pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TotSouthwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0096971**
Facility Type	**Industrial**	APS ID	**1109288**
Major / Minor	**Minor**	Authorization ID	**1476519**

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

Applicant and Facility Information

Applicant Name	**West Carroll Township Water & Sewer Authority**	Facility Name	**Bakerton WTP**
Applicant Address	PO Box 328	Facility Address	191 Mitchel Road
	Elmora, PA 15737-0328		Bakerton, PA 15737-0374
Applicant Contact	Monica Lantzy	Facility Contact	Same as applicant
Applicant Phone	(814) 948-4052	Facility Phone	Same as applicant
Client ID	39428	Site ID	248030
SIC Code	4941	Municipality	West Carroll Township
SIC Description	Trans. & Utilities - Water Supply	County	Cambria
Date Application Received	March 6, 2024	EPA Waived?	Yes
Date Application Accepted	March 12, 2024	If No, Reason	

Purpose of Application: Renewal of NPDES Permit Coverage

Summary of Review

The Department received an NPDES permit renewal application from West Carroll Water & Sewer Authority on March 6, 2024 for coverage of its Bakerton Water Treatment Facility.

The site is a public water supply water treatment plant. The water source for the system is the Bakerton Reservoir at the head of the West Branch of the Susquehanna River. The raw water line is conveyed through a basket strainer and is then pretreated with liquid sodium hypochlorite, alum-based coagulant, and potassium or sodium permanganate for iron and manganese removal. After mixing, the water is conveyed to a flocculation tank, then to a clarifier and then to the membrane filtration system. The system is designed to make up to 0.15 MGD of potable water. Following the membrane filtration, the water will be conveyed to an 18,670-gallon concrete chlorine contact tank. Wastewater is generated when the membrane filters are backwashed. The backwash wastewater is conveyed to two setting basins in series prior to discharging via Outfall 001 to an unnamed tributary to the West Branch Susquehanna River, designated in 25 PA Code Chapter 93 as a Warm Water Fishery.

Approve	Deny	Signatures	Date
X		Jamie Ley Jamie Ley / Environmental Engineering Specialist	June 18, 2024
X		Michael E. Fifth Michael E. Fifth, P.E. / Environmental Engineer Manager	June 29, 2024

Summary of Review

Figure 1 - Aerial Image (Google Earth Imagery Dated March 2024)

The facility was inspected three (3) times during the current permit cycle:

PERMIT	FACILITY NAME	INSP REGION	COUNTY	MUNICIPALITY	INSP ID	INSP CATEGORY	INSPECTED DATE	INSP TYPE
PA0096971	BAKERTON WTP	SWRO	Cambria	West Carroll Twp	3049807	PF	03/12/2020	Compliance Evaluation
PA0096971	BAKERTON WTP	SWRO	Cambria	West Carroll Twp	3292761	PF	12/09/2021	Follow-up Inspection
PA0096971	BAKERTON WTP	SWRO	Cambria	West Carroll Twp	3292768	PF	12/09/2021	Administrative/File Review

The following violations were noted:

PERMIT	FACILITY	INSP REGION	COUNTY	MUNICIPALITY	VIOL ID	VIOLATION DATE	VIOLATION TYPE	VIOLATION TYPE DESC	RESOLVED DATE
PA0096971	BAKERTON WTP	SWRO	Cambria	West Carroll Twp	887708	03/12/2020	92A.44	NPDES - Violation of effluent limits in Part A of permit	03/12/2020
PA0096971	BAKERTON WTP	SWRO	Cambria	West Carroll Twp	938647	12/09/2021	92A.46	NPDES - Violation of Part C permit condition(s)	12/09/2021

The permittee currently has no open violations.

The inspection reports from the March 2020 and December 2021 inspections noted the operator stated that the effluent violations reported by the facility occurred when there was heavy rain. During the fall of 2023, a project was completed at the facility to address inflow and infiltration issues occurring at some of the pipes between the facility and Outfall 001. Since that time, the average flow during production/operation has been approximately 0.004 MGD as opposed to the 0.025 MGD reported in the renewal application.

Draft Permit issuance is recommended.

