pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0254843**
Facility Type	**Industrial**	APS ID	**1010534**
Major / Minor	**Minor**	Authorization ID	**1303966**

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

Applicant and Facility Information

Applicant Name	**West View Water Authority**	Facility Name	**Beaver County WTP**
Applicant Address	210 Perry Highway	Facility Address	210 Perry Highway
	Pittsburgh, PA 15229-1862		Pittsburgh, PA 15229-1862
Applicant Contact	Robert Christian	Facility Contact	Mark Valenty
Applicant Phone	(412) 931-3292	Facility Phone	(412) 931-3292
Client ID	62410	Site ID	784002
SIC Code	4941	Municipality	Baden Borough
SIC Description	Trans. & Utilities - Water Supply	County	Beaver
Date Application Received	January 29, 2020	EPA Waived?	Yes
Date Application Accepted	February 14, 2020	If No, Reason	

Purpose of Application: Renewal of NPDES Permit for the discharge of WTP treated wastewater

Summary of Review

The permittee submitted an NPDES permit renewal application to the Department on January 29, 2020. The application is for the discharges from the Beaver County Water Treatment Plant (BCWTP). The water plant has a rated capacity of 15 MGD and currently treats an average daily intake flow of 10 MGD, for processing and distribution of potable water. BCWTP's source of intake water is the Ohio River at the Baden River Water Intake Facility. The previous NPDES permit was issued by the Department's Safe Drinking Water program on June 25, 2015 and its term ran from July 1, 2015 to June 30, 2020. The permit has been administratively extended until this renewal is processed.

The West View Water Authority (WVWA) was created in 1942 and provides potable water service to a population of more than 175,000 in 27 municipalities in Allegheny, Beaver and Butler counties with the majority of this water produced at the Joseph A. Berkley WTP on Neville Island. This primary potable water supply has been recently supplemented with the use of the BCWTP which achieved full operation on January 7, 2020. BCWTP is a conventional type treatment plant, operating under PWS Permit No. 0414504-1A. BCWTP treatment consists of chemical feed, inline static mixer, flocculation, sedimentation, multimedia filtration, pH adjustment, fluoridation, chlorination and UV disinfection.

The multimedia filter backwash wastewater treatment equipment, permitted under WQM Part II permit **0414200**, issued June 5, 2015, consists of sludge lagoons, sludge thickeners, belt filter presses (BFPs) and a disk filter. The treated wastewater effluent then enters a newly installed drain line, travelling over a mile before discharge at Outfall 001. This treated wastewater discharge is the subject of this NPDES permit.

Most of the waste generated at BCWTP is produced during filter backwash and sludge withdrawal from the process sedimentation basins which flow to gravity thickening tanks. Sludge is collected from these tanks for processing in the BFP

Approve	Deny	Signatures	Date
X		John L Duryea, Jr., P.E. / Environmental Engineer	March 14, 2022
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	March 15, 2022

Summary of Review

Holding Tank. Next it is processed by the BFPs. BFP filtrate is returned to the gravity thickener tanks. Solids are collected and removed offsite for landfill disposal.

The wastewater generated at this plant consists of filter backwash water and supernatant from the gravity thickening tanks. These wastewater streams are collected into two earthen lagoons to allow the solids to settle. The effluent from these lagoons is then conveyed to a disk filter for suspended solids removal. Disk filter backwash is returned to the gravity thickener tanks. The filtrate from the disk filter is conveyed through the drain line toward discharge into Tevebau Run at Outfall 001. From there it enters a 360-foot-long culvert under the railroad right-of-way at the southern end of Norfolk Southern's Conway Railyard. This culvert empties into the Ohio River. Therefore, the point of first use was established in the original issuance of this permit as the Ohio River; at River Mile Index of 20.27 from the state line (961.1 from the mouth of the Ohio River near Cairo, IL).Figure 1 below shows a satellite image (from eMapPA) of the relative positions of the BCWTP and Outfall 001 (marked with an "X").

