



**Maryland Department of Environment**  
**Water and Science Administration**  
**Compliance Program**  
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**Inspector:** Christopher Lepadatu  
**AI ID:** 8449

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

**Start Date/Time:** May 24, 2024 09:30 AM  
**End Date /Time:** May 24, 2024 11:30 AM  
**Media Type(s):** NPDES Municipal Major Surface Water

**Contact(s):** Scott Moffat – Policy Analyst, ERCS, Baltimore City DPW  
Timothy Simmons – Back River WWTP, Baltimore City DPW  
Mpoyo George Mulenda – Back River WWTP, Baltimore City DPW

## **NPDES Municipal Major Surface Water**

**Permit / Approval Numbers:** 15DP0581  
**NPDES Numbers:** MD0021555  
**Inspection Reason:** Follow-up  
**Site Status:** Active  
**Compliance Status:** Compliance  
**Site Condition:** Additional Investigation Required  
**Recommended Action:** Additional Investigation Required  
**Evidence Collected:** Photos or Videos Taken, Record Review, Visual Observation  
**Delivery Method:** Email  
**Weather:** Calm, Clear, Good

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### **Inspection Findings:**

#### **Introduction:**

Back River Wastewater Treatment Plant (WWTP) is operated by Baltimore City DPW. Some areas/systems of the WWTP are operated by subcontractors including the Headworks, Denitrification Building, and Centrifuges. The facility is authorized to discharge treated effluent through Outfalls 001 and 002. Outfall 001 discharges to Back River, a designated Use II waterway. Use II waterways support estuarine and aquatic life and shellfish harvesting. Outfall 002 discharges to Tradepoint Atlantic who then discharge via three (3) outfalls under their industrial discharge permit (#05DP0064) to Bear Creek and the Patapsco River which is also designated as a Use II waterway. Final effluent discharge at Back River WWTP is split at a junction box and a large portion of the flow (up to 130.0 MGD) goes to Outfall 001 via a step cascading aeration system and the remaining portion (up to 50.0 MGD) goes to Outfall 002.

The current permit has been administratively extended since it expired on April 30, 2023. A revised permit renewal application (#22DP0581) was received by MDE on May 26, 2023.

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Back River WWTP is an activated sludge process sewage treatment plant with biological nutrient removal by Modified Ludzack-Ettinger process, ferric chloride for phosphorous removal, denitrification filters for enhanced nutrient removal (ENR), polishing sand filters, chlorination, and dichlorination.

On this day, I met with the individual(s) listed above for an opening conference followed by a site walk and closing conference.

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 operation 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. My updates during this inspection are indicated in red text. The table below has been updated with the information included in the Consent Decree Report provided on February 14, 2024. Requests for deadline extensions have been received. Deadlines in the table will be updated if and when extensions are granted.

Back River WWTP Consent Decree (CD) Overall Progress Tracking Summary				
CD Paragraph Reference	Activity	CD Deadline	Actual Date Completed	Compliance Status (11/25/23)
132-BR	Replace H2S Sensors	12/15/2023	5/16/2023	Complete
133(a)-BR	Clean and complete repairs on at least 8 PSTs to ensure they are fully functional and capable to operate as designed. * 5 units in service	1/1/2024	FM Letter Sent 12/20/23 Requested extension: 3/31/24	88%
133(b)-BR	Clean and complete repairs to all 11 PSTs to ensure they are fully functional and available for use. * In progress	12/31/2025		63%
134-BR	Baltimore City to have and maintain an adequate supply of Dissolved Oxygen ("D.O.") probes.	12/1/2023	11/7/2023	Complete
135-BR	Baltimore City shall maintain Activated Sludge Plants No. 2 & 3 as well as their associated clarifiers.	Ongoing		Compliant
135(a)-BR	Submit for review and Department approval the standard operating procedure (SOP) for removal of vegetative growth in the final clarifiers.	1/15/2024	12/15/2023	Complete
135(b)-BR	Implement vegetative growth plan.	Upon approval of 135(a)-BR		Awaiting Approval
135(c)-BR	Maintain average sludge blanket depth of 2 to 4 feet in final clarifiers.	Ongoing		Compliant
135(d)-BR	Maintain manual operations until Activated Sludge PLCs are updated and set up for automatic operation.	Ongoing		Compliant
136(a)-BR	Complete evaluation of sand filters. Within 10 days of sand filter evaluation, request approval for change of use of the approved sand filter, OR	4/30/2024		20%
136(b)-BR	Submit plan and schedule for implementation of sand filter improvements (Sand Filter Improvement Plan). Immediately upon approval City shall implement the approved Sand Filter Improvement Plan.	5/10/2024		20%
137-BR	Repair all Gravity Belt Thickeners (GBTs) to operate as designed.	6/30/2024		50%
138-BR	Repair and install one of the three non-operational Dissolved Air Flotation (DAF) systems and thickened sludge pumps.	12/31/2023	12/5/2023	Complete
139-BR	Issue Notice to Proceed (NTP) with contract for rehabilitation of the egg-shaped digesters. Complete rehabilitation of egg-shaped digesters.	8/16/2023 (NTP) 9/16/2027 (Rehab)		Issued 10%
140-BR	Create and submit a Centrifuge Maintenance Plan to the Plaintiffs for review and the Department's approval.	12/15/2023	12/15/2023	Complete
141-BR	Complete repairs and installation of Centrifuge #4 to operate as designed. * some parts received, waiting on installation.	12/31/2023	FM Letter Sent: 12/20/2023 and 2/14/2024 Requested extension:	55%

