pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0040177**
Facility Type	**Industrial**	APS ID	**1108892**
Major / Minor	**Minor**	Authorization ID	**1475774**

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

Applicant and Facility Information

Applicant Name	**Pennsylvania American Water**	Facility Name	**Brownsville WTP**
Applicant Address	1 Water Street	Facility Address	17th Street
	Camden, NJ 08102		Brownsville, PA 15417
Applicant Contact	Leah Shopene	Facility Contact	Daryl Conner
Applicant Phone	(412) 613-4885	Facility Phone	724-350-5419
Client ID	87712	Site ID	262080
SIC Code	4941	Municipality	Brownsville Borough
SIC Description	Trans. & Utilities - Water Supply	County	Fayette
Date Application Received	March 4, 2024	EPA Waived?	Yes
Date Application Accepted	March 6, 2024	If No, Reason	

Purpose of Application: NPDES permit renewal

Summary of Review

The Department received an NPDES permit application from Pennsylvania American Water for renewal coverage of the Brownsville Water Treatment Plant (WTP) on 3/4/2024. The prior permit was issued on 9/6/2019 with an effective date of 10/1/2019 and an expiration date of 9/30/2024.

The Brownsville WTP (plant pumping capacity rated at 3 MGD) purifies water obtained from the Monongahela River. The raw water has carbon added if needed for taste/odor control, then treated with coagulant, caustic soda, chlorine and sodium permanganate which then goes through a static mixer prior to entering the two flocculation & sedimentation basins. The water then goes through one of six filter beds. The filtered water then has caustic soda, phosphate and chlorine added as needed prior to entering the clearwell. From the clearwell the treated water is conveyed to the distribution system. Wastewaters generated at the facility are sedimentation basin sludge, filter backwash water, and filter-to-wastewater. Wastewater flows to a holding tank, is treated with sodium bisulfite for dechlorination, polymer is added for flocculation, and supernatant is then discharged via Outfall 001 to the Monongahela River. Sludge is disposed of by pumping to the Brownsville sewage treatment plant. A line drawing of the WTP wastewater stream is shown in Figure 1. The Monongahela River has a 25 PA Code Chapter 93 Warm Water Fishes designation and is impaired for polychlorinated biphenyls (PCBs) from an unknown source at the point of discharge.

Approve	Deny	Signatures	Date
x		Jace William Marsh / Environmental Engineering Specialist	July 23, 2024
X		Michael E. Fifth, P.E. / Environmental Engineer Manager	August 2, 2024

Summary of Review

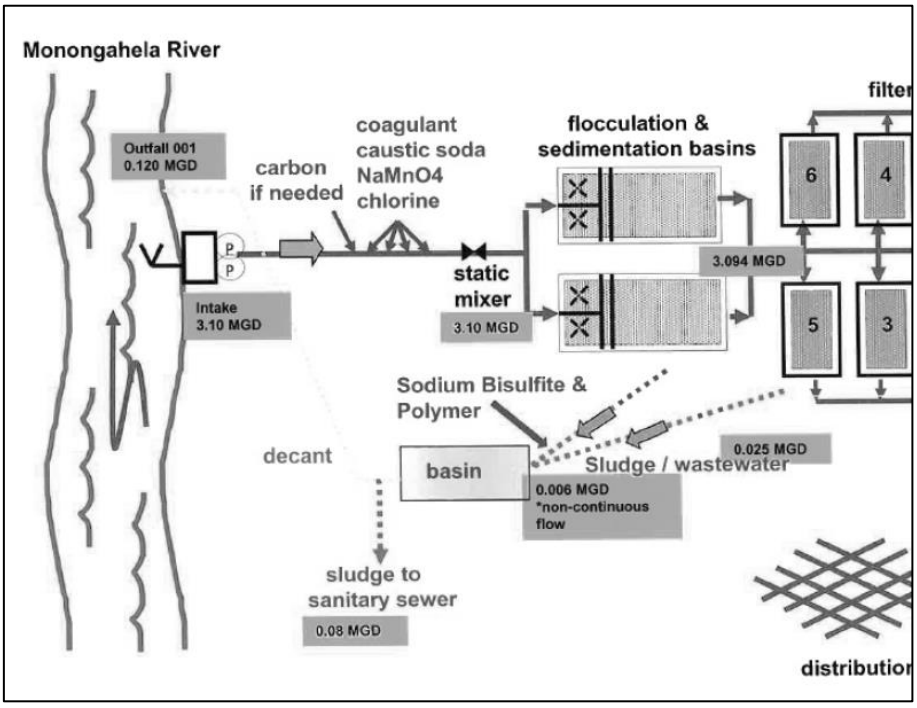

Figure 1. Brownsville WTP wastewater stream

The permittee has eight open violations at other facilities: four of which are at the Duquesne Sewage Treatment Plan in the Southwest Region with the remaining four at facilities in the Southeast Region. A NPDES compliance evaluation inspection was performed by Howard Dunn on 9/28/2021 with no violations noted. The permittee has not exceeded their current effluent limits in at least the past two years.

