

Application Type Renewal
Facility Type Industrial
Major / Minor Minor

**NPDES PERMIT FACT SHEET
INDIVIDUAL INDUSTRIAL WASTE (IW)
AND IW STORMWATER**

Application No. PA0217689
APS ID 1101779
Authorization ID 1463391

Applicant and Facility Information

Applicant Name	<u>West View Water Authority Allegheny County</u>	Facility Name	<u>Joseph A Berkley WTP</u>
Applicant Address	<u>2428 Rochester Road</u> <u>Sewickley, PA 15143-8667</u>	Facility Address	<u>210 Perry Highway</u> <u>Pittsburgh, PA 15229-1862</u>
Applicant Contact	<u>Al Sartoris</u>	Facility Contact	<u>Al Sartoris</u>
Applicant Phone	<u>(412) 931-3292</u>	Facility Phone	<u>(412) 931-3292</u>
Client ID	<u>62410</u>	Site ID	<u>258276</u>
SIC Code	<u>4941</u>	Municipality	<u>Neville Township</u>
SIC Description	<u>Trans. & Utilities - Water Supply</u>	County	<u>Allegheny</u>
Date Application Received	<u>November 30, 2023</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>August 30, 2024</u>	If No, Reason	<u></u>
Purpose of Application	<u>Renewal of NPDES Permit PA0217689</u>		

Summary of Review

West View Water Authority (WVWA), the applicant, submitted an NPDES permit renewal application to the Department on November 30, 2023 however, required sampling data was omitted from their submittal. The application is for the discharges from the Joseph A. Berkley Water Treatment Plant (BWTP), also commonly known as the West View WTP or the Neville Island WTP. A Technical Deficiency letter was issued to WVWA on July 17, 2024.

On July 25, 2024, the Department received an updated submittal from WVWA's consultant, MS Consultants, Inc. (MSC), with an updated, partial renewal application. However, the update still lacked some of the required stormwater sampling information. In the same email, MSC requested an extension to the Technical Deficiency letter due date to submit sampling results. In an email reply on July 25, 2024, the Department provided a 60-day extension. On August 30, 2024, MSC sent a reply email including a partial updated renewal application submittal as an attachment. Included, the Department received new stormwater sample results in the form of updated application Module 1 pages. After review, this renewal submittal was considered complete.

The BWTP has a rated capacity of 40 MGD and currently treats an average of 23 MGD, for potable supply. The main source of intake water is the Ohio River, with thirteen drilled wells on Neville and/or Davis Island as back-up sources.

The West View Authority was created in 1942 and provides potable water service to a population of more than 55,000 customers in 26 municipalities and, through interconnections with eight other water systems, serves a population of over 200,000 people in Allegheny, Beaver and Butler counties.

Approve	Deny	Signatures	Date
X		 John L Duryea, Jr., P.E. / Environmental Engineer	October 22, 2024
X		 Michael E. Fifth, P.E. / Environmental Engineer Manager	October 22, 2024

Summary of Review

BWTP is a conventional type water treatment plant, with treatment consisting of chemical feed, rapid mix, flocculation, sedimentation, filtration, pH adjustment, fluoridation, chlorination and UV disinfection. Two up-flow suspended solids contact clarifiers provide flocculation and clarification, followed by high rate mixed media filtration. The production of clean drinking water is supplied by BWTP to West View Water Authority's customers under a Public Water Supply Permit. The wastewater discharge of the clarifier underflow sludge from the BWTP is the subject of this NPDES permit.

Most of the waste generated at BWTP is produced during filter backwash and sludge withdrawal from the clarifiers. Excess sludge collected in the clarifiers is scraped by a mechanical thickener to a sludge hopper in the bottom of each clarifier. The sludge is then drawn off and discharged to a 500,000-gallon Flow Equalization Basin. From there it is transferred to onsite Belt Filter Press (BFP) machine(s), aided by chemical flocculants, to press solids into roll off boxes. Once full, these boxes are disposed of offsite. Currently the liquids remaining after pressing out solids are discharged at **Outfall 004**. When required for maintenance, periodically the use of the BFP(s) are suspended and clarifier underflow sludge is conveyed via a 10" line under the Ohio River back channel to two settling lagoons on Davis Island.

The construction of BWTP was previously authorized by WQM Part II **0278206** which was originally designed to collect and convey process wastes from treatment facility operations to the two wastewater lagoons on Davis Island as the primary solids settling means. This permit was issued on June 6, 1978. Subsequent amendments to this permit were approved on May 10, 2018 (**A1**) and again on October 5, 2018 (**A2**). These permit amendments allowed processing of sludge from the clarifiers and/or Equalization Basin via the BFPs and then the liquids through portable filtration units using 300 gpm pumps before discharge to the Ohio River at **Outfall 004**. This is believed to be in accordance with BWTP's current practice.

However, an additional amendment application (**A3**) was approved on October 20, 2020 allowing construction and startup of a wastewater treatment system (WWTS) on Neville Island; as well as, modifications to the Davis Island lagoons and discharge structures. The WWTS was never constructed, but the Davis Island lagoons were cleaned out of solids and the approved modifications for Davis Island were completed.

Of only historical interest, WQM Part II permit **0275209** was issued August 22, 1975 for facilities designed for the treatment and discharge of brine wastes. Treatment and discharge of brine wastes is no longer authorized at this facility today.

On September 5, 2023, WVWA and the Department entered into a Consent Order and Agreement (COA) replacing a prior agreement of May 22, 2019. The new plan is for WVWA to once again discharge clarifier underflow sludge to their Davis Island lagoons; however, under the new sludge handling plan, approved by the Department on June 21, 2024, WVWA will design and build a new pump lift station on Davis Island and pump clarifier underflow sludge and/or lagoon supernatant to a connection with the ALCOSAN system located toward the southeast in Stowe Township. A satellite overlay showing the rudiments of this plan is shown in Figure 1 below:



Figure 1: Sketch Overlay on Satellite Image with the Conceptual 2024 Sludge Handling Plan

Summary of Review

Under the terms of this newer agreement, WVWA will be discharging effluent from Outfalls 001, 002 and/or 004 during different stages of their construction and transition. They will also continue to discharge stormwater from all of their outfalls, except Outfall 011 which will continue to discharge lab sample water and Outfall 014. All of the BWTP outfall locations are shown in Attachment A and the outfalls on Neville Island are also illustrated in Figure 2 below:

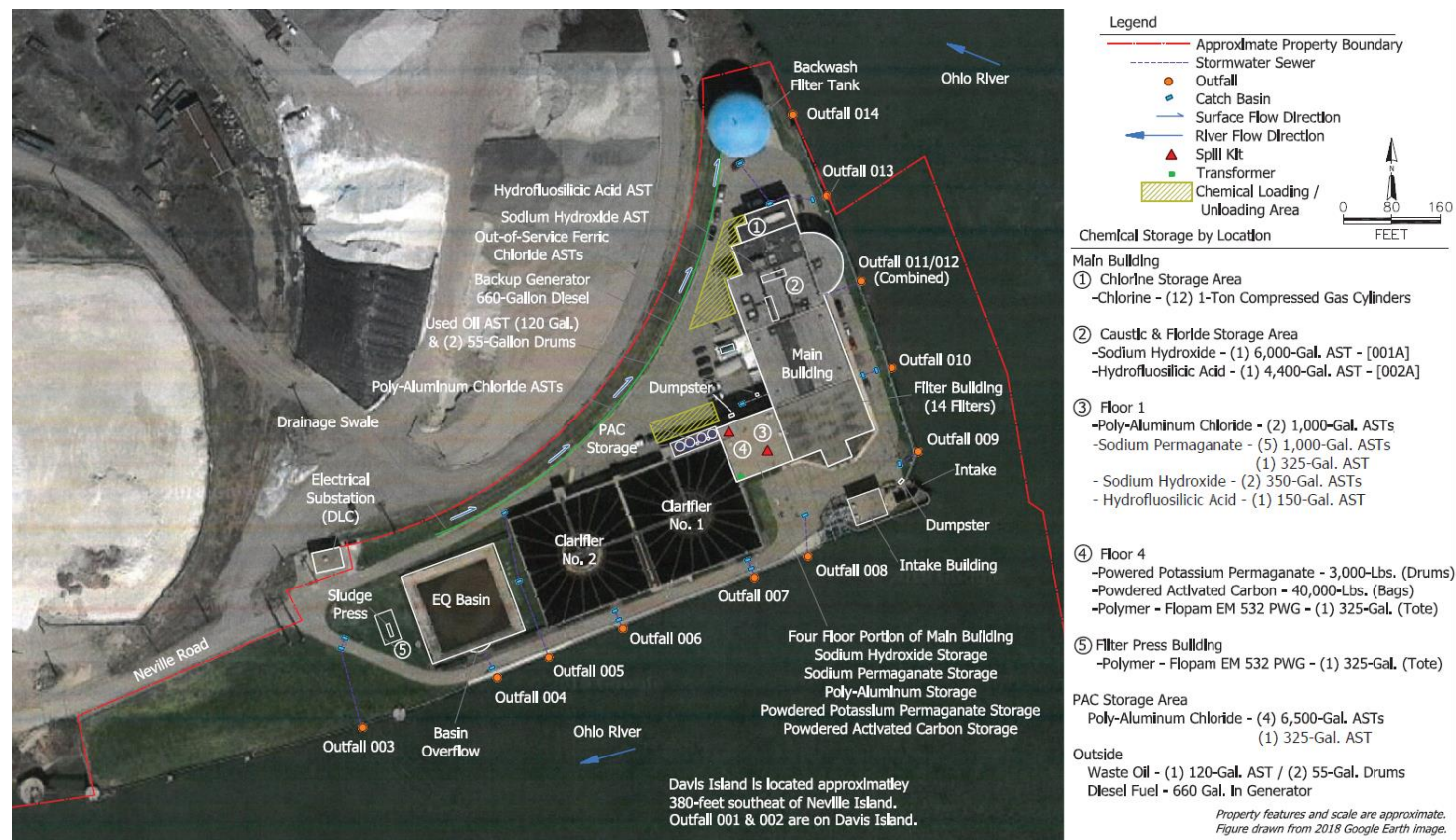
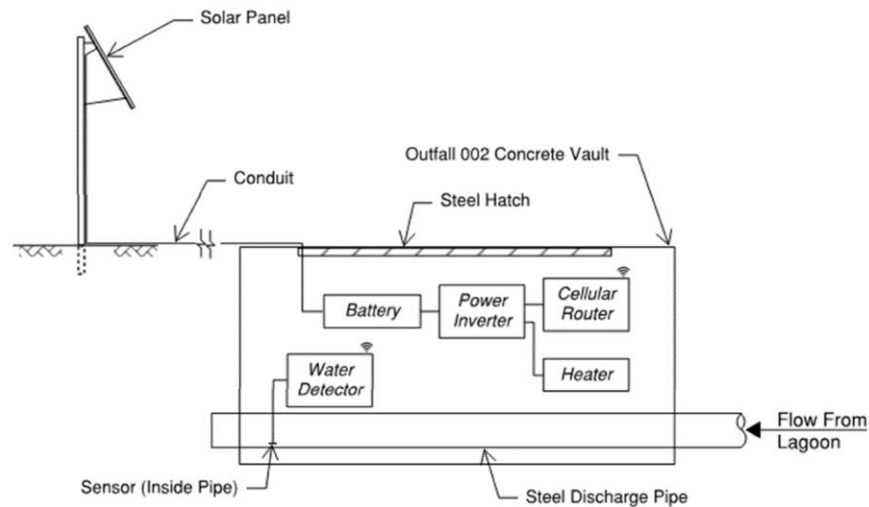


Figure 2: WVWA's Joseph A. Berkley WTP on Neville Island

Figure 2 above supplies a substantial amount of detail on the normal operation of the BWTP. All that is lacking is that the two sludge lagoons on Davis Island, each have independent outfalls. These are shown in Attachment A. Any discharge through these outfalls would pass through the outfall infrastructure illustrated in Figure 3 below:



Summary of Review

Over the course of the next permit term, normal process water discharges are conceivable from Outfalls 001, 002 and/or 004. Therefore, the same effluent monitoring and limitations will be promulgated for these three outfalls whether it is a discharge from the pressed liquids from BFP(s) on Neville Island at Outfall 004 (as at present) or of supernatant from the two sludge lagoons on Davis Island discharged to the Ohio River back channel via Outfalls 001 (Lagoon #1) and 002 (Lagoon #2). However, no monitoring has been designated for the eventual, planned flow to the ALCOSAN interconnection in Stowe Township as this flow is regulated under an agreement with that Publicly Owned Treatment Works (POTW) which falls outside the delegated authority granted to this Department.

