pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0265781**
Facility Type	**Industrial**	APS ID	**1089450**
Major / Minor	**Minor**	Authorization ID	**1441476**

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

Applicant and Facility Information

Applicant Name	**Slippery Rock Municipal Authority**	Facility Name	**Slippery Rock Borough WTP**
Applicant Address	116 Crestview Drive	Facility Address	Hines Road
	Slippery Rock, PA 16057-0157		Slippery Rock, PA 16057
Applicant Contact	Josh Miller, Lab Supervisor/Operations Manager (jmiller.srma@zoominternet.net)	Facility Contact	Josh Miller, Lab Supervisor/Operations Manager (jmiller.srma@zoominternet.net)
Applicant Phone	(724) 794-8303	Facility Phone	(724) 794-8303
Client ID	65258	Site ID	445263
SIC Code	4941	Municipality	Slippery Rock Township
SIC Description	Trans. & Utilities - Water Supply	County	Butler
Date Application Received	May 16, 2023	EPA Waived?	No
Date Application Accepted	May 25, 2023	If No, Reason	DEP Discretion

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of wastewater from a water treatment plant.

Summary of Review

Act 14 - Proof of Notification was submitted and received.

This facility is not subject to any ELGs.

A Water Quality Management (WQM) 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. Right of way
B. Solids handling
C. NPDES Permit Supersedes WQM Permits
D. Modification or Revocation for changes to BAT or BCT
E. Effluent Chlorine Optimization and Minimization
F. Annual Average Definition

There are no open violations in efacts associated with the subject Client ID (65258) as of 3/14/2024

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	3/14/2024
X		 (Vacant) / Environmental Engineer Manager	Okay to Draft JCD 3/18/2024

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.01
Latitude	41º 1' 46.40"	Longitude	-80º 4' 1.30"
Quad Name	-	Quad Code	-

Wastewater Description: IW Process Effluent without ELG (Wastewater from PWS Backwash)

Receiving Waters	Slippery Rock Creek (CWF)	Stream Code	34032
NHD Com ID	126222171	RMI	24.5
Drainage Area	150.2	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	19.5	Q_{7-10} Basis	calculated
Elevation (ft)	1139	Slope (ft/ft)	0.00079
Watershed No.	20-C	Chapter 93 Class.	CWF
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: Pennsylvania American Water Company - Ellwood City

PWS Waters	Slippery Rock Creek	Flow at Intake (cfs)	53.1
PWS RMI	0.1	Distance from Outfall (mi)	25.0

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 0.01 MGD of media filter backwash wastewater from the Slippery Rock Hines Road Water Treatment Plant in Slippery Rock Township, Butler County.

Treatment at the Hines Road WTP consists of:

Two trains each consisting of spray aeration followed by chlorination, detention followed by potassium permangante for dechlorination, and media filtration (the backwash from the media filters discharges to Outfall 001). The two treatment trains combine in an equalization tank where the flow is then pumped into two high pressure membrane filtration units in parallel (the reject water from these filters flows to Outfall 002). The flow is then chlorinated before going to a chlorine contact tank/clear well for pumping into the potable water system.

1. Streamflow:

Slippery Rock Creek at Wurtemburg, PA - USGS Gage no. 03106500:

Q_{7-10}:	30.4	cfs	(from StreamStats)
Drainage Area:	398	sq. mi.	(from StreamStats)
Yieldrate:	0.076	cfsm	(calculated)

Slippery Rock Creek at Outfall 001:

Yieldrate:	0.076	cfsm	(calculated above)
Drainage Area:	150.2	sq. mi.	(from StreamStats)
% of stream allocated:	100%	Basis:	no nearby discharges
Q_{7-10}:	11.4	cfs	(calculated)

2. Wasteflow: Outfall 001:

Maximum discharge: 0.01 MGD = 0.015 cfs

Runoff flow period: 24 hours Basis: Flow for a Municipal WTP

Flow will be required to be monitored as recommended by the NPDES Permit Writers' Manual (document number 362-0400-001) for Water Treatment Plant Wastes.