Summary of Review
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)	0.050
Latitude	40º 35' 28"	Longitude	-78º 43' 48"
Quad Name	Carrolltown	Quad Code	1416
Wastewater Description:	IW Process Effluent without ELG		

Receiving Waters	West Branch Susquehanna River	Stream Code	27279
NHD Com ID	61838291	RMI	0.34
Drainage Area	0.87	Yield (cfs/mi^2)	0.048
Q_{7-10} Flow (cfs)	0.0418	Q_{7-10} Basis	USGS Streamstats
Elevation (ft)	1788	Slope (ft/ft)	0.001
Watershed No.	8-B	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	West Branch Susquehanna

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>50 miles

Changes Since Last Permit Issuance:

Other Comments:

Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	0.05
Latitude	40º 35' 28"	**Longitude**	-78º 43' 48"

Wastewater Description: Filter Backwash Wastewater

Technology-Based Limitations

The Bakerton WTP is not subject to Federal Effluent Limitation Guidelines (ELGs) as the SIC code is not listed under 40 CFR parts 405 through 471.

Regulatory Effluent Standards and Monitoring Requirements

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

Effluent standards for pH are also imposed on industrial wastes by 25 Pa. Code §§ 95.2(1) which is displayed in Table 1 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 BPJ evaluation which is displayed in Table 1 below.

Table 1. Regulatory Effluent Standards

Parameter	Monthly Avg	Daily Max	IMAX
Flow	Monitor	Monitor	----
pH	6-9 at all times		----
TRC	0.5 mg/l	----	1.6 mg/l

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 Best Professional Judgement under 40 CFR § 125.3 and the limits imposed are displayed in Table 2 below.

Table 2. BPT Limits for WTP sludge and filter backwash wastewater

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

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. The facility is not new or expanding waste loading of TDS, therefore, the facility is exempt from 25 Pa. Code § 95.10 treatment requirements.

Water Quality-Based Limitations

Toxics Management Spread Sheet

The Department of Environmental Protection (DEP) 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 Toxics Management Spreadsheet 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 Toxics Management Spread Sheet 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 Toxics Management Spread sheet 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 Toxics Management Spread Sheet. The maximum reported value of the parameters from the application form or from previous DMRs is used as the input concentration in the Toxics Management Spread Sheet. 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 Toxics Management Spread Sheet is run with the discharge and receiving stream characteristics shown in Table 3.

Table 3: TMS Inputs for Outfall 001

Parameter	**Value**
River Mile Index	0.34
Discharge Flow (MGD)	0.004
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	0.87
Q_{7-10} (cfs)	0.0418
Low-flow yield (cfs/mi^2)	0.048
Elevation (ft)	1788
Slope	0.001

For IW discharges, the design flow used in modeling is the average flow during production or operation taken from the permit application or DMRs. 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 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 Toxics Management Spread Sheet in Attachment B of this Fact Sheet.

The Toxics Management Spread Sheet recommended multiple monitoring requirements for Outfall 001.

Table 4: TMS Recommended Monitoring Requirements for Outfall 001

Parameter	AML	MDL	IMAX	Units	Reported QL	Target QL
Total Aluminum	3.73	5.82	9.32	mg/L	0.010 mg/L	10 ug/L
Total Cadmium	Report	Report	Report	mg/L	**0.3 ug/L**	0.2 ug/L
Total Iron	Report	Report	Report	mg/L	0.0200 mg/L	20 ug/L
Total Manganese	Report	Report	Report	mg/L	0.005 mg/L	2.0 ug/L

Based on the results shown in Table 4, for the parameter of cadmium, the results were reported as less than analytical reporting limits, but those reporting limits were too high to rule out the possibility that discharges will result in excursion above Pennsylvania's water quality criteria. During the 30-day public comment period, Bakerton Water Treatment Facility may resample this parameter at the Department's QL to verify that it is not present in the discharge. If it is determined that the parameter is not present in the discharge at the Department's QLs, it may be removed from the Final Permit.

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 chlorine demands for the receiving stream and the discharge, 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 imposed in the permit. The results of the modeling, included in Attachment C, indicate that BAT/BPJ are required for TRC.

Chesapeake Bay Strategy

This is a non-significant industrial discharge facility that will not need a phosphorus or nitrogen loading cap.