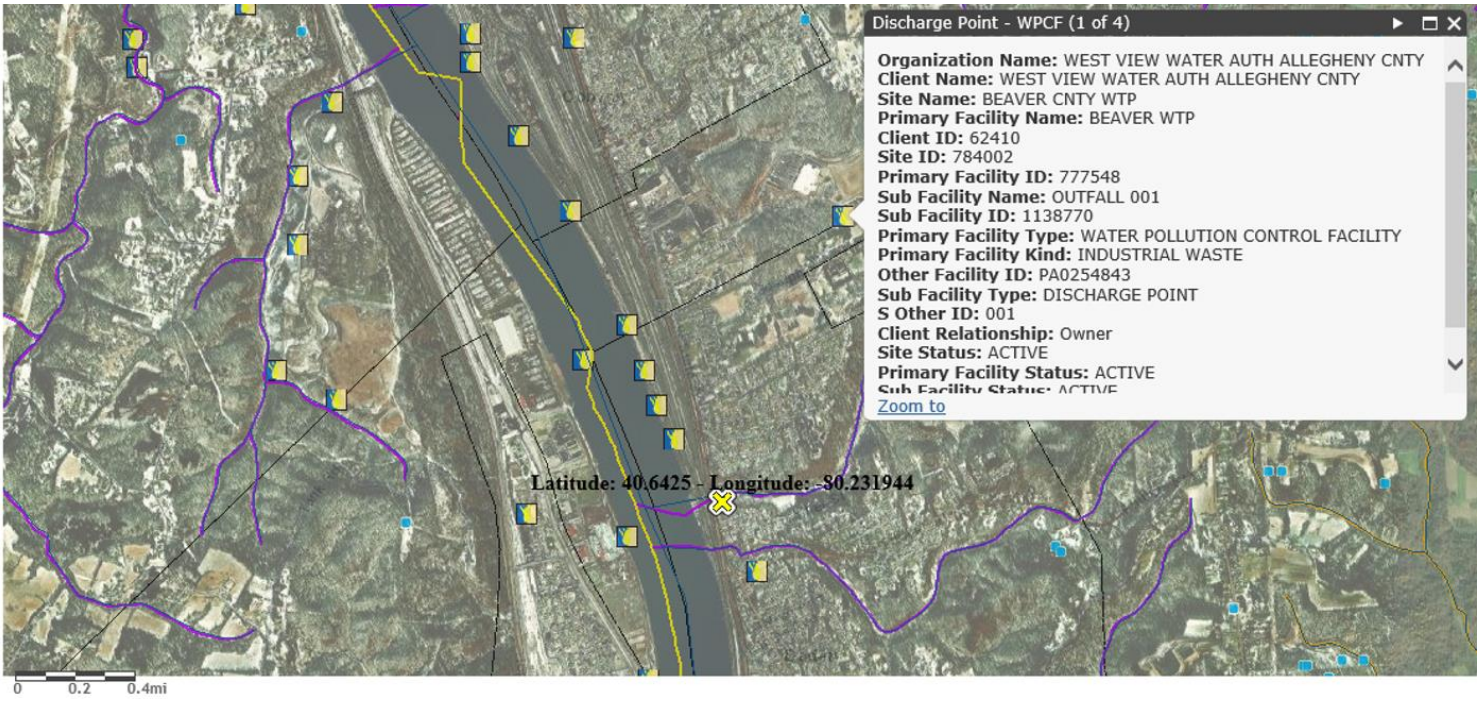

Figure 1: Satellite Image of the Beaver County WTP and Outfall 001 (marked with an "X")

As can be seen in Figure 1 above the BCWTP and Outfall 001 are separated by more than a mile, were it in a direct line. The distance of the drain line is in fact considerably farther, as the line is generally run along Tevebau Run, although in some cases, it is run along Tevebaugh Hollow Road. Figure 2 below shows an extract from a permittee supplied drawing, detailing the locations of the Baden River Water Intake Facility, BCWTP Outfall 001, Tevebau Run, a portion of the plant's drain line, the 360-foot-culvert and the Ohio River.

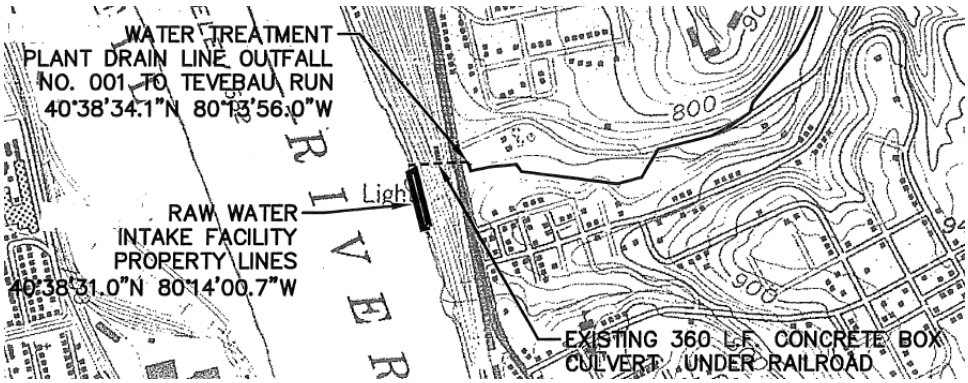

Figure 2: Excerpt from WVWA Drawing Showing the BCWTP Intake and Outfall 001

Summary of Review

As can be seen from Figure 2 above, Outfall 001 discharges to Tevebau Run in close proximity to the culvert entrance under the adjacent railyard. Immediately after passing through this culvert, Tevebau Run has its confluence with the Ohio River. Also shown is the Baden River Water Intake Facility which is just upstream of the Tevebau Run/Ohio River confluence point. Figure 3 below shows the Pennsylvania Water Quality Network, Station 902 and its proximity to the BCWTP site (on the Baden Borough/Economy Township line) and outfall.