Effluent limits for Outfall 001 in the draft permit remain unchanged from the prior permit and originate from DEP Best Practicable Technology Currently Available (BPT) effluent limits for wastewater from treatment of WTP sludge and filter backwash.

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)	.090
Latitude	40º 01' 17.52"	Longitude	-79º 54' 24.93"
Quad Name	1806	Quad Code	California
Wastewater Description:	Treated supernatant from wastewater holding tank containing sedimentation basin sludge, filter backwash water, and filter-to-wastewater		
Receiving Waters	Monongahela River (WWF)	Stream Code	37185
NHD Com ID	99411736	RMI	57.5
Drainage Area	4980 mi^2	Yield (cfs/mi^2)	0.110
Q_{7-10} Flow (cfs)	550	Q_{7-10} Basis	USACE Q_{7-10} Flows
Elevation (ft)	744	Slope (ft/ft)	0.215 (mean basin slope)
Watershed No.	19-C	Chapter 93 Class.	WWF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	Potable Water Supply, Recreational	Exceptions to Criteria	n/a
Assessment Status	Impaired		
Cause(s) of Impairment	Polychlorinated Biphenyls (PCBs)		
Source(s) of Impairment	Source Unknown		
TMDL Status	n/a	Name	n/a
Nearest Downstream Public Water Supply Intake	Newell Municipal Authority		
PWS Waters	Monongahela River	Flow at Intake (cfs)	550
PWS RMI	52.93	Distance from Outfall (mi)	6.57

Changes Since Last Permit Issuance: no significant changes

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	.090
Latitude	40º 01' 17.52"	**Longitude**	-79º 54' 24.93"

Wastewater Description: Treated supernatant from wastewater holding tank containing sedimentation basin sludge, filter backwash water, and filter-to-wastewater

001.A. Technology-Based Effluent Limitations (TBEL)

Federal Effluent Limitation Guidelines

The Brownsville WTP is not subject to Federal Effluent Limitation Guidelines (ELGs).

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 1 below.

Flow monitoring is required pursuant to 25 Pa. Code § 92a.61(d)(1) as indicated in Table 1 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 1 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 1 below.

Table 1. Regulatory Effluent Standards

Parameter	Monthly Avg	Daily Max	Instantaneous Max
Flow (MGD)	Monitor	Monitor	----
Iron, Dissolved	----	----	7.0 mg/L
pH (S.U.)	Wastes must have a pH of not less than 6.0 nor greater than 9.0		
Total Residual Chlorine	0.5 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. The facility is not a new or expanding waste loading of TDS so is exempt from 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 shown in Table 2 below.

Table 2. BPT Limits for WTP Filter Backwash Wastewater

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

001.B. Water Quality-Based Effluent Limitations (WQBEL)

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are man-made chemicals, are resistant to heat, water and oil, and persist in the environment and the human body. PFAS are not found naturally in the environment, and can be found in air, soil, and water (both groundwater and surface water) They have been used to make cookware, carpets, clothing, fabrics for furniture, paper packaging for food, and other materials that are resistant to water, grease, or stains. They are also used in firefighting foams and in a number of industrial processes. DEP has decided it will not require PFAS monitoring for water treatment plant backwash discharges unless there is a treatment process in place specifically designed to remove PFAS from drinking water. This facility does not utilize a PFAS treatment process. PFAS sample data in Table 3 was provided with the application.

