pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0037893**
Facility Type	**Municipal**	APS ID	**1002115**
Major / Minor	**Minor**	Authorization ID	**1289101**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**East Brady Borough**	Facility Name	**East Brady STP**
Applicant Address	502 Ferry Street, Suite 15	Facility Address	300 Verner Street
	East Brady, PA 16028-1238		East Brady, PA 16028
Applicant Contact	Barbara Mortimer	Facility Contact	Aaron Serene, Operator
Applicant Phone	(724) 526-5531	Facility Phone	(412) 826-5454
Client ID	36546	Site ID	258272
Ch 94 Load Status	Not Overloaded	Municipality	East Brady Borough
Connection Status	No Limitations	County	Clarion County
Date Application Received	September 11, 2019	EPA Waived?	Yes
Date Application Accepted	September 20, 2019	If No, Reason	-

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater.

Summary of Review

Act 14 - Proof of Notification was submitted and received.
A Part II Water Quality Management permit is not required at this time.
The applicant should be able to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

A. Stormwater into Sewers
B. Right of Way
C. Solids Handling

SPECIAL CONDITIONS:

II. Solids Management

There are 3 open violations in efacts associated with the subject Client ID (36546) as of 2/10/2023 (see Attachment 3).

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	2/10/2023
X		Chad W. Yurisic Chad W. Yurisic, P.E. / Environmental Engineer Manager	2/21/2023

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.185
Latitude	40º 58' 41.00"	Longitude	-79º 37' 17.00"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent		

Receiving Waters	Allegheny River (WWF)	Stream Code	42122
NHD Com ID	123857786	RMI	69.27
Drainage Area	7763	Yield (cfs/mi^2)	0.26
Q_{7-10} Flow (cfs)	2072	Q_{7-10} Basis	calculated
Elevation (ft)	822	Slope (ft/ft)	0.000378
Watershed No.	17-C	Chapter 93 Class.	WWF
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	-	Name	-

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

Nearest Downstream Public Water Supply Intake	PA American Water Company - Kittanning District		
PWS Waters	Allegheny River	Flow at Intake (cfs)	987
PWS RMI	45.6	Distance from Outfall (mi)	23.6

Sludge use and disposal description and location(s): All sludge is taken to larger, approved STPs where it is ultimately disposed of at an approved landfill.

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.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.185 MGD of treated sewage from a municipal STP in East Brady Borough, Clarion County.

Treatment permitted under Water Quality Management Permit No. 1610401 consists of the following: A pump station and wet well, comminutor, bar screen, flow equalization tank, two aeration basins, two clarifiers, an aerobic digestor/sludge holding tank, and UV disinfection.

1. Streamflow:

Allegheny River at Parker, PA - USGS Stream Gage 03031500 (1967-2008):

Drainage Area:	7671	sq. mi.	(USGS StreamStats)
Q_{7-10}:	2050	cfs	(USGS StreamStats)
Yieldrate:	0.26	cfsm	calculated

Allegheny River at Outfall 001:

Yieldrate:	0.26	cfsm	calculated above
Drainage Area:	9.78	sq. mi.	(USGS StreamStats)
Q_{7-10}:	2.54	cfs	calculated

% of stream allocated: 100% Basis: No nearby discharges

2. Wasteflow:

Maximum discharge: 0.185 MGD = 0.286 cfs

Runoff flow period: 24 hours Basis: Runoff flow for municipal STPs

There is greater than 3 parts stream flow (Q7-10) to 1 part effluent (design flow). Therefore, the standards in DEP guidance (391-2000-014) will not be applied.

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, E. Coli, Total Phosphorus, Total Nitrogen, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits.

The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

b. Total Suspended Solids

Limits are 30.0 mg/l as a monthly average and 60.0 as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits.

c. Fecal Coliform

05/01 - 09/30:	200/100ml	(monthly average geometric mean)
	1,000/100ml	(instantaneous maximum)

10/01 - 04/30: 2,000/100ml (monthly average geometric mean)
10,000/100ml (instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/quarter.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows between 0.05 MGD and 1.0 MGD.

e. Phosphorus

Chapter 96.5 does not apply. The previous monitoring for Total Phosphorus will be retained in accordance with the SOP, based on Chapter 92a.61. However, the monitoring frequency will be reduced from 1/month to 1/year since the receiving stream is not impaired, per the SOP.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61. However, the monitoring frequency will be reduced from 1/month to 1/year since the receiving stream is not impaired, per the SOP.

g. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 6.9 Standard Units (S.U.)

Basis: eDMR data

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background NH_3-N concentration: 0.1 mg/l

Basis: Default value

Calculated NH_3-N Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Calculated NH_3-N Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1). The winter limits are calculated as three times the summer limits, but since the technology-based limits would govern, they will be used. Since the calculated limits are the same as in the previous permit, they will be retained. Since this is an existing discharge, the year-round monitoring requirement for ammonia-nitrogen will be retained, per the SOP.

h. $CBOD_5$

Median discharge pH to be used: 6.9 Standard Units (S.U.)

