



Maryland Department of Environment
Water and Science Administration
Compliance Program
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Inspector: Christopher Lepadatu
AI ID: 3076

Site Name: Patapsco WWTP
Facility Address: 3501 Asiatic Ave, Curtis Bay, MD 21226
County: Baltimore City County

Start Date/Time: April 26, 2024 09:30 AM
End Date /Time: April 26, 2024 12:00 PM
Media Type(s): NPDES Municipal Major Surface Water

Contact(s): Neal Jackson – Plant Manager, Patapsco WWTP
Scott Moffatt – Policy Analyst, Baltimore City DPW
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NPDES Municipal Major Surface Water

Permit / Approval Numbers: 15DP0850
NPDES Numbers: MD0021601
Inspection Reason: Follow-up
Site Status: Active
Compliance Status: Compliance
Site Condition: Additional Investigation Required
Recommended Action: Continue Routine Inspection
Evidence Collected: Photos or Videos Taken, Record Review, Visual Observation
Delivery Method: Email
Weather: Calm, Clear, Good

Inspection Findings:

Introduction:

The Patapsco Wastewater Treatment Plant (WWTP) is permitted to discharge to the Patapsco River which is designated as Use II waters protected for estuarine and marine aquatic life. The Patapsco WWTP features advanced treatment processes to achieve enhanced nutrient removal (ENR), chlorination and de-chlorination. The Patapsco WWTP is rated to treat an average daily flow of up to 73 MGD.

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The treatment system includes preliminary treatment (grit removal and fine screening), primary treatment (primary settling tanks (PSTs)), secondary treatment (biological nutrient removal activated sludge process and additional filter nitrification), tertiary treatment (denitrification filters for enhanced nutrient removal) and disinfection (chlorination).

Primary sludge (PS) and waste activated sludge (WAS) produced by the primary treatment and secondary treatment process is thickened on-site. The solids thickening process consists of Gravity Sludge Thickeners (GSTs) and dissolved air flotation tanks. The thickened sludge is stored in a sludge blend tank and then conveyed to the drying facility onsite which is operated by a third-party, Synagro.

On this day, I inspected the WWTP with the contacts listed above.

Consent Decree:

As of November 2023, Baltimore City and the Department signed a Consent Decree, Case No. 24-C-22-00386, which establishes specific goals and objectives related to the operations and maintenance of the Patapsco WWTP. As a result, maintenance items observed during the site inspection will be notated in the relevant areas of the inspection report and not itemized in the Violation(s) section as in previous inspection reports. The goals and objectives in the Consent Decree are noted below for monitoring and tracking progress. The table has been updated with the information included in the Consent Decree Report provided on February 14, 2024.

Patapsco WWTP Consent Decree (CD) Overall Progress Tracking Summary				
CD Paragraph Reference	Activity	CD Deadline	Actual Date Completed	Compliance Status (11/25/23)
147-PAT	Provide the Dryer Facility with access to, and control of, GST thickened sludge pumps to automate sludge withdrawal from the GSTs until the existing stored sludge from the SBTs is removed and the SBTs are returned to normal operating mode.	11/15/2023	October 2023	Complete
148-PAT	Have and maintain contracts for on-call hauling services to serve as back-up to the Dryer Facility.	Ongoing		Compliant
149-PAT	Complete replacement or rehabilitation of the grit facility, which includes provision for odor control and proper ventilation. Workers entering the grit facility to comply with Grit Facility SOPs.	4/30/2024 (RFP) 12/31/2027 (Complete Rehabilitation or Replacement)		80% 0%
150-PAT	Repair or refurbish Industrial Plant Influent Facility (IPI) screens and pumps and replace or fully rehabilitate the IPI Facility to operate as designed.	6/30/2024		95%
151-PAT	Repair all non-functional screens in the Fine Screen Facility, increase screen opening size for three screens, and install new conveyors, northern screen compactors, and curtains from the screen chutes to the belt.	6/30/2024		50%
152-PAT	Repair and upgrade scum trough actuators associated with the PSTs to allow for automatic operation of the scum removal system, and upgrade mechanisms of clarifiers #1-3 to provide automatic operation.	6/30/2024	10/23/2023	Complete
153-PAT	Ensure all six PSTs are fully functional and operating as designed.	12/15/2023	9/5/2023	Complete
154(a)-PAT	Repair all RAS/WAS pumps for secondary clarifier #6a to operate as designed.	11/25/2023	8/16/2023	Complete
154(b)-PAT	Replace missing skimmer sections to increase scraper effectiveness.	11/25/2023	9/22/2023	Complete
154(c)-PAT	Remove BAF media from secondary clarifier influent and BAF mudwells.	11/25/2023	11/18/2023	Complete
155(a)-PAT	Complete evaluation of need for secondary clarifier #3. Within 10 days of evaluation: Request approval to discontinue or alter use of clarifier.	4/1/2024 (Complete Evaluation) 5/1/2024 (Request Approval to Discontinue / Alter)		95% 0%
155(b)-PAT	Submit a plan for Department approval to improve the clarifier #3 (Clarifier #3 Improvement Plan) and implement immediately upon approval	5/1/2024		0%
156-PAT	Investigate Biological Aerated Filter Facility ("BAF") media state	12/15/2023	March 2023	Complete
157-PAT	Submit a plan and schedule to address BAF media loss and prohibit any	1/14/2023	11/25/2023	Complete

