keeping the float switch from shutting the pumps off.
- **Justin noted that the chem feed system has been operating for the past three weeks without any clogging issue.**
- Chem feed system will be connected to an existing transmitter tied to an ultrasonic level sensor in the influent channel.
  - NE Environmental Equipment will be onsite either 1/30 or 1/31 to program transmitter for connection to chem feed system. No additional cost to the Town.
  - Richardson will return to the headworks building to run conduit from transmitter to chem feed system. May be small CO request. **See Item 2.**

4. Sludge Transfer

- Summary of sludge transfer:
  - Cell 2A:
    - 18 days (12/6/24 to 12/28/24)
    - 1,300,000 liquid gallons (6 to 10 ft deep throughout)
  - Cell 2B:
    - 5 days (12/29/24 to 1/2/25)
    - 140,000 liquid gallons (10' high x 8' wide trench across width of Lag 2)
    - Unclogged window in baffle between Cells 2A and 2B
  - Cell 1B:
    - 1 day (1/3/25)
    - Inspected baffle between Cells 1A/1B & documented sludge depth in 1B.
- Additional notes
  - Aquatic Services noted that Cell 1A couldn't be dredged with their type of pump because of the potential for constant clogging due to rags.
    - **Future work considerations**
      - **In the long term, installing a mechanical fine screen would prevent rags from entering Cell 1A.**
      - **In the short term, removing existing sludge from Cell 1A should be considered. Town is considering putting out a warrant article this year.**
        - **UE has a quote from LEMNA for cover replacement at Cell 1A (~$130k) and a bid from Denali for barge dredging (~$140k). Need a cost for labor to remove and dispose of old cover and install new cover.**
        - **AI: UE to prepare opinion of probable cost for Cell 1A sludge transfer before 2/7. See Item 7 for dates.**
  - WWTF effluent was halted in the first week of January to let lagoon levels to rise.
  - Cell 2A modular cover that was moved aside to let divers in was left open.
  - Sludge judge measurements were taken by the Town in 6-8 locations across Cell 2A after dredging. Average measured depth was 6".
- Potential Change Order
  - RCS is requesting a $101,110 change order (see attached).
    - Sludge volume comparison
      - Original volume to be dredged (Cell 2A) = 550,000 liquid gallons
      - Actual volume dredged (Cells 2A, 2B) = 1,440,000 liquid gallons
      - Percent additional volume dredged = 262%
      - Alternatively the bid was for average depth of 5 feet vs. 8 feet so they moved 8/5 = 160% more material in Cell 2A alone.
    - **AI: Town to discuss a more reasonable cost for change ordering additional sludge removal and provide a consensus to UE.**
- **Volume of sludge in lagoons**
  - **Most recent sludge judge measurements were recorded in October of 2022. It would be helpful to get an updated layout of sludge depths.**
    - **AI: Justin to complete a more thorough round of sludge judge measurements in all four cells when snow/ice melts on the covers.**

5. Complete Mix Restoration

- Summary of complete mix restoration
  - Diffuser membrane replacements
    - 5 days (12/2–12/4, 12/8–12/9)
    - 186 diffuser membranes replaced (93 diffuser assemblies)
    - RCS noted divers checked diving gear pressure gauges to confirm final elevations of diffusers are all similar. **As a punch list item, RCS will provide a written letter certifying all elevations have been checked.**
  - Servicing floating mixers
    - Mixers brought to shore on 12/2/24 and delivered to the shop on 12/4/24.
    - Mixers returned to lagoons and restored to original locations on 1/2/25.
  - Aeration blower modifications
    - New blower/motor sheaves were installed on 1/13/25.
      - 7" sheaves installed on motor shafts.
      - 13" sheaves installed on blower shafts (spec called for 7" sheaves)
        - RCS has requested clarification from AAA/Faye. Correcting the blower sheaves will be at no cost to the Town.
    - Future blower operation
      - **Town is considering operating both blowers/motors simultaneously at 36 Hz, given that (a) the power required wouldn't be significantly more than one operating at 60 Hz and (b) if one were to die, the second one could be operated at 60 Hz until the first was replaced, regardless of configuration.**
      - **UE noted that a new blower and motor costs approximately $25k-$30k to furnish and install. The Town is further considering budgeting for blower replacement.**
  - CO #1 for furnishing four new sheaves **was signed by the Town at the meeting.**

6. Pilot Sampling

- See attached for plots of updated effluent sample readings.
- Prior to pilot testing, frequency of baseline sampling is limited.
- For an accurate pilot test, samples below MUST be collected every other week:

Location	Parameter
Cell 1A Effluent	Ammonia
Cell 1B Effluent	Temperature
	pH
	Alkalinity
	Ammonia
	Total Phosphorus
	Total Recoverable Copper

Location	Parameter
Influent	Temperature
	pH
	Alkalinity
	Ammonia
	Total Phosphorus
	Total Recoverable Copper

Location	Parameter
Effluent	Temperature
	pH
	Alkalinity
	Ammonia
	Total Phosphorus
	Total Recoverable Copper

7. Other/Discussion Items

- New blower VFD was installed on 1/23. Installation bill has not yet been received. Cost to furnish new VFD was about $5,200.
    - Work can likely be covered by CWSRF loan. There is $21,236.00 contingency in the funding, **assuming the full sludge transfer CO is executed.**
- **Town would like to see comparison between increased capacity from sludge removal versus nitrification reactor.**
    - **AI: UE to perform calculations to compare treatment for both alternatives.**
- **Town confirmed that influent TP currently read at 22 mg/L is valid. More data will be needed to confirm if this is recurring or not.**
- **Important dates**
    - **2/17 – Town is holding a public hearing**
    - **2/10 – Deadline for public hearing agenda**
    - **2/7 – UE to provide a Cell 1A sludge transfer & cover removal/replacement cost**