Basis: eDMR data

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

Calculated $CBOD_5$ Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Calculated $CBOD_5$ Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1). The winter limits are calculated as three times the summer limits, but since the technology-based limits would govern, they will be used. Since the calculated limits are the same as in the previous permit, they will be retained. Since the summer and winter limits are technology-based, the year-round limit of 25.0 mg/l monthly average and 50.0 mg/l instantaneous maximum will be retained with this renewal.

i. Influent Total Suspended Solids and BOD_5

Monitoring for these two parameters will be retained as recommended in the SOP for POTWs, as authorized under Chapter 92a.61.

j. Dissolved Oxygen (DO)

The Dissolved Oxygen minimum of 4.0 mg/l will be retained with this renewal. The technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61.

The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

k. Disinfection

☒ Ultraviolet (UV) light

Basis: UV Intensity (µw/cm²) reporting will be added with this renewal, per the SOP. The measurement frequency will be set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

☐ TRC limits: _____ mg/l (monthly average)
_____ mg/l (instantaneous maximum)

Basis: N/A

4. Reasonable Potential Analysis for Receiving Stream:

A Reasonable Potential Analysis was performed in accordance with State practices for Outfall 001 using the Department's Toxics Management Spreadsheet (see Attachment 2).

Result: No reasonable potential was calculated, so no WQBELs are necessary for this renewal.

5. Reasonable Potential for Downstream Public Water Supply (PWS):

The Department's Toxics Management Spreadsheet does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). However, since the sample data was provided, mass-balance calculations were performed (see below).

Nearest Downstream potable water supply (PWS): PA American Water Company - Kittanning District
Distance downstream from the point of discharge: 23.6 miles (approximate)

PWS Evaluation:

Stream flow (sf) at the potable water supply intake = 987 cfs
Waste flow (wf) from the STP = 0.185 MGD = 0.286 cfs
Total flow = 987.286 cfs
Background Concentrations: TDS - 150 mg/l, all others - no data available (assumed zero)

Mass balance for TDS at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(987 cfs)(150 mg/l) + (0.286 cfs)(x) = (987.286 cfs)(500 mg/l)

x = 1,208,367 mg/l (renewal application maximum was 450 mg/l - ok)

Mass balance for Chlorides at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(987 cfs)(0 mg/l) + (0.286 cfs)(x) = (987.286 cfs)(250 mg/l)

x = 863,012 mg/l (renewal application maximum was 92 mg/l - ok)

Mass balance for Bromide at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(987 cfs)(0 mg/l) + (0.286 cfs)(x) = (987.286 cfs)(1 mg/l)

x = 3,452 mg/l (renewal application maximum was <0.1 mg/l - ok)

Bromide has been linked to the formation of disinfection byproducts at increased levels in public water systems. Where the concentration of Bromide in a discharge exceeds 1 mg/L, and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for bromide. The maximum reported sample data for Bromide was <0.1 mg/l, and the permitted discharge is 0.185 MGD. However, since the dilution of stream flow to discharge flow is greater than 800:1 at the discharge point, monitoring for Bromide will not be added with this renewal permit.

Mass balance for Sulfates at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(987 cfs)(0 mg/l) + (0.286 cfs)(x) = (987.286 cfs)(250 mg/l)

x = 863,012 mg/l (renewal application maximum was 40.8 mg/l - ok)

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available

6. Flow Information:

100% of the wastewater flow comes from the East Brady Borough. All the sewers in the East Brady Borough system are separate sewers.

7. Anti-Backsliding:

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

8. Attachment List:

Attachment 1 - WQ Modeling Printouts

Attachment 2 - Toxics Management Spreadsheet

Attachment 3 - Open Violations in Efacts

(The Attachments above can be found at the end of this document)

Threatened and Endangered Mussel Species Concerns and Considerations

The Allegheny River is known to contain state and federally listed threatened and endangered mussel species. Due to this being a direct discharge to the Allegheny River, potential impacts were evaluated.

The USFWS has indicated in comment letters on other NPDES permits, that to protect threatened and endangered mussel species, wastewater discharges containing ammonia-nitrogen (NH_3-N), chloride (Cl^-) and nickel, where mussels or their habitat exist, can be no more than 1.9 mg/l, 78 mg/l and 7.3 µg/l, respectively.

Although the application form associated with the subject NPDES permit renewal does require sampling for ammonia-nitrogen, NPDES permits for sewage facilities of this nature do not, generally, include routine monitoring requirements for pollutants such as chloride and nickel. Therefore, with exception of the permit renewal application sampling for ammonia-nitrogen, which can be seen in the table below, the Department lacked sufficient data to support its assumption that a properly constructed, operated and maintained minor sewage facility of this size is expected to produce an effluent that would be protective of all the uses of the receiving stream including threatened and endangered mussels.

Sampling Data for USFWS Parameters of Concern	
Parameter	NPDES Renewal Application (September 11, 2019)
Ammonia-Nitrogen (NH_3-N) (mg/L)	0.332 avg. / 3.0 max. (29 samples)
Chloride (mg/L)	92.0 max. (1 sample)
Total Nickel (µg/L)	-
Total Zinc (µg/L)	-

Note 1: The samples are all 8-hour composite samples.
Note 2: The STP utilizes ultraviolet (UV) light disinfection.