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			4/30/24	
142-BR	Submit Staffing Plan	12/31/2023	12/22/2023	Complete
143-BR	City to have, maintain, and make available to the Department the formal written operation and maintenance procedures (Back River WWTP SOP)	6/30/2024		20%
144-BR	City to submit a report that identifies what processes are currently automated and conduct a feasibility study for automation of additional processes, with a plan and schedule for future automation.	5/13/2024		80%
145-BR	Baltimore City shall have, maintain, and update a Computerized Maintenance Management System (CMMS) as a functional work order system to ensure that the plant and its equipment operate as designed.	Ongoing		Compliant
146-BR	Complete a condition assessment and inventory of existing assets in order to develop an asset management program. Complete development and begin implementation of asset management program within 90 days of assessment and inventory.	11/15/2024 (Assessment) 2/12/2025 (Commence Implementation)		75%  Not Started

The table above will be updated during future inspections.

Site Walkthrough:

*Headworks*

Raw sewage enters the plant at the mechanical screen building where there are four (4) coarse screening units. Each unit is rated for flows up to 200 million gallons per day (MGD). During normal flows, one coarse screening unit is sufficient to treat the average daily flow. In general, they rotate which coarse screening unit is in operation every week.

Effluent from coarse screening flows into two (2) deep wet wells that are over 50 feet deep. The headworks influent pumping station has eight (8) lift pumps installed to pump the screened wastewater from the wet wells to the Fine Screening System. During periods of high flow, screened wastewater can be pumped to two (2) above ground storage tanks each with a capacity of 18 million gallons. The two tanks are connected by two 14- to 16-inch pipes near the top of the tanks to allow one to overflow into the other as needed.

The Fine Screening System features six (6) fine screening units rated for flows up to 100 MGD each. No issues were reported with the fine screening units.

Effluent from the fine screening system travels to the Grit Removal System. Eight (8) grit channels equipped with traveling bridges remove grit from the fine-screened wastewater. Each grit channel and traveling bridge has an 80 MGD capacity. Under normal flow conditions, two grit channels are necessary for satisfactory grit removal. The traveling bridges move back and forth along the grit channel using a submersible pump / suction plate system to remove settled grit from the channels and transfer the grit to classifiers for further dewatering. The classified grit is then dried and transported off-site for disposal. No issues were reported with the grit removal system.

No issues were reported with the odor control system.

*Primary Settling*

Effluent from the Grit Removal System flows to a junction box then to the Primary Settling Tanks (PSTs). Primary Settling is the first stage of treatment where solids and sludge are allowed to settle by gravity and any floating scum or fats, oils, and grease (FOG) is removed. Generally, PSTs are designed to remove a large percentage of the total suspended solids (TSS) and reduce the biochemical oxygen demand (BOD) of the wastewater.

There are eleven (11) PSTs at the facility. During the site inspection, the following observations were made:

- Units 1, 3, 4, 9, and 11 are in service.
- Unit 5 is finishing electrical work, will be test run in the coming week.
- Unit 6 is clean, beginning rehab work.
- Unit 8 is out of service for baffle and weir repairs.
- Units 2 and 7 are offline while repairs are made to C-station (pump station).

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- Unit 10 is out of service while the bottom of the tank is regouted.



Image 01: PST #6.