Attachments

A. Contract 1: RCS Proposed Cost for Additional Sludge Dredging (CO #1)
B. Effluent Parameter Plots

Copies to: Attendees

			Activity		
	Monday	2-Dec-24	Arrive, Remove Mixers, begin setup of site for diving work on diffusers		
	Tuesday	3-Dec-24	Continue setup test dive gear and make test dive, work on diffusers		
	Wednesday	4-Dec-24	Pump arrives, begin sludge removal at berm 2A, work on diffusers		
	Thursday	5-Dec-24	No Work		
1	Friday	6-Dec-24	Sludge Removal (note sludge depth = 6 or more feet)		
2	Saturday	7-Dec-24	Sludge Removal (note sludge depth = 6 or more feet)		
3	Sunday	8-Dec-24	Sludge Removal (note sludge depth = 6 or more feet), work on diffusers		
4	Monday	9-Dec-24	Sludge Removal (note sludge depth = 6 or more feet), work on diffusers		
5	Tuesday	10-Dec-24	Sludge Removal (note sludge depth = 8 or more feet)		
6	Wednesday	11-Dec-24	Sludge Removal (note sludge depth = 8 or more feet)		
7	Thursday	12-Dec-24	Sludge Removal (note sludge depth = 8 or more feet)		
8	Friday	13-Dec-24	Sludge Removal (note sludge depth = 8 or more feet)		
9	Saturday	14-Dec-24	Sludge Removal (note sludge depth = 8 or more feet)		
10	Sunday	15-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
11	Monday	16-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
12	Tuesday	17-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
13	Wednesday	18-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
14	Thursday	19-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
15	Friday	20-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
16	Saturday	21-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
17	Sunday	22-Dec-24	Sludge Removal (note sludge depth = 9 or more feet)		
18	Monday	23-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)	This encompassed the area between row 4 and the 2A/2B baffle. The sludge was extremely dense. The sludge from the 2B side of the baffle slid under the baffle so the diver had to make several passes to remove the sludge. The divers moved to the opposite side of the baffle.	$8,975.00
19	Tuesday	24-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
20	Wednesday	25-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
	Thursday	26-Dec-24	No Work		
21	Friday	27-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
22	Saturday	28-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$11,275.00
23	Sunday	29-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)	The divers removed sludge along the baffle about 8-ft wide. That seemed to stop most of the sludge from squeezing under the baffle back into 2A. It also took the bulging stress off the baffle and allowed it to settle back on the bottom. The window in the baffle was found to be completely blocked and has been cleared, Found window in baffle between 1A and 1B. Window was clear and baffle is resting on the floor. It appears in this section of 1B the sludge level is less than two feet.	$11,275.00
24	Monday	30-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
25	Tuesday	31-Dec-24	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
26	Wednesday	1-Jan-25	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$11,275.00
27	Thursday	2-Jan-25	Sludge Removal (note sludge depth = 10 or more feet and hard packed)		$8,975.00
28	Friday	3-Jan-25	Check and Clean baffle window between 1A and 1B		$8,975.00
	Saturday	4-Jan-25	Demobilize and prepare to travel home		

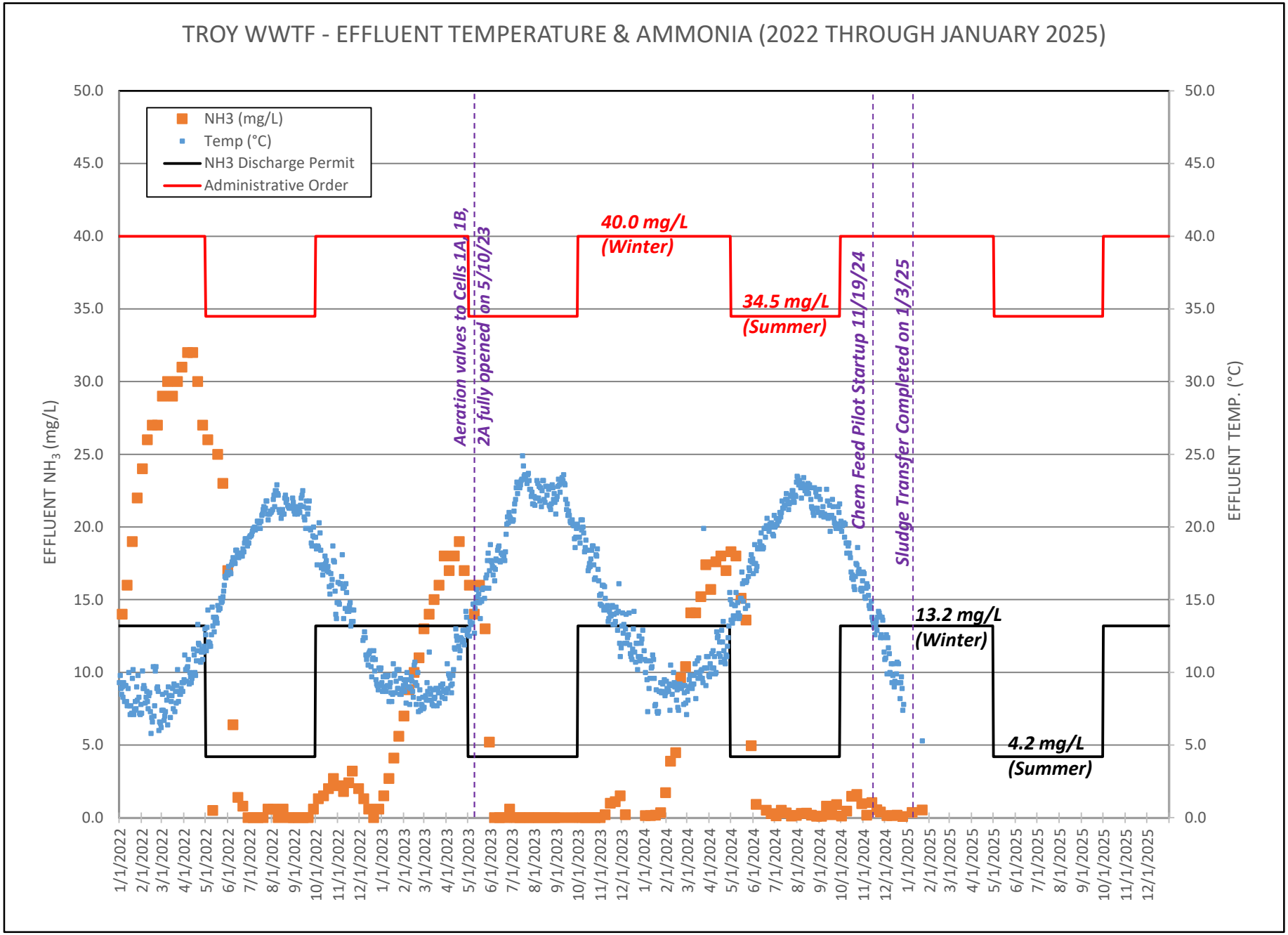
Note: The sludge levels were found to be significantly deeper than known, greatly increasing the time to remove it. Our crew calculated removing approximately 1,300,000 gallons of sludge which is about twice as much as anticipated. Therefore we are asking for a change order to cover the extra number of days (5 additional).

