



Maryland Department of Environment
Water and Science Administration
Compliance Program
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Inspector: Ronald Wicks
AI ID: 3076

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

Start Date/Time: August 24, 2022 08:39 AM
End Date /Time: September 06, 2022 11:59 AM

Complaint Number:
Media Type(s): NPDES Municipal Major Surface Water

Contact(s):
Neal Jackson
Eric Johnson
Andrea Buie-
Branam

NPDES Municipal Major Surface Water

Permit / Approval Numbers: 15DP0580
NPDES Numbers: MD0021601
Inspection Reason: Follow-up (Non-Compliance)
Site Status: Active
Compliance Status: Noncompliance
Site Condition: Noncompliance
Recommended Action: Refer to Others (See Findings)
Evidence Collected: Photos or Videos Taken, Record Review, Visual Observation
Delivery Method: Email
Weather:

Inspection Findings:

The Patapsco Wastewater Treatment Plant (WWTP) is a 73 million gallons per day (MGD) capacity activated sludge WWTP with ferric chloride for removal of phosphorus. The treatment system has grit removal, mechanical fine screens, primary clarifiers, oxygen activated sludge reactors, secondary clarifiers, biological aerated filters (BAF) for nitrification, denitrification filters (DNF), flow distribution chamber, chlorine contact chamber, dichlorination, and cascade post aeration chamber prior to final discharge to the Patapsco River. The receiving water is designated Use II waters protected for estuarine and marine aquatic life. The average flow is approximately 55-57 MGD; however, during heavy rainfall flows can double due to infiltration from the sewer

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lines. Patapsco WWTP's biosolids are processed by Synagro, Inc., a private company, located on-site that draws the undigested biosolids and then dewateres the biosolids and transports off-site.

The permit effective date is 10/1/2017, expiration date is 9/30/2022 with a reapplication date of 3/31/2021. The renewal application was received by the Maryland Department of the Environment (Department or MDE). The facility's activity code or standard industrial classification (SIC) is 4952, and the North American Industry Classification System (NAICS) is 22132.

Today, I (Ron Wicks) performed a follow up announced inspection at Patapsco WWTP, National Pollutant Discharge Elimination System (NPDES) Discharge Permit number MD0021601, and state number 15-DP-0580.

I met Neal Jackson, Plant Manager, Eric Johnson, Wastewater Operations Supervisor II, Andrea Buie-Branam, Environmental Compliance Manager, and Aaron Thomas, Senior Associate, Hazen and Sawyer. Hazen and Sawyer is a third-party engineering consultant firm that was contracted by the Baltimore City Department of Public Works (DPW) to assist with operations and maintenance at Patapsco WWTP.

During a preliminary meeting with the above people, I discussed my plans for this inspection and what I expected to accomplish during this evaluation. I began the evaluation with a discussion on operation and maintenance. The last inspection report required that Patapsco WWTP shall improve operating practices by utilizing preventive maintenance procedures that are devised to reduce incidents of process equipment failures and inefficiency due to poorly functioning equipment. Observations and records have shown that Patapsco WWTP is operating in a corrective maintenance mode and correcting problems after an incident or after failing equipment no longer functions instead of operating in a preventative maintenance (PM) mode.

Operations and Maintenance (O&M), PM, and Staffing

As reported in previous inspection reports, current operating conditions in many process areas require improvements. In addition, failing and nonfunctioning process equipment are preventing Patapsco WWTP from meeting the effluent limitations. The majority of these process equipment issues have been outstanding for months and many for over 1 year. Patapsco WWTP must improve operating practices by utilizing PM procedures that are devised to reduce incidents of process equipment failures and inefficiency due to poorly functioning equipment.

In the 6/29/22 and 7/7/22 inspection report, the Department specified that Patapsco WWTP shall develop and initiate a PM program, including, but not limited to the following:

1. A written PM program covering all major equipment items;
2. Types of repair and other PM tasks necessary for each piece of equipment, including interval or frequency of service;
3. PM tasks should be scheduled in accordance with the manufacturer's recommendations;
4. All PM tasks should be recorded, filed, and reviewed so future maintenance problems can be assessed properly; and
5. A central inventory of spare parts, equipment, and supplies should be maintained and controlled.

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I asked the plant manager about the status of the written PM program guidance plan. According to the plant manager, the PM program is being developed by Baltimore City DPW and he did not have firsthand information on the status of the PM guidance plan, but they have initiated a PM program at the WWTP.

The Department was informed during a meeting on 8/22/22 that Patapsco WWTP has about 50 vacancies. I asked the plant manager how Patapsco WWTP is able to operate the treatment processes, keep up with routine work orders, and also keep up with required PM considering the number of vacancies. Jackson stated that there is adequate staff to maintain all of the operational processes, work orders, and necessary PM. He further stated that Patapsco WWTP will also be using the open-ended work order contractors. This third-party contracting program is now being set up by Baltimore City DPW management to assist maintenance staff so Baltimore City DPW can prioritize PM work and outsource work orders to third party contractors as needed. Jackson further stated that while Baltimore City DPW continues to recruit and hire more operations personnel, Hazen and Sawyer has provided eight members of their staff to help with staffing needs, with more available if needed.

The PM work orders are now generated through the eLKE system based on schedules defined by the manufacturer's O&M guidance. This was initiated in June 2022. I reviewed recently generated work orders, which are maintained as hardcopies by the plant manager. During the May 2021 inspection, I found that the management did not have access to a central inventory system or an inventory control system in order for me to determine if there was sufficient inventory of spare parts and supplies. According to the plant manager, the ransomware attack shutdown the control apps for the inventory system. During this inspection, I asked the plant manager if the inventory system was back online or if they were able to determine the status of spare parts and equipment. Jackson stated that they are still working on the inventory problem. Inventory control is to be managed under the eLKE system and the asset management system will be used to reconcile available parts.

Patapsco WWTP shall maintain a reliable central inventory of spare parts, equipment, and other supplies. The inventory shall consist of parts and supplies that are recommended by the process equipment manufacturer as well as recommendation by chief operators and managers based on past experience with maintenance problems and requirements. Patapsco WWTP shall ensure that spare parts, equipment, and supply inventory are maintained at levels sufficient to avoid process interruptions.