A total nitrogen and total phosphorus "Monitor & Report" requirement will not be necessary since this facility discharges wastewater without a significant nitrogen or phosphorus component. The Supplement to Phase II Watershed Implementation Plan states the following:

> *"For non-significant IW facilities, monitoring and reporting of TN and TP will be required throughout the permit term in renewed or amended permits anytime the facility has the potential to introduce a net TN or TP increase to the load contained within the intake water used in processing. In general, facilities that discharge groundwater and cooling water with no addition of chemicals containing N or P do not require monitoring."*

Total Maximum Daily Load (TMDL)

Wastewater discharges from Bakerton Treatment Facility are located within the West Branch Susquehanna River Watershed for which the Department has developed a TMDL. The TMDL was finalized on December 3, 2011 and establishes waste load allocations for the discharge of aluminum, iron and manganese within the West Branch

Susquehanna River Watershed. The facility permit, PA0096971, is listed in the Attachment H of the TMDL, requiring load allocations and is displayed below in Table 5.

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's Water Quality Planning and Management Regulations (codified at Title 40 of the *Code of Federal Regulations* Part 130) require states to develop a TMDL for impaired water bodies. A TMDL establishes the amount of a pollutant that a water body can assimilate without exceeding the water quality criteria for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and non-point sources in order to restore and maintain the quality of the state's water resources (USEPA 1991a). Stream reaches within the West Branch Susquehanna River Watershed are included in the state's 2008 Section 303(d) list because of various impairments, including metals and pH. The TMDL includes consideration for each river and tributary within the target watershed and its impairment sources. Stream data is then used to calculate minimum pollutant reductions that are necessary to attain water quality criteria levels. The applicable water quality criteria concentrations for selected parameters are 0.750 mg/L total recoverable aluminum, 1.5 mg/L total recoverable iron based on a 30-day average and 1.0 mg/L total recoverable manganese. The reduction needed to meet the minimum water quality standards is then divided between each known point and non-point pollutant source in the form of a watershed allocation. TMDLs prescribe allocations that minimally achieve water quality criteria (i.e., 100 percent use of a stream's assimilative capacity).

Table 5: Outfall 001 TMDL WLA

Parameter	Monthly Average ($^{mg}/_{L}$)	Design Flow (MGD)	Allowable Load (lbs/day)
Iron, Total	2.0	0.004	0.07
Manganese, Total	1.0	0.004	0.03
Aluminum, Total	2.2	0.004	0.07

The TMDL WLA for Bakerton Water Treatment Facility was calculated using the above monthly average concentration (technology-based limits for water treatment plant wastes) and a design flow to get the allowable load for the facility. The TMDL has identified the facility design flow as 0.004 MGD and the actual facility design flow is 0.05 MGD. The monthly average concentrations identified in the TMDL will be applied as noted in Table 5.

Anti-Backsliding

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

Table 6: Current Permit Effluent Limits

Parameters	Mass (lb/day)		Concentration (mg/l)			
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX
Total Suspended Solids	XXX	XXX	XXX	30	60	XXX
Total Residual Chlorine	XXX	XXX	XXX	0.24	0.561	XXX
Total Aluminum	XXX	XXX	XXX	1.01	1.57	XXX
Total Iron	XXX	XXX	XXX	2.0	4.0	XXX
Total Manganese	XXX	XXX	XXX	1.0	2.0	XXX
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX

Proposed Effluent Limitations for Outfall 001

The proposed effluent limitations and monitoring requirements for Outfall 001 are shown below in Table 7. The limits are the most stringent values from the above limitation analysis.

Table 7: Proposed Effluent Limitations for Outfall 001

Parameters	Mass (lb/day)		Concentration				Monitoring Requirements	
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	2/Month	Measure
Total Suspended Solids (mg/L)	XXX	XXX	XXX	30.0	60.0	XXX	2/Month	Grab
Total Residual Chlorine (mg/L)	XXX	XXX	XXX	0.24	0.561	XXX	2/Month	Grab

Table 7: Proposed Effluent Limitations for Outfall 001

Parameters	Mass (lb/day)		Concentration				Monitoring Requirements	
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Daily Maximum	Instant. Maximum	Frequency	Sample Type
Total Aluminum (mg/L)	XXX	XXX	XXX	1.01	1.57	XXX	2/Month	Grab
Total Iron (mg/L)	XXX	XXX	XXX	2.0	4.0	XXX	2/Month	Grab
Total Manganese (mg/L)	XXX	XXX	XXX	1.0	2.0	XXX	2/Month	Grab
Total Cadmium (mg/L)	XXX	XXX	XXX	Report	Report	XXX	2/Month	Grab
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	2/Month	Grab