The Department prepared the following calculations (included on the following pages) to determine the area of river that will be required to assimilate the maximum reported effluent concentrations of Chloride, Nickel, Zinc, and Ammonia-Nitrogen to achieve pollutant concentrations that at or below the USFWS criteria in the river.

Notes:

1. *The dissolved zinc criteria of 13.18 µg/l was provided to the Department in emails from the USFWS dated October 25, 2021 and November 8, 2021. The nickel criteria has been provided in numerous comment letters and other correspondence with the USFWS. As part of the October 25, 2021 correspondence, the USFWS provided the Department with a "Hazard/Risk Assessment" for the "Evaluation of Acute and Chronic Toxicity of Nickel and Zinc to 2 Sensitive Freshwater Benthic Invertebrates Using Refined Testing Methods" as prepared by Ning Wang, James L. Kunz, Danielle M. Cleveland, Jeffery A. Steevens, Edward J. Hammer, Eric Van Genderen, Adam C. Ryan, and Christian E. Schlekat published in the Environmental Toxicology and Chemistry—Volume 39, Number 11—pp. 2256–2268, 2020, received May 11, 2020, revised June 3, 2020, and accepted July 30, 2020.*
2. *The Department has limited dissolved nickel data for the effluent from sewage treatment plants. However, the Department has been incorporating quarterly monitoring for total nickel in NPDES permits for publicly owned treatment plants that are discharging to waterways known to contain state and federally listed threatened and endangered mussel species. A summary of the data collected at the POTWs with nickel monitoring is as follows:*

		PA0103373	PA0023931	PA0239861	PA0026271	PA0101923	PA0025470	PA0047201	PA0027367	PA0222585	PA0029467	PA0025291	PA0027120
		FOXBURG STP	CAMBRIDGE AREA JT AUTH STP	COCHRANTON BORO STP	MEADVILLE AREA STP	SAEGERTOWN AREA STP	FREDERICKSBURG STP	TIONESTA BORO WWTP	GREENVILLE SANI AUTH	BROKENSTRAW VALLEY AREA AUTH STP	NORTH WARREN MUNI STP	SOUTHWEST WARREN CNTY STP	WARREN CITY WWTP
UNITS		ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L
2017	4th QTR												0.05
2018	1st QTR		< 0.01	< 0.005	< 0.005			0.006	0.001				< 0.005
	2nd QTR		< 0.01	< 0.005	< 0.005			0.001	0.003				0.05
	3rd QTR		< 0.04	< 0.005	< 0.005			0.016	0.0001				0.01
	4th QTR		< 0.04	< 0.005	< 0.005		< 0.005	0.003	0.001		0.00518		< 0.05
2019	1st QTR		< 0.007	< 0.005	< 0.005		< 0.005	0.001	0.001		< 0.00400	< 0.02	< 0.05
	2nd QTR		< 0.007	< 0.005	< 0.005	0.007	< 0.005	0.001	0.0009	< 0.005	0.007	< 0.02	< 0.05
	3rd QTR		< 0.007	< 0.005	< 0.005	0.009	< 0.005	0.0003	0.002	< 0.005	0.04	< 0.02	< 0.05
	4th QTR	0.005	< 0.007	< 0.005	< 0.005	0.008	< 0.005	0.019	0.002	< 0.005	< 0.007	< 0.02	< 0.05
2020	1st QTR	< 0.005	< 0.007	< 0.005	< 0.005	< 0.007	< 0.005	0.001	0.0009	< 0.005	< 0.007	< 0.02	< 0.05
	2nd QTR	0.007	< 0.007	< 0.005	< 0.005	< 0.007	< 0.005	0.002	0.0007	< 0.005	< 0.007	< 0.02	< 0.05
	3rd QTR	0.006	< 0.007	< 0.005	< 0.005	0.011	< 0.005	0.004	0.001	< 0.005	0.007	< 0.02	< 0.05
	4th QTR	< 0.005	< 0.007	< 0.005	< 0.005	0.012	< 0.005	0.003	0.003	< 0.005	0.007	< 0.02	< 0.05
2021	1st QTR	< 0.005	< 0.007	< 0.005	< 0.005	< 0.007	< 0.005	0.001	0.005	< 0.005	0.007	< 0.02	< 0.05
	2nd QTR	0.005	< 0.007	< 0.005	< 0.005	0.008	< 0.005	0.006	0.004	< 0.005	0.007	< 0.02	< 0.05
	3rd QTR	< 0.005	< 0.007	< 0.005	< 0.005	0.011	< 0.005	0.003	0.001	0.005	< 0.007	0.02	< 0.05

As seen from this data, nickel is rarely above the USFWS criteria of 7.5 ug/L. The highest reported value that does not appear to be an outlier was 19 ug/L at the Tionesta Borough WWTP in the fourth quarter of 2019. Therefore, this value is used in the following calculations.

As shown on the following “impact area” calculations, the subject discharge is expected to almost instantaneously dilute with the river for Chloride, Nickel, Zinc, and Ammonia-Nitrogen. Based on this information, the Department has determined the discharge will be protective of threatened and endangered mussels in the Allegheny River.