By the original design, the average discharge rate of a filter backwash cycle wherever it occurs would be 700 gpm for 10 minutes. Reportedly, these discharges can occur up to 12 times per 24-hour period or a total of 0.084 MGD. Previous permit reviewers conservatively considered that this 700 gpm discharge rate could be continuous for a 24-hour period or 1.008 MGD. This conservative basis was used as the basis for Water Quality modeling in the past and has been continued here-in. However, this conservative approach is counter-balanced by the considerable assimilative capacity of the Ohio River; in addition to, the simplified approach of neglecting background data for this receiving river, as no readily available upstream data exists, except from Water Quality Monitoring stations well upstream of the confluence of the Allegheny and Monongahela Rivers.

The current NPDES renewal permit application sampling results for Groups 1 and 2 were attributed to **Outfall 004**. This data was also considered representative of potential discharges at both **Outfalls 001** and **002** for model development. Adding some background on past lagoons operation, the sludge from the lagoons was previously removed in 2009, and more recently cleaned out in the 2020 – 2021 timeframe. A previous sludge removal from the lagoons was completed in 1994. The Authority's ability to predict the need for sludge removal has been suspect in the recent past. However, provisions to better regulate the timing of a decision to contract for lagoon clean out have been included in the 2023 COA.

Another potential process discharge is at **Outfall 011** which consists of lab sink drains; floor drains, and pump gland water. In response to Department inquiry, the applicant added the following:

- “1. Process water flows through the Turbidity, Chlorine, pH, Fluoride, and Permanganate Monitoring Instruments and then is discharged to Outfall 011.
2. Potable water is used for pump seal lubrication and then discharged to Outfall 011.
3. In the Laboratory, process water is sent to a sample sink for the Operators to collect samples for Raw Water Jar Test and Turbidity, Chlorine, pH, Fluoride, and Permanganate level testing, using benchtop laboratory equipment. Drops of chemical is added to each beaker of process water as required by the benchtop laboratory equipment. The discharge from this sink goes to Outfall 011.
4. Outfall 011 use (sic) a Tablet De-Chlorinator to remove chlorine residual before discharge.
5. Expired chemical used in the Laboratory are disposed of off-site and do not go to Outfall 011.

At the time of design, the above discharges were approved by the Department to go to Outfall 011 and the gray water and wastewater holding tank was not sized to receive these discharges.”

In the renewal application update submittal received on July 25, 2024, besides samples from Outfall 004, influent and discharge sample results were supplied for Outfall 011. Therefore, modeling of this discharge for this outfall will also be documented here-in.

Outfall 014, in an abnormal event, could serve as the overflow for the BWTP's gravity filter backwash water storage tank. Water stored in the backwash water storage tank is potable water intended for use in the process of backwashing the plants filtration system. The design of the plant includes a high alarm set point for this tank. If this setpoint is tripped, an alarm sounds, and then the operating staff's procedure is to secure the pumps conveying water to the tank to prevent overflow. Should this fail, an overflow pipe would convey excess water to **Outfall 014**. The plant has no record of this occurring. In prior permit terms, due to the low probability of a discharge, no effluent limitations were assigned. With no record of a discharge occurring, no limits are proposed again for this permit term beyond a permit Part C Overflow Monitoring Requirement, as before. A part C condition for emergency overflow discharges will be added to this permit to cover this possibility.

Summary of Review

The remaining **Outfalls 003, 005-010 and 012-013** shall consist solely of uncontaminated stormwater runoff. Effluent samples were taken of these outfalls and analyses was received by the Department on August 30, 2024. In the past, WVWA has complained of air and waterborne contaminants from adjacent industrial facilities. Investigations of these assertions tends to corroborate the WVWA complaints even to the possibility of an additional discharge point from offsite sources. Intervention with these offsite sources has been conducted. Still, the Department is charged to protect the Commonwealth's waters and so monitoring of these stormwater discharges will continue.

As noted above **Outfall 004** is initially planned for use for IW discharge, but discharges are conceivable under certain circumstances at **Outfall 001** and/or **002**. In consultation with Department enforcement personnel, this renewal will permit the use of **Outfall 004** as the normal discharge of processed wastewater effluent from the site. **Outfalls 001 and 002** will also be permitted as alternates, after cessation of full operation of the BFP and/or filtration systems. However, the normal process discharge in the future after construction of the lift pump station on Davis Island should be to the ALCOSAN system and not directly to the Ohio River, except under emergency situations. Future permit reviews may consider Outfall 004 as just another stormwater discharge once construction projects are completed.

The effluent limits for Total Residual Chlorine are based on PADEP regulations in 25 PA Code Chapter 92. TRC has been limited in the permit for all non-stormwater active outfalls, including **Outfalls 001, 002, 004 and 011**.

ORSANCO WQBELS

On April 17, 2015, the Department sent a letter to notify the permittee that the Ohio River Valley Water Sanitation Commission (ORSANCO) was prohibiting mixing zones for 22 Bioaccumulative Chemicals of Concern (BCCs), including an end-of-pipe Mercury effluent limit of 0.012 micrograms/liter. After the outfall specific effluent limit analyses were completed a detailed evaluation of the ORSANCO limits was conducted, including use of a detailed comparison of ORSANCO limits that were potentially more protective than those currently used by the Department and modeling runs with the revised limits applied. This evaluation did not indicate a need for any more restrictive WQBELS beyond the end-of-pipe Mercury limit documented above. Since the permittee's effluent sample indicated that mercury levels were below the Commonwealth's established Quantitative Limits (QLs) at the process outfalls, therefore the imposition of Mercury limits is not recommended, except at **Outfall 011** where mercury was above the laboratory detection limit and above the target QLs.

It is recommended that a draft permit be published for public comment in response to this application.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	1.008
Latitude	40° 29' 18"	Longitude	-80° 4' 24"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Supernatant from sludge lagoon No. 1 and Stormwater			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: As stated above, the lagoons on Davis Island have been cleaned out of sediment and a WQM Part II amendment A3 was approved but then partially repudiated; however, the modifications on Davis Island were completed. Further changes are planned and will be governed by the 2023 COA to allow a transition from the use of BFP(s) to remove solids to, ultimately, sludge discharge to a planned ALCOSAN interconnection in Stowe Township. In the interim period sludge discharges to the Davis Island lagoons are permitted, as are discharges from Outfalls 001, 002 and 004 to the Ohio River back channel.

Cessation of any process water discharges from Outfall 004 on Neville Island and Outfalls 001 and 002 on Davis Island to the Ohio River back channel, beyond emergency situations, is the planned end state.

Other Comments: Used 1/2 of the ACOE Ohio River flow in modeling. A drawing of BWTP outfall locations is included as Attachment A. An excerpt showing the orientation of the lagoons and associated outfalls is in Figure 4 below:

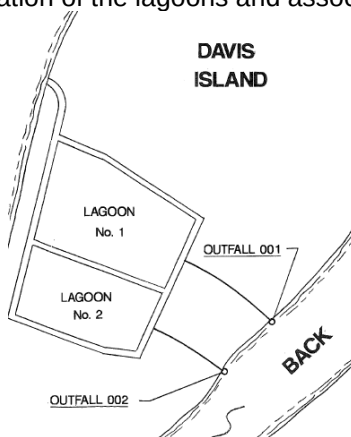


Figure 4: Sketch of the Davis Island Lagoons and Associated Outfalls

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	002	Design Flow (MGD)	1.008
Latitude	40° 29' 18"	Longitude	-80° 4' 27"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description:	Supernatant from sludge lagoon No. 2 (IW Process Effluent without ELG) and Stormwater		
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi ²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: As stated above, the lagoons on Davis Island have been cleaned out of sediment and a WQM Part II amendment A3 was approved but then partially repudiated; however, the modifications on Davis Island were completed. Further changes are planned and will be governed by the 2023 COA to allow a transition from the use of BFP(s) to remove solids to, ultimately, sludge discharge to a planned ALCOSAN interconnection in Stowe Township. In the interim period sludge discharges to the Davis Island lagoons are permitted, as are discharges from Outfalls 001, 002 and 004 to the Ohio River back channel.

Cessation of any process water discharges from Outfall 004 on Neville Island and Outfalls 001 and 002 on Davis Island to the Ohio River back channel, beyond emergency situations, is the planned end state.

Other Comments: Used 1/2 of the ACOE Ohio River flow in modeling.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	003	Design Flow (MGD)	0
Latitude	40° 29' 27"	Longitude	-80° 04' 30"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Stormwater runoff			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	004	Design Flow (MGD)	1.008
Latitude	40° 29' 29"	Longitude	-80° 04' 23"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Effluent from BFP and filtration (IW Process Effluent without ELG) and Stormwater			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi ²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	n/a
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: As stated above, the lagoons on Davis Island have been cleaned out of sediment and a WQM Part II amendment A3 was approved but then partially repudiated; however, the modifications on Davis Island were completed. Further changes are planned and will be governed by the 2023 COA to allow a transition from the use of BFP(s) to remove solids to, ultimately, sludge discharge to a planned ALCOSAN interconnection in Stowe Township. In the interim period sludge discharges to the Davis Island lagoons are permitted, as are discharges from Outfalls 001, 002 and 004 to the Ohio River back channel.

Cessation of any process water discharges from Outfall 004 on Neville Island and Outfalls 001 and 002 on Davis Island to the Ohio River back channel, beyond stormwater, is the planned end state.

IW discharges of BFP pressed liquids from the Flex Media Filtration system is intended to be discharged only from this outfall in the interim period before resuming discharges to the Davis Island lagoons. The discharge rate at design flow is 0.432 MGD, but average daily flow is expected to be circa 0.104 MGD. However, it seems prudent that limits calculated for Outfalls 001 and 002 should be applied to this outfall during use of the BFP and filtration units, therefore the associated higher flow rate (1.008 MGD) is the implied basis used for analyses.