Table 3. PFAS sample data provided

Parameter	Concentration (ng/L)
PFOA	2.1
PFOS	0.74
PFBS	<0.28
HFPO-DA	<2.0

Toxics Management Spread Sheet

The Department of Environmental Protection has developed the DEP Toxics Management Spreadsheet (“TMS”) to facilitate calculations necessary for completing a reasonable potential (RP) analysis and determining water quality-based effluent limitations for discharges of toxic pollutants. The TMS is a macro-enabled Excel binary file that combines the functions of the PENTOXSD model and the Toxics Screening Analysis spreadsheet to evaluate the reasonable potential for discharges to cause excursions above water quality standards and to determine WQBELs. The TMS is a single discharge, mass-balance water quality calculation spread sheet 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, discharge flow rate and the discharge concentrations for parameters in the permit application or in DMRs, which are entered into the spread sheet 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. Discharge concentrations for the parameters are chosen to represent the "worst case" quality of the discharge (i.e., maximum reported discharge concentrations). The spread sheet then evaluates each parameter by computing a Waste Load Allocation for each applicable criterion, 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, the TMS recommends average monthly and maximum daily WQBELs.

Reasonable Potential Analysis and WQBEL Development for Outfall 001

Discharges from Outfall 001 are evaluated based on concentrations reported on the application and on DMRs; data from those sources are entered into the TMS. The maximum reported value of the parameters from the application form or from previous DMRs is used as the input concentration in the TMS. All toxic pollutants whose maximum concentrations, as reported in the permit application or on DMRs, are greater than the most stringent applicable water quality criterion are considered to be 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 TMS is run with the discharge and receiving stream characteristics shown in Table 4. Pollutants for which water quality standards have not been promulgated (e.g., TSS, oil and grease) are excluded from the analysis. All the parameters are evaluated using the model to determine the water quality-based effluent limits applicable to the discharge and the receiving stream. The spreadsheet then compares the reported discharge concentrations to the calculated water quality-based effluent limitations to determine if a reasonable potential exists to exceed the calculated WQBELs. Effluent limitations are established in the draft permit where a pollutant’s maximum reported discharge concentration equals or exceeds 50% of the WQBEL. For non-conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 25% - 50% of the WQBEL. For conservative pollutants, monitoring requirements are established where the maximum reported concentration is between 10% - 50% of the WQBEL.

The average discharge flow of 0.090 MGD was used. No WQBELs were recommended. The Output from the TMS is included in Attachment B.

Table 4. TMS Inputs for Outfall 001

Discharge Information	
Parameter	**Value**
River Mile Index	57.5
Discharge Flow (MGD)	0.090
Basin/Stream Information	
Parameter	**Value**
Drainage Area (mi^2)	4980
Q_{7-10} (cfs)	550
Low-flow yield (cfs/mi^2)	0.110
Elevation (ft)	744
Slope (ft/ft)	0.215

Total Residual Chlorine

To determine if WQBELs are required for discharges containing total residual chlorine (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 D, indicate that average monthly limits of 0.5 mg/L and daily maximum limits of 1.17 mg/L are required for TRC.

Table 5. TRC limits from TRC_CALC

Parameter	Monthly Avg (mg/L)	Daily Max (mg/L)
Total Residual Chlorine	0.5	1.17

001.C. Anti-Backsliding

Previous limits can be used pursuant to EPA's anti-backsliding regulation, 40 CFR 122.44(l), and are displayed below in Table 6.

Table 6. Effluent limitations from current permit

Parameter	Mass (pounds)		Concentration (mg/L)		Samples	
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	—	—	2/month	Measure
Total Residual Chlorine	—	—	0.5	1.0	2/month	Grab
Total Suspended Solids	—	—	30.0	60.0	2/month	Grab
Total Iron	—	—	2.0	4.0	2/month	Grab
Total Aluminum	—	—	4.0	8.0	2/month	Grab
Total Manganese	—	—	1.0	2.0	2/month	Grab
pH (S.U.)	—	—	6.0-9.0		2/month	Grab

001.D. Proposed Effluent Limitations and Monitoring Requirements

Effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in Table 7.

Table 7. Effluent limits and monitoring requirements for Outfall 001

Parameter	Mass (pounds)		Concentration (mg/L)		Samples	
	Average Monthly	Daily Maximum	Average Monthly	Daily Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	—	—	2/month	Measure
Total Residual Chlorine	—	—	0.5	1.0	2/month	Grab
Total Suspended Solids	—	—	30.0	60.0	2/month	Grab
Total Iron	—	—	2.0	4.0	2/month	Grab
Total Aluminum	—	—	4.0	8.0	2/month	Grab
Total Manganese	—	—	1.0	2.0	2/month	Grab
pH (S.U.)	—	—	6.0-9.0		2/month	Grab