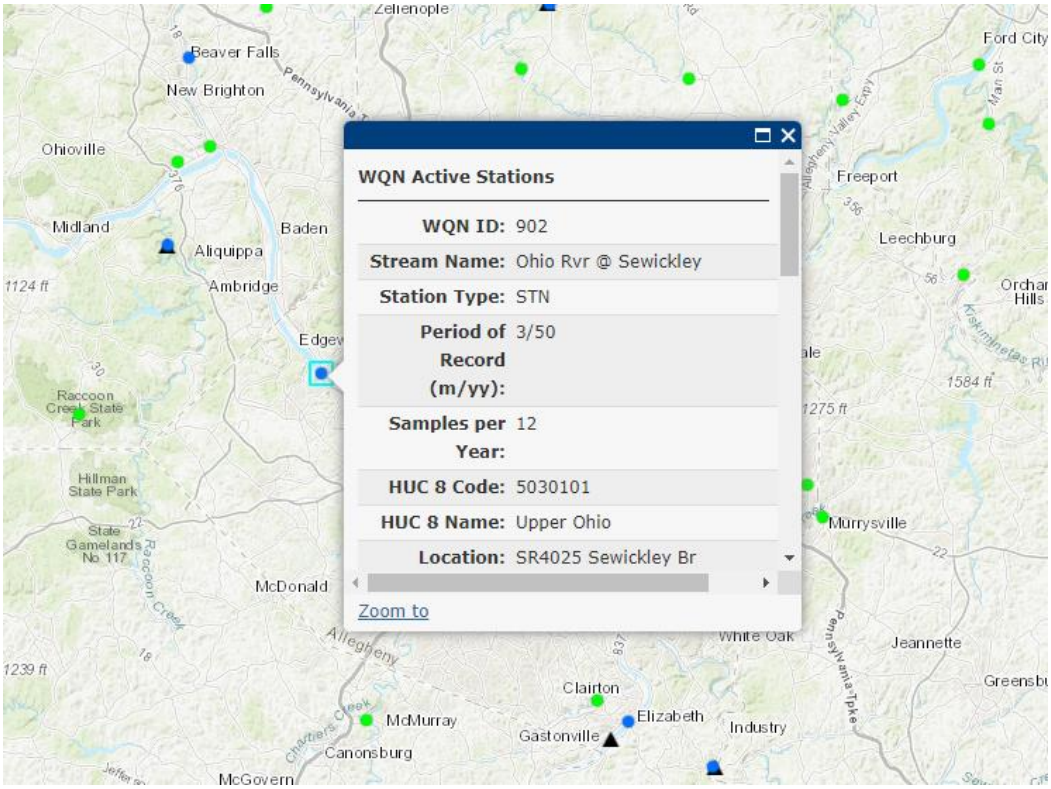

Figure 3: Water Quality Network Station 902 in Relation to Baden and the BCWTP

The applicant complied with Act 14.

A compliance check revealed a number of WVWA Effluent Limitation exceedances and related open violations in the Department's Clean Water Program at WVWA's Neville Island Facility. However, WVWA is working with the Department to gain compliance on these violations.

The prior Fact Sheet for this permit included a requirement for the permittee to submit sample results for the pollutants included in Modules 4 and 5 with their renewal submittal. This was also included as a Part C Condition in their permit. Although this additional information was not submitted with the renewal application, upon Department request, this information was received on February 17, 2022. This information was reviewed and none of the pollutants were detected in the three effluent samples taken and analyzed. Engineering judgement was exercised to determine that the reasonable potential analysis and WQBEL Development for the BCWTP discharge at Outfall 001 should not require reanalysis based on this input.

It is recommended that this permit be published as a draft for public comment.

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*,

Summary of Review
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)	1.08
Latitude	40° 38’ 34.1”	Longitude	-80° 13’ 56.0”
Quad Name	Baden	Quad Code	1304
Wastewater Description:	Filter backwash water and supernatant from sludge thickening tanks		
Receiving Waters	Tevebau Run	Stream Code	36581
NHD Com ID	99679792	RMI	0.189
Drainage Area	2.5 square miles	Yield (cfs/mi^2)	0.0092
Q_{7-10} Flow (cfs)	0.023	Q_{7-10} Basis	USGS
Elevation (ft)	710	Slope (ft/ft)	0.01
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	**Aquatic Life**	Existing Use Qualifier	None
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Attaining Use(s) WWF		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	N/A	Name	
Nearest Downstream Public Water Supply Intake	Center Township Water Authority		
PWS Waters	Ohio River	Flow at Intake (cfs)	5880
PWS RMI	954.0	Distance from Outfall (mi)	7.14 miles

Changes Since Last Permit Issuance: The site reported its first discharge in December 2018 and completed the plant’s initial startup in January 2020.