East Brady Borough (Clarion County)

Facility:	East Brady STP
Permit Number:	PA0037893 Effective: N/A Expiration: N/A
Outfall No:	001
Location:	East Brady Borough, Clarion County
Discharge to:	Allegheny River
Site Specific Mussel Survey Completed:	No

Discharge and Stream Characteristics			Comments
Q_S	Stream Flow	1339 MGD / 2072 cfs	Fact Sheet
Q_D	Discharge Flow	0.185 MGD / 0.28628 cfs	Fact Sheet
$C_{S(Cl^-)}$	Instream chloride Concentration	15.6 mg/L	Average WQN data (2010 to 2021 - USGS-03036500)
$C_{E(Cl^-)}$	Discharge chloride (existing)	92 mg/L	From renewal application - Max of 3 grab samples
$C_{P(Cl^-)}$	Discharge chloride (proposed)	92 mg/L	From renewal application - Max of 3 grab samples
$C_{S(Cl^-)}$	Instream nickel Concentration	5 µg/L	Assumed - No WQN data below the criteria of 7.3 µg/L (reported at < 50)
$C_{E(Ni)}$	Discharge nickel (existing)	0 µg/L	From renewal application - no data
$C_{P(Ni)}$	Discharge nickel (proposed)	0 µg/L	From renewal application - no data
$C_{S(Zn)}$	Instream zinc Concentration	16.26 µg/L	Average WQN data (2010 to 2021 - USGS-03036500)
$C_{E(Zn)}$	Discharge zinc (existing)	0 µg/L	From renewal application - no data
$Zn_{P(Cl^-)}$	Discharge zinc (proposed)	0 µg/L	From renewal application - no data
$C_{S(NH3-N)}$	Instream NH^3-N	0.03 mg/L	Average WQN data (2010 to 2021 - USGS-03036500)
$C_{E(NH3-N)}$	Discharge NH^3-N (existing)	3 mg/L	From renewal application - Max of 15 grab samples
$C_{P(NH3-N)}$	Discharge NH^3-N (proposed)	3 mg/L	From renewal application - Max of 15 grab samples
pH_S	Instream pH	7.6 S.U.	Average WQN data (2010 to 2021 - USGS-03036500)
T_S	Instream Temp.	25 °C	Default value for a WWF
$C_{C(NH3-N)}$	Ammonia criteria	0.920 mg/L	From ammonia criteria comparison spreadsheet -using instream pH and Temp
$C_{C(Cl^-)}$	Chloride criteria	78 mg/L	USFWS criteria
$C_{C(Ni)}$	Nickel criteria	7.3 µg/L	USFWS criteria
$C_{C(Zn)}$	Zinc criteria	13.18 µg/L	USFWS criteria
W_S	Stream width	223 meters	Google Earth

Ammonia Criteria Calculations:

	pH_S	7.6	S.U.	*(Default value is 7.0)*
	T_S	25	°C	*(Default value is 20 °)*

Acute Criteria

	METHOD and UNITS	CRITERIA	Comments	
	Old CMC (mg TAN/L) =	3.577		
	EPA 2013 CMC (mg TAN/L) =	5.226	Oncorhynchus present	* formula on pg. 41 (plateaus at 15.7 C)
		5.226	Oncorhynchus absent	* formula on pg. 42 (plateaus at 10.2 C)

Chronic Criteria

	METHOD and UNITS	CRITERIA	COMMENTS
	Old CMC (mg TAN/L) =	0.952	
$C_{C(NH3-N)}$	EPA 2013 CMC (mg TAN/L) =	0.920	* formula on pg. 46 (plateaus at 7 C)

Endangered Mussel Species Impact Area Calculations:

Existing Area of Impact

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

Approximate Area of Impact Determined from Survey =	N/A m^2	(Enter N/A if no site specific survey has been completed)
Existing Mussel Density within Area of Impact =		
Rabbitsfoot *(Quadrula cylindrical)*	N/A per m^2	
Northern Riffleshell *(Epioblasma torulosa rangiana)*	N/A per m^2	
Rayed Bean *(Villosa fabalis)*	N/A per m^2	
Clubshell *(Pleurobema clava)*	N/A per m^2	
Sheepnose *(Plethobasus cyphyus)*	N/A per m^2	
Snuffbox *(Epioblasma triquetra)*	N/A per m^2	
TOTAL	0 per m^2	

Method 1 - Utilizing Site Specific Mussel Survey Information

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

This method utilizes a simple comparison of the size of the existing area of impact as determined from a site specific mussel survey and the chlorides in the existing discharge compared to the chlorides in the proposed discharge after the facility upgrades treatment technologies. This method is only applicable to where the stream impairment is caused by TDS and/or chlorides as the plume has been delineated through conductivity measurements.

A.	Area of Impact Determined from Survey:	N/A	m^2
B.	Chlorides in Existing Discharge:		92 mg/L
C.	Chlorides in Proposed Discharge after Treatment Facility Upgrades:		92 mg/L
D.	Approximate Area of Impact after Treatment Facility Upgrades:		N/A m^2

A/B = D/C Therefore, D = (A*C)/B

Endangered Mussel Species Impact Area Calculations: (continued...)