During the May 2021 inspection, I asked Jackson and Johnson why so many of the automated process systems were being operated in manual mode. At that time, I was told that the automated overrides were done because the response time for the automated systems to engage were too slow. During my discussion today on the possibility of getting the systems back in automated mode to be more efficient, Jackson told me that now that the solids are under control, they are now trying to get the automated systems back online. Currently, a technician from ChemScan Inc., is in the process of getting the automatic system in the Enhanced Nutrient Removal (ENR) process back online. Jackson further stated that an automation specialist services company is evaluating the process systems to determine the best way to get the systems automated. According to Jackson, the

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computers at Patapsco WWTP are operating using Windows 10 so the operating system will not need to be upgraded.

Next, I discussed the status of the operations and functionality of specific treatment processes that the Department identified as requiring corrective actions:

Biosolids Treatment and Management

According to Jackson, Patapsco WWTP is working with Synagro to improve biosolids processing and removal from the site. Originally the solids were pulled from the sludge blending tanks (SBT). This operation was controlled by Synagro; however, analytical data show that the sludge in the SBT has petroleum hydrocarbon concentrations at levels that Synagro determined were too high to process in the dryer. Biosolids are now being taken from the gravity sludge thickeners (GST) instead of from the SBT where the hydrocarbon concentrations are very high. According to Jackson and Johnson, 45-50 dry tons of biosolids are now being processed daily. Synagro has obtained the necessary permits and is sending the centrifuged sludge off-site by railcar. The removal of the sludge by rail began on 6/23/22. The inventory of biosolids has been greatly reduced. A portable belt press has been set up to dewater the sludge in the SBTs as the dryer cannot currently be utilized due to the high concentrations of hydrocarbons. High levels of methane can build up in the SBTs as the air space increases so I asked Jackson how the methane will be controlled. He indicated that they are using recirculating pumps so that there is no build-up of methane.

Grit Building

The domestic waste enters the plant at the grit building where there are six grit chambers. Hazen and Sawyer, a third-party contractor, has cleaned and repaired some of the grit processing equipment. Initially, Hazen and Sawyer determined that all six grit chambers were not functioning as designed due to the grit and rags in the chambers. All of the grit chambers have been cleaned and put into service. Hazen and Sawyer have also repaired and put into service one of the cranes with clamshell buckets. Due to the problems with odor control and ventilation at the grit building, confined space entry requirements are in place. Baltimore City DPW will refurbish the grit building under Capital Project SC 938. The facility generates 60-70 tons of grit per month, which is landfilled off-site. This month, the grit removal contractor placed six roll off dumpsters at the grit building to make the loading and disposal of the grit easier. According to the plant manager, they were able to increase the amount of grit disposed of each day.

Fine Screening Process

Five of the eight screens have been recently refurbished. Baltimore City has appropriated the funds to upgrade the bar screens by replacing all the internal parts and installing a more effective wash system. All eight of the screening units are scheduled to be refurbished. I asked the plant manager for a maintenance schedule for the upgrades, but I have not received a response to my request to date.

Primary Settling Tanks (PST)

Baltimore City DPW's Fats, Oils, and Grease (FOG) Mitigation plan, that was submitted to MDE in 2017, states that the capital improvement project for 2018 was approved by the Board of Estimates in 2017 to provide upgrades for the PSTs. These improvements include pump and scum removal upgrades for all PSTs and the replacement of actuators in all scum troughs. The

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improvements also include replacing the flight plant brackets on PSTs #2-6 with new functional heavy-duty brackets and installing scum trough (skimmer) with actuated adjustment rods in PST #1-3. The Baltimore City DPW's 2021 FOG mitigation plan submitted to the Department states that the above capital improvement project was completed; however, during my May 2021 inspection, I found that these improvements have not been completed and the actuators on PSTs #4-6 also required repairs to function satisfactorily. To date these improvements have not been initiated. I asked the plant manager to provide information on the current status of the improvements and repairs for PSTs #1-6.

According to the plant manager, the purchase order (PO) for the parts necessary for certain improvements for PSTs #1-3 is close to being approved and these repairs and improvements are being expedited ahead of the capital improvement project, which is being rebid. He further reported that the contractor has proceeded ahead of the PO approval process and has ordered the necessary parts and equipment. Also included in the PO are replacement of the actuators for PSTs #4-6, and the construction of a weir wall behind the scum troughs in PST's #1-3, similar to the walls behind PSTs #4-6. The weir wall will help contain the FOG and prevent it from entering the PSTs effluent. All the above expedited repairs are being done under the same PO.

GST

During the last inspection, I observed that the GSTs were not processing the sludge as designed as they were overloaded with solids. Currently only two of the three GSTs are operational. During gravity thickening, the biosolids are condensed to produce a concentrated solids material and a relatively solids-free supernatant. However, this is not being effectively done as the solids were observed flowing over the discharge weirs of the GSTs. The two GSTs require cleaning and maintenance. There is no redundancy for this process and both GSTs are necessary for current average flows at this time. Therefore, neither of the GSTs can be taken offline for an extended amount of time for the cleaning and repairs.

One of the directives of the last inspection report was that Patapsco WWTP shall operate and process sludge in the GSTs in a manner that maintains a solids-free supernatant. This can be accomplished by repairing the third GST identified as GST #4, and getting it back in service. Once online, the active GSTs can be taken offline, one at a time, for maintenance and cleaning and then put back into service. This action will greatly improve the quality of supernatants from the GSTs.

I asked the plant manager to provide me with information on the status of the repairs to GST #4, the expected date of completion, and what has been accomplished to date. According to Jackson, the repairs are now underway. The materials have been ordered and preliminary work such as cleaning, concrete testing, measurements, etc., have been completed. Jackson further reported that the tentative completion date is January 2023. Patapsco WWTP shall provide a monthly status report to the Department every 30 days.

High Purity Oxygen Biological Reactors (biological reactors)

During the Department's 7/7/22 inspection, four of the six biological reactors were functioning. During the 7/7/22 inspection, two of the aerators in the biological reactors were not functioning. Today reactors 2, 3, 5 and 6 are online. There are a total of 12 aerators for the six biological

reactors and only 10 are functioning. Due to this, the biological reactors are not being optimized for effective nitrogen removal.