Other Comments: See graphic of watershed in Figure 4 below:

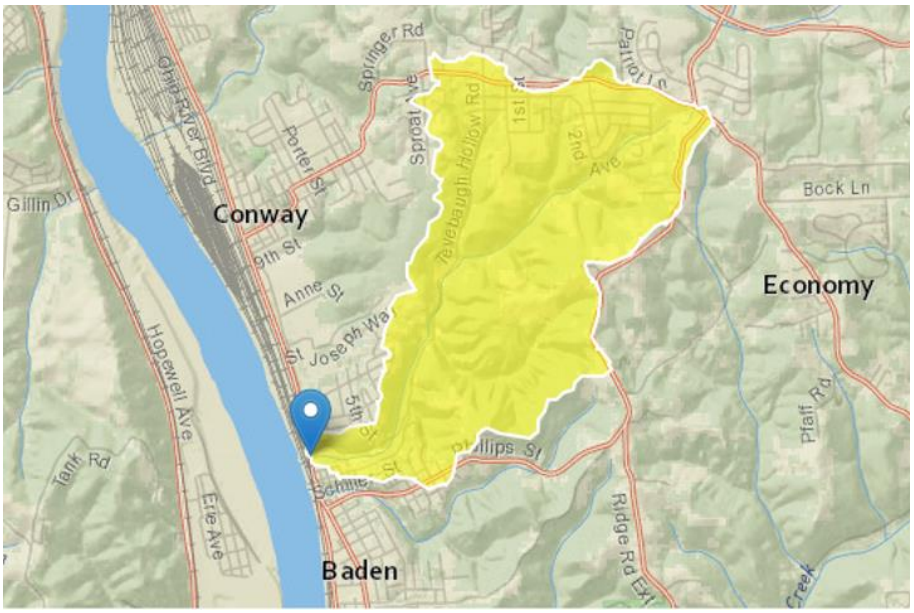

Figure 4: Tevebau Run Watershed from USGS StreamStats

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	1.08
Latitude	40º 38' 34.1"	Longitude	-80º 13' 56.0"
Quad Name	Baden	Quad Code	1304
Wastewater Description:	Filter backwash water and supernatant from sludge thickening tanks		

Receiving Waters	Ohio River (WWF)	Stream Code	32317
NHD Com ID	99680246	RMI	961.15 miles
Drainage Area	19600 Sq. Miles	Yield (cfs/mi^2)	0.241
Q_{7-10} Flow (cfs)	4730	Q_{7-10} Basis	ACOE, 2017
Elevation (ft)	683	Slope (ft/ft)	
Watershed No.	20-G	Chapter 93 Class.	WWF
Existing Use	**Aquatic Life**	Existing Use Qualifier	None
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	DIOXIN, PATHOGENS, POLYCHLORINATED BIPHENYLS (PCBs),		
Source(s) of Impairment	SOURCE UNKNOWN		
TMDL Status	**Final**	Name	**Ohio River TMDL**

Background/Ambient Data		Data Source
pH (SU)	7.5	Average of WQN 902 data from Oct. 1998 - June 2019
Hardness (mg/L)	100.465	Statistical Long Term Average (LTA) from WQN 902
Aluminum (mg/L)	0.3985	Statistical LTA from WQN 902, Dec. 2013 - June 2019
Iron (mg/L)	1.2808	Statistical LTA from WQN 902, Oct. 1998 - June 2019
Manganese (mg/L)	0.1795	Statistical LTA from WQN 902, Oct. 1998 - June 2019

Nearest Downstream Public Water Supply Intake		Center Township Water Authority	
PWS Waters	Ohio River	Flow at Intake (cfs)	5880
PWS RMI	954.0	Distance from Outfall (mi)	7.14

Changes Since Last Permit Issuance: The site reported its first discharge in December 2018 and completed the plant's initial startup in January 2020.

Other Comments: Consistent with the initial assessment and issuance of this permit, the discharge at Outfall 001 is to Tevebau Run just before the culvert entrance that passes under the Norfolk Southern Conway railyard. It continues to be considered that the first natural stream and aquatic life use of these waters is after it exits the culvert and enters the Ohio River.

