pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

North West Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Amendment, Major**	Application No.	**PA0025569 A-1**
Facility Type	**Municipal**	APS ID	**997170**
Major / Minor	**Major**	Authorization ID	**1279954**

Applicant and Facility Information

Applicant Name	**Slippery Rock Municipal Authority**	Facility Name	**Slippery Rock STP**
Applicant Address	PO Box 157	Facility Address	114 Crestview Drive
	Slippery Rock, PA 16057		Slippery Rock, PA 16057
Applicant Contact	Shawn Brown	Facility Contact	Shawn Brown
Applicant Phone	(724) 290-4437	Facility Phone	(724) 794-6330
Client ID	65258	Site ID	454652
Ch 94 Load Status	Not Overloaded	Municipality	Slippery Rock Borough
Connection Status	No Limitations	County	Butler County
Date Application Received	June 24, 2019	EPA Waived?	No
Date Application Accepted	July 11, 2019	If No, Reason	Major Facility

Purpose of Application: Amendment of a Major NPDES Permit to remove the monitoring/limits for Acrolein and Acrylonitrile.

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 continue to protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:
- A. Stormwater into sewers
- B. Right of way
- C. Solids handling
- D. Effluent Chlorine Optimization and Minimization
- E. Other Permits

SPECIAL CONDITIONS:
- II. Emergency Outfall 002
- III. Solids Management
- IV. Whole Effluent Toxicity (WET)
- V. Requirements Applicable to Stormwater Outfalls
- VI. Toxics Reduction Evaluation (TRE)

There are no open violations in efacts associated with the subject Client ID (65258) as of 11/21/2019.

Approve	Deny	Signatures	Date
X		Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	
X		Justin C. Dickey, P.E. / Environmental Engineer Manager	

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	1.20
Latitude	41º 01' 49.00"	Longitude	-80º 03' 59.00"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent - Municipal sanitary sewers serving Slippery Rock Township and Slippery Rock Borough		
Receiving Waters	Slippery Rock Creek (CWF)	Stream Code	34032
NHD Com ID	126222171	RMI	24.8
Drainage Area	150.2	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	19.526	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 amendment of an NPDES permit to remove the monitoring/limits for Acrolein and Acrylonitrile for an existing discharge of 1.2 MGD of treated sewage from an existing Publicly Owned Treatment Works (POTW) in Slippery Rock Borough, Butler County.

Treatment permitted by WQM Permit no. 1012402 for the STP consists of:

Coarse bar screen with bypass, fine bar screen with bypass, grit removal, SBR basins, and UV disinfection. Sludge treatment consists of aerobic sludge digestion, sludge conditioning, and belt filter press.

Facility Area: See the topographical map (Attachment 1) and the aerial map (Attachment 2)

1. Streamflow:

The yieldrate for the Slippery Rock Creek was calculated from the drainage area and the Q_{7-10} low flow at the nearest gage station:

Slippery Rock Creek at Wurtemburg, PA:	Q_{7-10}:	30.4	cfs	(StreamStats - Attachment 3)
USGS Gage no. 03106500	Drainage Area:	398	sq. mi.	(StreamStats - Attachment 3)
	Yield Rate:	0.076	cfsm	(calculated)

The drainage area for the receiving stream was then computed using the USGS StreamStats website in order to calculate the Q_{7-10} at Outfall 001.

Slippery Rock Creek @ Outfall 001:	Drainage Area:	150.2	sq. mi.	(from StreamStats)
	Yieldrate:	0.076	cfsm	(calculated above)
	% of stream allocated:	100%	Basis:	no nearby discharges
	Q_{7-10}:	11.4	cfs	(calculated)

2. Wasteflow: Outfall 001:

Maximum discharge: 1.2 MGD = 1.85 cfs

Runoff flow period: 24 hours Basis: Runoff flow for a Municipal STP

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, Phosphorus, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine. NH_3-N, $CBOD_5$, and Dissolved Oxygen were evaluated using WQM 7.0 at the discharge point.

NO_2-NO_3, Fluoride, Phenolics, Sulfates, and Chlorides can be evaluated using PentoxSD at the nearest downstream potable water supply (PWS). Since there is significant dilution available, no modeling was performed for this facility.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits

b. Total Suspended Solids

Limits are 30 mg/l as a monthly average and 60 as a daily maximum.