Other Comments: Used 1/2 of the ACOE Ohio River flow in modeling.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	005	Design Flow (MGD)	0
Latitude	40° 29' 30"	Longitude	-80° 04' 22"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Stormwater runoff			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	006	Design Flow (MGD)	0
Latitude	40° 29' 30"	Longitude	-80° 04' 22"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Stormwater runoff			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>007</u>	Design Flow (MGD)	<u>0</u>
Latitude	<u>40° 29' 30"</u>	Longitude	<u>-80° 04' 20"</u>
Quad Name	<u>Pittsburgh West</u>	Quad Code	<u>1505</u>
Wastewater Description: <u>Stormwater runoff</u>			
Receiving Waters	<u>Ohio River (Back channel)</u>	Stream Code	<u>32317</u>
NHD Com ID	<u>134396120</u>	RMI	<u>35.5</u>
Drainage Area	<u>19,500 square miles</u>	Yield (cfs/mi²)	<u>regulated</u>
Q ₇₋₁₀ Flow (cfs)	<u>2365</u>	Q ₇₋₁₀ Basis	<u>USACOE Regulated flow</u>
Elevation (ft)	<u>710 feet</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>20-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u></u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>Dioxins, Pathogens, PCB</u>		
Source(s) of Impairment	<u>Source Unknown</u>		
TMDL Status	<u>Final, 04/09/2001</u>	Name	<u>Ohio River</u>
Nearest Downstream Public Water Supply Intake	<u>Robinson Township Municipal Authority</u>		
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>2365</u>
PWS RMI	<u>31.9</u>	Distance from Outfall (mi)	<u>3.6</u>

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	008	Design Flow (MGD)	0
Latitude	40° 29' 30"	Longitude	-80° 04' 19"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Stormwater runoff			
Receiving Waters	Ohio River (Back channel)	Stream Code	32317
NHD Com ID	134396120	RMI	35.5
Drainage Area	19,500 square miles	Yield (cfs/mi ²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Robinson Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	31.9	Distance from Outfall (mi)	3.6

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information

Outfall No.	009	Design Flow (MGD)	0
Latitude	40° 29' 32"	Longitude	-80° 04' 17"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description:	Stormwater runoff		
Receiving Waters	Ohio River	Stream Code	32317
NHD Com ID	134396120	RMI	35.6
Drainage Area	19,500 square miles	Yield (cfs/mi ²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, Pathogens, PCB, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final, 04/09/2001	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Moon Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	28.7	Distance from Outfall (mi)	6.9

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: Note that Outfalls 009 through 014 discharge to the main channel of the Ohio River. This is shown in Attachment A and in an excerpt of that Attachment in Figure 5 below.

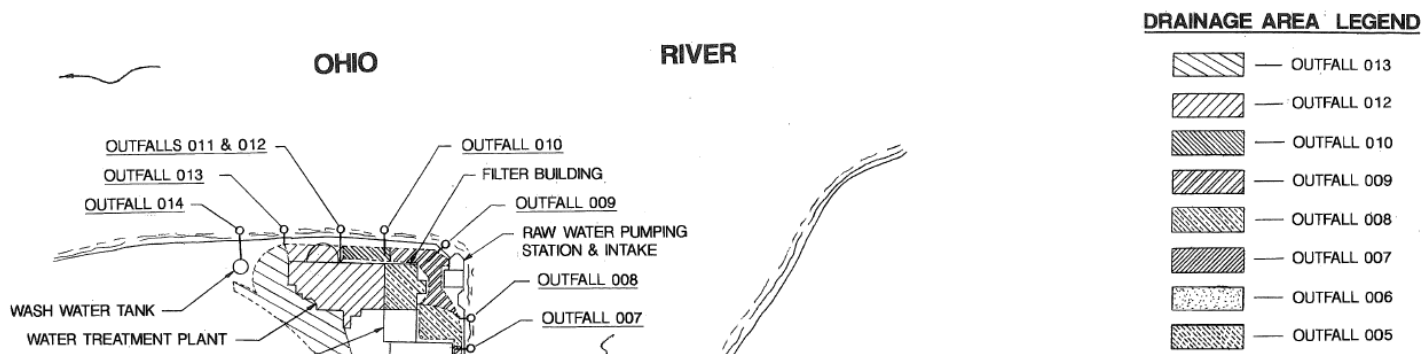


Figure 5 WVWA BWTP Eastern Outfall Locations / Drainage Areas

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>010</u>	Design Flow (MGD)	<u>0</u>
Latitude	<u>40° 29' 33"</u>	Longitude	<u>-80° 04' 17"</u>
Quad Name	<u>Pittsburgh West</u>	Quad Code	<u>1505</u>
Wastewater Description: <u>Stormwater runoff</u>			
Receiving Waters	<u>Ohio River</u>	Stream Code	<u>32317</u>
NHD Com ID	<u>134396120</u>	RMI	<u>35.6</u>
Drainage Area	<u>19,500 square miles</u>	Yield (cfs/mi ²)	<u>regulated</u>
Q ₇₋₁₀ Flow (cfs)	<u>2365</u>	Q ₇₋₁₀ Basis	<u>USACOE Regulated flow</u>
Elevation (ft)	<u>710 feet</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>20-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u>PWS, Aquatic Life, Fish Consumption, Recreational</u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>Dioxins, Pathogens, PCB, Chlordane</u>		
Source(s) of Impairment	<u>Source Unknown</u>		
TMDL Status	<u>Final, 04/09/2001</u>	Name	<u>Ohio River</u>
Nearest Downstream Public Water Supply Intake	<u>Moon Township Municipal Authority</u>		
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>2365</u>
PWS RMI	<u>28.7</u>	Distance from Outfall (mi)	<u>6.9</u>

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: The locations of the BWTP site outfalls is shown in Attachment A and in Figure 5 above.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>011</u>	Design Flow (MGD)	<u>.016</u>
Latitude	<u>40° 29' 35"</u>	Longitude	<u>-80° 04' 17"</u>
Quad Name	<u>Pittsburgh West</u>	Quad Code	<u>1505</u>
Wastewater Description: <u>Lab sink drains, floor drains and pump gland water (IW Process Effluent without ELG)</u>			
Receiving Waters	<u>Ohio River</u>	Stream Code	<u>32317</u>
NHD Com ID	<u>99684474</u>	RMI	<u>35.6</u>
Drainage Area	<u>19,500 square miles</u>	Yield (cfs/mi ²)	<u>regulated</u>
Q ₇₋₁₀ Flow (cfs)	<u>2365</u>	Q ₇₋₁₀ Basis	<u>USACOE Regulated flow</u>
Elevation (ft)	<u>710 feet</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>20-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u>PWS, Aquatic Life, Fish Consumption, Recreational</u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>Dioxins, PCB, Pathogens, Chlordane</u>		
Source(s) of Impairment	<u>Source Unknown</u>		
TMDL Status	<u>Final</u>	Name	<u>Ohio River</u>
Nearest Downstream Public Water Supply Intake	<u>Moon Township Municipal Authority</u>		
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>2365</u>
PWS RMI	<u>28.7</u>	Distance from Outfall (mi)	<u>6.9</u>

Changes Since Last Permit Issuance: none

Other Comments: Used 1/2 of the ACOE Ohio River flow in modeling.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>012</u>	Design Flow (MGD)	<u>0</u>
Latitude	<u>40° 29' 35"</u>	Longitude	<u>-80° 04' 17"</u>
Quad Name	<u>Pittsburgh West</u>	Quad Code	<u>1505</u>
Wastewater Description: <u>Stormwater runoff</u>			
Receiving Waters	<u>Ohio River</u>	Stream Code	<u>32317</u>
NHD Com ID	<u>99684474</u>	RMI	<u>35.6</u>
Drainage Area	<u>19,500 square miles</u>	Yield (cfs/mi ²)	<u>regulated</u>
Q ₇₋₁₀ Flow (cfs)	<u>2365</u>	Q ₇₋₁₀ Basis	<u>USACOE Regulated flow</u>
Elevation (ft)	<u>710 feet</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>20-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u>PWS, Aquatic Life, Fish Consumption, Recreational</u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>Dioxins, PCB, Pathogens, Chlordane</u>		
Source(s) of Impairment	<u>Source Unknown</u>		
TMDL Status	<u>Final</u>	Name	<u>Ohio River</u>
Nearest Downstream Public Water Supply Intake	<u>Moon Township Municipal Authority</u>		
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>2365</u>
PWS RMI	<u>28.7</u>	Distance from Outfall (mi)	<u>6.9</u>

Changes Since Last Permit Issuance: none

Other Comments: Shared discharge point with Outfall 011. Note that this outfall was not listed in the July 25, 2024 renewal application update. Because of the pervasive nature of stormwater benchmark exceedances on this site over the 2019 through 2024 permit term, monitoring will be required for this outfall in the new permit, analogous to the site's other stormwater outfalls.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	013	Design Flow (MGD)	0
Latitude	40° 29' 35"	Longitude	-80° 04' 18"
Quad Name	Pittsburgh West	Quad Code	1505
Wastewater Description: Stormwater runoff			
Receiving Waters	Ohio River	Stream Code	32317
NHD Com ID	99684474	RMI	35.6
Drainage Area	19,500 square miles	Yield (cfs/mi²)	regulated
Q ₇₋₁₀ Flow (cfs)	2365	Q ₇₋₁₀ Basis	USACOE Regulated flow
Elevation (ft)	710 feet	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	PWS, Aquatic Life, Fish Consumption, Recreational	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Dioxins, PCB, Pathogens, Chlordane		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final	Name	Ohio River
Nearest Downstream Public Water Supply Intake	Moon Township Municipal Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	2365
PWS RMI	28.7	Distance from Outfall (mi)	6.9

Changes Since Last Permit Issuance: Samples reported in last permit term occasionally, in some cases, exceeded the established benchmarks. Monitoring will be continued for this outfall in the new permit term.

Other Comments: None

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>014</u>	Design Flow (MGD)	<u>0</u>
Latitude	<u>40° 29' 36"</u>	Longitude	<u>-80° 04' 18"</u>
Quad Name	<u>Pittsburgh West</u>	Quad Code	<u>1505</u>
Wastewater Description: <u>Potential water tank overflow discharge</u>			
Receiving Waters	<u>Ohio River</u>	Stream Code	<u>32317</u>
NHD Com ID	<u>99684474</u>	RMI	<u>35.6</u>
Drainage Area	<u>19,500 square miles</u>	Yield (cfs/mi²)	<u>regulated</u>
Q ₇₋₁₀ Flow (cfs)	<u>2365</u>	Q ₇₋₁₀ Basis	<u>USACOE Regulated flow</u>
Elevation (ft)	<u>710 feet</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>20-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u>PWS, Aquatic Life, Fish Consumption, Recreational</u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>Dioxins, PCB, Pathogens, Chlordane</u>		
Source(s) of Impairment	<u>Source Unknown</u>		
TMDL Status	<u>Final</u>	Name	<u>Ohio River</u>
Nearest Downstream Public Water Supply Intake	<u>Robinson Township Municipal Authority</u>		
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>2365</u>
PWS RMI	<u>28.7</u>	Distance from Outfall (mi)	<u>6.9</u>

Changes Since Last Permit Issuance: none

Other Comments: Note that this outfall was not listed in the July 25, 2024 renewal application update. A part C condition will be added for emergency overflows. This provision will apply to any non-stormwater discharges from Outfall 014.