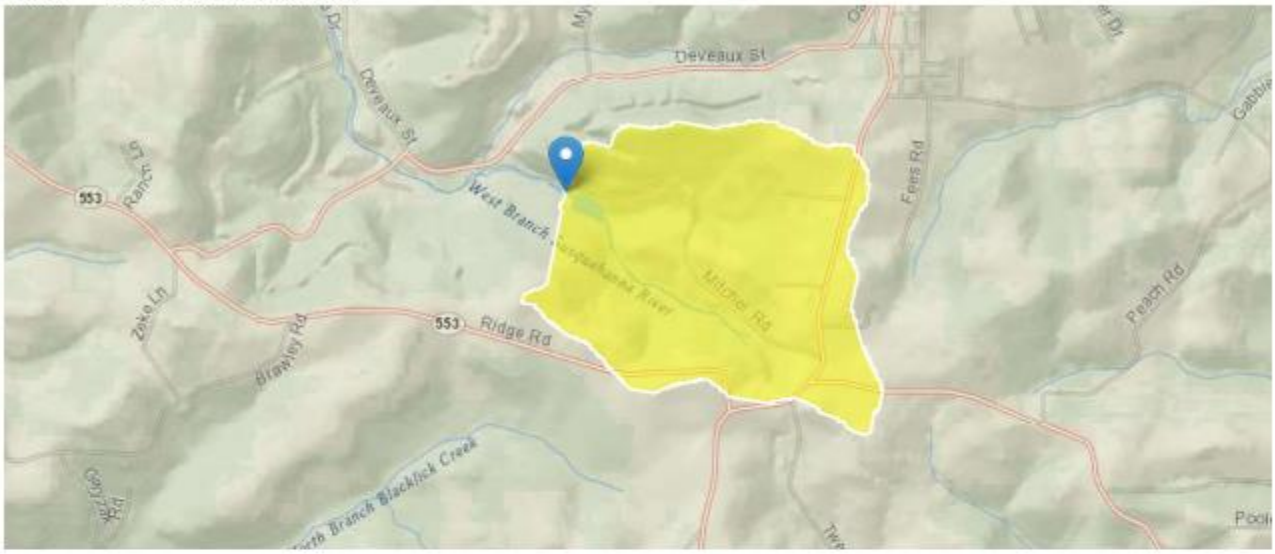
As previously stated, for the parameter of cadmium, the results were reported as less than analytical reporting limits, but those reporting limits were too high to rule out the possibility that discharges will result in excursion above Pennsylvania's water quality criteria. During the 30-day public comment period, Bakerton Water Treatment Facility may resample this parameter at the Department's QL to verify that it is not present in the discharge. If it is determined that this parameter is not present in the discharge at the Department's QLs, it may be removed from the Final Permit.

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: BCW-PMT-001, BCW-PMT-032, BCW-PMT-033, BCW-PMT-037
☐	Other:

Attachment A – Outfall 001 & End of Reach StreamStats Reports

StreamStats Report_Outfall 001_Bakterton WTP

Region ID: PA
Workspace ID: PA20240320204440437000
Clicked Point (Latitude, Longitude): 40.59178, -78.73017
Time: 2024-03-20 16:45:02 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	0	percent
DRNAREA	Area that drains to a point on a stream	0.87	square miles
ELEV	Mean Basin Elevation	2026	feet
FOREST	Percentage of area covered by forest	58.6904	percent
PRECIP	Mean Annual Precipitation	43	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.95	percent
URBAN	Percentage of basin with urban development	0.8861	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Region 2 SIR 2019 5094]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.87	square miles	0.92	1160
STORAGE	Percent Storage	0.95	percent	0	8.9

Peak-Flow Statistics Disclaimers [Peak Flow Region 2 SIR 2019 5094]

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

Peak-Flow Statistics Flow Report [Peak Flow Region 2 SIR 2019 5094]

Statistic	Value	Unit
50-percent AEP flood	54	ft^3/s
20-percent AEP flood	87.3	ft^3/s
10-percent AEP flood	113	ft^3/s
4-percent AEP flood	149	ft^3/s
2-percent AEP flood	179	ft^3/s
1-percent AEP flood	211	ft^3/s
0.5-percent AEP flood	246	ft^3/s
0.2-percent AEP flood	297	ft^3/s