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	discharge of media to waters of the State			
158-PAT	Automate time scum log operation of the Chlorine Contact Tank (CCT)	1/31/2025		95%
159-PAT	Ensure staff are present at all times during each shift to maintain manual skimming of FOGs or floating solids at the CCTs until 158-PAT is complete.	Ongoing		Compliant
160-PAT	Rehabilitate GST #4 and associated pumps.	3/14/2024	2/10/2023	Complete
161-PAT	Ensure all GSTs are fully functional and operating as designed. Baltimore City shall notify Plaintiffs upon receipt of parts.	11/25/2023	July 2023	Complete
162-PAT	Submit a PCB Minimization Plan	12/15/2023	11/25/2023	Complete
163-PAT	Complete investigation into flow meter and complete root cause analysis of the discrepancy between influent and effluent flow volume.	12/15/2023	5/29/2023	Complete
164-PAT	Submit a revised FOG Mitigation Plan	11/25/2023	11/25/2023	Complete
165-PAT	Submit a Staffing Report and Staffing Plan	12/31/2023	12/22/2023	Complete
166-PAT	Have, maintain, and make available to the Department Patapsco WWTP SOP	6/30/2024		60%
167-PAT	Submit a report that identifies what processes at the Patapsco WWTP are currently automated, and conduct a feasibility study for the automation of additional processes, with a plan and schedule for future automation.	5/13/2024		10%
168-PAT	Have, maintain, and update a Computerized Maintenance Management System (CMMS) as functional work order system to ensure that the plant and its equipment and components operate as designed.	Ongoing		Compliant
169-PAT	Complete a condition assessment and inventory of existing assets in order to develop an asset management program, and within 90 days of the completion of the assessment and inventory, begin implementing the asset management program.	11/15/2024 (Completion of assessment)		40%
		2/13/2025 (Commence Implementation)		0%

The table above will be updated during future facility inspections.

Site Walkthrough:

The Industrial Plant Influent (IPI) contains two (2) fine screens and four (4) pumps for conveying flow to the primary clarifiers. The IPI building has approximately 2-3 MGD capacity for industrial influent. The two (2) fine screens in the IPI building receive flow by means of individual channels and gates for flow control. The gate for Bar screen #1 is not functional and needs maintenance – no schedule of repair provided at this time. Screened and raked material is discharged into rolling dumpsters, one for each fine screen. The dumpsters rest in a concrete channel where they can be winched to the exterior of the IPI building for waste collection.

The Fine Screen facility contains eight (8) fine screens divided into two groups of four which I will refer to as “north group” and “south group”. Each group of screens has a conveyor and compactor associated with it to carry screened material to the compactor before discharging it to waste dumpsters. At the time of the site visit, the four (4) fine screens in the south group were observed to be in operation with the north group of four (4) screens off for maintenance. A project for replacing the compactors and conveyor belts for both groups of screens is ongoing. It was reported that the work observed during the last inspection was maintenance work on the belt and rollers for the north group of fine screens. The new belts have been received, but they are waiting on the rollers before they can install the new belts. Fats, oils, and grease (FOG) continues to be an ongoing issue for the facility.