Original Contract

Additional Days

Total of 28 Sludge work days. One baffle inspection day for Cell 1B

Holiday Mobilization =	$4,460.00
Susan	
Misc Expenses	
Total =	$101,110.00



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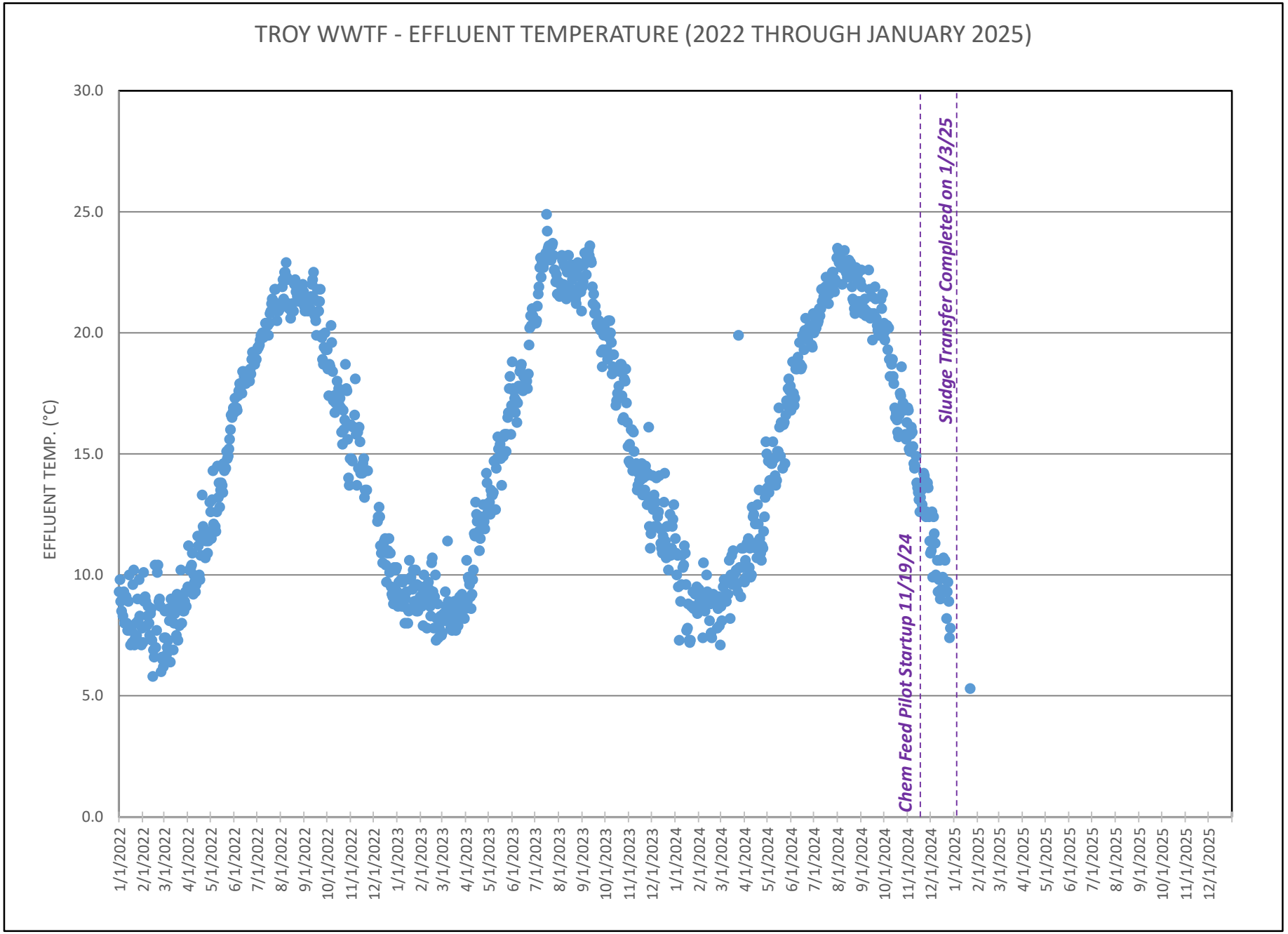
TROY WWTF - EFFLUENT TEMPERATURE (2022 THROUGH JANUARY 2025)
EFFLUENT TEMP. (°C)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Chem Feed Pilot Startup 11/19/24
Sludge Transfer Completed on 1/3/25
1/1/2022
2/1/2022