3. Parameters:

The limits for pH, Total Residual Chlorine, Total Suspended Solids, Total Aluminum, Total Iron, Total Manganese, and Total Hardness are technology-based on the Department's document entitled, "NPDES Permit Writers' Manual" (document number 362-0400-001) under Chapter 14.5.4 - Methods Employed to Treat and Dispose of Water Treatment Plant Wastes.

a. Total Suspended Solids

Technology-based limits are 30.0 mg/l as a monthly average and 60.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 75.0 mg/l.

b. Total Iron

Technology-based limits are 2.0 mg/l as a monthly average and 4.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 5.0 mg/l.

c. Total Aluminum

Technology-based limits are 4.0 mg/l as a monthly average and 8.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 10.0 mg/l.

d. Total Manganese

Technology-based limits are 1.0 mg/l as a monthly average and 2.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 2.5 mg/l.

e. pH

Between 6.0 and 9.0 at all times.

f. Total Residual Chlorine (TRC)

TRC limits were calculated using the Department's TRC Calculation Spreadsheet (see Attachment 1). The calculated limits are slightly less restrictive than the limits in the previous NPDES Permit, which were technology-based limits of 0.5 mg/l as a monthly average and 1.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 1.25 mg/l.

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.

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

Nearest Downstream potable water supply (PWS): Pennsylvania American Water Company - Ellwood City

Distance downstream from the point of discharge: 25.0 miles (approximate)

Parameter	PWS Criteria (mg/l)	Discharge Maximum (mg/l)
TDS	500	5,710
Chloride	250	149
Bromide	1.0	1.15
Sulfate	250	18.4

Result: Since some of the parameters are discharged at a concentration greater than the criteria at the PWS, mass-balance calculations were performed below to ensure that no limits or monitoring are necessary.

PWS Evaluation:

Stream flow (sf) at the PWS intake = 53.1 cfs
Waste flow (wf) from the WTP = 0.01 MGD = 0.015 cfs
Total flow = 53.115 cfs
Background Concentrations: Default of 150 mg/l for TDS, all others assumed zero

Mass balance for TDS at the PWS intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(150 mg/l) + (0.015 cfs)(x) = (53.115 cfs)(500 mg/l)
x = 1,239,500 mg/l (renewal application maximum was 5,710 mg/l - ok)

Mass balance for Chlorides at the PWS intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.015 cfs)(x) = (53.115 cfs)(250 mg/l)
x = 885,250 mg/l (renewal application maximum was 149 mg/l - ok)

Mass balance for Bromide at the PWS intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.015 cfs)(x) = (53.115 cfs)(1 mg/l)
x = 3,541 mg/l (renewal application maximum was 1.15 mg/l - ok)

Mass balance for Sulfates at the PWS intake:
(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.015 cfs)(x) = (53.115 cfs)(250 mg/l)
x = 885,250 mg/l (renewal application maximum was 18.4 mg/l - ok)

Result: No limits or monitoring are necessary as significant dilution is available.

h. Total Dissolved Solids (TDS)

Outfall 001 had a maximum TDS discharge of 5,710 mg/l. Based on the design flow of 0.01 MGD and the maximum concentration of 5,710 mg/l, the maximum mass loading discharged from this outfall was 476.2 lbs/day.

The wastestream is exempt from Chapter 95.10 since under Section (a)(7), it is has “discharge loadings of TDS equal to or less than 5,000 lbs/day, measured as the annual average daily load” (maximum - 476.2 lbs/day). Based on the eDMR data and the type of wastewater, the previous monitoring requirement for TDS will be retained.

TDS were evaluated to protect the water quality standards at the nearest downstream PWS intake.