Transfer Station:

The transfer station has a roof, low wall on three sides, and trench drains in its concrete floor. Grease and grit from the preliminary treatment systems (screening) are stored in the transfer station. Liquid that drains into the trench drains of the transfer station is pumped back into the gravity sludge thickeners (GSTs). Dried waste and grit are taken to the Quarantine Road Municipal Landfill for disposal.

Gravity Sludge Thickeners (GSTs):

There are three (3) 65-ft diameter gravity sludge thickeners (GSTs) in the sludge handling area of the plant. The GSTs are numbered #1, #2, and #4. GSTs #1 and #2 are built on grade and GST #4 is elevated above grade. The skimming arms of GST #1 and #2 are missing significant portions of the rubber flaps which should extend down to the liquid

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surface to effectively remove surface scum. Currently, staff spray water on the surface of GST #1 and #2 in order to manually remove surface scum. Repairs for the skimming arms are reportedly planned and a vendor has been selected to complete the repairs.



Image 01: GST #1

It was reported that Synagro’s sludge processing operations has been keeping up with the plant’s sludge production. The vertical sludge storage tanks are empty and Synagro is able to pull directly from GST’s #1 and #2. The scum troughs on GST #1 and GST #2 were clear and operational. GST #4 is operational but not in use and is kept as a back up for GSTs #1 and #2.

Sludge Processing to Synagro

Sludge processing data is provided in the monthly MOR submitted with the netDMR submissions. The data provided for the month of March 2024 is organized in the table below.

Sludge Processing to Synagro, March 2024				
Date	KGAL Feed Sludge	%Total Solids in Feed Sludge	Feed Sludge, Dry Tons	Synagro Pellet Production, Dry Tons
3/1	640.498	3.20	85.47	69.51
3/2	446.328	4.05	75.38	0.00
3/3	655.161	2.87	78.41	0.00
3/4	448.496	3.79	70.88	93.21
3/5	323.260	3.38	45.56	47.03
3/6	310.398	4.00	51.77	70.41
3/7	240.208	3.89	38.96	92.10
3/8	182.433	3.72	28.30	46.03
3/9	309.256	3.68	47.46	0.00
3/10	155.258	4.18	27.06	0.00
3/11	223.833	2.88	26.88	68.72
3/12	358.297	2.94	43.93	39.77
3/13	392.160	2.44	39.90	22.97
3/14	33.606	2.37	3.32	22.48
3/15	0.000	N/A	0.00	0.00
3/16	40.758	3.16	5.37	0.00
3/17	309.795	3.32	42.89	0.00
3/18	125.371	3.48	18.19	23.07
3/19	295.246	4.03	49.62	0.00
3/20	244.744	5.45	55.62	45.71
3/21	54.729	3.96	9.04	42.85
3/22	138.704	4.44	25.68	45.52
3/23	77.042	4.92	15.81	0.00
3/24	78.031	3.73	12.14	0.00
3/25	426.013	3.45	61.29	39.99

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3/26	280.647	3.50	40.96	22.67
3/27	260.974	4.18	45.49	21.48
3/28	153.525	3.98	25.48	16.19
3/29	293.981	4.33	53.08	45.86
3/30	215.553	4.20	37.75	23.33
3/31	158.839	3.88	25.70	0.00
Total	7,873.14	111.40	1,187.39	898.90
Average	253.972	3.71	38.30	29.00

Primary Treatment:

The primary treatment system consists of six (6) large, rectangular Primary Settling Tanks (PSTs), each equipped with a chain and flight sludge conveyance mechanism, scum logs, and screw sludge collector.



Image 02: PST # 6, Effluent.

At the time of the site inspection, PSTs #3 and #6 were in service. PST #1 was drained and in the process of being cleaned. PST #5 was operating as flow-thru until it can be drained, cleaned, and repaired. PSTs #2 and #4 were down waiting for repairs. Recent rain events have overloaded the facility and each PST needs to be drained and cleaned following significant rain events.