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment B)
☒	TRC Model Spreadsheet (see Attachment C)
☐	Temperature Model Spreadsheet (see Attachment)
☐	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: Establishing Effluent Limits for Individual Industrial Permits (BCW-PMT-032)
☒	Other: USGS StreamStats (see Attachment A)

Attachment A:
USGS StreamStats at Point of Discharge

Brownsville WTP StreamStats Report

Region ID: PA
Workspace ID: PA20240718182506261000
Clicked Point (Latitude, Longitude): 40.02219, -79.90663
Time: 2024-07-18 14:25:38 -0400

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	12.1135	degrees
DRNAREA	Area that drains to a point on a stream	4980	square miles
ELEV	Mean Basin Elevation	1875	feet

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	4980	square miles	2.26	1400
ELEV	Mean Basin Elevation	1875	feet	1050	2580

Low-Flow Statistics Disclaimers [Low Flow Region 4]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [Low Flow Region 4]

Statistic	Value	Unit
7 Day 2 Year Low Flow	664	ft^3/s
30 Day 2 Year Low Flow	884	ft^3/s
7 Day 10 Year Low Flow	383	ft^3/s
30 Day 10 Year Low Flow	451	ft^3/s
90 Day 10 Year Low Flow	674	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Attachment B:
Toxics Management Spreadsheet

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: Brownsville WTP NPDES Permit No.: PA0040177 Outfall No.: 001

Evaluation Type: Major Sewage / Industrial Waste Wastewater Description: IW Process Effluent without ELG

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
0.09	66.2	7.2						

					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		141									
	Chloride (PWS)	mg/L		24.8									
	Bromide	mg/L	<	0.1									
	Sulfate (PWS)	mg/L		38.5									
	Fluoride (PWS)	mg/L	<	0.05									
Group 2	Total Aluminum	µg/L		184									
	Total Antimony	µg/L	<	0.5									
	Total Arsenic	µg/L	<	0.5									
	Total Barium	µg/L		29.3									
	Total Beryllium	µg/L	<	0.5									
	Total Boron	µg/L		58									
	Total Cadmium	µg/L		0.3									
	Total Chromium (III)	µg/L	<	0.5									
	Hexavalent Chromium	µg/L		3.2									
	Total Cobalt	µg/L		0.5									
	Total Copper	mg/L		0.0006									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L	<	10									
	Dissolved Iron	µg/L	<	20									
	Total Iron	µg/L		61.1									
	Total Lead	µg/L	<	0.2									
	Total Manganese	µg/L		100									
	Total Mercury	µg/L	<	0.1									
	Total Nickel	µg/L		1.1									
	Total Phenols (Phenolics) (PWS)	µg/L		5									
	Total Selenium	µg/L	<	0.5									
	Total Silver	µg/L	<	0.1									
	Total Thallium	µg/L	<	0.1									
	Total Zinc	mg/L		0.0281									
	Total Molybdenum	µg/L	<	0.5									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L	<										
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<											
	Di-n-Octyl Phthalate	µg/L	<											
	1,2-Diphenylhydrazine	µg/L	<											
	Fluoranthene	µg/L	<											
	Fluorene	µg/L	<											
	Hexachlorobenzene	µg/L	<											
	Hexachlorobutadiene	µg/L	<											
	Hexachlorocyclopentadiene	µg/L	<											
	Hexachloroethane	µg/L	<											
	Indeno(1,2,3-cd)Pyrene	µg/L	<											
	Isophorone	µg/L	<											
	Naphthalene	µg/L	<											
	Nitrobenzene	µg/L	<											
	n-Nitrosodimethylamine	µg/L	<											
	n-Nitrosodi-n-Propylamine	µg/L	<											
	n-Nitrosodiphenylamine	µg/L	<											
	Phenanthrene	µg/L	<											
	Pyrene	µg/L	<											
	1,2,4-Trichlorobenzene	µg/L	<											
Group 6	Aldrin	µg/L	<											
	alpha-BHC	µg/L	<											
	beta-BHC	µg/L	<											
	gamma-BHC	µg/L	<											
	delta BHC	µg/L	<											
	Chlordane	µg/L	<											
	4,4-DDT	µg/L	<											
	4,4-DDE	µg/L	<											
	4,4-DDD	µg/L	<											
	Dieldrin	µg/L	<											
	alpha-Endosulfan	µg/L	<											
	beta-Endosulfan	µg/L	<											
	Endosulfan Sulfate	µg/L	<											
	Endrin	µg/L	<											
	Endrin Aldehyde	µg/L	<											
	Heptachlor	µg/L	<											
	Heptachlor Epoxide	µg/L	<											
	PCB-1016	µg/L	<											
	PCB-1221	µg/L	<											
	PCB-1232	µg/L	<											
	PCB-1242	µg/L	<											
	PCB-1248	µg/L	<											
	PCB-1254	µg/L	<											
	PCB-1260	µg/L	<											
	PCBs, Total	µg/L	<											
	Toxaphene	µg/L	<											
	2,3,7,8-TCDD	ng/L	<											
Group 7	Gross Alpha	pCi/L												
	Total Beta	pCi/L	<											
	Radium 226/228	pCi/L	<											
	Total Strontium	µg/L	<											
	Total Uranium	µg/L	<											
	Osmotic Pressure	mOs/kg												