To calculate the TDS capacity for the Slippery Rock Creek at the Pennsylvania American Water Company - Ellwood City PWS intake, the Q_{7-10} low flow for the PWS is needed. From previous work, the Q_{7-10} low flow for the Slippery Rock Creek at the PWS was calculated as 53.1 cfs. Since no background TDS data is readily available, an assumed value of 150 mg/l will be used for this evaluation. Subtracting the 150 mg/l from the allowable 500 mg/l yields a remaining assimilative capacity of 350 mg/l. Multiplying the 350 mg/l by the Q_{7-10} low flow rate of 53.1 cfs and then by 5.4 for conversions yields a total assimilative capacity of 100,359 lbs/day of TDS at the Pennsylvania American Water Company - Ellwood City PWS intake.

Based on the maximum discharge of 476.2 lbs/day, there is no reasonable potential that the TDS from this discharge will impact the nearest downstream public water supply.

4. Reasonable Potential Analysis:

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: None of the discharge concentrations for the parameters sampled were found to be greater than 10% of the calculated WQBELs. No monitoring or limits are required as a result of the Reasonable Potential Analysis.

5. Attachment List:

Attachment 1 - TRC_Calc Spreadsheet - Outfall 001

Attachment 2 - Toxics Management Spreadsheet - Outfall 001

Attachment 3 - TRC_Calc Spreadsheet - Outfall 002

Attachment 4 - Toxics Management Spreadsheet - Outfall 002

Attachment 5 - Outfall Layout Diagram

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

Compliance History

DMR Data for Outfall 001 (from February 1, 2023 to January 31, 2024)

Parameter	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23	APR-23	MAR-23	FEB-23
Flow (MGD) Average Monthly	0.008	0.006	0.007	0.00020	0.004	0.004	0.005	0.005	0.004	0.005	0.003	0.004
pH (S.U.) Instantaneous Minimum	7.67	7.68	7.61	7.72	7.77	7.70	7.78	7.79	7.75	7.77	7.76	7.62
pH (S.U.) Instantaneous Maximum	7.75	7.77	7.77	7.79	7.83	7.81	7.83	7.98	7.87	7.90	7.89	7.82
TRC (mg/L) Average Monthly	0.1	0.4	0.1	0.2	0.13	0.12	0.12	0.2	0.06	0.35	0.21	0.12
TRC (mg/L) Daily Maximum	0.17	0.85	0.21	0.22	0.32	0.21	0.12	0.31	0.06	0.74	0.29	0.19
TSS (mg/L) Average Monthly	< 3	< 3	< 3	< 3.0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
TSS (mg/L) Daily Maximum	< 3	< 3	< 3	< 3.0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Total Dissolved Solids (mg/L) Average Monthly	382	386	414	405	404	378	375	396	404	394	405	435
Total Dissolved Solids (mg/L) Daily Maximum	382	396	430	428	406	380	396	406	414	400	424	444
Total Aluminum (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Aluminum (mg/L) Daily Maximum	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Iron (mg/L) Average Monthly	0.04	0.1	0.05	< 0.02	0.03	< 0.05	0.05	< 0.03	0.03	0.12	0.05	0.06
Total Iron (mg/L) Daily Maximum	0.04	0.09	0.07	0.02	0.03	0.07	0.05	0.03	0.04	0.14	0.06	0.07
Total Manganese (mg/L) Average Monthly	0.6	0.3	0.6	0.1	0.11	0.13	0.14	0.08	0.09	0.21	0.13	0.15
Total Manganese (mg/L) Daily Maximum	0.72	0.36	0.86	0.08	0.11	0.14	0.15	0.08	0.11	0.29	0.15	0.16

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" (386-0400-001), 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	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	1/day	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
TRC	XXX	XXX	XXX	0.5	1.0	1.25	1/day	Grab
TSS	XXX	XXX	XXX	30.0	60.0	75	2/month	Grab
Total Dissolved Solids	XXX	XXX	XXX	Report	Report	XXX	2/month	Grab
Total Aluminum	XXX	XXX	XXX	4.0	8.0	10	2/month	Grab
Total Iron	XXX	XXX	XXX	2.0	4.0	5	2/month	Grab
Total Manganese	XXX	XXX	XXX	1.0	2.0	2.5	2/month	Grab

Compliance Sampling Location: Outfall 001.

