



Maryland Department of Environment
Water and Science Administration
Compliance Program
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Inspector: Ronald Wicks
AI ID: 8449

Site Name: Back River WWTP
Facility Address: 8201 Eastern Ave, Baltimore, MD 21224
County: Baltimore County

Start Date/Time: March 22, 2022, 10:00 AM
End Date /Time: March 23, 2022, 08:31 PM

Complaint Number: 28368
Media Type(s): NPDES Municipal Major Surface Water

Contact(s):

Betty Jacobs, Plant Manager
Dan Latova, Plant Engineer
Chris Kroen, Plant Engineer
Ronald Turner, Plant Engineer

NPDES Municipal Major Surface Water

Permit / Approval Numbers: 15DP0581

NPDES Numbers: MD0021555

Inspection Reason: Follow-up (Non-Compliance)

Site Status: Active

Compliance Status: Noncompliance

Site Condition: Noncompliance

Recommended Action: Additional Investigation Required

Evidence Collected: Photos or Videos Taken, Record Review, Visual Observation

Delivery Method: Email

Weather: Clear Average

Inspection Findings:

The Back River WWTP is a 180 MGD activated sludge process sewage treatment plant with BNR (MLE process), ferric chloride for phosphorous removal, Enhanced Nitrogen Removal (Denitrification filters), sand filters, chlorination and dechlorination. The flow is split at a junction box after the sand filters and the main portion of the flow goes to Outfall 001 to Back River and about 20 MGD of the flow goes to Outfall 002. The effluent from Outfall 002 is sent to Tradepoint Atlantic, where it flows to High Head Lake and then discharged to Bear Creek through outfalls at the Tradepoint Atlantic site. The facility's activity code or standard industrial classification (SIC) is 4952 and the North American Industry Classification System (NAICS) is 2213. The receiving water is Back River and a tributary named Bread and Cheese Creek. The Back River basin is protected for Use II, water contact recreation and the protection of aquatic life.

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On March 22, 2022, I met Ms. Betty Jacobs, Mr. Dan Latova, Mr. Rayford McEachern, Mr. Ronald Turner, Mr. Chris Kroen, Ms. Charmayne Paton, and Ms. Dona Garris representing the Back River WWTP for an announced inspection pursuant to State permit #15-DP-0581 (NPDES MD0021555), Back River WWTP.

During a preliminary meeting with the above staff, I discussed my plans and the reason for this inspection, which was a follow-up to my last inspection involving operations and maintenance of the wastewater treatment system.

After the discussion, I conducted a site review accompanied by Mr. Kroen, Ms. Paton, Ms. Garris, and Mr. Latova. The first stop was at the primary settling tanks (PST). There, I found that only two (#8 and #11 PST) of the eleven PSTs were in operation. I was informed that previously there were three PSTs in operation, however the motor on the center drive arm for PST #10 failed taking that PST offline. I was informed that there is a PST #4 that is currently being cleaned. The March 14, 2022, status report from the permittee shows that there are 5 available PSTs indicating there has been no progress in getting all 11 PSTs operating as designed. During an inspection of the two PSTs in operation, found excess floating scum in PST# 11. The skimming arm was functional however during an inspection of the scum trough, I found that it was clogged, and the scum needed to be cleaned out. See picture below:



Scum trough at PST # 11 clogged due to floating scum 3/22/22

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Inactive PST due to solids buildup 3/22/22

I asked staff that accompanied me what would be the minimum number of PSTs required for satisfactory primary settling based on current flows of 120 MGD. The consensus was at minimum four PSTs are required. Therefore, currently the treatment system is operating with half the number of PST necessary for satisfactory primary settling and scum removal.