Treatment Facility Summary	
Treatment Facility Name: Joseph A Berkley WTP	
WQM Permit No.	Issuance Date
0275209	Aug. 22, 1975
0278206	June 6, 1978
0278206-A1	May 10, 2018
0278206-A2	October 5, 2018
0278206-A3	October 20, 2020

Changes Since Last Permit Issuance: The lagoons on Davis Island were cleaned out and other lagoon modifications were completed by the end of 2021. Other modifications planned and permitted under WQM Part II permit 0278206-A3, including construction of a wastewater treatment plant on Neville Island have now been abandoned. A new WQM permit amendment application is pending, expected to include additional lagoon modifications and construction of a lift pump station on Davis Island to convey clarifier underflow to an interconnection with the ALCOSAN system in Stowe Township.

Other Comments: WVWA has been challenged to meet the process discharge effluent limitations in its permit since the last issuance, effective on June 1, 2019. This fact is illustrated in Table 1 below which details the exceedances at Outfall 004 for only the last year.

Compliance History	
Summary of DMRs:	The Department has received paper records and has retained records since July 2001. Electronic Discharge Monitoring Report (eDMR) records started in June 2012. In the prior permit term starting in June 2019 there have been hundreds of exceedances of process discharge effluent limitations and also exceedances of Part C condition benchmark at many of the stormwater outfalls.
Summary of Inspections:	One site inspection at this facility occurred during the previous permit term, on June 22, 2022 which resulted in two NOVs. The specific violations cited included: - o Violations of effluent limits in Part A of the permit. - o Failure to submit Corrective Action Plans for exceeding stormwater benchmarks in 2020 and 2021. In addition, an inspection comment was included: Facility has an active COA to address the permit exceedances. Benchmarks for stormwater outfalls have been exceeded. Have not received a CAP.

Other Comments: **A COA was executed on September 5, 2023, including a plan toward resolving the ongoing violations and exceedances.**

Compliance History

Table 1: Effluent Violations for Outfall 004, from: September 1, 2023 through July 31, 2024

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Total Suspended Solids	12/31/23	Avg Mo	37.0	mg/L	30.0	mg/L
Total Suspended Solids	04/30/24	Avg Mo	32.0	mg/L	30.0	mg/L
Total Aluminum	12/31/23	Avg Mo	4.7	mg/L	4.0	mg/L
Total Manganese	06/30/24	Avg Mo	15.5	mg/L	1.0	mg/L
Total Manganese	10/31/23	Avg Mo	3.2	mg/L	1.0	mg/L
Total Manganese	03/31/24	Avg Mo	3.3	mg/L	1.0	mg/L
Total Manganese	12/31/23	Avg Mo	1.7	mg/L	1.0	mg/L
Total Manganese	09/30/23	Avg Mo	18.1	mg/L	1.0	mg/L
Total Manganese	07/31/24	Avg Mo	4.7	mg/L	1.0	mg/L
Total Manganese	05/31/24	Avg Mo	2.6	mg/L	1.0	mg/L
Total Manganese	04/30/24	Avg Mo	9.1	mg/L	1.0	mg/L
Total Manganese	02/29/24	Avg Mo	1.8	mg/L	1.0	mg/L
Total Manganese	05/31/24	Daily Max	3.0	mg/L	2.0	mg/L
Total Manganese	07/31/24	Daily Max	7.6	mg/L	2.0	mg/L
Total Manganese	06/30/24	Daily Max	17.7	mg/L	2.0	mg/L
Total Manganese	03/31/24	Daily Max	3.5	mg/L	2.0	mg/L
Total Manganese	12/31/23	Daily Max	2.1	mg/L	2.0	mg/L
Total Manganese	04/30/24	Daily Max	14.0	mg/L	2.0	mg/L
Total Manganese	10/31/23	Daily Max	3.2	mg/L	2.0	mg/L
Total Manganese	09/30/23	Daily Max	27.5	mg/L	2.0	mg/L

Development of Effluent Limitations

Outfall No.	001, 002 and 004	Design Flow (MGD)	1.008
Latitude	40° 29' 18"	Longitude	-80° 04' 24"
Wastewater Description:	Stormwater and supernatant from sludge lagoons No. 1, 2 and/or discharge from Outfall 004 from the BFP liquid filtrate.		

Technology-Based Limitations

Federal involvement in the regulation of wastes from water treatment plants began with the enactment of the 1965 amendments to the Federal Water Pollution Control Act (PL 84-660). These amendments required states to initiate water quality standards for interstate waters and gave states additional authority to require control/treatment of wastes from sewage and industrial dischargers (including water treatment plants).

The primary objective of such technology-based effluent limitations (TBELs) is to decrease the total pollution load to all streams, while dealing equitably with discharges in a given class or category.

TBELs should not be looked at from the viewpoint of whether they will or will not protect water quality; rather they should be considered as the baseline for decreasing pollution with stricter requirements being imposed as needed to protect the water quality of a receiving stream.

The BWTP is not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code supplied for BWTP, 4941 ("Water Supply"), is not listed under 40 CFR parts 405 through 471.

Regulatory Effluent Standards and Monitoring Requirements

The pH effluent range for all Industrial waste process and non-process discharges pursuant of 25 Pa. Code § 92a.48(a)(2) and 25 Pa. Code § 95.2 is indicated in Table 2 below.

Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(d)(1); effluent standards for pH are also imposed on industrial wastes by 25 Pa. Code §§ 95.2(1). These limits are displayed in Table 2 below.

Pursuant to 25 Pa. Code § 95.2(4) effluent standards for industrial wastes may not contain more than 7 mg/L of dissolved iron as indicated in Table 2 below.

Pennsylvania regulations at 25 Pa. Code § 92a.48(b) require the imposition of technology-based TRC limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELGs or a facility-specific Best Professional Judgement (BPJ) evaluation which is displayed in Table 2 below.

Table 2. Regulatory Effluent Standards – Outfalls 001, 002 and 004

Parameter	Monthly Avg.	Daily Max	IMAX
Flow (MGD)	Monitor	Monitor	----
Iron, Dissolved	----	----	7.0 mg/L
pH (S.U.)	6-9 at all times	----	----
TRC	0.5 mg/L	----	1.6 mg/L

Total Dissolved Solids

Integral to the implementation of 25 Pa. Code § 95.10 is the principle that existing, authorized mass loadings of TDS are exempt from any treatment requirements under these provisions. Existing mass loadings of TDS up to and including the maximum daily discharge loading for any existing discharge, provided that the loading was authorized prior to August 21, 2010 are exempt. Discharge loadings of TDS authorized by the Department are typically exempt from the treatment requirements of Chapter 95.10 until the net TDS loading is increased, an existing discharge proposes a hydraulic expansion or a change in the waste stream. If there are existing mass or production-based TDS effluent limits, then these are used as the basis for the existing mass loading. The facility is not new or expanding waste loading of TDS, therefore, the BWTP facility is exempt from 25 Pa. Code § 95.10 treatment requirements.

Best Practicable Control Technology Currently Achievable (BPT)

BPT for wastewater from treatment of WTP sludges and filter backwash is found in DEPs Technology-Based Control Requirements for Water Treatment Plant Wastes Document which falls under BPJ under 40 CFR § 125.3 and the limits imposed are displayed in Table 3 below.

Table 3. BPT Limits for WTP BFP filtrate or Lagoon Supernatant Wastewater – Outfalls 001, 002 and 004

Parameter	Monthly Avg (mg/L)	Daily Max (mg/L)
Suspended solids	30.0	60.0
Iron (total)	2.0	4.0
Aluminum (total)	4.0	8.0
Manganese (total)	1.0	2.0
Flow	Monitor	----
pH	6-9 at all times	----
Total Residual Chlorine	0.5	1.0

Water Quality-Based Limitations

Total Maximum Daily Load (TMDL)

Wastewater discharges from BWTP are located within the Ohio River watershed. The Department has developed a TMDL for this watershed from Pittsburgh to the state border with Ohio. The TMDL was finalized on March 6, 2001. The TMDL applies only to discharges of PCBs and chlordane to the Ohio River and does not provide wasteload allocations (WLA) for either. The Ohio River TMDL is unique in that the pollutants of concern have been banned from production and use since 1979. In addition, the TMDL acknowledges that there are no longer any known point sources of either pollutant in the watershed and the TMDL is expected to achieve implementation through “natural attenuation.” Neither chlordane nor PCBs are used at BWTP; nor is there any evidence to suggest that PCBs and chlordane were ever used, generated, or stored onsite in the past. Based upon these considerations, effluent limitations from the Ohio River TMDL will not be applied to BWTP wastewater discharges.

The TMDLs for the Ohio River are summarized below in Table 4.

Table 4: Ohio River TMDL Summary

Pollutant	TMDL	WLA	LA	MOS
PCB	0.00442 lbs/day	0	0.00398 lbs/day	0.000442 lbs/day
Chlordane	0.0553 lbs/day	0	0.0497 lbs/day	0.00553 lbs/day

No limits from the Ohio River TMDL above have been imposed on BWTP

Toxics Screening Analysis – Procedures for Evaluating Reasonable Potential and Developing WQBELs

Pursuant to consideration of the Water Quality Based Effluent Limitations (WQBELs) at Outfalls 001, 002 and/or 004, water quality modeling was created following DEP’s procedures for evaluating reasonable potential which are as follows:

1. For IW discharges, the design flow used in the modeling is the average flow during production or operation and may be taken from the permit application.
2. All toxic pollutants with discharge concentrations reported in the permit application or on DMRs, are modeled and compared to the most stringent applicable water quality criterion as potential pollutants of concern. [This includes pollutants reported as “Not Detectable” or as “<MDL” where the method detection limit for the analytical method used by the applicant is greater than the most stringent water quality criterion]. The highest reported concentration is entered into the most recent version of the Department’s Toxics Management Spreadsheet (TMS) analysis (refer to Attachment B).
3. For any outfall with an applicable design flow, perform TMS modeling for all pollutants reported in the discharge. Use the maximum reported value from the application form or from DMRs as the input concentration for the TMS model.

4. Compare the actual WQBEL from TMS with the maximum concentration reported on DMRs or the permit application. Use WQN data or another source to establish the existing or background concentration for naturally occurring pollutants, but generally assume zero background concentration for non-naturally occurring pollutants
 - Establish limits in the draft permit where the maximum reported concentration equals or exceeds 50% of the WQBEL. Use the average monthly and maximum daily limits for the permit as recommended by TMS. In some cases, establish an IMAX limit at 2.5 times the average monthly limit.
 - For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.
 - For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10% - 50% of the WQBEL.

The information described above including the maximum reported discharge concentrations, the most stringent water quality criteria, the pollutant-of-concern (reasonable potential) determinations, the calculated WQBELs, and the WQBEL/monitoring recommendations are displayed in the results presentation from the TMS spreadsheet (refer to Attachment B).

Water Quality Modeling Programs

TMS, Version 1.4 is a single discharge, mass-balance water quality modeling program that includes consideration for mixing, first-order decay and other factors to determine recommended WQBELs for toxic substances and several non-toxic substances. Required input data including stream code, river mile index, elevation, drainage area, discharge name, NPDES permit number and discharge flow rate are entered into TMS to establish site-specific discharge conditions. Other data such as low flow yield, reach dimensions and partial mix factors may also be entered to further characterize the conditions of the discharge and receiving water. The modeling approach outlined above is used to determine if any pollutants are present or likely to be present in a discharge at levels that may cause, have the reasonable potential to cause, or contribute to excursions above state water quality standards (i.e., a reasonable potential analysis). Discharge concentrations for the selected pollutants are chosen to represent the "worst case" quality of the discharge (i.e., maximum reported discharge concentrations). TMS evaluates each pollutant by computing a Waste Load Allocation (WLA) for each applicable criterion and associated WQ objective, determining a recommended maximum WQBEL and comparing that recommended WQBEL with the input discharge concentration to determine which is more stringent. Based on this evaluation, TMS recommends average monthly and maximum daily WQBELs.