Figure 5: Ohio River Watershed at Its Confluence with Tevebau Run from USGS StreamStats

Treatment Facility Summary				
Treatment Facility Name: Beaver County WTP				
WQM Permit No.	**Issuance Date**			
0414200	June 5, 2015			
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Industrial	Basic	Settling and filtration	Chlorination and UV	1.0008
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
	N/A	Not Overloaded	N/A	N/A

Changes Since Last Permit Issuance: BCWTP started full operation on January 7, 2020.

Other Comments: The process is illustrated below in Figure 6:

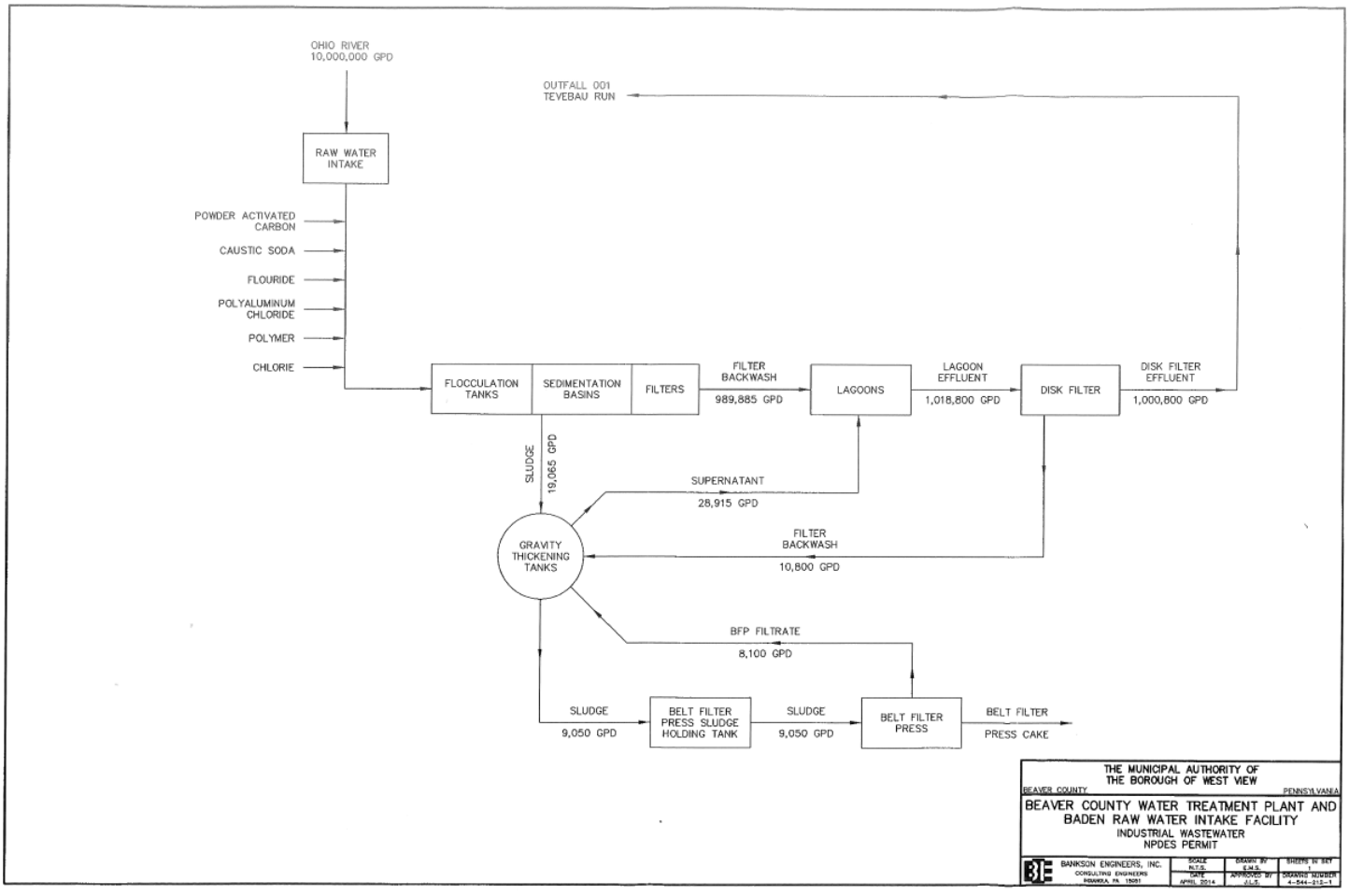

Figure 6: Process Flow Diagram for the Water and Wastewater Treatment at BCWTP

Compliance History

Table 1: DMR Data for Outfall 001 (from July 1, 2020 to June 30, 2021)