### *Sludge Handling / Processing*

Four (4) GSTs were reportedly in service at the time of the site inspection – GST’s 1, 3, 5, and 7. GST’s 2 & 4 are being used as sludge holding / mixing tanks. GSTs #6 and #8 are out of service long-term in need of an overhaul.

GBTs use gravity and a porous drainage belt to dewater and thicken sludge. The WWTP has 8 GBTs in total. Five (5) GBTs were reported to be in service. Repairs are in progress for the other 3 units. Unit #2 is in need of an overhaul. The remaining two units are in need of a drive and belt. It was reported that the drives and belts for these two units should be installed before June 30, 2024.

The WWTP has four (4) Dissolved Air Flotation Units (DAFs) installed. A DAF unit is designed to remove TSS, FOG, and BOD from wastewater. DAFs are ideal for processing particles and floc that are of neutral density, slow-settling, or buoyant. DAF 1 was in service. Maintenance work on DAF 2 is in the process of being completed. DAF 3 and 4 are drawn down and out of service for repairs / refurbishment. The work on DAF 3 and 4 is expected to be a major overhaul of the units.

From the GSTs, GBTs, and DAF units, sludge is transferred to sludge holding tanks #1 or #26 which are located near the centrifuge building and drying facility. The facility has four (4) centrifuges in total, three (3) of which are operational. Unit #4 is still in the process of scheduling repairs and waiting on additional parts.

It was reported that sludge processing depends on the volume of sludge available as well as the dry storage capacity. Sludge Production and Disposal reported for the month of March and April 2024 is provided in the table(s) below.

<b>Sludge Production and Disposal, March 2024</b>				
Date	Total Sludge Production (dry tons)	Centrifuge Sludge Disposal (to compost) (dry tons)	Pelletech Pellets Disposal (dry tons)	Total Sludge Disposal (dry tons)
3/1	NA	43.7	0	43.7
3/2	NA	NA	0	NA
3/3	NA	NA	0	NA
3/4	NA	41.28	0	41.3
3/5	NA	36.09	0	36.1
3/6	NA	28.38	0	28.4
3/7	NA	24.30	0	24.3
3/8	NA	NA	0	NA
3/9	NA	NA	0	NA
3/10	NA	NA	0	NA
3/11	NA	38.14	0	38.1
3/12	NA	38.26	0	38.3

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3/13	NA	27.54	0	27.5
3/14	NA	27.54	0	27.5
3/15	NA	NA	0	NA
3/16	NA	NA	0	NA
3/17	NA	NA	0	NA
3/18	NA	40.34	0	40.3
3/19	NA	27.81	0	27.8
3/20	NA	NA	0	NA
3/21	NA	40.72	0	40.7
3/22	NA	26.24	0	26.2
3/23	NA	NA	0	NA
3/24	NA	NA	0	NA
3/25	NA	38.16	0	38.2
3/26	NA	NA	0	NA
3/27	NA	28.54	0	28.5
3/28	NA	29.95	0	29.9
3/29	NA	NA	0	NA
3/30	NA	NA	0	NA
3/31	NA	NA	0	NA
<b>Total</b>	<b>0.0</b>	<b>536.95</b>	<b>0.0</b>	<b>537</b>

<b>Sludge Production and Disposal, April 2024</b>				
Date	Total Sludge Production (dry tons)	Centrifuge Sludge Disposal (to compost) (dry tons)	Pelletech Pellets Disposal (dry tons)	Total Sludge Disposal (dry tons)
4/1	52.6	21.5	0	21.5
4/2	80.4	26.5	0	26.5
4/3	83.5	30.5	0	30.5
4/4	55.0	32.45	0	32.4
4/5	63.1	27.42	0	27.4
4/6	49.4	NA	0	NA
4/7	56.9	NA	0	NA
4/8	44.5	27.95	0	28.0
4/9	54.4	26.31	0	26.3
4/10	62.2	27.13	0	27.1
4/11	62.2	24.93	0	24.9
4/12	62.4	26.42	0	26.4
4/13	70.0	NA	0	NA
4/14	63.4	NA	0	NA
4/15	94.9	27.74	0	27.7
4/16	83.8	28.03	0	28.0
4/17	73.4	28.66	0	28.7
4/18	55.3	31.38	0	31.4
4/19	61.3	26.54	0	26.5
4/20	70.6	NA	0	NA
4/21	67.7	NA	0	NA
4/22	58.6	27.34	0	27.3
4/23	52.7	26.23	0	26.2
4/24	79.1	25.37	0	25.4
4/25	131.6	29.88	0	29.9
4/26	53.6	29.48	0	29.5
4/27	56.7	NA	0	NA
4/28	81.7	NA	0	NA
4/29	125.8	31.29	0	31.3
4/30	106.6	33.09	0	33.1
<b>Total</b>	<b>2,113.3</b>	<b>616.17</b>	<b>0</b>	<b>616</b>