High Purity Oxygen Aeration Reactors and Liquid Oxygen Plant (LOX Plant):

The LOX Plant converts air to 95% liquid oxygen. Liquid oxygen is used for the pure oxygen reactors for BOD removal. The main system at the LOX Plant is currently running. The High Purity Oxygen Aeration facility has six (6) pure oxygen reactors. The reactors are enclosed, rectangular tanks where the inside cannot be observed. Reactors #2, #3, #5, and #6 were in service at the time of the inspection. Reactor #1 is in standby and reactor #4 is down while two of its mixers are being rebuilt.

Secondary Treatment:

The facility is equipped with eight (8) secondary clarifiers. Secondary clarifier #3 is not operational and is being used as a mudwell to contain backwash water from the denitrification filters (DNF) and biological aeration filters (BAF). Wastewater from secondary clarifier #3 is pumped back to the PST influent via a temporary pump from United Rental. It was reported that there is a plan to run the HDPE pipe directly to the temporary pump and avoid using secondary clarifier #3 for this purpose. There is a delay in this process as they are having difficulty locating a vendor.

Secondary clarifier #4 has a section of the skimmer arm missing. It was reported that parts have been received and clarifier #4 will be drained in preparation for the repair. Clarifier #6b was drawn down due to a need for repairs to its skimmer arm. It was reported that the skimmer arm hung up on the scum trough and was severely bent / twisted from

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the torque. Clarifier #5a was observed as having a bent end to its skimmer arm that is dipping below the water surface. The scum trough on Clarifier #4 and Clarifier #2 appeared to be clogged with material.



Image 03: Clarifier #4, missing section of skimmer arm.



Image 04: Clarifier #4, clogged scum trough.

BAFs and Mud Wells:

Inside the Biological Aeration Filter (BAF) facility there are 22 filter cells and associated blowers. Fourteen (14) filter cells are necessary for design average daily flow. Cell #16 is out of service for valve issues. No other issues were observed or reported with the BAF system or Mud Wells.

Denitrification Filters:

The denitrification filter (DNF) facility contains 34 gravity filters and support systems such as backwash pumps and blowers. 29 filters were in service at the time of the inspection. Filters #21, #32, and #33 are out of service for mechanical issues. Filters #34 and #1 are maintained in standby and used only for emergencies. 24 filters are necessary for design average daily flow. The DNF filters are automatically backwashed every four hours for approximately 46 minutes.

Chlorine Contact Chambers:

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The wastewater treatment plant has four (4) chlorine contact chambers with scum troughs and mixers. No issues were reported or observed.

Outfall 001:

Foam was observed on the surface of the final discharge channel which appeared to disperse rapidly. BAF media and FOGs were not observed to be leaving the site via the effluent channel.



Image 05: Final effluent.

Self-Monitoring / In-House Lab:

The following records were reviewed:

- Daily pH calibration records from 4/1/24 to 4/26/24.
- Daily zero oxygen verification / dissolved oxygen (DO) calibration from 4/1/24 to 4/26/24.
- Daily composite samplers' temperatures from 4/1/24 to 4/26/24.
- Chlorine Colorimeter calibrations for 4/1/24 to 4/26/24.

No violations were observed in the review of the above records.

The facility's operator lab for the outfall has two composite samplers. The temperatures of the composite samplers #1 and #2 were 2.0°C and 3.0°C, respectively. The composite samplers were less than or equal to 6°C which is within the temperature requirement for sample holding / preservation, according to Table II in CFR 136.3.

Lab Reports, MORs, and DMRs:

Lab reports and MORs for March 2024 were provided for review. Lab reports for 5-day biological oxygen demand (BOD), total suspended solids (TSS), ammonia, nitrate plus nitrite, total phosphorous (TP), ortho-phosphate, Enterococci, cyanide, and metals were reviewed.

No issues or violations were observed in the lab reports or MORs. No issues or violations were observed or reported in the NetDMR submission for March 2024.