Peak-Flow Statistics Citations

Roland, M.A., and Stuckey, M.H.,2019, Development of regression equations for the estimation of flood flows at ungaged streams in Pennsylvania: U.S. Geological Survey Scientific Investigations Report 2019–5094, 36 p. (https://doi.org/10.3133/sir20195094)

> Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.87	square miles	2.33	1720
ELEV	Mean Basin Elevation	2026	feet	898	2700
PRECIP	Mean Annual Precipitation	43	inches	38.7	47.9

Low-Flow Statistics Disclaimers [Low Flow Region 3]

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 3]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.107	ft^3/s
30 Day 2 Year Low Flow	0.155	ft^3/s
7 Day 10 Year Low Flow	0.0418	ft^3/s
30 Day 10 Year Low Flow	0.0586	ft^3/s
90 Day 10 Year Low Flow	0.0885	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/)

Annual Flow Statistics

Annual Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.87	square miles	2.26	1720
ELEV	Mean Basin Elevation	2026	feet	130	2700
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
FOREST	Percent Forest	58.6904	percent	5.1	100
URBAN	Percent Urban	0.8861	percent	0	89

Annual Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

Annual Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Mean Annual Flow	1.39	ft^3/s

Annual 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/)

General Flow Statistics

General Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.87	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	58.6904	percent	5.1	100
URBAN	Percent Urban	0.8861	percent	0	89

General Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

General Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Harmonic Mean Streamflow	0.236	ft^3/s

General 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/)

Base Flow Statistics

Base Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.87	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	58.6904	percent	5.1	100
URBAN	Percent Urban	0.8861	percent	0	89

Base Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

Base Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Base Flow 10 Year Recurrence Interval	0.477	ft^3/s
Base Flow 25 Year Recurrence Interval	0.418	ft^3/s
Base Flow 50 Year Recurrence Interval	0.386	ft^3/s

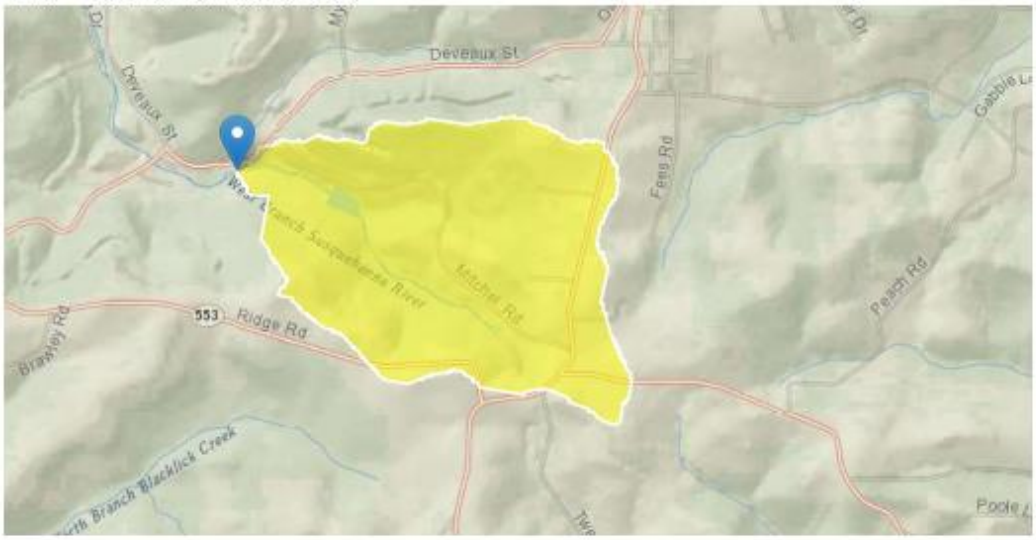
Base Flow Statistics Citations

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/)

Application Version: 4.19.4
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report_End of Reach_Bakerton WTP

Region ID: PA
Workspace ID: PA20240415155754600000
Clicked Point (Latitude, Longitude): 40.59264, -78.73569
Time: 2024-04-15 11:58:15 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	0	percent
DRNAREA	Area that drains to a point on a stream	0.97	square miles
ELEV	Mean Basin Elevation	2012	feet
FOREST	Percentage of area covered by forest	61.0144	percent
PRECIP	Mean Annual Precipitation	43	inches
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.92	percent
URBAN	Percentage of basin with urban development	0.812	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Region 2 SIR 2019 5094]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.97	square miles	0.92	1160
STORAGE	Percent Storage	0.92	percent	0	8.9