Method 2 - Mass Balance Relationship of Loading and Assimilative Capacity of Stream

Chloride (Cl⁻)	$L_{S(Cl^-)}$ = Available Chloride Loading in Stream = $C_{C(Cl^-)} - C_{S(Cl^-)} \times Q_S$(MGD) X 8.34 =	696,837 lbs/Day
	$L_{D\text{-}MAX(Cl^-)}$ = Current Maximium Discharge Chloride Loading exceeding criteria = $(C_{E(Cl^-)} - C_{E(Cl^-)}) \times Q_D$(MGD) X 8.34 =	22 lbs/Day
	$\%_{E(Cl^-)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(Cl^-)} / L_{S(Cl^-)}$ =	0% of Stream Capacity
	$L_{D(Cl^-)}$ = Proposed Discharge Cl⁻ Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Cl^-)} - C_{P(Cl^-)}) \times Q_D$(MGD) X 8.34 =	21.6006 lbs/Day
	$\%_{P(Cl^-)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Cl^-)} / L_{S(Cl^-)}$ =	0.00% of Stream Capacity
	Proposed Area of Impact due to Chloride * = $(\%_{P(Cl^-)} \times W_s)^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0000 m^2
Nickel (Ni)	$L_{S(Ni)}$ = Available Nickel Loading in Stream = $C_{C(Ni)} - C_{S(Ni)} \times Q_S$(MGD) X 8.34 =	25,685 lbs/Day
	$L_{D\text{-}MAX(Ni)}$ = Current Maximium Discharge Nickel Loading exceeding criteria = $(C_{E(Ni)} - C_{E(Ni)}) \times Q_D$(MGD) X 8.34 =	-11 lbs/Day
	$\%_{E(Ni)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(Ni)} / L_{S(Ni)}$ =	0% of Stream Capacity
	$L_{D(Ni)}$ = Proposed Discharge Ni Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Ni)} - C_{P(Ni)}) \times Q_D$(MGD) X 8.34 =	-11.26317 lbs/Day
	$\%_{P(Ni)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Ni)} / L_{S(Ni)}$ =	-0.04% of Stream Capacity
	Proposed Area of Impact due to Nickel * = $(\%_{P(Ni)} \times W_s)^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0048 m^2
Zinc (Zn)	$L_{S(Zn)}$ = Available Zinc Loading in Stream = $C_{C(Zn)} - C_{S(Zn)} \times Q_S$(MGD) X 8.34 =	-34,395 lbs/Day
	$L_{D\text{-}MAX(Zn)}$ = Current Maximium Discharge Zinc Loading exceeding criteria = $(C_{E(Zn)} - C_{E(Zn)}) \times Q_D$(MGD) X 8.34 =	-20 lbs/Day
	$\%_{E(Zn)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(Zn)} / L_{S(Zn)}$ =	0% of Stream Capacity
	$L_{D(Zn)}$ = Proposed Discharge Zn Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Zn)} - C_{PZn)}) \times Q_D$(MGD) X 8.34 =	-20.335422 lbs/Day
	$\%_{P(Zn)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Zn)} / L_{S(Zn)}$ =	0.06% of Stream Capacity
	Proposed Area of Impact due to Zinc * = $(\%_{P(Zn)} \times W_s)^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0087 m^2
Ammonia-Nitrogen (NH3-N)	$L_{S(NH3\text{-}N)}$ = Available NH3-N Loading in Stream = $C_{C(NH3\text{-}N)} - C_{S(NH3\text{-}N)} \times Q_S$(MGD) X 8.34 =	9,939 lbs/Day
	$L_{D\text{-}MAX(NH3\text{-}N)}$ = Current Maximium Discharge NH3-N Loading = $C_{E(NH3\text{-}N)} \times Q_D$(MGD) X 8.34 =	5 lbs/Day
	$\%_{E(NH3\text{-}N)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(NH3\text{-}N)} / L_{S(NH3\text{-}N)}$ =	0% of Stream Capacity
	$L_{D(NH3\text{-}N)}$ = Proposed Discharge NH3-N Loading after Treatment Facility Upgrades = $C_{P(NH3\text{-}N)} - C_{C(NH3\text{-}N)} \times Q_D$(MGD) X 8.34 =	3 lbs/Day
	$\%_{P(NH3\text{-}N)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(NH3\text{-}N)} / L_{S(NH3\text{-}N)}$ =	0.03% of Stream Capacity
	Proposed Area of Impact due to NH3-N * = $(\%_{P(NH3\text{-}N)} \times W_s)^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0023 m^2

Endangered Mussel Species Impact Area Calculations: (continued…)

Method 3 - Mass Balance Relationship of Stream Flow, Proposed Effluent Quality, and Mussel Protection Criteria