Non-compliance Report / Bypass Event(s):

On March 24, 2024, the department was notified of an internal unit bypass at Patapsco WWTP. On Saturday, March 23, 2024, at about 1:00pm, the Biological Aerated Filters (BAF) were bypassed due to high plant influent flow caused by a large rainstorm. The bypass ended at approximately 7:00 am on March 24, 2024. During the bypass, an estimated 76.17 million gallons bypassed the BAF and continued to the Denitrifying Filter (DNF) system, Chlorine Contact

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Chambers, and final effluent. Without the BAF available, the plant was unable to convert ammonia to nitrate, which led to higher than normal effluent Total Nitrogen (TN) concentration.

On April 2, 2024, the department was notified of internal unit bypasses at Patapsco WWTP. Higher than average rainfall led to ongoing high flows to the Patapsco WWTP which caused damage to process equipment, particularly the Primary Settling Tanks (PSTs) and the associated sludge collectors and sludge pumps. Additionally, mechanical issues with Clarifier #6b and Clarifier #2 presented additional challenges during this period of high flows. Heavy rain started on April 1, 2024, and continued off and on through April 4, 2024, and resulted in a total precipitation amount of 2.9” and high flows to the plant through April 5, 2024. The high flows overwhelmed the Biological Aerated Filters (BAF) with solids from the secondary process and the BAF was taken offline at 11:00am on April 1, 2024, and returned to service on April 5, 2024, at 7:00am. While the BAF was offline, all the flow through the plant also bypassed the DNF system and continued to the Chlorine Contact Chambers for disinfection before the final outfall. The total amount of plant flow bypassed during the storm event was 501.78 million gallons. Bypassing both processes led to higher plant effluent Total Nitrogen concentrations than normal.

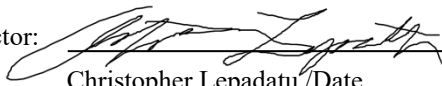
On April 16, 2024, the department was notified of permit exceedances for weekly BOD and TSS loading at Patapsco WWTP. Due to the higher than average rainfall experienced and the system bypasses described in the previous non-compliance / bypass report on April 2, 2024, a high level of secondary solids led to an exceedance of the weekly limit for Total Suspended Solids (TSS) loading. The weekly limit is 27,000 lbs/day and for the week of April 1-7 the plant discharged an average of 30,550 lbs/day. In addition, the BOD loading also exceeded the weekly limit. The weekly BOD loading limit is 27,000 lbs/day and for the week of April 1-7 the plant discharged an average of 33,997 lbs/day. It was noted that the plant was able to maintain compliance with the weekly concentration limits of 45 mg/L for both TSS and BOD during the storm event and the exceedance is due to the high flows caused by the rainfall.

On April 25, 2024, the department was notified of an internal unit process bypass at Patapsco WWTP. On April 22, 2024, at approximately 10:30pm the Biological Aerated Filters (BAF) were taken offline and bypassed due to high solids loading from the secondary process and a temporary inability to backwash due to inadequate space in the mud wells. The upstream issues were addressed and the BAF was placed back in service at approximately 7:15am on April 23, 2024. The BAF process was bypassed for 8 hours and 45 minutes. During this time, approximately 24.1 million gallons were bypassed around the BAF and continued to the Denitrifying Filter (DNF) system (and to the Chlorine Contact Chambers before the final outfall).

I followed up with Patapsco WWTP on April 26, 2024, upon receiving an email on the bypass listed above. It was reported that the internal issue was Synagro not pulling as much sludge as they usually do for processing and the sludge blanket in the secondary clarifiers overwhelmed the clarifiers and flowed into the BAF system influent effectively blinding the filters. The BAF was bypassed while efforts were made to reduce the sludge blankets in the secondary clarifiers and allow the BAF system to be backwashed to clear the buildup of solids.

As of November 2023, Baltimore City and the Department have signed a Consent Decree – Case No. 24-C-22-00386 which establishes specific goals and objectives related to the operations and maintenance of the Patapsco WWTP. As a result, maintenance items observed during the site inspection will be notated in the relevant areas above and not itemized in the Violation(s) section as in previous inspection reports.

Regular inspections will continue.

Inspector:  5/9/2024 Received by: _____
Christopher Lepadatu /Date
christopher.lepadatu@maryland.gov Signature/Date
410-537-3521 _____
Print Name