Parameter	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20
Flow (MGD) Average Monthly	0.845	0.775	0.912	0.878	0.961	0.900	0.792	0.828	0.834	0.962	1.008	0.966
Flow (MGD) Daily Maximum	0.904	0.950	0.959	0.936	0.986	0.936	0.806	0.850	0.928	1.08	1.008	1.01
pH (S.U.) Minimum	7.5	7.4	7.4	7.2	7.3	7.1	7.3	7.4	7.4	7.3	7.3	7.3
pH (S.U.) Maximum	7.5	7.5	7.5	7.4	7.4	7.3	7.4	7.5	7.5	7.3	7.6	7.5
TRC (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	0.1	0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRC (mg/L) Instantaneous Maximum	< 0.1	< 0.1	< 0.1	0.1	0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TSS (mg/L) Average Monthly	< 5.0	< 5.0	< 5.0	9	< 5.0	< 5	< 5.0	< 5.0	< 5.0	< 5	< 5	< 5
TSS (mg/L) Instantaneous Maximum	< 5.0	< 5.0	< 5.0	18	< 5.0	< 5	< 5.0	< 5.0	< 5.0	< 5	< 5	< 5
Total Aluminum (mg/L) Average Monthly	0.2	0.2	0.1	3.0	0.4	< 0.1	< 0.1	< 0.1	0.1	0.1	0.1	0.2
Total Aluminum (mg/L) Instantaneous Maximum	0.2	0.2	0.2	5.8	0.5	< 0.1	< 0.1	< 0.1	0.1	0.1	0.1	0.3
Total Iron (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	0.3	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Total Iron (mg/L) Instantaneous Maximum	< 0.1	< 0.1	< 0.1	0.6	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Total Manganese (mg/L) Average Monthly	0.5	0.5	0.4	0.3	0.1	0.2	0.1	0.1	0.2	0.4	0.9	**1.4**
Total Manganese (mg/L) Instantaneous Maximum	0.7	0.5	0.5	0.5	0.2	0.2	0.2	0.1	0.2	0.5	1.0	1.8

Compliance History	
Summary of DMRs:	The site reported its first discharge in December 2018. The site has had only one exceedance for manganese 2020, but no recorded violations. However, the trend is positive after the completion of the plant's initial startup in January 2020
Summary of Inspections:	An inspection was conducted on January 29, 2019. This inspection report identified no violations.

Other Comments:

Since the issuance of its renewed NPDES permit in May 2019, WVWA's Joseph A. Berkley WTP (PA0217689) has been challenged to meet some of its permit effluent limitations. A revision to an existing Consent Order and Agreement is being prepared to address these issues. In addition, the construction and operation of a permanent wastewater treatment plant was planned to be added to the Neville Island site. More recently, WVWA has communicated to the Department that it would prefer to modify the Davis Island lagoons and add an overflow discharge to ALCOSAN. The Department attorney involved in these discussions was consulted and based on the WVWA letter received on February 9, 2022 and the meeting held between the Department and WVWA on February 10, 2022, there were no objections to issuing the permit for the Beaver County WTP.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 1.08
Latitude 40º 39' 23" **Longitude** -80º 13' 27"
Wastewater Description: Filter backwash water and supernatant from sludge thickening tanks

Technology-Based Limitations

The WVWA BCWTP facility is not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code (4941) 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) as indicated 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.

Pursuant to 25 Pa. Code § 92a.48(b) the imposition of technology-based Total Residual Chlorine (TRC) limits for facilities that use chlorination and that are not already subject to TRC limits based on applicable federal ELG's or a facility specific BPJ evaluation as indicated in Table 2 below.

Table 2. Regulatory Effluent Standards

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 (TDS)

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. However, this facility is new, therefore, the facility is subject to 25 Pa. Code § 95.10 treatment requirements.

Best Practicable Control Technology Currently Achievable (BPT)

The Department's reference document *Technology-Based Control Requirements for Water Treatment Plant Wastes* (DEP-ID 362-2183-003) established BPT for discharges of WTPs wastewater, which are illustrated in Table 3 below.

Table 3. BPT Limits for WTP Filter Backwash Wastewater

Parameter	Monthly Avg. (mg/L)	Daily Max (mg/L)
Total Suspended Solids (TSS)	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 (S.U.)	6-9 at all times	
TRC	0.5	1.0

Water Quality-Based Limitations

Total Maximum Daily Load (TMDL)

Tevebau Run is not subject to a TMDL. However, as noted above, the point-of-first-use for aquatic life and for the other designated uses subsequent to this discharge at Outfall 001 is a segment of the Ohio River that is covered by a TMDL for PCBs, Chlordane and organics. However, there is no known history or documentation that indicates that BCWTP discharges any of these toxins or pathogenic pollutants. Therefore, a Part C condition will be added to prohibit discharge of these proscribed pollutants.

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

Pursuant to consideration of the Water Quality Based Effluent Limitations (WQBELs) at Outfall 001, 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 A).