3/1/2022
4/1/2022
5/1/2022
6/1/2022
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8/1/2022
9/1/2022
10/1/2022
11/1/2022
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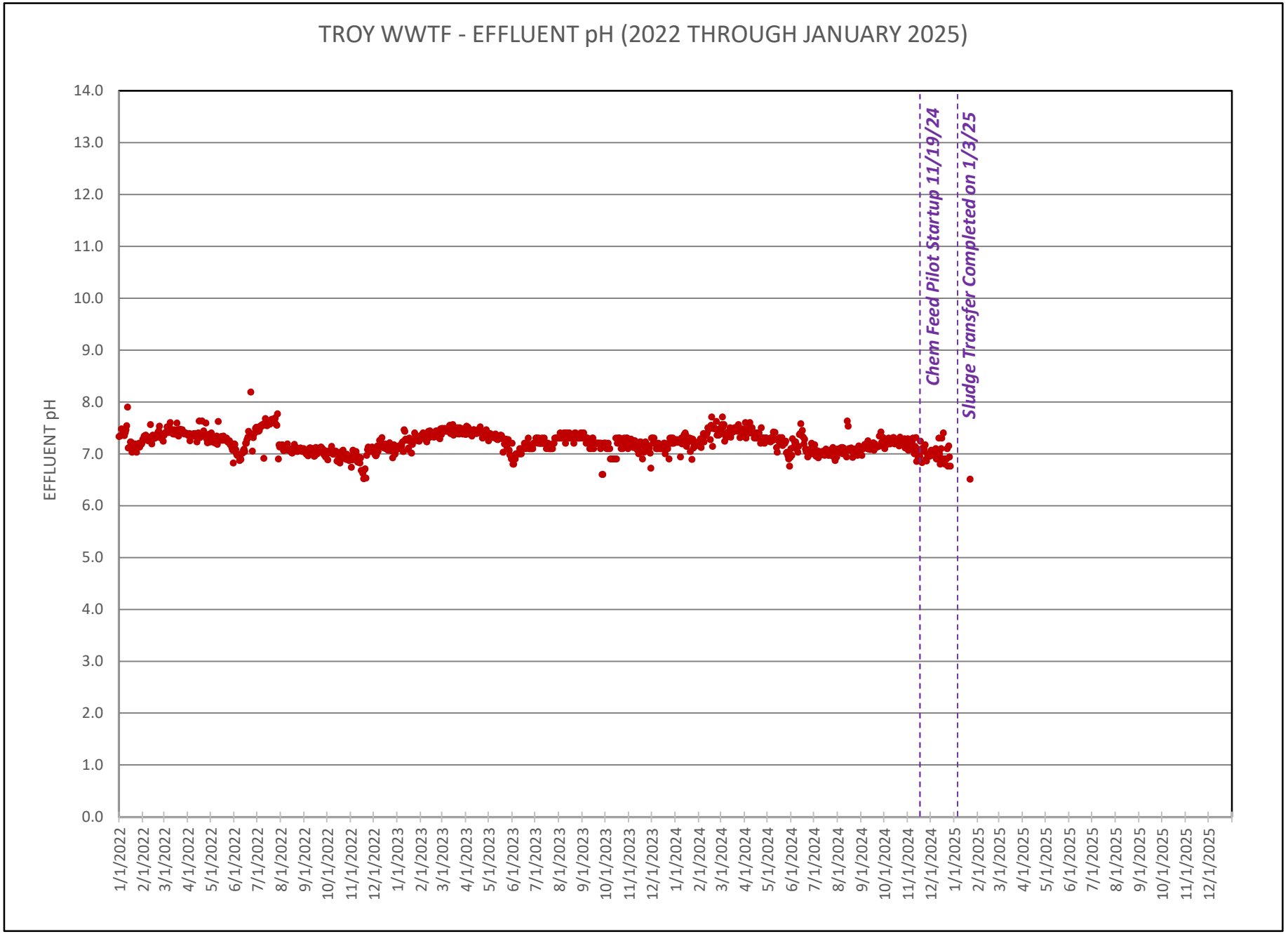
TROY WWTF - EFFLUENT pH (2022 THROUGH JANUARY 2025)
EFFLUENT pH
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Chem Feed Pilot Startup 11/19/24
Sludge Transfer Completed on 1/3/25
1/1/2022
2/1/2022
3/1/2022
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11/1/2022