Liquid Oxygen (LOX) Plant

The LOX required for the biological reactors is produced in the LOX plant. The LOX plant had two separate trains for the production of oxygen and each with its own compressor. One of the compressors was out being refurbished and the other was failing, therefore oxygen was being trucked in by a third-party contractor for most of 2022. The system is not capable of injecting the purchased liquid oxygen with the same pressure as can be done using the onsite oxygen plant. Due to this, the second stage dissolved oxygen can only reach 5 mg/L, which is under the minimum 6 mg/L required for second stage nitrification in the biological treatment. Therefore, ammonia as N and organic nitrogen concentrations have been high due to unsatisfactory nitrification in the biological reactors.

During the Department's 7/7/22 inspection, it was reported that the refurbished compressor had been shipped back to the facility and ready to be installed. Only one of the two trains was functional and the other required extensive electrical and mechanical problems before it could be used. Later, it was determined that the compressor attachment assemblies on the two LOX plant trains were not interchangeable, and the refurbished compressor would not fit the functional train. The repairs were made to the out of service train in August and the refurbished compressor was installed. According to Jackson, as of 8/19/22, the LOX plant has been in service. Only one compressor is required to produce the oxygen needed for the biological reactors. However, under normal operation the trains are alternated, and the two trains are needed for redundancy. The second compressor is still out being refurbished.

Biological Aeration Filters (BAF)

The next topic of discussion was the media leakage problem from the nitrifying filters. The filters used are Veolia Water technologies BAF. The media loss has been an ongoing problem since 2020 when media loss was observed at cell #5. There were reports to the Department of small floating particles around the facility's outfall. In addition, during previous inspections, I have observed the media in the secondary clarifiers and contact chambers.

According to Jackson, the media leakage problem is isolated to cell #5; however, that cell was taken out of service. The media loss occurred during the backwash cycle and there is an excessive accumulation of the media in the backwash mud wells and on the ledges of the wells. Secondary clarifier #3 was taken offline and is now being used to collect the backwash water.

According to Jackson, the media problem will be addressed once the ammonia as N concentrations are under control. He further stated on 8/23/22, Baltimore City DPW met with Kruger USA, the manufacturer, to discuss a manufacturing contract.

The Department's 6/29/22 and 7/7/22 inspection report specified that Patapsco WWTP shall provide a written plan or Standard Operating Procedure (SOP) by 8/3/22 on how the BAF media will be removed from the mud well and steps that will be taken to prevent further media loss. Baltimore City DPW responded to the Department by stating that there is no observed media loss

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during backwashes and once the BAF system begins nitrifying again, DPW will take down one mud well at a time to remove the media.

The media shall not discharge to the surface waters of the state and final effluent containing media is not acceptable. **This issue must be addressed and permanently resolved.** This accumulated media must be removed from the backwash well and disposed of appropriately. Patapsco WWTP shall submit a plan of action on how it proposes to remove the media from the mud wells and provide updates to the Department every 30 days as specified in the 6/29/22 and 7/7/22 report.

Chlorine Contact Chambers (CCC)

The scum collection trough on CCC #2 has been out of service for over 4 months and requires repairs in order for it to function and skim off FOG and floating scum. According to Jackson, Baltimore City DPW has outlined the scope of the work necessary to get the troughs functioning and the project is awaiting procurement approval. Jackson stated that PLASTEC Services is the contractor that has been selected to complete the work. Jackson further stated that manual skimming is performed as needed by staff. As specified in the 6/28/22 and 7/7/22 report, Patapsco WWTP shall provide updates every 30 days until the repairs are completed and the scum trough is back online.

Self-Monitoring Program

A. Sampling and Analysis

For calendar year 2022, there have been a significant number of sample results that were not reported because of laboratory or operator error (see Table 1 below). Failure to monitor and report as specified by the permit is a violation of 40 CFR Parts 122 and 125 and Title 9 of the Environmental Article. According to the permittee, most of those errors are due to problems by the laboratory and are out of their control. However, this does not change a permittee's obligations to monitor and report in accordance with the requirements of the permit.

In order to comply with 40 CFR Part 122 and 125 and of Title 9 of the Environmental Article, Patapsco WWTP must ensure that measures are taken to ensure that all samples meet the sampling and analytical requirements of 40 CFR Part 136 so that rejection is not required. Some compliance methods require rejection of data that fail quality control (QC) criteria. However, to do so when there is no opportunity for reanalysis, resampling, or corrective action may cause a violation of 40 CFR Part 122 or 125 reporting requirements.

The reporting requirements in Parts 122 or 125 take precedence over the otherwise applicable reporting or preservation requirements of a particular analytical method. There have been a significant number of missed opportunities to report as required and this is not acceptable to the Department. If this problem persists, Patapsco WWTP should assess the current laboratory services and deliverables to determine and implement the necessary corrective actions.

Table 1

Date	Parameter	Issue	Action
3/4/22	<i>Enterococci</i>	Laboratory analysts failed to incubate samples for the method-specified 24 hrs.	Discussed with analyst
4/3/22	<i>Enterococci</i>	The Patapsco operator delivered the sample a day late, therefore the sample arrived at the laboratory beyond the EPA 40 CFR Part 136 specified maximum holding time.	Patapsco WWTP detailed a plan of action in the 5-day letter submitted to the Department
7/2/22	BOD and TSS	The samples were considered invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136 for TSS and BOD. In addition, the results of laboratory control sample for BOD did not meet the recovery rate of 85 – 115%	Laboratory analytical problem and failure to properly ice samples for transport to the laboratory
7/2/22	TKN, Ammonia, Nitrate-Nitrite and total Phosphorus	The samples were considered invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136	
7/8/22	BOD	BOD result was considered invalid because the temperature of the incubator was above the method specified temperature of 21°C	Laboratory oversight
7/9/22	BOD	BOD result was considered invalid because the temperature of the incubator was above the method specified temperature of 21°C	Laboratory oversight
7/11/22	Ortho phosphorus	Sample was held beyond the 48-hr holding time specified by 40 CFR Part 136.	Laboratory oversight
7/13/22	BOD	BOD result was considered invalid because the temperature of the incubator was above the method specified temperature of 21°C	Laboratory oversight
7/18/22	TSS and BOD	The samples were considered	

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		invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136	
7/18/22	TKN, Ammonia, Nitrate-Nitrite and total Phosphorus	The samples were considered invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136	
7/31/22	TSS and BOD	The samples were considered invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136	
7/31/22	TKN, Ammonia, Nitrate-Nitrite and total Phosphorus	The samples were considered invalid because the temperature upon arrival at the laboratory exceeded the maximum temperature of 6°C specified by 40 CFR Part 136	