Peak-Flow Statistics Flow Report [Peak Flow Region 2 SIR 2019 5094]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
50-percent AEP flood	59.2	ft^3/s	26.1
20-percent AEP flood	95.7	ft^3/s	27
10-percent AEP flood	124	ft^3/s	28.9
4-percent AEP flood	163	ft^3/s	31.6
2-percent AEP flood	196	ft^3/s	34.8
1-percent AEP flood	231	ft^3/s	37.8
0.5-percent AEP flood	270	ft^3/s	41.6
0.2-percent AEP flood	325	ft^3/s	46.1

Peak-Flow Statistics Citations

Roland, M.A., and Stuckey, M.H.,2019, Development of regression equations for the estimation of flood flows at ungaged streams in Pennsylvania: U.S. Geological Survey Scientific Investigations Report 2019–5094, 36 p. (https://doi.org/10.3133/sir20195094)

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.97	square miles	2.33	1720
ELEV	Mean Basin Elevation	2012	feet	898	2700
PRECIP	Mean Annual Precipitation	43	inches	38.7	47.9

Low-Flow Statistics Disclaimers [Low Flow Region 3]

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 3]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.118	ft^3/s
30 Day 2 Year Low Flow	0.172	ft^3/s
7 Day 10 Year Low Flow	0.0467	ft^3/s
30 Day 10 Year Low Flow	0.0655	ft^3/s
90 Day 10 Year Low Flow	0.0986	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/)

Annual Flow Statistics

Annual Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.97	square miles	2.26	1720
ELEV	Mean Basin Elevation	2012	feet	130	2700
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
FOREST	Percent Forest	61.0144	percent	5.1	100
URBAN	Percent Urban	0.812	percent	0	89

Annual Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

Annual Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Mean Annual Flow	1.56	ft^3/s

Annual 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/)

General Flow Statistics

General Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.97	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	61.0144	percent	5.1	100
URBAN	Percent Urban	0.812	percent	0	89

General Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

General Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Harmonic Mean Streamflow	0.268	ft^3/s

General 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/)

Base Flow Statistics

Base Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.97	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0	percent	0	99
FOREST	Percent Forest	61.0144	percent	5.1	100
URBAN	Percent Urban	0.812	percent	0	89

Base Flow Statistics Disclaimers [Statewide Mean and Base Flow]

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

Base Flow Statistics Flow Report [Statewide Mean and Base Flow]

Statistic	Value	Unit
Base Flow 10 Year Recurrence Interval	0.542	ft^3/s
Base Flow 25 Year Recurrence Interval	0.476	ft^3/s
Base Flow 50 Year Recurrence Interval	0.44	ft^3/s

Base 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/)

Application Version: 4.20.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Attachment B – TMS Input & Results

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Bakerton WTP** NPDES Permit No.: **PA0096971** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Membrane Filter Backwash**

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
0.004	126	8.28						

					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		217									
	Chloride (PWS)	mg/L		36.7									
	Bromide	mg/L		0.928									
	Sulfate (PWS)	mg/L		44.9									
	Fluoride (PWS)	mg/L		0.094									
Group 2	Total Aluminum	mg/L		3.04									
	Total Antimony	mg/L	<	0.0004									
	Total Arsenic	mg/L	<	0.001									
	Total Barium	µg/L		51									
	Total Beryllium	mg/L	<	0.005									
	Total Boron	mg/L	<	0.25									
	Total Cadmium	mg/L	<	0.0004									
	Total Chromium (III)	mg/L	<	0.005									
	Hexavalent Chromium	µg/L		0.12									
	Total Cobalt	mg/L	<	0.001									
	Total Copper	mg/L	<	0.002									
	Free Cyanide	µg/L											
	Total Cyanide	mg/L	<	0.005									
	Dissolved Iron	µg/L	<	20									
	Total Iron	mg/L		1.565									
	Total Lead	mg/L	<	0.001									
	Total Manganese	mg/L		3.41									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L	<	5									
	Total Phenols (Phenolics) (PWS)	µg/L	<	250									
	Total Selenium	µg/L	<	5									
	Total Silver	mg/L	<	0.001									
	Total Thallium	mg/L	<	0.0004									
	Total Zinc	µg/L	<	10									
	Total Molybdenum	µg/L	<	5									
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										
	Carbon Tetrachloride	µg/L	<										