The limits for pH, Total Residual Chlorine (TRC), Total Suspended Solids (TSS), Aluminum, Iron, and Manganese are technology-based on the NPDES Permit Writers' Manual for potable water treatment backwash wastewater. Flow and Total Dissolved Solids are monitor only based on Chapter 92a.61.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	002	Design Flow (MGD)	0.19
Latitude	41º 1' 51.77"	Longitude	-80º 3' 48.77"
Quad Name	-	Quad Code	-
Wastewater Description:	IW Process Effluent without ELG (Reject Wastewater from Reverse Osmosis Units - Not being used)		
Receiving Waters	Slippery Rock Creek (CWF)	Stream Code	34032
NHD Com ID	126222171	RMI	24.5
Drainage Area	150.2	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	19.5	Q_{7-10} Basis	calculated
Elevation (ft)	1139	Slope (ft/ft)	0.00079
Watershed No.	20-C	Chapter 93 Class.	CWF
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	Pennsylvania American Water Company - Ellwood City		
PWS Waters	Slippery Rock Creek	Flow at Intake (cfs)	53.1
PWS RMI	0.1	Distance from Outfall (mi)	25.0

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.19 MGD (currently not discharging) of Reverse Osmosis reject wastewater from the Slippery Rock Hines Road Water Treatment Plant in Slippery Rock Township, Butler County. Since Outfall 002 is not currently discharging, sampling was not performed with this renewal. Since there is no current sampling data, the previous sampling data for Outfall 002 was used with this renewal.

Treatment at the Hines Road WTP consists of:

Two trains each consisting of spray aeration followed by chlorination, detention followed by potassium permangante for dechlorination, and media filtration (the backwash from the media filters discharges to Outfall 001). The two treatment trains combine in an equalization tank where the flow is then pumped into two high pressure membrane filtration units in parallel (the reject water from these filters flows to Outfall 002). The flow is then chlorinated before going to a chlorine contact tank/clear well for pumping into the potable water system.

1. Streamflow:

Slippery Rock Creek at Wurtemburg, PA - USGS Gage no. 03106500:

Q_{7-10}:	30.4	cfs	(from StreamStats)
Drainage Area:	398	sq. mi.	(from StreamStats)
Yieldrate:	0.076	cfsm	(calculated)

Slippery Rock Creek at Outfall 002:

Yieldrate:	0.076	cfsm	(calculated above)
Drainage Area:	150.2	sq. mi.	(from StreamStats)
% of stream allocated:	100%	Basis:	no nearby discharges
Q_{7-10}:	11.4	cfs	(calculated)

2. Wasteflow: Outfall 002:

Maximum discharge: 0.19 MGD = 0.29 cfs

Runoff flow period: 24 hours Basis: Flow for a Municipal WTP

Flow will be required to be monitored as recommended by the NPDES Permit Writers' Manual (document number 362-0400-001) for Water Treatment Plant Wastes.

3. Parameters:

The limits for pH, Total Residual Chlorine, Total Suspended Solids, Total Aluminum, Total Iron, Total Manganese, and Total Hardness are technology-based on the Department's document entitled, "NPDES Permit Writers' Manual" (document number 362-0400-001) under Chapter 14.5.4 - Methods Employed to Treat and Dispose of Water Treatment Plant Wastes.

a. Total Suspended Solids

Technology-based limits are 30.0 mg/l as a monthly average and 60.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 75.0 mg/l.

b. Total Iron

Technology-based limits are 2.0 mg/l as a monthly average and 4.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 5.0 mg/l.

c. Total Aluminum

Technology-based limits are 4.0 mg/l as a monthly average and 8.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 10.0 mg/l.

d. Total Manganese

Technology-based limits are 1.0 mg/l as a monthly average and 2.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 2.5 mg/l.

e. pH

Between 6.0 and 9.0 at all times.

f. Total Residual Chlorine (TRC)

TRC limits were calculated using the Department's TRC Calculation Spreadsheet (see Attachment 3). The calculated limits are slightly less restrictive than the limits in the previous NPDES Permit, which were technology-based limits of 0.5 mg/l as a monthly average and 1.0 mg/l as a daily maximum, with a calculated instantaneous maximum of 1.25 mg/l.