Reasonable Potential Analysis and WQBEL Development for Outfalls 001, 002 and 004

Table 4: TMS Inputs for Outfall 004

Parameter	Value
River Mile Index	35.50
Discharge Flow (MGD)	1.008
Basin/Stream Characteristics	
Parameter	Value
Area in Square Miles	19,500
Q ₇₋₁₀ (cfs)	2365
Low-flow yield (cfs/mi ²)	0.359
Elevation (ft)	710
Slope	0.001

WQBELs are calculated by TMS by allocating the established Water Quality (WQ) criteria for the receiving surface water from 25 PA Code § 93 and ORSANCO values. The criteria are then converted to a WQ objective. For metals with criteria established for its dissolved form, a translator is used to determine the criteria for the total metal which is then used as the WQ objective.

From this calculated objective for each pollutant concentration the discharge allocation is then reduced by available data of existing pollutant loads in the receiving waters using actual concentration data from instream monitoring. In this case, no upstream water quality data was available, so none was entered. The assumption of zero background concentration is therefore used for non-naturally occurring pollutants or where background data is insufficient to determine the background concentration.

The TMS model calculates and applies partial mixing factors for CFC, THH and CRL. The most limiting criteria is selected and, finally, WLAs are calculated for the IW discharger and compared to its reported discharge concentrations.

Note that the downstream public water intake on the Ohio River back channel for the municipal authority of Robinson Township is approximately 3.7 miles downstream

from these BWTP discharges, on the Ohio River back channel with a significant volume of water flow and the PWS intake is also downstream of a lock and dam. Both this distance, volume of water and the mixing inherent in the elevation drop at the dam is considered sufficient for PWS related pollutants (e.g. phenolics) to dissipate. Therefore, PWS data was not explicitly incorporated into the model.

Separate models were constructed for the “influent” samples and for the discharge (or outfall) samples. Some supplied discharge values were replaced with values from the electronic Discharge Monitoring Report (eDMR) values from the previous two years of the prior permit term. For both models, these TMS results included **no** recommended effluent limits and/or reporting requirements for the pollutants modeled. Only the TMS model results for the discharge model are included as Attachment B (Outfall 004). The “influent” results were generally less limiting. Note that for the modeling, some undetected parameters’ input values were set to the reported testing laboratory MDL. In some cases, sampling results may be set to the Department’s target Quantitation Limits (QLs) as specified in DEP’s most recent *Application for Permit to Discharge Industrial Wastewater*. The target QLs are the means by which DEP is implementing EPA’s September 18, 2014 revisions to 40 CFR Parts 122 and 136 requiring applicants and permittees to use “sufficiently sensitive” EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits. Despite this conservative modeling approach, **no** WQBELS were recommended by either of the models.

WQM 7.0 Model

The computer model WQM 7.0 is run to determine wasteload allocations and effluent limitations for CBOD₅, NH₃-N and Dissolved Oxygen for single and multiple point source discharge scenarios. In general, WQM 7.0 is run if the maximum BOD₅/CBOD₅ concentrations exceeds 30/25 mg/L respectively in the permit application or the DMRS. The permit application reported a peak BOD₅ concentration at Outfall 004 of 6.31 mg/L, but no CBOD₅ result was required for this type of permit renewal. As this industrial discharger does not approach the criteria requiring the use of the WQM 7.0 Model, no run was made, and no related effluent limitations imposed.

Total Residual Chlorine

To determine if WQBELs are required for discharges containing TRC, a discharge evaluation is performed using a DEP program called TRC_CALC created with Microsoft Excel for Windows. TRC_CALC calculates TRC Waste Load Allocations (WLAs) through the application of a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the program include flow rates and discharge chlorine demands for the receiving stream, the number of samples taken per month, coefficients of TRC variability, partial mix factors, and an optional factor of safety. The mass balance model calculates WLAs for acute and chronic criteria that are then converted to long term averages using calculated multipliers. The multipliers are functions of the number of samples taken per month and the TRC variability coefficients (normally kept at default values unless site specific information is available). The most stringent limitation between the acute and chronic long-term averages is converted to an average monthly limit for comparison to the BAT average monthly limit of 0.5 mg/L from 25 Pa. Code § 92a.48(b)(2). The more stringent of these average monthly TRC limitations is then proposed. The results of the modeling, included in Attachment C, indicate that BAT/BPJ are required for TRC. The more stringent of these average monthly TRC limitations is then proposed. The results of the modeling, included in Attachment C, indicate that AFC limits are required for TRC including an average monthly concentration of 0.500 mg/L and an instantaneous maximum concentration (IMAX) of 1.635 mg/L. This is imposed as 1.6 mg/L. Note that these limits are the same as the TBELs in Table 2.

Anti-Backsliding

Section 402(o) of the Clean Water Act (CWA), enacted in the Water Quality Act of 1987, establishes anti-backsliding rules governing two situations. The first situation occurs when a permittee seeks to revise a Technology-Based effluent limitation based on BPJ to reflect a subsequently promulgated effluent guideline which is less stringent. The second situation addressed by Section 402(o) arises when a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard or water quality standard. Previous limits can be used pursuant to EPA’s anti-backsliding regulation 40 CFR § 122.44 (l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued. Interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62). (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit. The facility has not sought to revise the previously permitted effluent limits. These prior limits are identical to the applicable TBELs as those shown in Table 3 above.

PFAS Monitoring

Per- and poly-fluoroalkyl substances (PFAS) have attracted widespread attention recently because of their characteristic bioaccumulation, toxicity, and wide dispersion in the environment. PFAS are a group of compounds used in a variety of industrial and consumer products such as surfactants for soil/stain resistance, textiles, paper and metals, firefighting foam, and pesticides. Humans are exposed to PFAS through contaminated drinking water, food, outdoor air, indoor dust, and soil.

On February 5, 2024, the Department updated their standard procedures to include a requirement for monitoring of selected PFAS related compounds. These include:

PFOA – perfluorooctanoic acid
PFOS – perfluorooctanesulfonic acid
PBFS – perfluorobutane sulfonate
HFPO-DA – hexafluoropropylene oxide – dimer acid

As part of the renewal application, WVWA included sampling for these compounds for their process discharges. At Outfall 004, for both influent and discharge sampling, of the PFAS compounds listed above, only PFOS was detected. For permittees that detect one or more of these compounds in their process water discharges, quarterly monitoring is required. No effluent limitations have been promulgated at this time. Further, if 4 consecutive samples result in no detections of these substances, further monitoring may be discontinued.

Effluent Limitations and Monitoring Requirements for Outfalls 001, 002 and 004

Effluent limits applicable at Outfalls 001, 002 and 004 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 4. The applicable limits and monitoring requirements provided below are based on those in Tables 2 and 3 of this Fact Sheet. Not shown in the table below is the quarterly monitoring for the PFAS related requirements noted above.

Table 4. Effluent limits and monitoring requirements for Outfalls 001, 002 and 004

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(b)
Total Residual Chlorine	—	—	0.5	1.0	—	25 Pa. Code § 92a.48(b)(2)
Total Suspended Solids	—	—	30.0	60	—	40 CFR § 125.3
Aluminum (total)	—	—	4.0	8.0	—	40 CFR § 125.3
Iron (total)	—	—	2.0	4.0	—	40 CFR § 125.3
Manganese (total)	—	—	1.0	2.0	—	40 CFR § 125.3
pH	Within the range of 6.0 to 9.0					40 CFR § 125.3 & 25 Pa. Code § 95.2(1)

Monitoring Frequency for Outfalls 001, 002 and 004

Monitoring requirements for BWTP are displayed in Table 5 are based on the previous permits monitoring requirements.

Table 5. Monitoring Requirements for Outfalls 001, 002 and 004

Parameter	Sample Type	Minimum Sample Frequency
Flow	Meter	2/Month
Total Residual Chlorine	Grab	2/Month
Total Suspended Solids	Grab	2/Month
Aluminum (total)	Grab	2/Month
Iron (total)	Grab	2/Month
Manganese (total)	Grab	2/Month
pH	Grab	2/Month

Effluent Limitation Compliance Schedule

Whenever the Department proposes the imposition of WQBELs on existing sources, the NPDES permit may include a schedule of compliance to achieve the WQBELs. Any compliance schedule contained in an NPDES permit must be an “enforceable sequence of actions or operations leading to compliance with the water quality-based effluent limitations (“WQBELs”). In accordance with 40 CFR 122.47(a)(3) and PA Code, Chapter 92a.51, compliance schedules that are longer than one year in duration must set forth interim requirements and dates for their achievement. In order to grant a compliance schedule in an NPDES permit, the permitting authority has to make a reasonable finding, adequately supported by the administrative record and described in the fact sheet, that a compliance schedule is “appropriate” and that compliance with the final WQBEL is required “as soon as possible”.

In this case, since no WQBELs have been proposed. The effluent limitations for Outfalls 001, 002 and/or 004 proposed are identical to those in the prior permit. Therefore, monitoring and the promulgated effluent limitations will become effective immediately after the permit’s effective date.

Development of Effluent Limitations

Outfall No.	011	Design Flow (MGD)	0.016
Latitude	40° 29' 35"	Longitude	-80° 04' 17"
Wastewater Description: Lab sink drains, floor drains and pump gland water (IW Process Effluent without ELG)			

Technology-Based Limitations

The BWTP is not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code supplied for BWTP, 4941 ("Water Supply"), is not listed under 40 CFR parts 405 through 471.

Regulatory Effluent Standards and Monitoring Requirements

The sections of the Commonwealth's code requiring flow monitoring, effluent standards for pH, effluent standards for dissolved iron, and the imposition of technology based TRC limits are displayed in Table 2.

BPT for wastewater from treatment of WTP sludges and filter backwash is found in DEPs Technology-Based Control Requirements for Water Treatment Plant Wastes Document which falls under BPJ under 40 CFR § 125.3 and the limits imposed are displayed in Table 3.

Water Quality-Based Limitations

Toxics Screening Analysis – Evaluating Reasonable Potential and Developing WQBELs

DEP's procedures for evaluating reasonable potential are detailed in an earlier section for Outfalls 001, 002 and 004. As before, both the "influent" and discharge concentrations were modeled separately.

The information related to WQBELs for this outfall including the maximum reported discharge concentrations, the most stringent water quality criteria, the pollutant-of-concern (reasonable potential) determinations, the calculated WQBELs, and the WQBEL/monitoring recommendations are presented in the TMS results outputs shown (Attachment D).

Reasonable Potential Analysis and WQBEL Development for Outfall 011

Table 6: TMS Inputs for Outfall 011

Parameter	Value
River Mile Index	35.60
Discharge Flow (MGD)	0.016
Basin/Stream Characteristics	
Parameter	Value
Area in Square Miles	19,500
Q ₇₋₁₀ (cfs)	2365
Low-flow yield (cfs/mi ²)	0.359
Elevation (ft)	710
Slope	0.001

The TMS model is run with the discharge and receiving stream characteristics shown in Table 6. Discharges from Outfall 011 are evaluated based on concentrations reported on the application and on eDMRs from the prior permit term. WQBELs are calculated using the TMS model by allocating the established Water Quality (WQ) criteria for the receiving surface water from 25 PA Code § 93 and ORSANCO values. These criteria are then converted to a WQ objective. For metals with criteria established for its dissolved form, a translator is used to determine the criteria for the total metal which is then used as the WQ objective.