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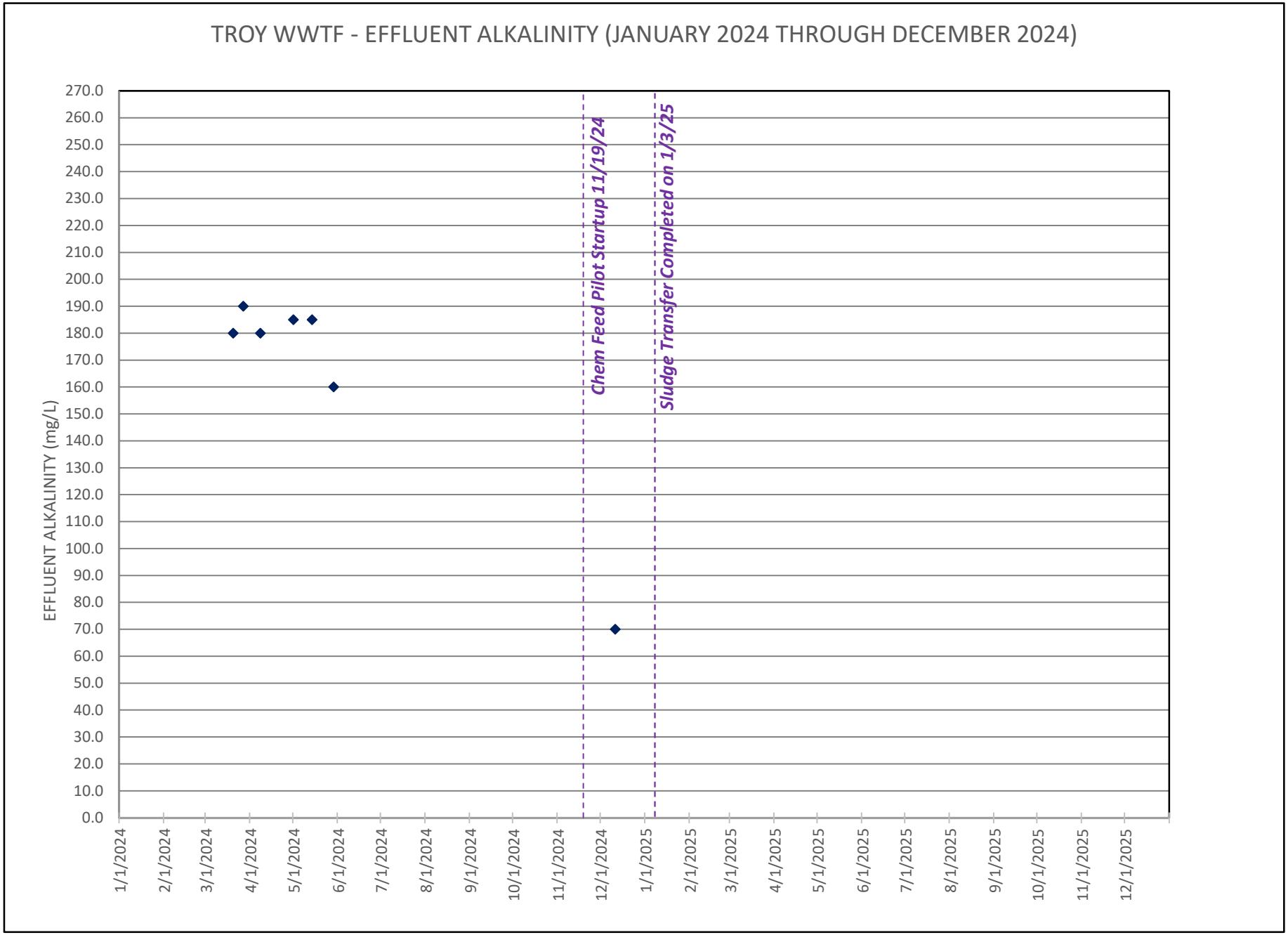
TROY WWTF - EFFLUENT ALKALINITY (JANUARY 2024 THROUGH DECEMBER 2024)
EFFLUENT ALKALINITY (mg/L)
270.0
260.0
250.0
240.0
230.0
220.0
210.0
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Chem Feed Pilot Startup 11/19/24
Sludge Transfer Completed on 1/3/25
1/1/2024
2/1/2024
3/1/2024
4/1/2024
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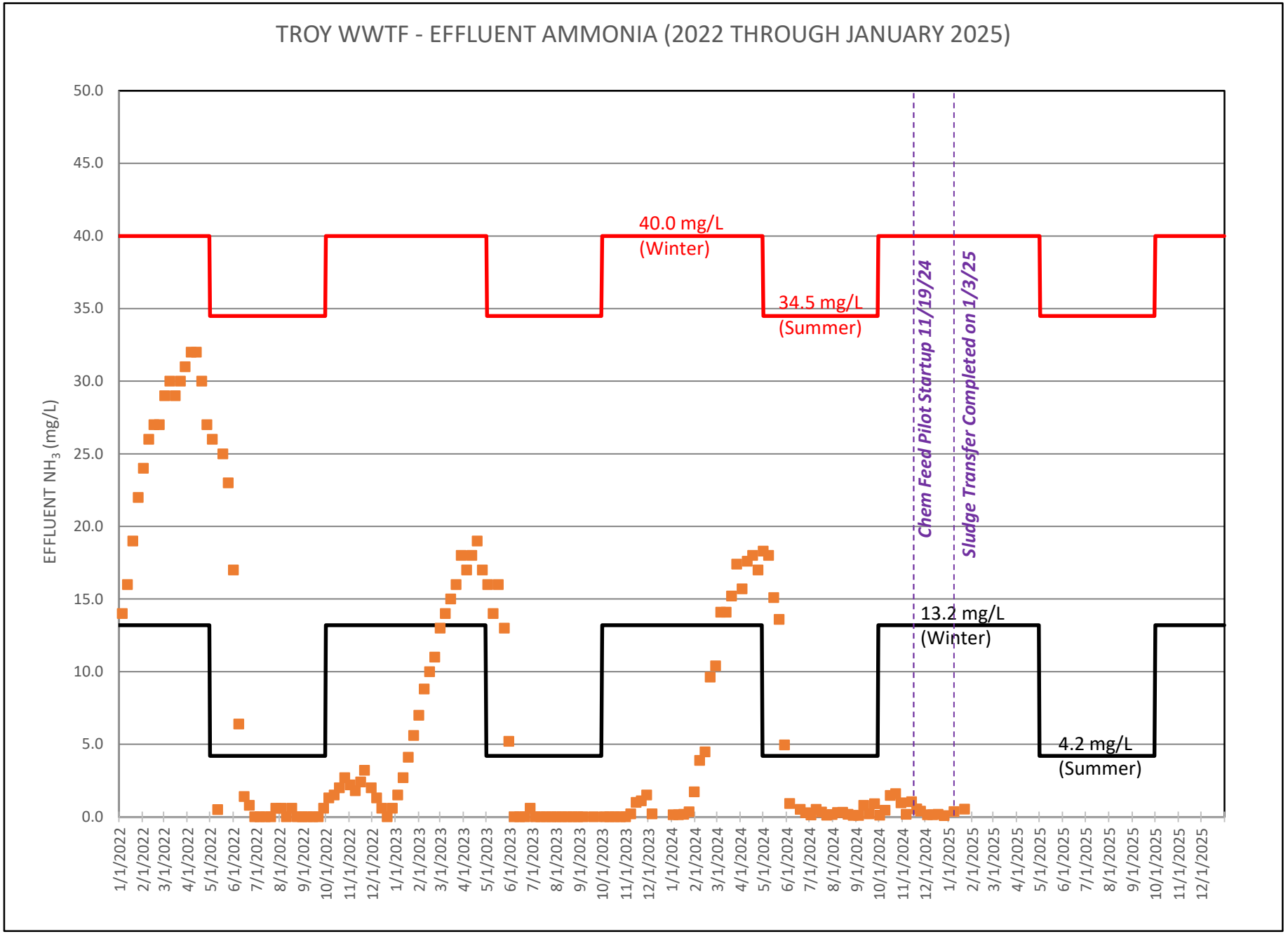