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.

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

Nearest Downstream potable water supply (PWS): Pennsylvania American Water Company - Ellwood City

Distance downstream from the point of discharge: 25.0 miles (approximate)

Parameter	PWS Criteria (mg/l)	Discharge Maximum (mg/l)
TDS	500	1,950

Result: Only TDS was sampled with the last permit application. Since TDS was discharged at a concentration greater than the criteria at the PWS, a mass-balance calculation was performed below to ensure that no limits or monitoring are necessary. Mass-balance calculations were performed below for Chlorides, Bromide, and Sulfates to compare with the Outfall 001 maximums since sampling data is not available.

PWS Evaluation:

Stream flow (sf) at the PWS intake = 53.1 cfs
Waste flow (wf) from the WTP = 0.19 MGD = 0.29 cfs
Total flow = 53.39 cfs
Background Concentrations: Default of 150 mg/l for TDS, all others assumed zero

Mass balance for TDS at the PWS intake:
(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(150 mg/l) + (0.29 cfs)(x) = (53.39 cfs)(500 mg/l)
x = 64,586 mg/l (Previous maximum was 1,950 mg/l - ok)

Mass balance for Chlorides at the PWS intake:
(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.29 cfs)(x) = (53.39 cfs)(250 mg/l)
x = 46,025 mg/l (Outfall 001 maximum was 149 mg/l - ok)

Mass balance for Bromide at the PWS intake:
(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.29 cfs)(x) = (53.39 cfs)(1 mg/l)
x = 184 mg/l (Outfall 001 maximum was 1.15 mg/l - ok)

Mass balance for Sulfates at the PWS intake:
(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (0.29 cfs)(x) = (53.39 cfs)(250 mg/l)
x = 46,025 mg/l (Outfall 001 maximum was 18.4 mg/l - ok)

Result: No limits or monitoring are necessary as significant dilution is available.

h. Total Dissolved Solids (TDS)

Outfall 002 had a maximum TDS discharge of 1,950 mg/l. Based on the design flow of 0.19 MGD and the maximum concentration of 1,950 mg/l, the maximum mass loading discharged from this outfall was 3,089 lbs/day.

The wastestream is exempt from Chapter 95.10 since under Section (a)(7), it is has "discharge loadings of TDS equal to or less than 5,000 lbs/day, measured as the annual average daily load" (maximum - 3,089 lbs/day). Based on the eDMR data and the type of wastewater, the previous monitoring requirement for TDS will be retained.

TDS were evaluated to protect the water quality standards at the nearest downstream PWS intake.

To calculate the TDS capacity for the Slippery Rock Creek at the Pennsylvania American Water Company - Ellwood City PWS intake, the Q_{7-10} low flow for the PWS is needed. From previous work, the Q_{7-10} low flow for the Slippery Rock Creek at the PWS was calculated as 53.1 cfs. Since no background TDS data is readily available, an assumed value of 150 mg/l will be used for this evaluation. Subtracting the 150 mg/l from the allowable 500 mg/l yields a remaining assimilative capacity of 350 mg/l. Multiplying the 350 mg/l by the Q_{7-10} low flow rate of 53.1 cfs and then by 5.4 for conversions yields a total assimilative capacity of 100,359 lbs/day of TDS at the Pennsylvania American Water Company - Ellwood City PWS intake.