From this calculated objective for each pollutant concentration the discharge allocation is then reduced by available data of existing pollutant loads in the receiving waters using actual concentration data from instream monitoring. In this case, no upstream water quality data was available, so none was entered. The assumption of zero background concentration is therefore used for non-naturally occurring pollutants or where background data is insufficient to determine the background concentration.

The TMS model calculates and applies partial mixing factors for CFC, THH and CRL. The most limiting criteria is selected and, finally, WLAs are calculated for the IW discharger and compared to its reported discharge concentrations.

Note that the downstream public water intake on the Ohio River main channel for the municipal authority of Moon Township is approximately 6.9 miles downstream from the BWTP discharge. Given that the Ohio River main channel has such a significant volume of water flow and public water intake is also downstream of a lock and dam. Both this distance, volume

of water and the mixing inherent in the elevation drop at the dam is considered sufficient for PWS related pollutants (e.g. phenolics) to dissipate. Therefore, PWS data was not explicitly incorporated into the model.

Separate models were constructed for the “influent” samples and for the discharge (or outfall) samples supplied for Outfall 011. Some supplied discharge values were replaced with values from the electronic Discharge Monitoring Report (eDMR) values from the prior permit term. Based on the recommendations of the TMS Analysis, the WQBELs and monitoring requirements shown in Table 7 are applicable at Outfall 011. Note that only results for the discharge model (Outfall 011) are presented in Attachment D as these were generally more limiting.

Note that some undetected parameters' input values were set to the reported testing laboratory MDL. In some cases, sampling results may be set to the Department's target Quantitation Limits (QLs) as specified in DEP's most recent *Application for Permit to Discharge Industrial Wastewater*. The target QLs are the means by which DEP is implementing EPA's September 18, 2014 revisions to 40 CFR Parts 122 and 136 requiring applicants and permittees to use “sufficiently sensitive” EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits.

Also included in Table 7 for reference are the target Quantitation Limits (QLs) specified in DEP's most recent *Application for Permit to Discharge Industrial Wastewater*. The target QLs are the means by which DEP is implementing EPA's September 18, 2014 revisions to 40 CFR Parts 122 and 136 requiring applicants and permittees to use “sufficiently sensitive” EPA-approved analytical methods that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria or permit limits.

Note that Outfall 011 shares the discharge piping with Outfall 012. Although only the Outfall 011 discharges of laboratory discharges require WQBELs, these same limits will be imposed on stormwater discharges if these are commingled together.

Table 7. Outfall 011 WQBELs and Monitoring Requirements (with Most Stringent Criteria and Target QLs)

Parameter	Concentration (µg/L)		Most Stringent Criterion (µg/L)	Target QL (µg/L)
	Monthly Avg	Maximum Daily		
Mercury	0.012	0.019	0.012	0.2

Note that this mercury limit, being below the Department's target QL, will be enforced at the QL, requiring that mercury not be detected in samples.

Total Maximum Daily Load (TMDL)

Wastewater discharges from BWTP are located within the Ohio River watershed. The Department has developed a TMDL for this watershed from Pittsburgh to the state border with Ohio. The TMDL was finalized on March 6, 2001. However, the TMDL applies only to discharges of PCBs and chlordane to the Ohio River and does not provide wasteload allocations (WLA) for either. The Ohio River TMDL is unique in that the pollutants of concern have been banned from production and use since 1979. In addition, the TMDL acknowledges that there are no longer any known point sources of either pollutant in the watershed and the TMDL is expected to achieve implementation through “natural attenuation.” Neither chlordane nor PCBs are used at BWTP; nor is there any evidence to suggest that PCBs and chlordane were ever used, generated, or stored onsite in the past. The TMDLs for the Ohio River are summarized above in Table 4. BWTP does not generate or discharge wastewaters containing PCBs or Chlordane; accordingly, the Ohio River TMDLs are not imposed on BWTP.

Total Residual Chlorine

To determine if WQBELs are required for discharges containing TRC, a discharge evaluation is performed using a DEP program called TRC_CALC created with Microsoft Excel for Windows. TRC_CALC calculates TRC Waste Load Allocations (WLAs) through the application of a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the program include flow rates and discharge chlorine demands for the receiving stream, the number of samples taken per month, coefficients of TRC variability, partial mix factors, and an optional factor of safety. The mass balance model calculates WLAs for acute and chronic criteria that are then converted to long term averages using calculated multipliers. The multipliers are functions of the number of samples taken per month and the TRC variability coefficients (normally kept at default values unless site specific information is available). The most stringent limitation between the acute and chronic long-term averages is converted to an average monthly limit for comparison to the BAT average monthly limit of 0.5 mg/L from 25 Pa. Code § 92a.48(b)(2). The more stringent of these

average monthly TRC limitations is then proposed. The results of the modeling, included in Attachment E, indicate that BAT/BPJ are required for TRC. The more stringent of these average monthly TRC limitations is then proposed. The results of the modeling, included in Attachment E, indicate that AFC limits are required for TRC including an average monthly concentration of 0.500 mg/L and an instantaneous maximum concentration (IMAX) of 1.635 mg/L. This is imposed as 1.6 mg/L. Note that these limits are the same as the TRC TBELs in Table 2.

Anti-Backsliding

Section 402(o) of the Clean Water Act (CWA), enacted in the Water Quality Act of 1987, establishes anti-backsliding rules governing two situations. The first situation occurs when a permittee seeks to revise a Technology-Based effluent limitation based on BPJ to reflect a subsequently promulgated effluent guideline which is less stringent. The second situation addressed by Section 402(o) arises when a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard or water quality standard. Previous limits can be used pursuant to EPA's anti-backsliding regulation 40 CFR § 122.44 (l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued. Interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62). (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit. The facility has not sought to revise the previously permitted effluent limits. These prior limits are identical to the applicable TBELs as those shown in Table 3 above.

PFAS Monitoring

Per- and poly-fluoroalkyl substances (PFAS) have attracted widespread attention recently because of their characteristic bioaccumulation, toxicity, and wide dispersion in the environment. PFAS are a group of compounds used in a variety of industrial and consumer products such as surfactants for soil/stain resistance, textiles, paper and metals, firefighting foam, and pesticides. Humans are exposed to PFAS through contaminated drinking water, food, outdoor air, indoor dust, and soil.

On February 5, 2024, the Department updated their standard procedures to include a requirement for monitoring of selected PFAS related compounds. These include:

- PFOA – perfluorooctanoic acid
- PFOS – perfluorooctanesulfonic acid
- PBFS – perfluorobutane sulfonate
- HFPO-DA – hexafluoropropylene oxide – dimer acid

As part of the renewal application, WVWA included sampling for these compounds for their process discharges. At Outfall 011, for both influent and discharge sampling, of the PFAS compounds listed above, only PFOS was detected. For permittees that detect one or more of these compounds in their process water discharges, quarterly monitoring is required. No effluent limitations have been promulgated at this time. Further, if 4 consecutive samples result in no detections of these substances, further monitoring may be discontinued.

Effluent Limitations and Monitoring Requirements for Outfall 011

Effluent limits applicable at Outfall 011 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 8. The applicable limits and monitoring requirements provided below are based on those listed in Tables 2, 3, and 7 of this Fact Sheet. The Instantaneous Maximum values have been converted to Daily Maximum values to be consistent with current practice and guidance.

Not shown in the table below is the quarterly monitoring for the PFAS related requirements noted above.

Table 8. Effluent limits and monitoring requirements for Outfall 011

Parameter	Mass (pounds)		Concentration (mg/L)			Basis
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Instant Maximum	
Flow (MGD)	Report	Report	—	—	—	25 Pa. Code § 92a.61(d)(1)
Total Residual Chlorine (TRC)	—	—	0.5	1.0	—	25 Pa. Code § 92a.48(b)
Total Suspended Solids (TSS)	—	—	30.0	60.0	—	40 CFR § 125.3
Iron (total)	—	—	2.0	4.0	—	40 CFR § 125.3
Aluminum (total)	—	—	4.0	8.0	—	40 CFR § 125.3
Manganese (total)	—	—	1.0	2.0	—	40 CFR § 125.3
Mercury	—	—	0.000012	0.000019	—	WQBELs, Reasonable Pot.
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Items displayed in bold in Table 8 are either new or more restrictive than effluent limits or monitoring enforced in WVWA's previous permit for BWTP. Prior to issuance of the draft of this renewal, a pre-draft survey will be issued in order to determine if the permittee believes current controls are sufficient to meet these new limits. The WVWA response and any comments will be considered before this renewal will be finalized.

Monitoring requirements are based on the previous permit's monitoring requirements for the facility which are displayed in Table 9 below. The newly added parameter has been set at a matching frequency.

Table 9. Monitoring Requirements for Outfalls 002 and 003

Parameter	Sample Type	Minimum Sample Frequency
Flow (MGD)	Meter	2/Month
TRC	Grab	2/Month
TSS	Grab	2/Month
Iron (total)	Grab	2/Month
Aluminum (total)	Grab	2/Month
Manganese (total)	Grab	2/Month
Mercury	Grab	2/Month
pH (S.U.)	Grab	2/Month

Effluent Limitation Compliance Schedule

Whenever the Department proposes the imposition of WQBELs on existing sources, the NPDES permit may include a schedule of compliance to achieve the WQBELs. Any compliance schedule contained in an NPDES permit must be an "enforceable sequence of actions or operations leading to compliance with the water quality-based effluent limitations ("WQBELs"). In accordance with 40 CFR 122.47(a)(3) and PA Code, Chapter 92a.51, compliance schedules that are longer than one year in duration must set forth interim requirements and dates for their achievement. In order to grant a compliance schedule in an NPDES permit, the permitting authority has to make a reasonable finding, adequately supported by the administrative record and described in the fact sheet, that a compliance schedule is "appropriate" and that compliance with the final WQBEL is required "as soon as possible".

In this case, the BWTP discharge is from their laboratory and the quantity discharged may be small enough to allow for non-discharge alternatives. As such, the Department has not established a compliance schedule for WVWA's next permit term. However, WVWA's response to the pre-draft survey letter and any other comments may cause reconsideration of this determination. As of now, following the permit effective date, the final permit limits will take effect.

Development of Effluent Limitations

Outfall No. 003, 005 – 010, 012 and 013
Latitude 40° 29' 27", 30" - 35"
Wastewater Description: Stormwater

Design Flow (MGD) 0
Longitude -80° 04' 30" – 17"

Storm Water Outfalls

The Department's policy for stormwater discharges is to either (1) require that the stormwater is uncontaminated, (2) impose "Monitor and Report", to establish effluent goals and require the permittee to submit a Stormwater Pollution Prevention Plan (SWPPP), or (3) impose effluent limits. In all cases, a storm water special condition is placed in the permit in Part C.