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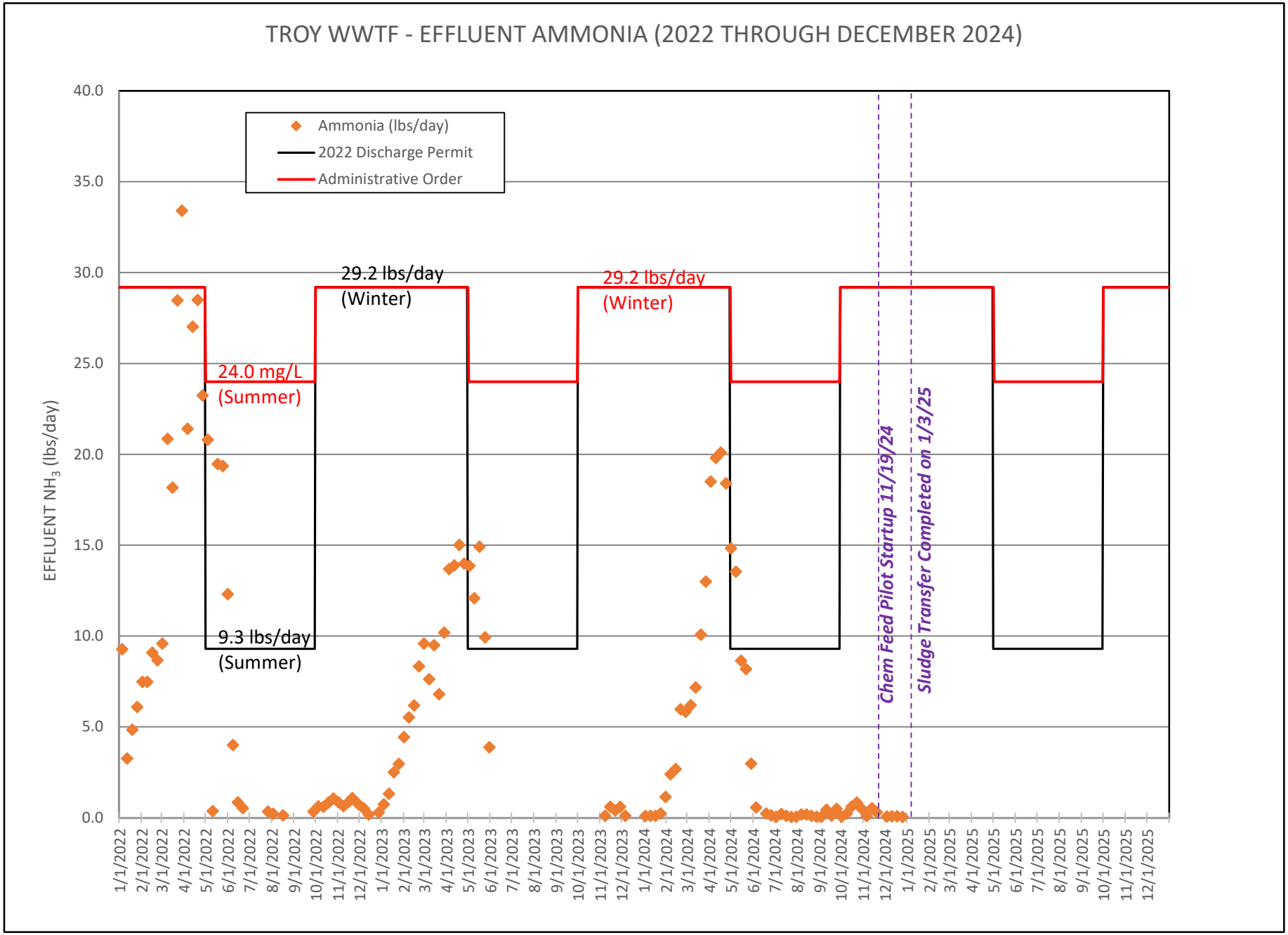