Group 3	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											

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Bakerton WTP, NPDES Permit No. PA0096971, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **West Branch of Susquehanna 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	027279	0.34	1788	0.87	0.001		Yes
End of Reach 1	027279	0.03	1753	0.97	0.001		Yes

Q_{7-10}

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	0.34	0.048	0.0418									100	7		
End of Reach 1	0.03	0.0481	0.0467												

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	0.34														
End of Reach 1	0.03														

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Bakterton WTP, NPDES Permit No. PA0096971, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 3.018 PMF: 1 Analysis Hardness (mg/l): 103.35 Analysis pH: 7.06

Pollutants	Stream Conc	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	5,816	
Total Antimony	0	0		0	1,100	1,100	8,531	
Total Arsenic	0	0		0	340	340	2,637	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	162,855	
Total Boron	0	0		0	8,100	8,100	62,816	
Total Cadmium	0	0		0	2.079	2.21	17.1	Chem Translator of 0.943 applied
Total Chromium (III)	0	0		0	585.361	1,852	14,365	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	126	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	737	
Total Copper	0	0		0	13.863	14.4	112	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	66.941	85.1	660	Chem Translator of 0.786 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	12.8	Chem Translator of 0.85 applied
Total Nickel	0	0		0	481.483	482	3,741	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	3.404	4.01	31.1	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	504	
Total Zinc	0	0		0	120.501	123	956	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 3.018 PMF: 1 Analysis Hardness (mg/l): 103.35 Analysis pH: 7.06

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	1,706	
Total Arsenic	0	0		0	150	150	1,163	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	31,796	
Total Boron	0	0		0	1,600	1,600	12,408	
Total Cadmium	0	0		0	0.252	0.28	2.15	Chem Translator of 0.908 applied
Total Chromium (III)	0	0		0	76.143	88.5	687	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	80.6	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	147	
Total Copper	0	0		0	9.212	9.6	74.4	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	11,633	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.609	3.32	25.7	Chem Translator of 0.786 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	7.03	Chem Translator of 0.85 applied
Total Nickel	0	0		0	53.478	53.6	416	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	38.7	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	101	
Total Zinc	0	0		0	121.486	123	956	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 3.018 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	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	43.4	
Total Arsenic	0	0		0	10	10.0	77.6	
Total Barium	0	0		0	2,400	2,400	18,612	
Total Boron	0	0		0	3,100	3,100	24,041	
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	2,327	
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	7,755	
Total Mercury	0	0		0	0.050	0.05	0.39	
Total Nickel	0	0		0	610	610	4,731	
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	1.86	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 0.860 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	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

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	0.12	0.19	3.73	5.82	9.32	mg/L	3.73	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Cadmium	Report	Report	Report	Report	Report	mg/L	0.002	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Iron	Report	Report	Report	Report	Report	mg/L	11.6	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Manganese	Report	Report	Report	Report	Report	mg/L	7.76	THH	Discharge Conc > 10% WQBEL (no RP)

☑ ***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 Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	18,612	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	12.4	mg/L	Discharge Conc ≤ 10% WQBEL
Total Chromium (III)	0.69	mg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	80.6	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cobalt	0.15	mg/L	Discharge Conc < TQL
Total Copper	0.072	mg/L	Discharge Conc < TQL
Total Cyanide	N/A	N/A	No WQS
Dissolved Iron	2,327	µg/L	Discharge Conc < TQL
Total Lead	0.026	mg/L	Discharge Conc < TQL
Total Mercury	0.39	µg/L	Discharge Conc < TQL
Total Nickel	416	µg/L	Discharge Conc ≤ 10% WQBEL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	38.7	µg/L	Discharge Conc < TQL
Total Silver	0.02	mg/L	Discharge Conc ≤ 10% WQBEL
Total Thallium	0.002	mg/L	Discharge Conc < TQL
Total Zinc	612	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Attachment C – TRC Evaluation Model for Outfall 001

TRC EVALUATION

0.0418	= Q stream (cfs)	0.5	= CV Daily
0.004	= 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)
	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	**1.3.2.iii**	WLA afc =	2.174	**1.3.2.iii**	WLA cfc =	2.112
PENTOXSD TRG	**5.1a**	LTAMULT afc =	0.373	**5.1c**	LTAMULT cfc =	0.581
PENTOXSD TRG	**5.1b**	LTA_afc=	0.810	**5.1d**	LTA_cfc =	1.228

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)**