Stormwater effluent data reported in the application are compared to stream criteria, EPA's Multi-Sector General Permit "benchmark values", ELGs and other references while considering site specific conditions such as stream flow and location to determine if actual discharge concentrations of various pollutants in stormwater warrant further controls. If there is insufficient data available, or if pollutant levels are excessive, monitoring for specific pollutants and/or a SWPPP are required in the permit. Otherwise, the storm water outfalls are simply listed as discharge points. In either case, a special condition is added to the permit to include some of the key components of the Department's General Permit (PAG-03) for Discharges of Stormwater Associated with Industrial Activities.

In the last permit review, the stormwater data revealed values that were meaningfully elevated above benchmark values, but generally for a widely varying set of pollutants. An exception was made for Outfall 012 which was considered consistent with uncontaminated stormwater.

For this reason, the Department imposed "Monitor and Report" requirements to establish effluent goals. The parameters selected for monitoring were generally based on pollutants which exceeded Department benchmarks at least once among the stormwater outfall data supplied. A Part C requirement also required the permittee to submit a Stormwater Pollution Prevention Plan (SWPPP).

Armed now with the eDMR data from late 2019 through early 2024, a review of this data reveals a continuing need to monitor pollutants. At all of the monitored stormwater discharge points, different sample results exceeded their stormwater benchmarks at various times in the prior permit term, without exception. Given this result, monitoring will be continued and also will be imposed for Outfall 012, as well.

Please note that a Part C condition requires permittee action in the event of stormwater discharge concentration exceeding the benchmark values identified in Table 10 below:

Table 10: Pollutant Benchmarks Established for Stormwater

Parameter	Benchmark Value (mg/L) or as noted
pH	Between 6.0 and 9.0 S.U.
Biochemical Oxygen Demand (BOD5)	30.0
Chemical Oxygen Demand (COD)	120.0
Total Suspended Solids (TSS)	100.0
Oil and Grease	30.0
Nitrate-Nitrite as N	0.68
Aluminum, Total	0.75
Iron, Total	1.0

In the event that a parameter falls outside the benchmark repetitively at the same outfall for two or more consecutive monitoring periods, the permittee shall develop a Corrective Action Plan (CAP) to reduce the concentrations of the parameters in stormwater discharges. The permittee shall submit a copy of this CAP to DEP within 90 days of the end of the monitoring period triggering the need for the plan and shall implement the plan immediately upon submission or at a later time if authorized by the Department in writing.

As previously noted, a Notice of Violation (NOV) was issued to WVWA regarding non-compliance with this CAP provision after the onsite inspection conducted on June 22, 2022. This NOV was cleared for the Department after execution of the COA on September 5, 2023.

Therefore, monitoring will be continued at all of the BWTP stormwater outfalls on a semi-annual basis, for the next permit term. This data should be reviewed in the next renewal to determine if effluent limitations for stormwater discharges should be established.

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachments B and D)
☒	TRC Model Spreadsheet (see Attachments C and E)
☐	Temperature Model Spreadsheet
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☒	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☒	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: SOP for Clean Water Program New and Reissue IW and ISW Ind. NPDES Permit Applications, BPNPSM-PMT-001, Ver. 1.5, Oct. 11, 2013.
☐	Other:

Attachments

Attachment A: Drawing WVWA BWTP “NPDES Permit Outfall Locations”

Attachment B: TMS Modeling Results for Outfall 004, (and 001 and 002)

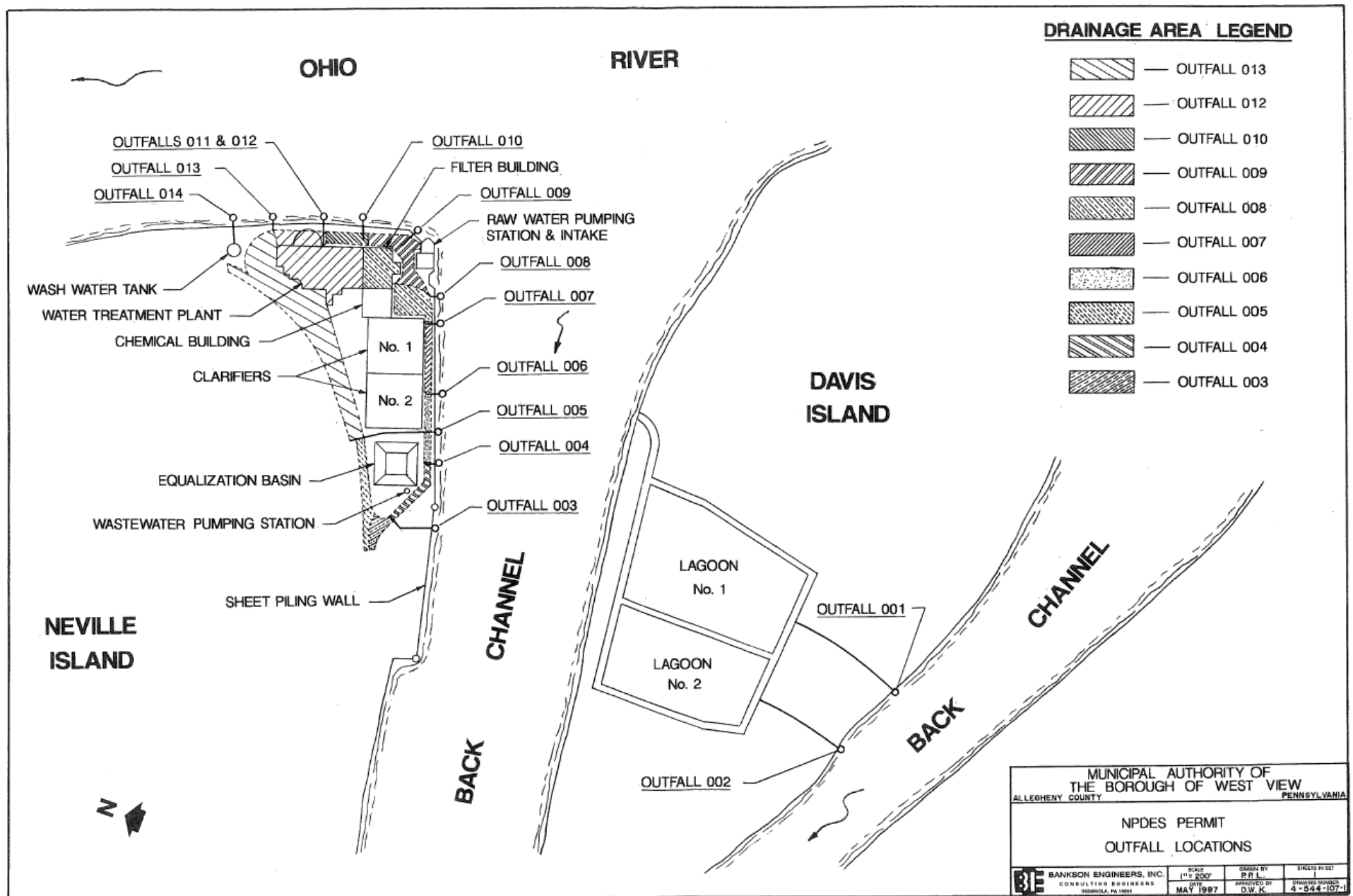
Attachment C: TRC Modeling Results for Outfalls 001, 002 (and 004)

Attachment D: TMS Modeling Results for Outfall 011

Attachment E: TRC Modeling Results for Outfall 011

ATTACHMENT A:

Drawing WVWA BWTP “NPDES Permit Outfall Locations”



ATTACHMENT B:

Toxics Management Spreadsheet Results for Outfall 004 for discharge of BFP filtrate.
(also representative of discharges of lagoon supernatant at Outfalls 001 and 002)

Inputs:



Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions

Discharge

Stream

CLEAR PROJECT

CLEAR FORM

CALCULATE

Facility: **WVWA J. A. Berkley WTP** NPDES Permit No.: **PA0217689** Outfall No.: **001/002/004**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **WTP Plant Filter Backwash - 004 Parametric**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q ₇₋₁₀	Q _h
1.008	100	7						

				0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc	Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L	600									
	Chloride (PWS)	mg/L	37.1									
	Bromide	mg/L	0.922									
	Sulfate (PWS)	mg/L	97.9									
	Fluoride (PWS)	mg/L	0.5									
Group 2	Total Aluminum	µg/L	10300									
	Total Antimony	µg/L	< 0.4									
	Total Arsenic	µg/L	< 10									
	Total Barium	µg/L	99									
	Total Beryllium	µg/L	< 0.4									
	Total Boron	µg/L	< 250									
	Total Cadmium	µg/L	< 0.4									
	Total Chromium (III)	µg/L	< 5									
	Hexavalent Chromium	µg/L	0.41									
	Total Cobalt	µg/L	< 1									
	Total Copper	mg/L	0.002									
	Free Cyanide	µg/L										
	Total Cyanide	µg/L	732									
	Dissolved Iron	µg/L	< 20									
	Total Iron	µg/L	10300									
	Total Lead	µg/L	< 1									
	Total Manganese	µg/L	39200									
	Total Mercury	µg/L	< 0.2									
	Total Nickel	µg/L	< 5									
	Total Phenols (Phenolics) (PWS)	µg/L	21									
	Total Selenium	µg/L	< 20									
	Total Silver	µg/L	< 5									
	Total Thallium	µg/L	26									
	Total Zinc	mg/L	0.009									
	Total Molybdenum	µg/L	< 5									



Stream / Surface Water Information

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

Instructions Discharge **Stream**

CLEAR FORM

CALCULATE

Receiving Surface Water Name: **Ohio River Back Channel**

No. Reaches to Model: **1**

- ☐ Statewide Criteria
☐ Great Lakes Criteria
☒ ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi ²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	032317	35.5	710	19500			Yes
End of Reach 1	032317	35.4	709.9	19501			Yes

Q₇₋₁₀

Location	RMI	LFY (cfs/mi ²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	35.5	0.1	2365			585	25					100	7		
End of Reach 1	35.4	0.1	2365												

Q_h

Location	RMI	LFY (cfs/mi ²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	35.5														
End of Reach 1	35.4														

Results:



Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ Recommended WQBELs & Monitoring Requirements

No. Samples/Month:

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			



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☒ Hydrodynamics

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
35.5	2,365		2,365	1.559	0.00019	25.	585.	23.4	0.162	0.038	272.316
35.4	2,365		2,365								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
35.5	6602.63		6602.63	1.559	0.00019	39.269	585.	14.897	0.287	0.021	138.445
35.4	6602.634		6602.63								



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ Wasteload Allocations

☒ AFC

CCT (min): 15

PMF: 0.235

Analysis Hardness (mg/l): 100

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	267,713	
Total Antimony	0	0		0	1,100	1,100	392,645	
Total Arsenic	0	0		0	340	340	121,363	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	7,495,951	
Total Boron	0	0		0	8,100	8,100	2,891,295	
Total Cadmium	0	0		0	2.014	2.13	761	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	569.763	1,803	643,598	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	5,816	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	33,910	
Total Copper	0	0		0	13.439	14.0	4,997	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	64.581	81.6	29,143	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	588	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.236	469	167,472	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.217	3.78	1,351	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	23,202	
Total Zinc	0	0		0	117.180	120	42,768	Chem Translator of 0.978 applied