*Activated Sludge Plants (ASPs)*

Effluent from Primary Settling flows to a flow distribution building to one (1) of three (3) Activated Sludge Plants (ASPs) numbered 2, 3, and 4. The ASPs each contain six (6) biological reactors for nitrogen removal. ASPs 2 and 3

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have a three-pass train designated A, B, and C for each reactor while ASP 4 is a two-pass system. There are twelve (12) secondary clarifiers associated with each ASP for a total of thirty-six (36) secondary clarifiers at the facility.

It was reported during a previous site inspection that efforts were focused on maintaining ASPs 2 and 4. A capital improvement project is planned in the near future for ASP 3 which will take ASP 3 off-line for repairs. Timothy Simmons reported the status of the different ASP facilities at the time of the site inspection – whether the reactor is online, standby, or out of service.

ASP Process Control Sheet		
Reactor	Pass A	Pass B
ASP 2		
5	Online	Online
6	Online	Online
7	Online	Online
8	Online	Online
9	Online	Online
10	Online	Online
ASP 3		
11	Online	Online
12	Out of Service	Out of Service
13	Out of Service	Standby
14	Standby	Standby
15	Online	Online
16	Out of Service	Standby
ASP 4		
17	Online	Online
18	Online	Online
19	Online	Online
20	Online	Online
21	Online	Online
22	Online	Online

*Denitrification Filters (DNFs)*

At the DNF building, there are four filter quads with each quad containing 13 Tetra Denitrification Filters with a total of 52 filters. It was reported that all 52 filters were functional and in operation at the time of the site inspection. It was reported that the filters are coming due to refresh the filter media and this may begin in the coming months.

*Sand Filters*

The sand filters at the facility are used to polish the wastewater coming from the DNF building. There are 48 total filters. No issues were reported with the Sand Filter system.

*Chlorination / De-chlorination Facility and Final Outfalls*

The final effluent at the step aeration system was observed to be clear and without any noticeable foam, solids, or odor. No visible floating scum or solids were observed in the chlorine contact chambers at the facility. The temperature of the composite samplers in service for Outfall 001 was observed to be 4°C and 2.5°C. The temperature of the composite sampler for Outfall 002 was observed to be 5°C.

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Image 02: Step Aeration system, final effluent.

I reviewed the lab located at the Chlorination / De-chlorination Facility. No violations were observed with the logbooks. Copies of the pH and DO calibration records were provided to me for review.

Closing Conference:

After the Chlorination / Dichlorination Facility, we returned to the administration building for an exit conference.

Records Review:

Following the site inspection, laboratory reports and calibration records were reviewed. DMRs for April 2024 were reviewed. No violations were observed in the pH and DO calibration records or the laboratory analysis reports. No violations were observed in the NetDMR submissions.

*Non-Compliance Report(s) / Bypass Events*

On March 14, 2024, the Department was notified of a spill event at Back River WWTP that occurred at 2:30 pm on Tuesday, March 13, 2024. It was reported that operations was in the process of placing Reactor #9 in service. One of the clarifiers was being filled. Operations had been monitoring the process throughout the day. When a supervisor went to check on progress, the overflowing manhole was discovered. A broken line was being backfilled with mixed liquor which caused the line to leak into the manhole. Once the line filled up with mixed liquor, a downstream manhole began to overflow. Sandbags were already around the storm drain, but the mixed liquor still breached and went into the storm drain inlet which discharges to Back River via Outfall #4. The influent gate to the reactor was closed. The return activated sludge (RAS) pump flow was diverted to Reactor 10 to start draining the reactor. Sump pumps were placed in 2 manholes and pump into clarifiers to stop the overflow. Operations continued draining Reactor #9 and associated clarifiers. They also monitored both sump pumps every few hours until the sump pumps are no longer needed. Reactor #9 would not be placed back in service until there is a viable solution. The estimated amount of mixed liquor that escaped the manhole is 22,500 gallons.

The event described above occurred at the same manhole as an event which occurred on February 20, 2024, described below.