The wastewater leaving the PSTs flows to a series of biological reactors for nitrogen removal. The facility has two trains with six reactors in each train for a total of 12. Each reactor has a three-pass design designated A, B and C. There is also a third activated sludge plant called activator #4 that is still under construction and when completed there will be 18 reactors. According to Mr. Latova, #4 plant is covered under contract #882 and will be in operation soon. The wastewater traveling in the channels from the PSTs to the activated sludge plants was a dark grey color indicating a high concentration of solids in the waste stream. See pictures below:

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3/22/22 wastewater from PSTs going to the biological reactors
Ferric chloride is added to the waste stream at this point

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Turbid dark grey wastewater traveling to the biological reactors 3/22/22

Next, I inspected the reactors. There, I found the following problems listed below:

1. Some of the mixers in the A pass have vegetation growing on the blades which is hindering mixing capabilities. See picture below:
2. There is a heavy accumulation of solids with vegetation growing at the end of the reactor before going to the clarifiers. See pictures below:
3. The mixed liquor concentration (MLSS) is currently being maintained at 4,000 – 4,500. Ideally the MLSS should be maintained around 3,000. The facility's target is between 2,600 – 2,800, however according to Mr. Latova due to the amount of solids in the system they cannot meet that goal.

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3/22/22 vegetation growing on the mixers on A pass in the reactors

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Solids buildup with growing vegetation in biological reactor 3/22/22

The wastewater travels from the biological reactors to the secondary clarifiers for final settling. During an inspection of the clarifiers, I observed major problems with maintenance, operation, and performance of the clarifiers. There was evidence of algae growth within the clarifiers. Algae growth in secondary clarifiers is a common problem for all uncovered secondary clarifiers. It requires regular maintenance to remove and is a normal issue for all uncovered secondary clarifiers. Algae can cause problems with total suspended solids within the treatment system and can cause problems with pumps by increasing the chances of clogging. The weirs on all secondary clarifiers should be routinely scrubbed to remove the algae. This should be done at least weekly in the summer and more frequently as necessary.

There was an excessive buildup of solids in the clarifiers and within the center well. Because of the nutrients available, the reed grasses, vines, algae, and other vegetation have taken over the clarifiers leading to the following operational problems:

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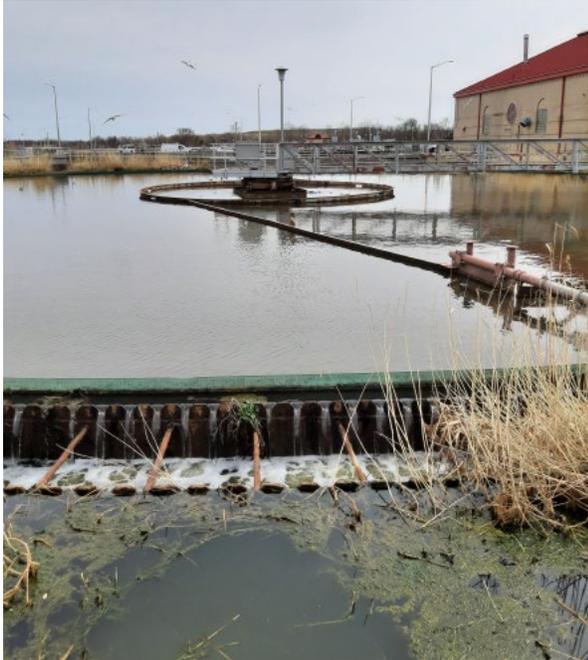
1. Settling dead zones in the clarifiers
2. Short circuiting of the weirs of the clarifiers
3. The Sludge blanket in the clarifier may rise to the surface and wash over the effluent weir of the clarifiers
4. The influent flow distribution hampered by solids and vegetations. Satisfactory distribution is a critical for secondary clarifier operational performance.
5. The final effluent TSS concentrations are in most cases dependent on the performance of the secondary clarifiers.

Pictures below show concerns over the operation of the secondary clarifiers.



3/22/22 Secondary clarifier filled with algae, reed grasses and other vegetation

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I also observed other maintenance issues at the secondary clarifiers detailed below:

The scum troughs clogged on some of the clarifiers
The center wells clogged with scum and the removed scum is being placed on the deck of the clarifier instead of being placed in containers.