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ CFC

CCT (min): 272.316

PMF: 1

Analysis Hardness (mg/l): 100

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	333,879	
Total Arsenic	0	0		0	150	150	227,645	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	6,222,292	
Total Boron	0	0		0	1,600	1,600	2,428,212	
Total Cadmium	0	0		0	0.246	0.27	411	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.115	86.2	130,789	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	15,776	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	28,835	
Total Copper	0	0		0	8.956	9.33	14,158	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	2,276,448	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.517	3.18	4,828	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	1,375	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.007	52.2	79,164	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	7,572	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	19,729	
Total Zinc	0	0		0	118.139	120	181,837	Chem Translator of 0.986 applied



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ THH

CCT (min): 272.316

PMF: 1

Analysis Hardness (mg/l): N/A

Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	1,000	1,000	1,517,632	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	8,499	
Total Arsenic	0	0		0	10	10.0	15,176	
Total Barium	0	0		0	1,000	1,000	1,517,632	
Total Boron	0	0		0	3,100	3,100	4,704,660	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	1,300	1,300	1,972,922	
Dissolved Iron	0	0		0	300	300	455,290	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	1,517,632	
Total Mercury	0	0		0	0.012	0.012	18.2	
Total Nickel	0	0		0	610	610	925,756	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	364	
Total Zinc	0	0		0	7,400	7,400	11,230,479	



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ CRL

CCT (min): 138.445

PMF: 1

Analysis Hardness (mg/l): N/A

Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	50	50.0	211,758	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 001/002/004

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☒ Other Pollutants without Limits or Monitoring

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., $\leq$ Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	1,518	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Aluminum	171,593	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	15,176	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Barium	1,517,632	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	1,853,204	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Cadmium	411	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Chromium (III)	130,789	µg/L	Discharge Conc $\leq$ 10% WQBEL
Hexavalent Chromium	3,728	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Cobalt	21,735	µg/L	Discharge Conc < TQL
Total Copper	3.2	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	455,290	µg/L	Discharge Conc < TQL
Total Iron	2,276,448	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Lead	4,828	µg/L	Discharge Conc < TQL
Total Manganese	1,517,632	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Mercury	0.012	µg/L	Discharge Conc < TQL
Total Nickel	79,164	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	7,572	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Silver	866	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Thallium	364	µg/L	Discharge Conc $\leq$ 10% WQBEL
Total Zinc	27.4	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

ATTACHMENT C:

TRC Modeling Results for Outfalls 001 and 002

(Results are also applied to Outfall 004 when used for discharge of BFP filtrate.)

TRC_CALC BWTP Outfalls 001 002 Final

TRC EVALUATION

BWTP Outfall 001, 002

2365	= Q stream (cfs)	0.5	= CV Daily	
1.008	= Q discharge (MGD)	0.5	= CV Hourly	
4	= no. samples	0.314	= AFC_Partial Mix Factor	
0.3	= Chlorine Demand of Stream	0.7	= CFC_Partial Mix Factor	
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)	
0.5	= BAT/BPJ Value	149.2	= CFC_Criteria Compliance Time (min)	
	= % Factor of Safety (FOS)		=Decay Coefficient (K)	
Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 151.934	1.3.2.iii	WLA cfc = 330.182
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 56.614	5.1d	LTA_cfc = 191.952
Source	Effluent Limit Calculations			
PENTOXSD TRG	5.1f	AML MULT = 1.720		
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.170		
WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)			
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)			
LTA_afc	wla_afc*LTAMULT_afc			
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)			
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)			
LTA_cfc	wla_cfc*LTAMULT_cfc			
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))			
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)			
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)			

ATTACHMENT D:
Toxics Management Spreadsheet Results for Outfall 011

Results:



Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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☒ All☐ Inputs☐ Results☐ Limits

☒ Recommended WQBELs & Monitoring Requirements

No. Samples/Month: 4

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			
Total Mercury	0.000002	0.000002	0.012	0.019	0.03	µg/L	0.012	THH	Discharge Conc ≥ 50% WQBEL (RP)



Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
35.6	2,365		2,365	0.025	0.00009	25.	585.	23.4	0.162	0.076	385.613
35.4	2,365		2,365								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
35.6	6602.63		6602.63	0.025	0.00009	39.276	585.	14.895	0.287	0.043	195.828
35.4	6602.634		6602.63								



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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☐ Limits

☒ Wasteload Allocations

☒ AFC

CCT (min): 15

PMF: 0.197

Analysis Hardness (mg/l): 100

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	14,134,313	
Total Antimony	0	0		0	1,100	1,100	20,730,325	
Total Arsenic	0	0		0	340	340	6,407,555	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	395,760,756	
Total Boron	0	0		0	8,100	8,100	152,650,577	
Total Cadmium	0	0		0	2.014	2.13	40,201	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	569.763	1,803	33,979,811	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	307,059	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	1,790,346	
Total Copper	0	0		0	13.439	14.0	263,823	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	64.581	81.6	1,538,663	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	31,040	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.236	469	8,841,938	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.217	3.78	71,320	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	1,224,974	
Total Zinc	0	0		0	117.180	120	2,258,030	Chem Translator of 0.978 applied



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

Instructions

Results

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☒ All

☐ Inputs

☐ Results

☐ Limits

☒ CFC

CCT (min): 385.613

PMF: 1

Analysis Hardness (mg/l): 100

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	21,020,744	
Total Arsenic	0	0		0	150	150	14,332,325	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	391,750,222	
Total Boron	0	0		0	1,600	1,600	152,878,135	
Total Cadmium	0	0		0	0.246	0.27	25,858	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.115	86.2	8,234,368	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	993,231	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	1,815,428	
Total Copper	0	0		0	8.956	9.33	891,366	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	143,323,252	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.517	3.18	303,997	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	86,556	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.007	52.2	4,984,117	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	476,708	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	1,242,135	
Total Zinc	0	0		0	118.139	120	11,448,319	Chem Translator of 0.986 applied



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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☒ THH

CCT (min): 385.613

PMF: 1

Analysis Hardness (mg/l): N/A

Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	1,000	1,000	95,548,835	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	535,073	
Total Arsenic	0	0		0	10	10.0	955,488	
Total Barium	0	0		0	1,000	1,000	95,548,835	
Total Boron	0	0		0	3,100	3,100	296,201,387	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	1,300	1,300	124,213,485	
Dissolved Iron	0	0		0	300	300	28,664,650	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	95,548,835	
Total Mercury	0	0		0	0.012	0.012	1,147	
Total Nickel	0	0		0	610	610	58,284,789	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	22,932	
Total Zinc	0	0		0	7,400	7,400	707,061,375	



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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☒ CRL

CCT (min): 195.828

PMF: 1

Analysis Hardness (mg/l): N/A

Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	50	50.0	13,337,627	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	



Model Results

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

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Results

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☒ All ☐ Inputs ☐ Results ☐ Limits

☒ Other Pollutants without Limits or Monitoring

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., $\leq$ Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	95,549	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Aluminum	9,059,524	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	955,488	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Barium	95,548,835	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	97,842,857	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Cadmium	25,768	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Chromium (III)	8,234,368	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Hexavalent Chromium	196,812	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Cobalt	1,147,540	μ g/L	Discharge Conc < TQL
Total Copper	169	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	28,664,650	μ g/L	Discharge Conc < TQL
Total Iron	143,323,252	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Lead	303,997	μ g/L	Discharge Conc < TQL
Total Manganese	95,548,835	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Nickel	4,984,117	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Phenols (Phenolics) (PWS)		μ g/L	PWS Not Applicable
Total Selenium	476,708	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Silver	45,713	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Thallium	22,932	μ g/L	Discharge Conc $\leq$ 10% WQBEL
Total Zinc	1,447	mg/L	Discharge Conc $\leq$ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Inputs:



Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

WVWA J. A. Berkley WTP, NPDES Permit No. PA0217689, Outfall 011

Instructions

Discharge

Stream

CLEAR FORM

CALCULATE

Receiving Surface Water Name: **Ohio River Back Channel**

No. Reaches to Model: **1**

- ☐ Statewide Criteria
☐ Great Lakes Criteria
☒ ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi ²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	032317	35.6	710	19500			Yes
End of Reach 1	032317	35.4	709.9	19501			Yes

Q₇₋₁₀

Location	RMI	LFY (cfs/mi ²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	35.6	0.1	2365			585	25					100	7		
End of Reach 1	35.4	0.1	2365												

Q_h

Location	RMI	LFY (cfs/mi ²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	35.6														
End of Reach 1	35.4														



Discharge Information

[Instructions](#)
[Discharge](#)
[Stream](#)

[CLEAR PROJECT](#)
[CLEAR FORM](#)
[CALCULATE](#)

Facility: **WVWA J. A. Berkley WTP**
 NPDES Permit No.: **PA0217689**
 Outfall No.: **011**

Evaluation Type: **Major Sewage / Industrial Waste**
 Wastewater Description: **WTP lab sink & floor drains and pump gland**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q ₇₋₁₀	Q _h
0.016	100	7						

	Discharge Pollutant	Units	Max Discharge Conc	0 if left blank		0.5 if left blank		0 if left blank		1 if left blank		
				Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L	2040									
	Chloride (PWS)	mg/L	50									
	Bromide	mg/L	< 0.07									
	Sulfate (PWS)	mg/L	91.6									
	Fluoride (PWS)	mg/L	0.462									
Group 2	Total Aluminum	µg/L	71									
	Total Antimony	µg/L	< 0.4									
	Total Arsenic	µg/L	< 10									
	Total Barium	µg/L	38									
	Total Beryllium	µg/L	< 0.4									
	Total Boron	µg/L	< 250									
	Total Cadmium	µg/L	< 0.4									
	Total Chromium (III)	µg/L	< 5									
	Hexavalent Chromium	µg/L	0.62									
	Total Cobalt	µg/L	< 1									
	Total Copper	mg/L	0.015									
	Free Cyanide	µg/L										
	Total Cyanide	µg/L	5									
	Dissolved Iron	µg/L	< 20									
	Total Iron	µg/L	74.7									
	Total Lead	µg/L	< 1									
	Total Manganese	µg/L	0.025									
	Total Mercury	µg/L	0.2									
	Total Nickel	µg/L	< 5									
	Total Phenols (Phenolics) (PWS)	µg/L	6									
	Total Selenium	µg/L	< 20									
	Total Silver	µg/L	< 5									
	Total Thallium	µg/L	< 10									
	Total Zinc	mg/L	12									
	Total Molybdenum	µg/L	5									

ATTACHMENT E:
TRC Modeling Results for Outfall 011

TRC_CALC BWTP Outfall 011 Final

TRC EVALUATION

BWTP Outfall 011

2365	= Q stream (cfs)	0.5	= CV Daily	
0.016	= Q discharge (MGD)	0.5	= CV Hourly	
4	= no. samples	0.315	= AFC_Partial Mix Factor	
0.3	= Chlorine Demand of Stream	0.7	= CFC_Partial Mix Factor	
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)	
0.5	= BAT/BPJ Value	150.8	= CFC_Criteria Compliance Time (min)	
	= % Factor of Safety (FOS)		=Decay Coefficient (K)	
Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 9601.143	1.3.2.iii	WLA cfc = 20800.775
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 3577.615	5.1d	LTA_cfc = 12092.595
Source	Effluent Limit Calculations			
PENTOXSD TRG	5.1f	AML MULT = 1.720		
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ	
		INST MAX LIMIT (mg/l) = 1.170		
WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)			
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)			
LTA_afc	wla_afc*LTAMULT_afc			
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)			
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)			
LTA_cfc	wla_cfc*LTAMULT_cfc			
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))			
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)			
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)			