Based on the maximum discharge of 3,089 lbs/day, there is no reasonable potential that the TDS from this discharge will impact the nearest downstream public water supply.

4. Reasonable Potential Analysis:

A Reasonable Potential Analysis was performed in accordance with State practices for Outfall 001 using the Department's Toxics Management Spreadsheet (see Attachment 4).

Result: The discharge concentrations for the following parameters were found to be greater than 10% of the calculated WQBELs:

Parameter	Discharge Conc. (mg/l)	WQBEL (mg/l)	%WQBEL
Total Manganese	25.5	39.8	>50%

Per the SOP, since the maximum discharge concentration for Total Manganese was greater than 50% of the calculated WQBEL, a new limit would be added. However, since there is already a more stringent technology-based limit of 1.0 mg/l set, no further action is necessary.

5. Attachment List:

Attachment 1 - TRC_Calc Spreadsheet - Outfall 001

Attachment 2 - Toxics Management Spreadsheet - Outfall 001

Attachment 3 - TRC_Calc Spreadsheet - Outfall 002

Attachment 4 - Toxics Management Spreadsheet - Outfall 002

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

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" (386-0400-001), SOPs and/or BPJ.

Outfall 002, 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	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
TRC	XXX	XXX	XXX	0.5	1.0	1.25	1/day	Grab
TSS	XXX	XXX	XXX	30.0	60.0	75	2/month	8-Hr Composite
Total Dissolved Solids	5000 Annl Avg	XXX	XXX	XXX	XXX	XXX	1/year	8-Hr Composite
Total Dissolved Solids	Report	XXX	XXX	Report	Report	XXX	2/month	8-Hr Composite
Total Aluminum	XXX	XXX	XXX	4.0	8.0	10	2/month	8-Hr Composite
Total Iron	XXX	XXX	XXX	2.0	4.0	5	2/month	8-Hr Composite
Total Manganese	XXX	XXX	XXX	1.0	2.0	2.5	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 002.

The limits for pH, Total Residual Chlorine (TRC), Total Suspended Solids (TSS), Aluminum, Iron, and Manganese are technology-based on the NPDES Permit Writers' Manual for potable water treatment backwash wastewater. Flow and Total Dissolved Solids are monitor only based on Chapter 92a.61. The annual average mass loading limit for Total Dissolved Solids is technology-based on Chapter 95.10.

Discharge, Receiving Waters and Water Supply Information

IMP No.	003	Design Flow (MGD)	0.00
Latitude	41º 01' 45.60"	Longitude	-80º 03' 55.10"
Quad Name	-	Quad Code	-

Wastewater Description: Stormwater (No Exposure)

Receiving Waters	Unnamed Tributary to the Slippery Rock Creek	Stream Code	N/A
NHD Com ID	126222171	RMI	N/A
Drainage Area	-	Yield (cfs/mi^2)	-
Q_{7-10} Flow (cfs)	-	Q_{7-10} Basis	-
Elevation (ft)	-	Slope (ft/ft)	-
Watershed No.	-	Chapter 93 Class.	CWF
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: Pennsylvania American Water Company - Ellwood City

PWS Waters	Slippery Rock Creek	Flow at Intake (cfs)	53.1
PWS RMI	0.1	Distance from Outfall (mi)	25.0

This stormwater outfall received a No Exposure Certification during the previous NPDES Permit. That certification will be continued with this renewal.