3/22/22 secondary clarifier. Scum trough clogged

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3/22/22 Scum collected from center well is not being disposed of properly



3/22/22 Center well of clarifier filled with floating debris

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Solids and vegetation in secondary clarifier.3/22/22

The system was designed with 24 secondary clarifiers for the two activator plants, however during this inspection there were 7 out of 12 in service at Activator Train #3 and 10 out of 12 in service at Activator Train #2.

The wastewater travels from the clarifiers to the denitrification filter building. There are 4 filter quads, and each quad contains 13 Tetra Denitrification Filters with 52 total filters.

During this inspection, I found that not all the filters were functioning as designed. Quads #1, #2 and #4 were all submerged under water due to clogging. Many of the filters had a floating layer of scum that appeared to be emulsified fats oil and grease (FOG) that carried over from primary treatment. This oily scum will prevent functional operation of the filter and affect the efficiency of the filters. According to the control panel, there were 14 of the 52 filters were not operational and requiring various types of service maintenance. However, I found that there was only one quad (13 filters) that was functioning as designed. The other 39 filters were not functioning because of clogging due to solids. I noticed a strong odor of hydrogen sulfide gas coming from the filters. Hydrogen sulfide is a corrosive gas and can cause human health problems.

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3/22/22 floating scum on submerged filter quad

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Submerged filters and mud well to right 3/22/22

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Filter as above on 3/22/22 submerged not functioning properly

Next in inspected the mud wells for the filter backwash. Each mud well manages the back wash for 13 filters. The back wash wastewater flows from the mud wells to the tertiary clarifier for settling. This wastewater then flows back to the treatment system.

I continued this inspection with an inspection of the sand filters. The facility has 48 sand filters and according to Mr. Latova, 21 were out of service due to various mechanical issues and insufficient sand. There was floating dark solid particles in the water of the functioning sand filter that I inspected.

The wastewater travels from the sand filters to the contact chambers where the wastewater is disinfected and then dechlorinated. The wastewater in the contact chambers was a dark grey color with intermittent small black clumps of floating solids flowing to the final discharge point. Next, I inspected the final effluent at the step post aeration system. The final effluent was grey in color with some turbidity.

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3/22/22 floating black clumps of solid material

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Scum and black solid particles in the final effluent 3/22/22

During the last phase of this inspection, I returned to the administration building to discuss my inspection findings with the above facility representatives.

With respect to the above MDE authorization, the following violations were observed under Environment Article Title 9 for the Back River WWTP:

1. Only 2 of the 11 PSTs were in service and one of the PSTs in service required maintenance. Currently there are an insufficient number of functional PSTs available for satisfactory treatment of the primary waste stream.
2. The denitrification filters are not functioning as designed due to high solids concentrations. Fourteen of the denitrification filters require service due to various mechanical reasons and quads 1, 2 and 4 were under water and not functioning as designed. This problem is

causing some of the final effluent to bypass the ENR treatment required by the permit. In addition, hydrogen sulfite (sewer gas) is being generated at the denitrification filters signaling that there is an operational or treatment process issue possibly related to methanol dosing.

3. For the month of January total suspended solids concentrations of the effluent from the secondary clarifiers going into the denitrification filters ranged between 31 and 292 mg/L, indicating that the solids settling processes are out of control causing intermittent and chronic clogging of the denitrification filter system.
4. Unacceptable algae and vegetation growth was observed on the weirs of the secondary clarifiers that was causing the short circuiting of the system. This condition can impact total suspended solids in the waste stream being treated.
5. There are unacceptable accumulations of solids in the bioreactors and the secondary clarifiers that should be removed to improve the quality of the final effluent and improve operations.
6. Established vegetation such as reed grasses were observed in the secondary clarifiers causing operational problems and unsatisfactory settling within the clarifiers.
7. Reed grasses and other vegetation are established in the biological reactors preventing satisfactory operations.
8. Total suspended solids concentrations of the waste stream going into the denitrification filters or influent has increased considerably compared to past operational data. The facility is experiencing BOD, total phosphorous violations due to the high concentrations of TSS throughout the processes and in the final effluent. These high TSS concentrations are also a violation of the above authorization.