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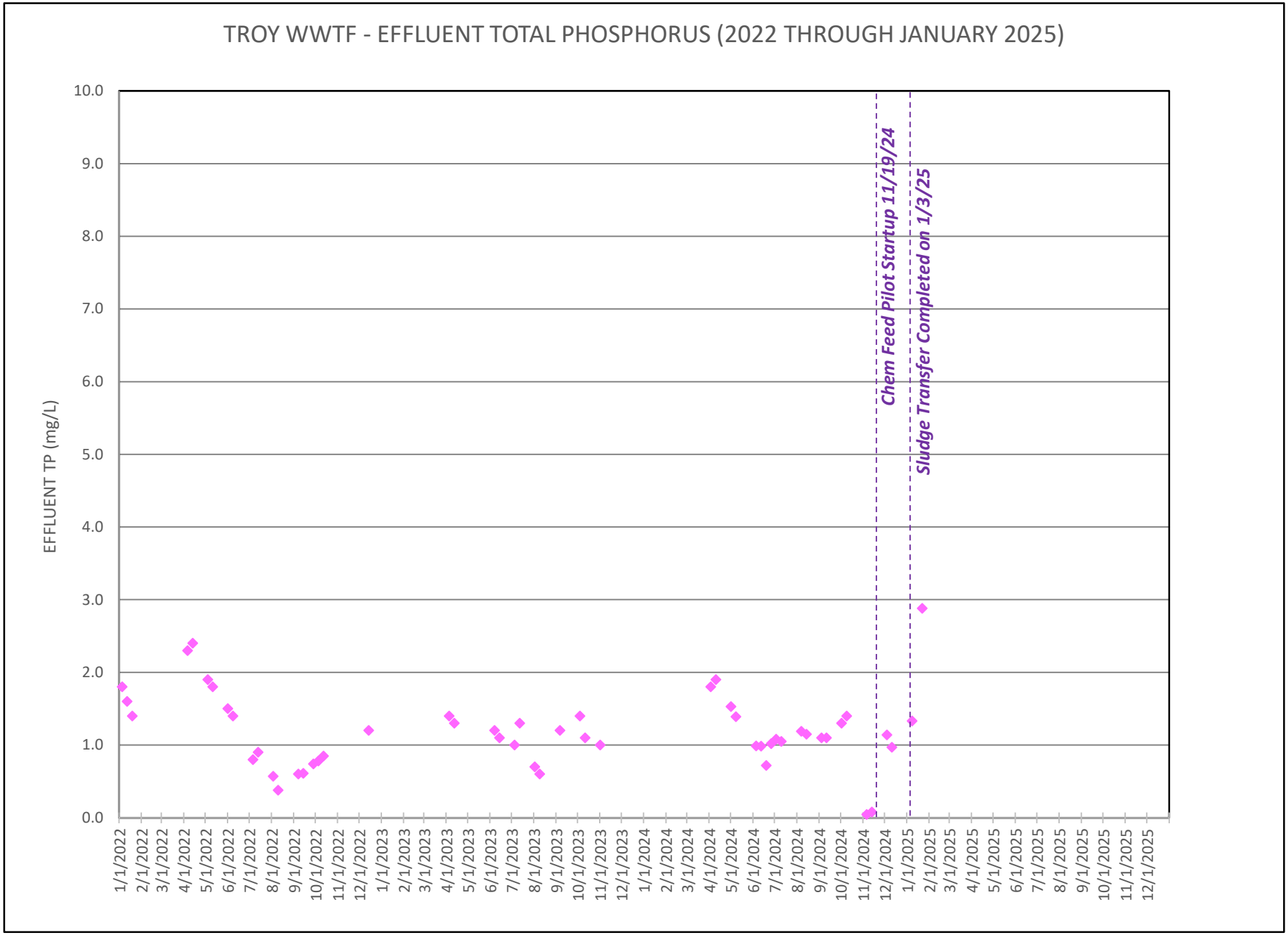
TROY WWTF - EFFLUENT TOTAL PHOSPHORUS (2022 THROUGH JANUARY 2025)
EFFLUENT TP (mg/L)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Chem Feed Pilot Startup 11/19/24
Sludge Transfer Completed on 1/3/25
1/1/2022
2/1/2022
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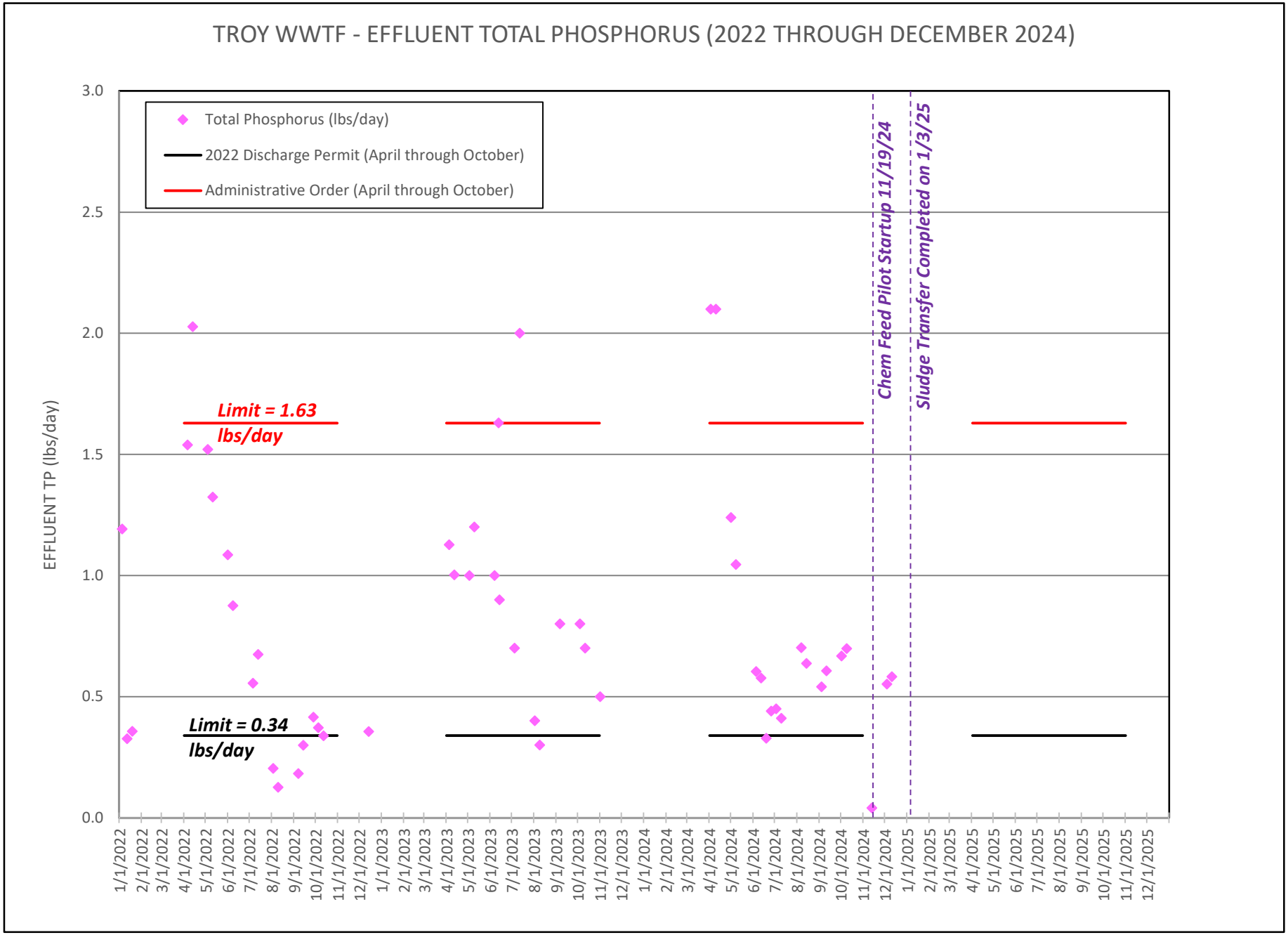