On February 20, 2024, the Department was notified of an active Sewage Sludge Overflow (SSO) event at the Back River WWTP being discovered at 12:45 pm. A large volume of flushing water was overflowing Manhole 12A (MH-12A) in the vicinity of 10B final clarifier. Back River WWTP reported in the 5-day follow-up letter that the event caused MH-12A to fill with flushing water and ferric chloride ( $\text{FeCl}_3$ ) residual and overflow onto a grassy swale. The discharge then entered a nearby "at grade" storm drain inlet which discharges to Back River via Outfall #4. By 3:00 pm, a berm was created to isolate the stormwater drain from receiving further discharge. Back River reports that an estimated 11,700 gallons of flushing water discharged during this event. The cause of the discharge was reported to be



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a failure in a valve or pipe. To improve efforts to prevent this from re-occurring, Back River has instructed their staff to conduct more visual checks of manholes throughout the facility.

During the site inspection on March 18, 2024, I reviewed the area of the sludge overflow described above. No standing water was observed near the storm drain inlet; however, I observed an accumulation of solids that appeared to be dried sludge rather than bare soil. I advised that the dried solids should be removed, and the area restored to its condition prior to the overflow. It was reported that the solids observed would be removed immediately.

During the previous site inspection on April 22, 2024, I observed residual solids around the storm drain and advised that the solids observed should be removed immediately.

I observed this area on the date of this inspection and found the area to be clear with no residual impact observed.



Image 03: Storm drain area clear.

On April 14, 2024, a non-complying discharge event was reported at Back River WWTP. A mobile belt filter press unit operated by a contractor experienced a release of sludge that escaped the containment area of the unit. This mobile belt filter press unit is different from the one mentioned in the above non-complying discharge event that was reported on April 9, 2024. This unit is located near GST#8. It was reported that a pump became energized and flow went from 0 to 300 gallons per minute of sludge while the belt filter press was not in operation. An estimated 9,000 gallons of sludge was released and ran down the road to a wetland area on site.

During the site inspection on April 22, 2024, I reviewed the area of the release. In the wetland area at the end of the road the odor of sewage sludge was present and the area was covered with a fine, gritty material that is consistent with sewage sludge. It was reported that the areas of standing water observed are not usually found there and that the material and standing water was the result of the spill. It was reported that the mobile belt filter press contractor had managed the vac truck and cleanup efforts and apparently left this area untouched.

On this day, I reviewed the wetland area associated with the spill. On the way to review the area, I observed that a new berm has been installed to mitigate any future accidental releases. The new temporary berm is installed along the roadway following the mobile filter press unit. The berm is installed in such a way to prevent flow from continuing down the roadway to the wetland area.



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Image 04: New temporary berm.

No visual impact from the release was observed in the wetland area. The area appeared to be free of residual debris from the release.



Image 05: Wetland area related to the belt filter press release.

On May 2, 2024, a non-complying discharge event was reported at Back River WWTP. An overflow event occurred at the stockpile pump station on Tuesday, April 30, 2024. It was reported that private contractors operating the centrifuge facility on the plant discharged centrate at a much higher than normal concentration causing a sludge buildup in the stockpile pit. This inhibited the stockpile pumps from operating properly resulting in pump failure. Electricians were called in and reset the pumps by 9:00pm. Clean up efforts began and a Vac-haul contractor was on site May 1, by 11:00am to remove the discharge from the adjacent road and grassy area. All cleanup efforts were completed by the evening of May 1. Lime was applied to the affected grassy area. It is estimated that 8,000 gallons of centrate escaped the stockpile station, but no report of sludge entering any drains or manholes. The float was adjusted by the electricians to prevent a re-occurrence. All staff was given instructions to make more frequent visual inspections of the area.

On this day, I reviewed the stockpile pit and surrounding area. The area appeared to be restored from the release and no visual residual impacts were observed.

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Image 06: Stockpile pit.



Image 07: Roadway and grassy area downslope from Stockpile pit.

On May 21, 2024, a temporary shutdown of effluent to Outfall 002 was reported at Back River WWTP. It was reported that the flow to Outfall 002 was shut down at the request of Tradepoint Atlantic on May 5, 2024. The request was made due to high levels at their receiving lake. During the shutdown period, on May 20, 2024, at 8:00pm, May 21, 2024, at 12:00am and 8:00am, pH, dissolved oxygen and chlorine residual data were not collected for Outfall 002. On May 21, 2024, at 12:00pm, the flow resumed to Outfall 002.

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 Back River 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.

**A follow-up inspection will be conducted.**

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Inspector:  6/17/2024  
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Received by: \_\_\_\_\_  
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