To bring this site into compliance with Environment Article Title 9, the Back River WWTP should make the following corrections:

- A. With respect to item #1 above, the Back River WWTP should get the PST cleaned and operational to improve the quality of the final effluent. There should be sufficient functioning PSTs in service to accommodate expected influent flows.
- B. With respect to item #2 above, the Back River WWTP should determine the cause of the problems with the out of service denitrification filters and make the necessary repairs. The problem with the clogged filters should be repaired so that the ENR treatment is not bypassed.
- C. With respect to item #3 above, The Back River WWTP should improve operational maintenance, evaluate wasting practices and make changes as necessary and provide better preventive maintenance practices to improve the solids concentrations throughout the processes.

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- D. With respect to item #4 above, the weirs on the secondary clarifiers should be routinely scrubbed to prevent aggressive algae growth. All vegetation should be removed from the secondary clarifiers and routine maintenance should be done to prevent the recurrence of the problem.
- E. With respect to item #5 above, vegetation and solids should be removed from the secondary clarifiers and biological reactors.
- F. With respect to item #6 above, all vegetation should be removed from the secondary clarifiers.
- G. With respect to item #7 above reed grasses and other vegetation should be removed from the biological reactor and mixers.
- H. With respect to item #8 above, the Back River WWTP should improve operational maintenance, get all treatment process functioning properly, evaluate wasting practices and make changes as necessary and provide better preventive maintenance practices to improve the solids concentrations throughout the processes. The Back River WWTP must take the necessary steps to improve the treatment processes throughout the system and eliminate violations at Outfall 001.

STATE LAW PROVIDES FOR PENALTIES FOR VIOLATIONS OF MARYLAND ENVIRONMENT ARTICLE TITLE 9 FOR EACH DAY THE VIOLATION CONTINUES. THE MARYLAND DEPARTMENT OF THE ENVIRONMENT MAY SEEK PENALTIES FOR THE AFOREMENTIONED VIOLATIONS OF TITLE 9 ON THIS SITE FOR EACH DAY THE VIOLA

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?	Out of Compliance	See narrative section
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	
Is the permittee meeting the compliance schedule per permit requirements?	No Violations Observed	
Has the operator or superintendent been certified by the Board in the appropriate classification for the facility?	No Violations Observed	
Are adequate records being maintained for the sampling date, time, and exact location; analysis dates and times; individual performing analysis; and analytical results?	4 - Not Evaluated	
Are adequate records being maintained for the analytical	4 - Not Evaluated	

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Inspection Item	Status	Comments
methods/techniques used?		
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?	4 - Not Evaluated	
Do lab records reflect that lab and monitoring equipment are being properly calibrated and maintained?	4 - Not Evaluated	
Does the permittee/laboratory use suitable QA/QC procedures and operate a formal quality assurance (QA) program using appropriate controls?	4 - Not Evaluated	
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?	4 - Not Evaluated	
Has the permittee submitted these results within the allotted time electronically?	4 - Not Evaluated	
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
Is sewage sludge managed correctly per permit requirements?	4 - Not Evaluated	
If a by-pass occurred since last inspection, has the permittee submitted notice of the by-pass within the allotted time?	4 - Not Evaluated	
If a non-complying discharge occurred since the last inspection, was the regulatory agency notified within the allotted time?	4 - Not Evaluated	
If applicable, has the permittee complied with all special conditions of their permit?	Out of Compliance	
Have overflows occurred since the last inspection?	4 - Not Evaluated	
Have records of overflows been maintained at the facility for at least five years?	4 - Not Evaluated	
Are flow measuring devices properly installed and operated, calibration frequency of flow meter adequate, flow measurement equipment adequate to handle expected ranges of flow?	4 - Not Evaluated	
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?	Corrective Actions Required	
Were discharge samples collected?	4 - Not Evaluated	

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Inspection Item	Status	Comments
Does this facility have coverage under 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?	2 - Not Applicable	
Are the permit conditions being met?	Out of Compliance	See narrative section

Inspector: Ronald Wicks 3/23/22

Ron Wicks /Date
 ron.wicks@maryland.gov
 410-537-3510

Received by: _____

Signature/Date

Print Name