B. Flow Measurement and Calibration

Flow data reported to the Department show that the plant influent on a daily basis is 15-30% greater than the amount of wastewater being discharged. I discussed this with Jackson and Johnson to see if there was an explanation for the discrepancy. According to Johnson, the influent flow meter has not been functioning since February 2022. On 6/1/22, the Department received copies of the influent and effluent flow measurement system calibration records for the January-May 2022. These records do not show any problems with either of the flow measuring systems. I asked to speak to the staff responsible for performing the in-house flow calibrations. When the technician arrived, we discussed the flow calibration procedure being used to verify the accuracy of the flow measuring systems. The facility has an open channel flow with a rectangular weir as the primary measuring device and a secondary device consisting of a totalizer. The technician is measuring the head height at the weir and then comparing it to the level measurement reading on the totalizer. These two measurements should be checked concurrently so two technicians are required to complete this accuracy check (one technician should be at the weir and the other at the totalizer). The technician should also calculate the flow discharging from the weir using a formula, app, or chart and compare it to the totalizer readout.

To comply with the requirements established in General Conditions 5a of the NPDES permit, Patapsco WWTP must accurately determine the quantity of wastewater being discharged. Patapsco WWTP shall within 10 days of the receipt of this report submit a copy of the SOP used to verify the accuracy of the secondary flow measuring system, including

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checklists and charts or formulas used to determine the measured flow from the primary flow measuring device.

C. Polychlorinated biphenyls (PCB) Minimization Plan

The total PCB loading for the 1st through 4th quarters of 2021 is 206.5 grams, which is above the annual waste load allocation (WLA) of 27.2 grams/year. Special Condition A2 footnote 4b specifies that within 60 days of exceeding the WLA, the permittee shall submit a PCB minimization plan (PMP) to the Department for approval to track the sources and Best Management Practice (BMP) implementation.

The Department specified in the 5/18/22, inspection report that within 60 days of the receipt of the report, Patapsco WWTP shall submit to the Department for approval a PCB minimization plan designed to track and eliminate PCB sources entering the treatment plant.

In November 2020, the Baltimore City DPW informed the Department in a letter that it has partnered with the U.S. Geological Survey (USGS) and the University of Maryland Baltimore Campus (UMBC) to implement a 2-year monitoring strategy for the PCB Total Maximum Daily Loads at Patapsco and Back River WWTPs. According to the Baltimore City DPW, the preliminary findings show that there are legacy PCB deposits within the sewer lines. The Baltimore City DPW has initiated a comprehensive cleaning and sewer relining program that was scheduled to be completed by January 2021. At that time, the Baltimore City DPW requested that the Department take no further action regarding the permit specified PMP until after the results of the 2nd quarter of 2021 PCB sampling have been received. The Baltimore City DPW was confident that the PCB concentrations would be reduced considerably after refurbishing the sewer lines. However, if the PCB concentrations were not reduced by the 2nd quarter of 2021, the Baltimore City DPW agreed to proceed with the permit specified requirements for PCB in footnote 4 on page 8 of the permit and conduct the source tracking and PMP/BMP at the direction of the Department. The Department agreed to the extension request. However, total Polychlorinated Biphenyls (tPCB) concentrations were not reduced after the 2nd quarter of 2021, and Patapsco WWTP exceeded the tPCB WLA specified by the permit for 2021, which prompted the Department to request the submission of the overdue PMP in the May 2022 inspection report. In addition, the 6-month load for 1/22–6/22/22 is 194.8 grams, which exceeds the annual waste WLA of 27.2 grams/year.

In a letter to the Department dated August 4, 2022, Patapsco WWTP stated that it did not have record of receiving a copy of the Departments guidance document on the preparation of the PMP and one of the sewer cleaning and relining projects was extended from the original time frame of the first quarter of 2021 to October of 2022. Due to not having the Departments guidance document, and a portion of the cleaning and lining of the sewer has not been completed, Patapsco WWTP is requesting another extension until after additional monitoring data has been received and the sewer project has been completed. Baltimore City DPW proposes to use the pending USGS data as a basis of evaluating the tPCB removal efficiency.

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On 11/8/21, at 11:03 AM, the Department sent the PCB minimization plan guidance document to Michael Hallmen representing Baltimore City DPW. Shailaja Polasi, representing the Water and Science Administration verbally confirmed receipt. Another copy was emailed to the plant manager on 9/12/22.

Patapsco WWTP has not provided a clear rationale for granting the extension and presented no supporting documentations, deliverables from the UMBC/USGS project, and how this data will affect the preparation of the PMP as a whole. The preparation guidelines are clear. Each site presents different challenges so the Department will allow flexible and innovative site-specific PCB load reduction strategies and tracking methodologies. As monitoring, source tracking, and data evaluation continues, the direction and approach will change as mitigation activities are implemented. Once the plan is implemented, Patapsco WWTP will not require approvals to implement different approaches as long as the key elements for a successful PMP remain in place. Therefore, the remaining USGS and other monitoring data that Patapsco WWTP is waiting for before preparing the PMP are not necessary to develop an effective PMP. PMP and BMPs change as data is collected and the rationale for requiring updates on a routine basis.

There have been a continual series of permit effluent violations reported for the following constituents due to operational and process problems:

- Biochemical oxygen demand (BOD₅)
- Total suspended solids (TSS)
- Total phosphorus (TP)
- Total Nitrogen (TN)
- Total Ammonia as N
- Enterococcus

During a data review of the Discharge Monitoring Reports and Monthly Operating Reports for April through July of 2022, the following reported violations were observed as shown in Table 1 below. The solids management is now under control and the TSS and BOD have gone down considerably from April. However, there are still treatment issues due to out of service and poorly functioning process equipment. Violations for the period on my review are listed below:

Date	Parameter	Result Reported	Permit Violation	Permit Limitation
April 2022	TSS	Monthly Average Concentration- 61 mg/L	Exceeded Monthly Average Concentration	30 mg/L
April 2022	TSS	Monthly Average Loading – 29,231 Lbs.	Exceeded Monthly Average Loading	18,000 Lbs.
April 4/1 – 4/7 2022	TSS	Weekly Average Concentration - 155 mg/L	Exceeded Weekly Average Concentration	45 mg/L
April	TSS	Weekly Average	Exceeded Weekly	27,000 Lbs.