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 TMS spreadsheet (refer to Attachment A).

Water Quality Modeling Programs

Toxics Management Spreadsheet Version 1.3 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 the BCWTP discharge at Outfall 001

Discharges from Outfall 001 were evaluated based on concentrations reported on the application. The TMS model was run for Outfall 001 using the modeled discharge and receiving stream characteristics shown in Table 4

Table 4: TMS Inputs

Parameter	Value
River Mile Index	961.15
Discharge Flow (MGD)	1.08
Basin/Stream Characteristics	
Parameter	**Value**
Area (mi^2)	19600
Q_{7-10} (cfs)	4,730
Low-flow yield (cfs/mi^2)	0.2413
Elevation (ft.)	683
Slope	0.0002

WQBELs are calculated by TMS by allocating the established Water Quality (WQ) criteria for the receiving surface water from 25 PA Code § 93. As Outfall 001 does not discharge directly to the Ohio River, ORSANCO criteria were not considered. 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, WQN 902 (located on the Sewickley Bridge) data was downloaded and used to calculate statistical LTAs and coefficients of variation (CVs) (where available) and were entered into the TMS to establish the existing or background concentration for naturally occurring pollutants. In contrast, the assumption of zero background concentration is 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 (Center Township Water Authority) was conservatively modeled as being at the downstream model node. The TMS model results did not recommend any additional effluent limits nor reporting requirements. These results are included as Attachment A.

WQM 7.0 Model

The computer model WQM 7.0 is run to determine wasteload allocations and effluent limitations for $CBOD_5$, NH_3-N and Dissolved Oxygen for single and multiple point source discharge scenarios. In general, WQM 7.0 is run if the maximum BOD_5/$CBOD_5$ concentrations exceeds 30/25 mg/L respectively in the permit application or the DMRs. The permit application reports a peak BOD_5 concentration as being undetectable with an MDL of 3 mg/L, and a peak COD concentration also undetectable at an MDL of 15 mg/L. 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 B, indicate that the BAT and BPJ, independently calculate are equivalent. Based on this the average monthly TRC limitations is proposed. The results of the modeling, included in Attachment B, indicate that AFC limits are required for TRC including an average monthly concentration of 0.500 mg/L (which matches the BAT value) and also calculated an instantaneous maximum concentration (IMAX) of 1.170 mg/L.

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 of 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 BCWTP facility is not seeking to revise the previously permitted effluent limits. Therefore, the prior permit values or those calculated in the previous sections whichever is more protective will be imposed.

Table 5: Effluent Limitations in Force for NPDES Permit PA0254843

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	2/month	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.0	2/month	Grab
TSS	XXX	XXX	XXX	30.0	XXX	60.0	2/month	Grab
Total Aluminum	XXX	XXX	XXX	4.0	XXX	8.0	2/month	Grab
Total Iron	XXX	XXX	XXX	2.0	XXX	4.0	2/month	Grab
Total Manganese	XXX	XXX	XXX	1.0	XXX	2.0	2/month	Grab

Effluent Limitations and Monitoring Requirements for Outfall 001

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 6 below. The applicable limits and monitoring requirements provided below are based on those listed in Tables 2, 3 and 5 of this Fact Sheet. The Instantaneous Maximum values have been converted to Daily Maximum values to be consisted with current practice and guidance. Note that some values were incorrectly labeled as IMAX values in the previous permit.

Table 6. Effluent limits and monitoring requirements for Outfall 001

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)
TRC	—	—	0.5	1.0	—	25 Pa. Code § 92a.48(b)
TSS	—	—	30.0	60.0	—	40 CFR § 125.3
Iron (total)	—	—	2.0	4.0	—	TBEL, 40 CFR 122.44
Aluminum (total)	—	—	4.0	8.0	—	TBEL, 40 CFR 122.44
Manganese (total)	—	—	1.0	2.0	—	TMDL
pH (S.U.)	Within the range of 6.0 to 9.0					25 Pa. Code § 95.2

Table 6 contains no new or more restrictive effluent limits or monitoring that differs from WVWA's previous permit for BCWFP. Monitoring requirements are based on the previous permit's monitoring requirements for the facility are displayed in Table 7 below.

Table 7. Monitoring Requirements for Outfall 001

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
pH (S.U.)	Grab	2/Month

Effluent Limitation Compliance Schedule

Whenever the Department proposes the imposition of water quality based effluent limitations 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, no new or more stringent Effluent Limitations have been proposed, so, the Department has not established a compliance schedule for WVWA's next permit term. Following the permit effective date, the final permit limits will take effect.