Chloride (Cl⁻)	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_D C_{P(Cl^-)} = Q_T C_{C(Cl^-)}$	
	$Q_{A(Cl^-)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_D C_{P(Cl^-)} = (Q_D+Q_S)C_{C(Cl^-)}$	
	SOLVING FOR $Q_{A(Cl^-)} = [(Q_D C_{P(Cl^-)} / C_{C(Cl^-)}) - Q_D)] / (1 - C_{S(Cl^-)}/C_{C(Cl^-)})$ =	0.06422949 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Chlorides to Criteria Concentration = $Q_{A(Cl^-)} / Q_S$ (cfs) =	0.0031%
	$W_{I(Cl^-)}$ = Proposed Width of Stream required to Assimilate Chlorides to Criteria Concentration = $W_s \times \%_{P(Cl^-)}$	0.006913 meters
	Proposed Area of Impact due to Chloride * = $(W_{I(Cl^-)})^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0000 m^2
Nickel (Ni)	$Q_{A(Ni)}C_{S(Ni)} + Q_D C_{P(Ni)} = Q_T C_{C(Ni)}$	
	$Q_{A(Ni)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Ni)}C_{S(Ni)} + Q_D C_{P(Ni)} = (Q_D+Q_S)C_{C(Ni)}$	
	SOLVING FOR $Q_{A(Ni)} = [(Q_D C_{P(Ni)} / C_{C(Ni)}) - Q_D)] / (1 - C_{S(Ni)}/C_{C(Ni)})$ =	-0.90862783 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Nickel to Criteria Concentration = $Q_{A(Ni)} / Q_S$ (cfs) =	-0.0439%
	$W_{I(Ni)}$ = Proposed Width of Stream required to Assimilate Nickel to Criteria Concentration = $W_s \times \%_{P(Ni)}$	-0.097792 meters
	Proposed Area of Impact due to Nickel * = $(W_{I(Ni)})^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0048 m^2
Zinc (Zn)	$Q_{A(Zn)}C_{S(Zn)} + Q_D C_{P(Zn)} = Q_T C_{C(Zn)}$	
	$Q_{A(Zn)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Zn)}C_{S(Zn)} + Q_D C_{P(Zn)} = (Q_D+Q_S)C_{C(Zn)}$	
	SOLVING FOR $Q_{A(Zn)} = [(Q_D C_{PZn)} / C_{C(Zn)}) - Q_D)] / (1 - C_{S(Zn)}/C_{C(Zn)})$ =	1.22505532 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Zinc to Criteria Concentration = $Q_{A(Zn)} / Q_S$ (cfs) =	0.0591%
	$W_{I(Zn)}$ = Proposed Width of Stream required to Assimilate Zinc to Criteria Concentration = $W_s \times \%_{PZn)}$	0.131847 meters
	Proposed Area of Impact due to Chloride * = $(W_{I(Cl^-)})^2 \times 0.5$ = * assuming equal flow across transect and 90° spread at discharge	0.0087 m^2
	$Q_{A(NH3\text{-}N)}C_{S(NH3\text{-}N)} + Q_D C_{P(NH3\text{-}N)} = Q_T C_{C(NH3\text{-}N)}$	

Ammonia-Nitrogen (NH3-N)	$Q_{A(NH3-N)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(NH3-N)}C_{S(NH3-N)} + Q_DC_{P(NH3-N)} = (Q_D+Q_S)C_{C(NH3-N))}$	
	SOLVING FOR $Q_{A(NH3-N)} = [(Q_DC_{P(NH3-N)} / C_{C(NH3-N)}) - Q_D)] / (1 - C_{S(NH3-N)}/C_{C(NH3-N)}) =$	0.669059 cfs
	$\%_{P(NH3-N)}$ = Percent of Stream Width Required to Assimilate NH3-N to Criteria Concentration = $Q_{A(NH3-N)} / Q_S$ (cfs) =	0.0323%
	$W_{I(NH3-N)}$ = Proposed Width of Stream required to Assimilate NH3-N to Criteria Concentration = W_S X $\%_{P(NH3-N)}$	0.072008 meters
	Proposed Area of Impact due to NH3-N * = $(W_{I(NH3-N)})^2$ X 0.5 = * assuming equal flow across transect and 90° spread at discharge	0.0026 m^2

Please note that the nickel impact area is based on assumptions and a worst-case scenario for both the in-stream concentration as well as the effluent concentration. All of the "impact area" calculations are based on the worst-case scenario of the stream being at low flow (Q_{7-10}) flow conditions and the discharge from the treatment plant being at the design capacity. The likelihood of all of these conditions being at the "worst-case" scenario is not anticipated. Please also note that as discussed below, the Department will be able to further evaluate nickel concentrations in the effluent through proposed effluent monitoring. The Department may also collect in-stream nickel data over the course of the upcoming permit cycle at various facilities to be able to better evaluate the associated "impact areas".

Similar to other NPDES Permits for POTWs that have minimal impact areas, the Department will add the following in the draft NPDES permit:

- Weekly effluent monitoring for Ammonia-Nitrogen
- Monthly effluent monitoring for Chloride.
- Quarterly effluent monitoring for Nickel.
- Quarterly effluent monitoring for Zinc.

This monitoring will provide a dataset as a means of further evaluating potential impacts in the upcoming permit term. This data will also allow the Department to evaluate the need for pollutant reduction evaluations in future NPDES permit renewals for some or all of these pollutants.