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4/1 – 4/7 2022		Loading - 74,486 Lbs.	Average Loading	
April 4/1 – 4/7 2022	Total Phosphorus	Weekly Average Concentration – 4.6 mg/L	Exceeded Weekly Average Concentration	3.0 mg/L
April 4/1 – 4/7 2022	Total Phosphorus	Weekly Average Loading – 2,513 Lbs.	Exceeded Weekly Average Loading	1,830 Lbs.
April 2022	Total Phosphorus	Monthly Average Concentration – 2.56 mg/L	Exceeded Monthly Average Concentration	2.0 mg/L
April 2022	Total Phosphorus	Annual cumulative loading - 128,800 Lbs.	Exceeded the 2022 total cumulative annual loading for 2022 in March 2022 and will continue to exceed the limit until 12/31/2022	66,700 Lbs./year
April 2022	Total Nitrogen	Annual cumulative loading 1,111,800.0 Lbs.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	889,300 Lbs./yr.
April 22	Enterococcus	Monthly Geomean concentration 54 MPN/100 ML	Exceeded Monthly Geomean Concentration	35 MPN/ 100 ml
April 4/1 – 4/7 2022	Biochemical Oxygen Demand	Reported Weekly Average Concentration - 60 mg/L	Exceeded Weekly Average Concentration	45 mg/L
April 4/1 – 4/7 2022	Biochemical Oxygen Demand	Weekly Average Loading – 30,136 Lbs.	Exceeded Weekly Average Loading	27,000 Lbs.
April 22	Biochemical Oxygen Demand	Monthly Average Concentration- 38 mg/L	Exceeded Monthly Average Concentration	30 mg/L
April 22	Biochemical Oxygen Demand	Monthly Average Loading – 18,778 Lbs.	Exceeded Monthly Average Loading	18,000 Lbs.
May 2022	Enterococcus	Monthly Geomean concentration 38.2 MPN/100 ML	Exceeded Monthly Geomean Concentration	35 MPN/ 100 ml
May 2022	Ammonia as N	Monthly Average Concentration- 14.2 mg/L	Exceeded Seasonal Monthly Average Concentration (5/1-	6.3 mg/L

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			10/31)	
May 2022	Ammonia as N	Monthly Average Loading – 7,100 Lbs.	Exceeded Seasonal Monthly Average Loading (5/1-10/31)	3,836 Lbs.
May 2022	Total Nitrogen	1,456,300.0 Lbs.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	889,300 Lbs./yr.
May 2022	Total Nitrogen,	344,600 Lbs. Seasonal Cumulative Total 5/1-10/31	Exceeded Seasonal cumulative total	333,330 Lbs.
June 2022	Ammonia as N	Monthly Average Concentration- 13.5 mg/L	Exceeded Seasonal Monthly Average Concentration (5/1-10/31)	6.3 mg/L
June 2022	Ammonia as N	Monthly Average Loading – 5,938 Lbs.	Exceeded Seasonal Monthly Average Loading (5/1-10/31)	3,836 Lbs.
June 2022	Total Phosphorus	Seasonal Cumulative Total 5/1-10/31 35,500 Lbs.	Exceeded Seasonal cumulative total	33,330 Lbs.
June 2022	Total Nitrogen	1,738,700.0 Lbs./yr.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	889,300 Lbs./yr.
June 2022	Total Phosphorus	164,300.0 Lbs./yr.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	66,700.0 Lbs./yr.
June 2022	Total Nitrogen,	627,000.0 Lbs. Seasonal Cumulative Total 5/1-10/31	Exceeded Seasonal cumulative total Will continue to exceed the limit until 10/31/2022	333,330 Lbs.
July 2022	Ammonia as N	Monthly Average Concentration- 10.3 mg/L	Exceeded Seasonal Monthly Average Concentration (5/1-10/31)	6.3 mg/L
July 2022	Ammonia as N	Monthly Average Loading – 4,302 Lbs.	Exceeded Seasonal Monthly Average Loading (5/1-10/31)	3,836 Lbs.

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July 2022	Total Phosphorus	Seasonal Cumulative Total 5/1-10/31 42,800.0 Lbs.	Exceeded Seasonal cumulative total	33,330 Lbs.
July 2022	Total Nitrogen	2,004,900.0 Lbs./yr.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	889,300 Lbs./yr.
July 2022	Total Phosphorus	171,600.0 Lbs./yr.	Exceeded the total annual cumulative loading for 2022. Will continue to exceed the limit until 12/31/2022	66,700.0 Lbs./yr.
July 2022	Total Nitrogen,	893,200.0 Lbs. Seasonal Cumulative Total 5/1-10/31	Exceeded Seasonal cumulative total Will continue to exceed the limit until 10/31/2022	333,330 Lbs.

Laboratory Analysis

The ASTM method 6919-09 is the laboratory designated test procedure for the analysis of total ammonia as N. This procedure is not an approved test procedure for the analysis of ammonia. The correct approved ASTM test procedures for the analysis of ammonia are ASTM 6919-17, ion chromatography, ASTM D1426-15 (A), Nesslerization, and ASTM D1426-15 (B), electrode. I spoke with Sadikia Caldarazzo, Laboratory Manager, who stated the following in an email: “ASTM D6919-09 will be altered to comply with ASTM D6919-17 for the analysis of Ammonia (NH3).” It is my understanding from this email that the test procedure for ammonia will be changed to ASTM D6919-17, which is approved.

After the initial meeting, I continued the inspection with a site review beginning at the fine screening building. The domestic waste enters the plant at the grit building where there are six grit chambers. Due to problems with odor control and ventilation at the grit building, confined space entry requirements are in place. Respirators are required for entry to the grit building, so I was not able to inspect the grit handling system.

I evaluated the fine screening system, which is the next phase of treatment after the grit building. There are two influent lines coming into the plant, domestic, which is 90-95% of the flow and industrial, which makes up the remaining 5-10% of the flow. The sewage travels from the grit chambers to the fine screening units.

The sewage is pumped to the influent tank at the fine screen building and travels to the fine screening building. Five of the eight screens have been recently refurbished. Baltimore City has appropriated the funds to upgrade the bar screens by replacing all the internal parts and installing a more effective wash system. There were six fine screens online at this time. An operator was on-

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site managing the system and keeping the area clean and collecting and preventing the trash and debris from falling off of the conveyor belts.

Concerns: During the unannounced inspection, I find that this area is not maintained properly.



8/24/22 Influent tank.