Attachment 1

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

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

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	1.3.2.iii	WLA afc =	235.093	1.3.2.iii	WLA cfc =	229.190
PENTOXSD TRG	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
PENTOXSD TRG	5.1b	LTA_afc=	87.601	5.1d	LTA_cfc =	133.240

Source		Effluent Limit Calculations		
PENTOXSD TRG	5.1f	AML MULT =	1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) =	0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) =	1.635	

WLA afc	**(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	**(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	**1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)**

Attachment 2

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Slippery Rock Borough WTP** NPDES Permit No.: **PA0265781** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **PWS 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
0.01	137	8.06						

					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		5710									
	Chloride (PWS)	mg/L		149									
	Bromide	mg/L		1.15									
	Sulfate (PWS)	mg/L		18.4									
	Fluoride (PWS)	mg/L		0.27									
Group 2	Total Aluminum	µg/L		0.015									
	Total Antimony	µg/L	<	2									
	Total Arsenic	µg/L	<	2									
	Total Barium	µg/L		697									
	Total Beryllium	µg/L	<	1									
	Total Boron	µg/L		120									
	Total Cadmium	µg/L	<	0.2									
	Total Chromium (III)	µg/L	<	2									
	Hexavalent Chromium	µg/L	<	1									
	Total Cobalt	µg/L	<	1									
	Total Copper	µg/L		4									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L		10									
	Dissolved Iron	µg/L	<	20									
	Total Iron	µg/L		210									
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L		3750									
	Total Mercury	µg/L		0.1									
	Total Nickel	µg/L	<	2									
	Total Phenols (Phenolics) (PWS)	µg/L		5									
	Total Selenium	µg/L	<	5									
	Total Silver	µg/L	<	0.4									
	Total Thallium	µg/L	<	2									
	Total Zinc	µg/L		22.6									
	Total Molybdenum	µg/L	<	2									
	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 1.4, May 2023

Stream / Surface Water Information

Slippery Rock Borough WTP, NPDES Permit No. PA0265781, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Slippery Rock Creek**

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	034032	24.5	1139	150.2			Yes
End of Reach 1	034032	20	1120	263.3			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	24.5	0.076										100	7		
End of Reach 1	20	0.076													

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	24.5														
End of Reach 1	20														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Slippery Rock Borough WTP, NPDES Permit No. PA0265781, 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)
24.5	11.42		11.42	0.015	0.0008	0.831	58.707	70.68	0.234	1.173	220.083
20	20.01		20.0108								

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)
24.5	62.41		62.41	0.015	0.0008	1.753	58.707	33.489	0.607	0.453	71.937
20	101.928		101.93								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.261 Analysis Hardness (mg/l): 100.19 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	145,230	
Total Antimony	0	0		0	1,100	1,100	213,004	
Total Arsenic	0	0		0	340	340	65,838	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	4,066,435	
Total Boron	0	0		0	8,100	8,100	1,568,482	
Total Cadmium	0	0		0	2.017	2.14	414	Chem Translator of 0.944 applied
Total Chromium (III)	0	0		0	570.655	1,806	349,688	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	3,155	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	18,396	

Total Copper	0	0		0	13.463	14.0	2,716	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	64.716	81.8	15,848	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	319	Chem Translator of 0.85 applied
Total Nickel	0	0		0	468.993	470	90,998	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	3.227	3.8	735	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	12,587	
Total Zinc	0	0		0	117.370	120	23,239	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): 100.05 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Fluoride (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	162,556	
Total Arsenic	0	0		0	150	150	110,834	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	3,029,460	
Total Boron	0	0		0	1,600	1,600	1,182,228	
Total Cadmium	0	0		0	0.246	0.27	200	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	74.145	86.2	63,704	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	7,681	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	14,039	
Total Copper	0	0		0	8.960	9.33	6,896	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	1,108,339	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.518	3.18	2,352	Chem Translator of 0.791 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	669	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.029	52.2	38,559	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	3,686	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	9,606	
Total Zinc	0	0		0	118.189	120	88,569	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc	Stream	Trib Conc	Fate	WQC	WQ Obj	WLA (µg/L)	Comments

Pollutants	Conc (µg/L)	CV	(µg/L)	Coef	(µg/L)	(µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Fluoride (PWS)	0	0		0	2,000	2,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	4,138	
Total Arsenic	0	0		0	10	10.0	7,389	
Total Barium	0	0		0	2,400	2,400	1,773,342	
Total Boron	0	0		0	3,100	3,100	2,290,567	
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	221,668	
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	738,893	
Total Mercury	0	0		0	0.050	0.05	36.9	
Total Nickel	0	0		0	610	610	450,725	
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	177	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 71.937 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