Compliance History

DMR Data for Outfall 001 (from January 1, 2022 to December 31, 2022)

Parameter	DEC-22	NOV-22	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22
Flow (MGD) Average Monthly	0.068	0.077	0.043	0.039	0.038	0.039	0.049	0.077	0.081	0.095	0.133	0.057
Flow (MGD) Daily Maximum	0.293	0.978	0.194	0.232	0.263	0.163	0.187	0.312	0.199	0.425	0.988	0.092
pH (S.U.) Minimum	6.65	6.6	6.67	6.7	6.7	6.72	6.4	6.4	6.69	6.52	6.5	6.73
pH (S.U.) Maximum	7.17	7.4	7.36	7.1	7.0	7.2	7.2	7.18	7.05	6.99	7.22	7.1
DO (mg/L) Minimum	6.42	6.04	4.54	4.8	4.82	4.24	5.11	5.12	6.12	6.32	6.65	6.44
CBOD5 (lbs/day) Average Monthly	3.997	1.922	1.082	2.433	0.946	0.957	1.231	2.352	2.327	2.382	4.66	2.924
CBOD5 (lbs/day) Weekly Average	3.997	1.922	1.082	2.433	0.946	0.957	1.231	2.352	2.327	2.382	4.66	2.924
CBOD5 (mg/L) Average Monthly	5.7	3	3	3	3	3	3	3	3	3	3.57	3
CBOD5 (mg/L) Weekly Average	5.7	3	3	3	3	3	3	3	3	3	3.57	3
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	109.592	78.146	58.053	39.64	56.725	62.658	69.157	100.993	121.86	106.19	126.94	72.356
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	169.302	125.07	81.265	57.045	59.848	95.351	103.16	106.68	144.62	130.75	218.86	111.88
BOD5 (mg/L) Raw Sewage Influent Average Monthly	186.5	137.66	162	149.25	182.4	198.25	169.8	136.75	157.25	143.52	150.0	168.5
TSS (lbs/day) Average Monthly	1.745	1.922	1.082	2.493	1.626	1.762	3.648	3.697	5.663	2.382	4.32	3.137
TSS (lbs/day) Raw Sewage Influent Average Monthly	93.679	111.029	86.840	52.812	76.401	61.854	61.332	109.118	98.053	93.93	104.45	76.881
TSS (lbs/day) Raw Sewage Influent Daily Maximum	131.772	202.56	133.807	68.304	98.479	86.069	77.06	123.16	109.88	142.46	195.75	127.5
TSS (lbs/day) Weekly Average	1.745	1.922	1.082	2.493	1.626	1.762	3.648	3.697	5.663	2.382	4.32	3.137
TSS (mg/L) Average Monthly	3	3	3	3.25	5.2	5.5	7.8	4.5	7	3	3	3.5

TSS (mg/L) Raw Sewage Influent Average Monthly	161.5	174.8	242.5	200.25	243.6	193.75	157.4	147	127	127	125	178.5
TSS (mg/L) Weekly Average	3	3	3	3.25	5.2	5.5	7.8	4.5	7	3	3	3.5
Fecal Coliform (CFU/100 ml) Geometric Mean	1	13.981	6.514	128.58	91.776	82.254	13.8	3	1.250	9.4	11.795	3.584
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	1	194	15	345	313	210	27	8	2	18	2420	11
Total Nitrogen (lbs/day) Average Monthly	15.936	22.284	10.077	0.364	0.428	0.455	1.291	1.11	17.429	13.231	2.54	0.641
Total Nitrogen (mg/L) Average Monthly	28.1	34.7	28.1	1.12	1.35	1.4	3.16	1.73	25.8	16.7	2.29	1.35
Ammonia (lbs/day) Average Monthly	0.057	0.180	0.129	0.032	0.032	0.068	0.123	0.096	0.068	0.333	0.199	0.071
Ammonia (mg/L) Average Monthly	0.1	0.28	0.36	0.1	0.1	0.21	0.3	0.15	0.1	0.42	0.18	0.15
Total Phosphorus (lbs/day) Average Monthly	1.979	3.237	1.219	1.824	1.794	1.903	2.358	1.971	1.952	1.196	4.37	1.269
Total Phosphorus (mg/L) Average Monthly	3.49	5.04	3.4	5.61	5.66	5.85	5.77	3.07	2.89	1.51	3.94	2.67

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
CBOD5	38.0	61.0	XXX	25.0	40.0	50	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS	46.0	69.0	XXX	30.0	45.0	60	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	Report Avg Qrtly	XXX	1/quarter	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/day	Metered
Total Nitrogen	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite

Outfall 001 , Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Nickel	Report Avg Qrtly	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	8-Hr Composite
Total Zinc	Report Avg Qrtly	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	8-Hr Composite
Chloride	Report	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite

Compliance Sampling Location: at Outfall 001, after ultraviolet (UV) light disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliform are technology based on Chapter 92a.47. Monitoring for influent BOD5 and influent Total Suspended Solids is based on Chapter 92a.61. Monitoring for E. Coli, UV Intensity, Total Nitrogen, Ammonia-Nitrogen, Total Phosphorus, Total Nickel, Total Zinc, and Chloride is based on Chapter 92a.61.