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8/24/22 Trash conveyor belt.

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8/24/22 Fine screen units out of service.

The wastewater travels from the fine screening to the PST for initial settling of the solids. The plant has six primary settling tanks with three passes. The bottom sludge from the PSTs is gathered by screw collectors at the bottom of the tanks and collected in hoppers and then sent to the GSTs. Today PST #1 and PST #6 were out of service.

According to Jackson, the scum troughs are rotated twice a day to remove the scum and manual skimming with a net is being conducted as well to try to manage the floating scum and FOGs. **There was no manual skimming or rotations being done during my time inspecting the PSTs during the last three inspections.** I inspected the final effluent from the PSTs and observed no floating scum going over the weir at this time. The facility shall ensure the operational integrity of the primary treatment system and shall take a proactive approach by removing the accumulation of FOGs that have accumulated in some of the PSTs.

Concerns: Extensive Repairs are needed to get the PSTs functioning. According to the plant manager, the major repairs are either approved or scheduled. Trash and scum are making it through the system into the PST effluent. Skimming is being conducted at the level required.

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8/24/22 PST.

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8/24/22 Trash and scum in effluent from PSTs.

I observed a layer of scum and FOG in PST #2 and a fine layer in the remaining in PST #3.

The wastewater travels from the PSTs to the high-pressure pure oxygen reactors, which are below ground. The first stage receives no oxygen and oxygen is added to the second stage to maintain a dissolved oxygen concentration of 6 to 12 mg/l. The second stage DO is monitored by the operators and adjusted as necessary. The waste streams from reactors #1 through #4 are split between 4 secondary clarifiers and the wastewater from reactors # 5 and #6 split between four smaller separate secondary clarifiers. The LOX required for the reactors is produced in the LOX plant. Both compressors for the LOX plant have been out of service for most of 2022, and the LOX plant was not producing pure oxygen needed for the reactors. This is one of the reasons why the reactors were not nitrifying, and the ammonia levels were high. One of the compressors was refurbished and put back online on 8/19/22. The other reactor is being refurbished.

Concerns: No redundancy for oxygen production at the LOX plant at this time. Pure oxygen is critical in keeping ammonia levels down. Aerators and blowers for the reactors need repairs or replacing. No spare parts. The poor performance in this process has affected the ENR by affecting BAF nitrification and denitrification in the DNF.

Next, I conducted an evaluation of the secondary clarifiers. During this inspection, seven of the eight secondary clarifiers were online. Secondary clarifier #3 is being used to collect the backwash

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from the BAF and the DNF to isolate the BAF media that is being discharged during backwash processes. The effluent from this clarifier goes back to the influent line of the PSTs. There was vegetation growing in the center well of secondary clarifier #2, and the skimming arm on clarifier #5A is slightly bent and the scum scraper is missing; therefore, there is no effective skimming being performed.

Concerns: Routine maintenance required and vegetation growing in the clarifiers.



8/24/22 Secondary clarifier – vegetation growing in the center well.

Next, I conducted an evaluation of the BAF. 21 of the 22 filters were online during this evaluation. Filter #5 was offline due to a problem with the media. I observed foaming in the filter cells caused by elevated BOD. Also, while talking to the operator, I found that ammonia removal is at about 30%, which means the system is not nitrifying properly. According to today's data, the ammonia concentration going into the BAF is 24 mg/L and 8.4 mg/L going out after treatment.

Concerns: Poor nitrification and the media in the BAF backwash mud wells. This media is not confined.

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8/24/22 BAF cell. Note, excessive foaming.

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7/7/22 BAF mud well containing a heavy layer of media.

The DNF was the next stop during the site review. The facility has 34 denitrification filters for denitrification and today, 32 were online. During the Department's May 18 inspection, I observed that the DNF was not functioning and was being bypassed. The cells were submerged and incapable of filtration and there was floating sludge in the filters indicating clogging of the system. Today, the DNF system was in better condition as seen in the pictures below. However, there was a small amount of floating solids and scum in some of the filter cells and water was breaching the side of DNF #6. This was brought to the attention of the plant manager.

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8/24/22 DNF: A small amount of floating solids was observed.

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8/24/22 DNF.

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Next, I inspected the chlorine contact basins prior to the final discharge. There are four contact chambers and three are currently online. Each contact chamber has three scum logs or troughs to remove floating scum. Contact chamber #3 is offline and the #2 scum trough is not functional and needs repairs. I observed floating scum and FOG at the chlorine contact chambers. **However, there was no staff skimming at the chlorine contact basins.** I questioned Jackson and Johnson regarding my observations. I was told that everyone was at lunch. The lunch breaks should be staggered so that there is adequate staff to perform the FOG skimming as required.



8/24/22 CCC.

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8/24/22 CCC.