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Monongahela River**

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	037185	57.5	744	4980			Yes
End of Reach 1	037185	56.6	743	4981			Yes

$Q_{7\text{-}10}$

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	57.5	0.11	550									100	7		
End of Reach 1	56.6	0.11	550												

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	57.5														
End of Reach 1	56.6														

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

☐ *Hydrodynamics*

☑ *Wasteload Allocations*

☑ *AFC* CCT (min): 15 PMF: 0.030 Analysis Hardness (mg/l): 99.721 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	90,784	
Total Antimony	0	0		0	1,100	1,100	133,151	
Total Arsenic	0	0		0	340	340	41,156	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	2,541,964	
Total Boron	0	0		0	8,100	8,100	980,472	
Total Cadmium	0	0		0	2.008	2.13	257	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	568.460	1,799	217,752	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	1,972	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	11,499	
Total Copper	0	0		0	13.404	14.0	1,690	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	64.385	81.4	9,848	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	199	Chem Translator of 0.85 applied
Total Nickel	0	0		0	467.129	468	56,657	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	3.201	3.77	456	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	7,868	
Total Zinc	0	0		0	116.903	120	14,469	Chem Translator of 0.978 applied

☑ *CFC* CCT (min): 720 PMF: 0.211 Analysis Hardness (mg/l): 99.959 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	183,195	
Total Arsenic	0	0		0	150	150	124,905	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	3,414,081	
Total Boron	0	0		0	1,600	1,600	1,332,324	
Total Cadmium	0	0		0	0.246	0.27	225	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.090	86.2	71,738	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	8,656	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	15,821	
Total Copper	0	0		0	8.953	9.33	7,766	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	5,926,947	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.516	3.18	2,648	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	754	Chem Translator of 0.85 applied
Total Nickel	0	0		0	51.989	52.1	43,421	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	4,154	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	10,825	
Total Zinc	0	0		0	118.098	120	99,737	Chem Translator of 0.986 applied

☑ *THH* CCT (min): 720 PMF: 0.211 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	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	4,663	
Total Arsenic	0	0		0	10	10.0	8,327	
Total Barium	0	0		0	2,400	2,400	1,998,486	
Total Boron	0	0		0	3,100	3,100	2,581,378	
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	249,811	
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	832,703	
Total Mercury	0	0		0	0.050	0.05	41.6	
Total Nickel	0	0		0	610	610	507,949	
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	200	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ *CRL* CCT (min): 720 PMF: 0.314 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	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	

☑ ***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			

☑ ***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	Discharge Conc < TQL
Total Aluminum	58,189	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	1,629,297	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	628,443	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	165	µg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	71,738	µg/L	Discharge Conc < TQL
Hexavalent Chromium	1,264	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	7,371	µg/L	Discharge Conc ≤ 10% WQBEL
Total Copper	1.08	mg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	249,811	µg/L	Discharge Conc < TQL
Total Iron	5,926,947	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	2,648	µg/L	Discharge Conc < TQL
Total Manganese	832,703	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	41.6	µg/L	Discharge Conc < TQL
Total Nickel	36,315	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	4,154	µg/L	Discharge Conc < TQL
Total Silver	292	µg/L	Discharge Conc < TQL
Total Thallium	200	µg/L	Discharge Conc < TQL
Total Zinc	9.27	mg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Attachment C:
TRC Model Spreadsheet

TRC EVALUATION

550	= Q stream (cfs)	0.5	= CV Daily
0.09	= Q discharge (MGD)	0.5	= CV Hourly
4	= no. samples	0.995	= 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)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 1253.863	1.3.2.iii	WLA cfc = 1228.554
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 467.219	5.1d	LTA_cfc = 714.223

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)**