Tools and References Used to Develop Permit	
☐	WQM for Windows Model
☒	Toxics Management Spreadsheet (see Attachment A)
☒	TRC Model Spreadsheet (see Attachment B)
☐	Temperature Model Spreadsheet
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 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, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 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, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☒	Other: Technology-Based Control Requirements for Water Treatment Plant Wastes (DEP-ID 362-2183-003)

ATTACHMENTS

ATTACHMENT A: TOXICS MANAGEMENT SPREADSHEET

ATTACHMENT B: TRC MODELING SPREADSHEET

ATTACHMENT A

TOXICS MANAGEMENT SPREADSHEET

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Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

WVWA Beaver County WTP, NPDES Permit No. PA0254843, Outfall 001

Instructions | *Results* | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All | ○ Inputs | ○ Results | ○ Limits

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

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

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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., <= 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)	N/A	N/A	PWS Not Applicable
Total Aluminum	47,927	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	14,601	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	2,848,113	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	1,098,558	µg/L	Discharge Conc < TQL
Total Cadmium	289	µg/L	Discharge Conc < TQL
Total Chromium (III)	125,827	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	2,210	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	12,884	µg/L	Discharge Conc < TQL
Total Copper	1,899	µg/L	Discharge Conc < TQL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	438,015	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	622,065	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	4,645	µg/L	Discharge Conc < TQL
Total Manganese	1,198,151	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	73.0	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	63,631	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	Discharge Conc < TQL
Total Selenium	7,284	µg/L	Discharge Conc < TQL
Total Silver	513	µg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	350	µg/L	Discharge Conc < TQL
Total Zinc	16,250	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

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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)
961.03	4,730		4,730	1.671	0.00005	25.	1349.	53.96	0.14	0.762	2710.727
959.28	4,731		4,731								

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)
961.03	12100.89		12100.89	1.671	0.00005	37.792	1349.	35.695	0.237	0.45	1459.093
959.28	12103.13		12103.13								

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☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.074 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	398.5	1.1993		0	750	750	74,774	
Total Antimony	0	0		0	1,100	1,100	232,755	
Total Arsenic	0	0		0	340	340	71,943	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	4,443,513	
Total Boron	0	0		0	8,100	8,100	1,713,927	
Total Cadmium	0	0		0	2.014	2.13	451	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	569.763	1,803	381,518	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	3,448	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	20,102	
Total Copper	0	0		0	13.439	14.0	2,962	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1280.8	1.3907		0	N/A	N/A	N/A	
Total Lead	0	0		0	64.581	81.6	17,276	Chem Translator of 0.791 applied
Total Manganese	179.5	0.8644		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	349	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.236	469	99,275	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	801	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	13,754	
Total Zinc	0	0		0	117.180	120	25,353	Chem Translator of 0.978 applied

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☑ **CFC** CCT (min): 720 PMF: 0.515 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	398.5	1.1993		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	321,211	
Total Arsenic	0	0		0	150	150	219,008	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	5,986,209	
Total Boron	0	0		0	1,600	1,600	2,336,082	
Total Cadmium	0	0		0	0.246	0.27	395	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.115	86.2	125,827	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	15,177	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	27,741	
Total Copper	0	0		0	8.956	9.33	13,621	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	1280.8	1.3907		0	1,500	1,500	622,065	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.517	3.18	4,645	Chem Translator of 0.791 applied
Total Manganese	179.5	0.8644		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	1,323	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.007	52.2	76,161	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	7,284	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	18,981	
Total Zinc	0	0		0	118.139	120	174,938	Chem Translator of 0.986 applied

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☑ ***THH*** CCT (min): 720 PMF: 0.515 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	2,000	2,000	N/A	
Total Aluminum	398.5	1.1993		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	8,176	
Total Arsenic	0	0		0	10	10.0	14,601	
Total Barium	0	0		0	2,400	2,400	3,504,122	
Total Boron	0	0		0	3,100	3,100	4,526,158	
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	300	300	438,015	
Total Iron	1280.8	1.3907		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	179.5	0.8644		0	1,000	1,000	1,198,151	
Total Mercury	0	0		0	0.050	0.05	73.0	
Total Nickel	0	0		0	610	610	890,631	
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	350	
Total Zinc	0	0		0	N/A	N/A	N/A	

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Model Results

WVWA Beaver County WTP, NPDES Permit No. PA0254843, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☑ ***CRL*** CCT (min): 720 PMF: 0.702 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	398.5	1.1993		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	1280.8	1.3907		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	179.5	0.8644		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	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

ATTACHMENT B

TRC MODELING SPREADSHEET

TRC_CALC_externa BCWTP PA0254843 Run Outfall 001

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

4730	= Q stream (cfs)	0.5	= CV Daily
1.08	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 903.123	1.3.2.iii	WLA cfc = 880.467
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 336.525	5.1d	LTA_cfc = 511.862

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)**