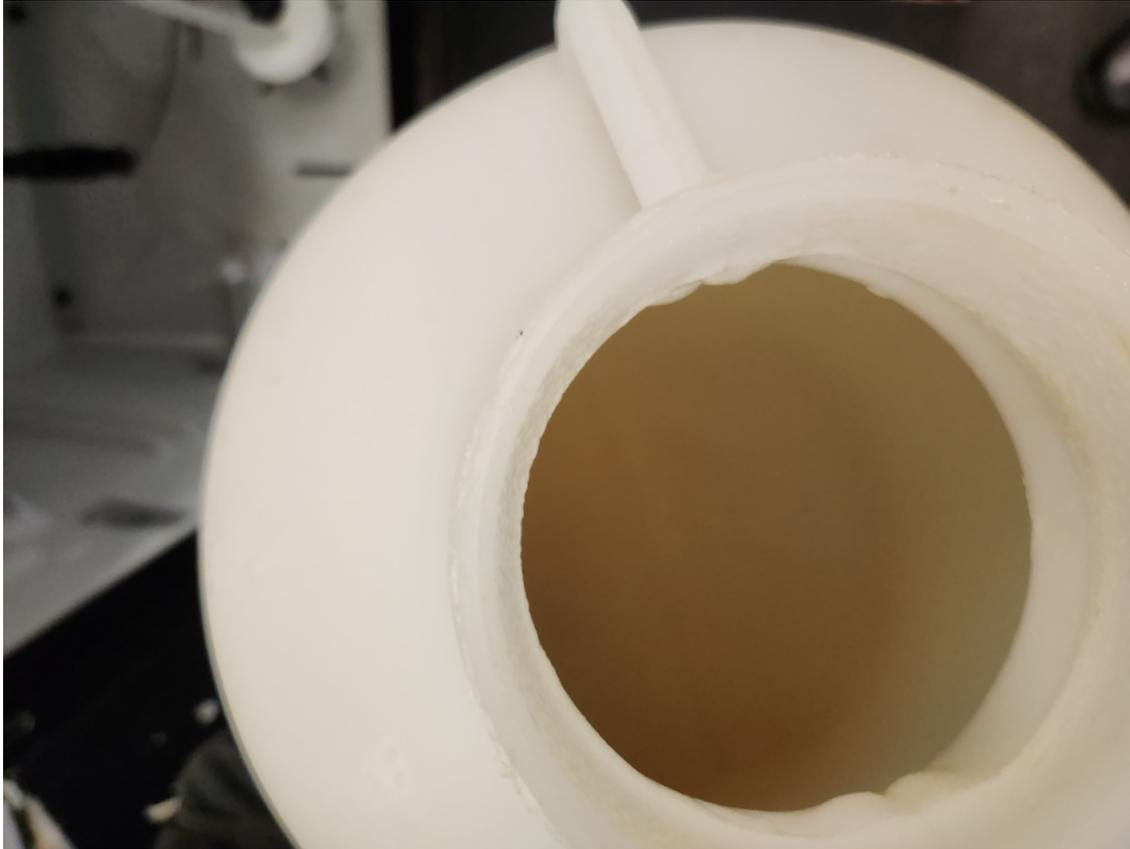
Next, I inspected the final effluent. The facility is collecting 24-hour, flow-proportional composite samples at Outfall 001 in accordance with the requirements of the permit. The primary refrigerated, automatic composite sampler was inspected, and I found that the temperature of the compartment was satisfactory, and the sampling container was also clean. The temperature of the refrigerated compartment was 4.5° C, which meets 40 CFR Part 136 requirements. I inspected the final effluent in the sampling container and observed that the composite sample was a medium amber color with visible suspended particulates (see picture).

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8/24/22 Final effluent.

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8/24/22 Effluent from composite sample container.

During the next phase of the evaluation, I inspected the GSTs and the solids processing at the SBTs. A portable belt press has been set up at the SBTs and Synagro is currently processing the sludge. The dewatered sludge is being trucked off-site and the water is being sent to the head of the plant.

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8/24/22 Portable belt press at the SBTs.

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8/24/22 De-watered solids from the SBTs are being trucked off-site.

After inspecting the belt press operation, we traveled to the GSTs. The facility has three GSTs (#1, #2, and #4) and only 2 are functional. GST #4 is not functional and requires a series of repairs to get it back online. The scrapers, drive, and pumps require replacement. According to Jackson, the funding to repair the scrapper arm that was causing a shaft drive problem was approved and the repairs are expected to be completed by next year. The water level was down, and the GST #1 was not discharging at this time so I could not evaluate the supernatant. The surface water in both GST tanks contained floating solids and there was an accumulation of scum and solids in both tanks, but not an excessive amount. A water spray was being used to break up the solids. GST #2 had fewer floating solids than observed during the July inspection and the sludge blanket was down. I could not get to the weirs due to heavy water spraying being used to break up the solid masses in the GST.

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8/24/22 GST #1.

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8/24/22 GST #2.

Total Annual Cumulative Load for 2020, 2021 and 2022

The annual nitrogen load for 2020 was 1,029,200 Lbs. and the annual phosphorus load for 2020 was 114,500 Lbs. **The facility did not meet the annual loading limitations for these parameters for 2020. The cumulative totals for 2021 were also not met and increased by approximately 50% from 2020, which indicates no discernable progress in improving treatment.** See Table 3 below. In addition, as reported in Table 1 above, the annual cumulative totals specified by the permit were exceeded for total phosphorus in March of 2022 and April of 2022 for total nitrogen. **The data show that the total nitrogen loading for the first 7 months of 2022 has exceeded the loading for 2021, and if current nutrient concentrations continue, the annual cumulative total for total phosphorus will exceed the 2021 loading rate as well.**

Table 3

Parameter	Cumulative Total for 2020	Cumulative Total for 2021	Cumulative Total for 2022 as of July 31, 2022	Limit	Compliance
Total Suspended Solids	1,690,800 Lbs./yr.	3,192,300 Lbs./yr.	2,858,900.0 Lbs./yr. to date above	6,669,776 Lbs./yr.	Y
Total Nitrogen	1,029,200 Lbs./yr.	1,993,300 Lbs./yr.	2,004,900.0 Lbs./yr. to date above	889,300 Lbs./yr.	N
Total Phosphorus	114,500 Lbs./yr.	252,300 Lbs./yr.	171,600.0 Lbs./yr. to date above	66,700 Lbs./yr.	N
Annual Flow	18,098.2 MG/yr.	18,340.6 MG/yr.	NA	NA	NA

FOG Mitigation Plan

On 4/28/22, the Department submitted a letter to Baltimore City DPW Director Jason Mitchell requesting revisions to the FOG Mitigation Plan with a list of corrections. The letter was received on 4/29/22. The revised plan was required to be submitted to the Department by 5/31/22. The revised plan was not submitted; however, on 7/5/22, the Department received a FOG Source Tracking Plan, which the Department believes to be a critical part of the plan. **However, the complete revised FOG Mitigation Plan revised as requested by the Department is overdue and must be submitted within 10 days of the receipt of this report.**

Before departing, I conducted an exit interview and discussed my findings with Jackson, Johnson and Buie-Branam.

With respect to the above MDE authorization the following violations of Environmental Article 9 by Patapsco WWTP were observed on this date:

- A. Patapsco WWTP does not have a reliable central inventory of spare parts, equipment, and other supplies.
- B. The management of biosolids at Patapsco WWTP has been increasingly problematic; however, now the biosolids are being transported off-site eliminating on-site sludge inventory. However, the high number of solids within the treatment system has overburdened the system and along with equipment failures and inefficient treatment processes, the quality of the final effluent has declined annually since 2020. See Table 1. Patapsco WWTP has failed to meet the effluent limitations of the permit due to these problems.
- C. Patapsco WWTP is operating in a corrective maintenance mode and only addressing maintenance and repairs after the process equipment begins to fail or stop working.