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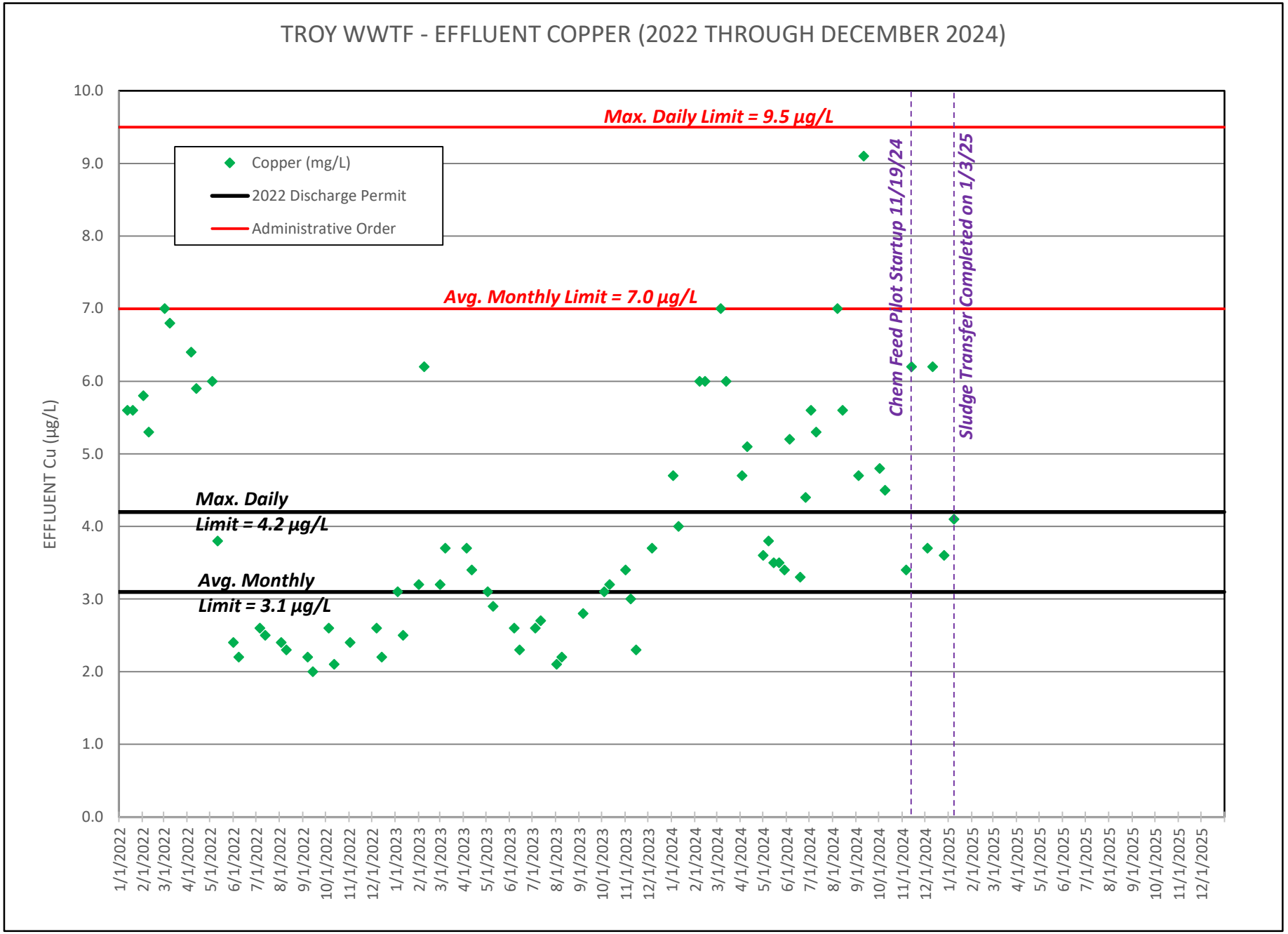

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