Attachment 1

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
18A	42122	ALLEGHENY RIVER

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
69.270	East Brady STP	PA0037893	0.185	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
18A	42122	ALLEGHENY RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
69.270	0.185	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1144.952	0.915	1251.305	1.927
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.00	0.003	0.00	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.242	3.833	Tsivoglou	5
Reach Travel Time (days)			
0.032			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.003	2.00	0.00	7.54
0.006	2.00	0.00	7.54
0.010	2.00	0.00	7.54
0.013	2.00	0.00	7.54
0.016	2.00	0.00	7.54
0.019	2.00	0.00	7.54
0.022	2.00	0.00	7.54
0.025	2.00	0.00	7.54
0.029	2.00	0.00	7.54
0.032	2.00	0.00	7.54

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
18A	42122	ALLEGHENY RIVER	**69.270**	822.00	7763.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.260	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
East Brady STP	PA0037893	0.1850	0.0000	0.0000	0.000	25.00	6.90

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
18A	42122	ALLEGHENY RIVER	**68.270**	820.00	7765.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.260	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
18A	42122	ALLEGHENY RIVER

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
69.270	East Brady STP	11.07	50	11.07	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
69.270	East Brady STP	1.37	25	1.37	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
69.27	East Brady STP	25	25	25	25	4	4	0	0

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
18A	42122	ALLEGHENY RIVER

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
69.270	2018.38	0.00	2018.38	.2862	0.00038	.915	1144.95	1251.3	1.93	0.032	25.00	7.00
Q1-10 Flow												
69.270	1291.76	0.00	1291.76	.2862	0.00038	NA	NA	NA	1.50	0.041	25.00	7.00
Q30-10 Flow												
69.270	2745.00	0.00	2745.00	.2862	0.00038	NA	NA	NA	2.29	0.027	25.00	7.00

Attachment 2

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **East Brady STP** NPDES Permit No.: **PA0037893** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **POTW sewage**

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
0.185	100	6.9						

					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		450									
	Chloride (PWS)	mg/L		92									
	Bromide	mg/L	<	0.1									
	Sulfate (PWS)	mg/L		40.8									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L		50									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	20									
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L		40									
	Total Molybdenum	µg/L											
	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											

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Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

East Brady STP, NPDES Permit No. PA0037893, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: _____ 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	042122	69.27	822	7763			Yes
End of Reach 1	042122	68.27	820	7765			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	69.27	0.26										100	7		
End of Reach 1	68.27	0.26													

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	69.27														
End of Reach 1	68.27														

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Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

East Brady STP, NPDES Permit No. PA0037893, Outfall 001

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

☑ ***Hydrodynamics***

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

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)
69.27	2018.38		2018.38	0.286	0.00038	0.915	1144.952	1251.305	1.927	0.032	105449.527
68.27	2018.90		2018.9								

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)
69.27	5748.59		5748.59	0.286	0.00038	1.45	1144.952	789.542	3.462	0.018	52861.848
68.27	5749.885		5749.88								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.012 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	
Total Copper	0	0		0	13.439	14.0	1,192	Chem Translator of 0.96 applied
Total Lead	0	0		0	64.581	81.6	6,949	Chem Translator of 0.791 applied
Total Zinc	0	0		0	117.180	120	10,198	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 720 PMF: 0.083 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	
Total Copper	0	0		0	8.956	9.33	5,446	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.517	3.18	1,857	Chem Translator of 0.791 applied
Total Zinc	0	0		0	118.139	120	69,943	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.083 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	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 720 PMF: 0.117 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	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	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

☑ ***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
Total Copper	764	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	1,857	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	6,536	µg/L	Discharge Conc ≤ 10% WQBEL

Attachment 3

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WATER MANAGEMENT SYSTEM
OPEN VIOLATIONS BY CLIENT

Client ID: 36546
Client: All

Open Violations: 3

CLIENT ID	CLIENT	PF ID	FACILITY	PF KIND	PF STATUS	INSP PROGRAM	PROGRAM SPECIFIC ID
36546	EAST BRADY BORO CLARION CNTY	283889	EAST BRADY WATER SYSTEM	Community	Active	Safe Drinking Water	6160003
36546	EAST BRADY BORO CLARION CNTY	283889	EAST BRADY WATER SYSTEM	Community	Active	Safe Drinking Water	6160003
36546	EAST BRADY BORO CLARION CNTY	283889	EAST BRADY WATER SYSTEM	Community	Active	Safe Drinking Water	6160003

INSP ID	VIOLATION ID	INSPECTION CATEGORY	VIOLATION DATE	VIOLATION CODE	VIOLATION	PF INSPECTOR	INSP REGION
3304790	941264	PF	01/06/2022	C2B	FAILURE TO FOLLOW APPROVED METHODS FOR SAMPLING AND ANALYSIS	WAYLAND,MATTHEW	NWRO
3304790	941265	PF	01/06/2022	D6D	FAILURE TO PREPARE AND/OR MAINTAIN A SYSTEM MAP	WAYLAND,MATTHEW	NWRO
3389666	961268	PF	07/11/2022	C7	FAILURE TO COMPLY WITH A PERMIT CONDITION	WAYLAND,MATTHEW	NWRO