- D. The analytical results of a significant number of samples collected in support of the Clean Water Act were not reported as required for failing to meet sample holding times specified in 40 CFR Part 136, and laboratory negligence and errors causing variances from the approved methodology. This failure to report is not acceptable to the Department.
- E. The Department was informed that there have been problems hiring qualified staff and there are about 50 vacancies.
- F. The tPCB WLA has been exceeded for 2021 and 2022.

To bring this site into compliance with Environment Article Title 9, Patapsco WWTP shall make the following corrections:

1. With respect to item A above, Patapsco WWTP shall maintain a reliable central inventory of spare parts, equipment, and other supplies. The inventory shall consist of parts and supplies that are recommended by the process equipment manufacturer as well as recommendation by chief operators and managers based on past experience with maintenance problems and requirements. Patapsco WWTP shall insure that spare parts, equipment, and supply inventory are maintained at levels sufficient to avoid process interruptions.
2. With respect to item B above, Patapsco WWTP shall operate the treatment works in a manner that optimizes the nutrient removal capability of the facility and the final discharge meets the effluent limitations specified in the permit.
3. With respect to item C above, Patapsco WWTP shall develop a PM management program plan and within 30 days of the receipt of this report, Patapsco WWTP shall submit a copy of the management plan along with any supporting documentation like PM activity schedules and templates. The PM program shall include but not limited to the following:
 - A written PM program covering all major equipment items
 - Types of repair and other PM tasks necessary for each piece of equipment, including interval or frequency of service.
 - PM tasks should be scheduled in accordance with the manufacturer's recommendations
 - All PM tasks should be recorded, filed, and reviewed so future maintenance problems can be assessed properly
 - A central inventory of spare parts, equipment, and supplies should be maintained and controlled.
4. There have been a significant number of failures to report monitoring results as required. Failing to report in accordance with the conditions of the permit are violations of Environment Article Title 9, 40 CFR Parts 122 and 125. If this problem persists, Patapsco WWTP must assess the current laboratory services and deliverables to determine and implement the necessary corrective actions.

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5. With respect to item #E above, in accordance with General Conditions 3b of the permit, Patapsco WWTP shall provide an adequate operating staff qualified to carry out operation, maintenance and testing functions required to ensure compliance with the permit. Superintendents and operators must be certified by the Board of Waterworks and Waste Systems Operators. Within 10 days of the receipt of this report, Patapsco WWTP shall submit to the Department a list of all operations and maintenance staff, certification status, assigned duties and work location at Patapsco WWTP. Patapsco WWTP shall also submit the names and certification status of the eight contract operators working at the plant and a list of vacant operations and maintenance positions at Patapsco WWTP.

6. With respect to item #F, Patapsco WWTP shall prepare and submit a PMP as outlined in the Departments' minimization guidance document emailed to the plant manager and included with this report.

State law provides for penalties for violations of Maryland Environment Article Title 9 for each day the violation continues. The MDepartment may seek penalties for the aforementioned violations of Title 9 on this site for each day the violation continues.

NPDES Municipal Major Surface Water - Inspection Checklist

Inspection Item	Status	Comments
Does the facility have a discharge permit?	No Violations Observed	
Is the discharge permit current?	No Violations Observed	
If the permit is not current, has facility applied for renewal?	No Violations Observed	
Does the facility operate as authorized by their current permit?	No Violations Observed	
Has the Permittee exceeded the permitted capacity of the WWTP?	No Violations Observed	
Is the number and location of discharge points as described in the discharge permit?	No Violations Observed	
Has permittee submitted correct name and address of receiving waters?	No Violations Observed	
Has the operator or superintendent been certified by the Board in the appropriate classification for the facility?	Corrective Actions Required	Waiting for data to be supplied by the permittee
Are adequate records being maintained for the sampling date, time, and exact location; analysis dates and times; individual performing analysis; and analytical results?	No Violations Observed	
Are adequate records being maintained for the analytical methods/techniques used?	No Violations Observed	
Does the permittee retained a minimum of 3 years worth of monitoring records including raw data and original strip chart recordings; calibration and maintenance records; and reports?	No Violations Observed	
Does the permittee/laboratory use suitable QA/QC procedures and	No Violations Observed	

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NPDES Municipal Major Surface Water - Inspection Checklist

Inspection Item	Status	Comments
operate a formal quality assurance (QA) program using appropriate controls?		
Has the permittee submitted the monitoring results on the proper Discharge Monitoring Report form?	No Violations Observed	
Do the Discharge Monitoring Reports reflect permit conditions?	No Violations Observed	
Has the permittee submitted these results within the allotted time electronically?	No Violations Observed	
Is the facility being properly operated and maintained including:(a) stand-by power or equivalent provisions available, (b) adequate alarm system for power or equipment failure available, (c) all treatments units are in service, .	Out of Compliance	See narrative section of the report
If a by-pass occurred since last inspection, has the permittee submitted notice of the by-pass within the allotted time?	No Violations Observed	
If a non-complying discharge occurred since the last inspection, was the regulatory agency notified within the allotted time?	No Violations Observed	
If applicable, has the permittee complied with all special conditions of their permit?	Out of Compliance	See narrative
Have overflows occurred since the last inspection?	No Violations Observed	
Are flow measuring devices properly installed and operated, calibration frequency of flow meter adequate, flow measurement equipment adequate to handle expected ranges of flow?	Corrective Actions Required	See Narrative
Are discharge monitoring points adequate for representative sampling?	No Violations Observed	
Do parameters and sampling frequency meet the minimum requirements?	No Violations Observed	
Does the permittee use the method of sample collection required by the permit?	No Violations Observed	
Are analytical testing procedures used approved by EPA?	No Violations Observed	
If alternate analytical procedures are being used, has proper approval been obtained?	No Violations Observed	
Has the permittee notified the Department of the name and address of the commercial laboratory?	No Violations Observed	
Were discharges observed at the authorized outfalls?	No Violations Observed	
If discharges were observed, do the discharges or receiving waters have any visible pollutants observed?	No Violations Observed	
Does this facility have coverage under a a NPDES stormwater discharge permit?	No Violations Observed	
If the permittee has coverage under a NPDES storm water permit, has a storm water pollution prevention plan been developed and implemented as required?	Corrective Actions Required	
Are the permit conditions being met?	Out of Compliance	

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Inspector: Ronald Wicks
Ronald Wicks 9/28/22
Ron Wicks /Date
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Received by: Neal Jackson 9/30/2022
Signature/Date
Neal Jackson
Print Name