☑ ***Other Pollutants without Limits or Monitoring***

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Fluoride (PWS)	N/A	N/A	PWS Not Applicable
Total Aluminum	93,086	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	N/A	N/A	Discharge Conc < TQL
Total Arsenic	N/A	N/A	Discharge Conc < TQL
Total Barium	1,773,342	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	1,005,334	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	200	µg/L	Discharge Conc < TQL
Total Chromium (III)	63,704	µg/L	Discharge Conc < TQL
Hexavalent Chromium	2,022	µg/L	Discharge Conc < TQL
Total Cobalt	11,791	µg/L	Discharge Conc < TQL
Total Copper	1,741	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS

Dissolved Iron	221,668	µg/L	Discharge Conc < TQL
Total Iron	1,108,339	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	2,352	µg/L	Discharge Conc < TQL
Total Manganese	738,893	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	36.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	38,559	µg/L	Discharge Conc < TQL
Total Phenols (Phenolics) (PWS)		µg/L	PWS Not Applicable
Total Selenium	3,686	µg/L	Discharge Conc < TQL
Total Silver	471	µg/L	Discharge Conc < TQL
Total Thallium	177	µg/L	Discharge Conc < TQL
Total Zinc	14,895	µg/L	Discharge Conc ≤ 10% WQBEL
Total Molybdenum	N/A	N/A	No WQS

Attachment 3

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

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

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 12.391	1.3.2.iii	WLA cfc = 12.073
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 4.617	5.1d	LTA_cfc = 7.019

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.635	

WLA afc	**(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	**(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	**1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)**

Attachment 4

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Slippery Rock Borough WTP** NPDES Permit No.: **PA0265781** Outfall No.: **002**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Reverse Osmosis Reject Wastewater**

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
0.19	580	7.7						

					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		1950									
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		145									
	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											
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L	<										
	Total Iron	µg/L		1000									
	Total Lead	µg/L	<										
	Total Manganese	µg/L		25500									
	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											
	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 1.4, May 2023

Stream / Surface Water Information

Slippery Rock Borough WTP, NPDES Permit No. PA0265781, Outfall 002

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Slippery Rock Creek**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	034032	24.5	1139	150.2			Yes
End of Reach 1	034032	20	1120	263.3			Yes

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

Location	RMI	LFY (cfs/mi²)*	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	24.5	0.076										100	7		
End of Reach 1	20	0.076													

Q_h

Location	RMI	LFY (cfs/mi²)	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	24.5														
End of Reach 1	20														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Slippery Rock Borough WTP, NPDES Permit No. PA0265781, Outfall 002

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)
24.5	11.42		11.42	0.294	0.0008	0.832	59.199	71.113	0.238	1.157	212.553
20	20.01		20.0108								

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)
24.5	62.41		62.41	0.294	0.0008	1.742	59.199	33.986	0.608	0.452	73.197
20	101.928		101.93								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.266 Analysis Hardness (mg/l): 142.41 Analysis pH: 7.03

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	
Total Aluminum	0	0		0	750	750	8,488	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***CFC*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): 112.05 Analysis pH: 7.01

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	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	59,755	WQC = 30 day average; PMF = 1
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc	Stream	Trib Conc	Fate	WQC	WQ Obj	WLA (µg/L)	Comments

Pollutants	Conc (µg/L)	CV	(µg/L)	Coef	(µg/L)	(µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	39,836	

☑ ***CRL*** CCT (min): 73.197 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	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	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 Manganese	63.1	98.5	39,836	62,151	99,591	µg/L	39,836	THH	Discharge Conc ≥ 50% WQBEL (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
Total Aluminum	5,440	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	59,755	µg/L	Discharge Conc ≤ 10% WQBEL