Basis: Application of Chapter 92a47 technology-based limits

c. Fecal Coliform

05/01 - 09/30:	200 No./100ml	(monthly average)
	1,000 No./100ml	(instantaneous maximum)

10/01 - 04/30: 2,000 No./100ml (monthly average)
10,000 No./100ml (instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. Phosphorus

☐ Limit necessary due to:

☐ Discharge to lake, pond, or impoundment
☐ Discharge to stream

☒ Limit not necessary

Basis: Chapter 96.5 does not apply. However, a Total Phosphorus and a Total Nitrogen monitoring requirement will be added as recommended by the SOP to provide data for review during the next renewal application to ensure the discharge is not high in nutrients.

e. NO_2-NO_3, Fluoride, Phenolics, Sulfates, and Chlorides

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

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

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available.

Based on the Toxics Screening Analysis Spreadsheet (see Attachment 4), Total Dissolved Solids and Chlorides were determined to have a reasonable potential.

Since PentoxSD does not calculate WQBELs for PWS-related parameters, Total Dissolved Solids and Chlorides were evaluated using a mass-balance calculation.

PWS Evaluation:

Stream flow (sf) at the potable water supply intake = 53.1 cfs
Waste flow (wf) from the STP = 1.2 MGD = 1.85 cfs
Total flow = 54.95 cfs

Background Concentrations: No data available

Mass balance for TDS at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (1.85 cfs)(x) = (54.95 cfs)(500 mg/l)

x = 14,851 mg/l (renewal application maximum was 667 mg/l - ok)

Mass balance for Chlorides at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (1.85 cfs)(x) = (54.95 cfs)(250 mg/l)

x = 7,425 mg/l (renewal application maximum was 272 mg/l - ok)

f. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (Default value used for modeling purposes)

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

Basis: Default value used for modeling purposes

Stream Temperature: 20˚C (Default value used for modeling purposes)

Background NH_3-N concentration: 0.00 mg/l

Basis: Default value used for modeling purposes

Calculated summer NH_3-N limits: 9.4 mg/l (monthly average)
18.8 mg/l (instantaneous maximum)

Calculated winter NH_3-N limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated summer limits above (see Attachment 4). The calculated limits are more restrictive than the previous NPDES Permit. Based on the eDMR data, the new, more restrictive limits are being met, a compliance schedule will not be necessary. Per the SOP, the winter limits were set as three times the summer limits, but were capped at the technology-based limits of 25 mg/l monthly average and 50 mg/l instantaneous maximum.

g. $CBOD_5$

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (Default value used for modeling purposes)

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

Basis: Default value used for modeling purposes

Stream Temperature: 20˚C (Default value used for modeling purposes)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value used for modeling purposes

Calculated summer $CBOD_5$ limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

Calculated winter $CBOD_5$ limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the above summer limits (see Attachment 4), which are the same as the previous NPDES Permit. Since the summer limits are technology-based, the winter limits will also be technology-based, so they will also be the same as in the previous NPDES Permit.

h. Dissolved Oxygen (DO)

- ☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life.
- ☐ 5.0 mg/l - required in effluent for CWF, WWF, or TSF based on WQ Model.
- ☐ 6.0 mg/l - minimum required due to discharge going to a drainage swale or ditch.
- ☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: A new Dissolved Oxygen technology-based minimum of 4.0 mg/l will be added with this renewal for Outfall 001 as recommended by the SOP based on Chapter 93.7, and by the WQ modeling (see Attachment 4), under the authority of Chapter 92a.61.

i. Total Residual Chlorine (TRC)

- ☒ No limit necessary
- ☐ TRC limits: _____ mg/l (monthly average)
  _____ mg/l (instantaneous maximum)

Basis: No TRC limits are required as the chlorine disinfection was replaced with Ultraviolet (UV) light disinfection equipment in 2015/2016. Monitoring for UV Intensity was added with this renewal for Outfall 001 per the SOP.

j. Influent Total Suspended Solids and BOD_5

These two parameters will be required to be monitored as recommended in the SOP for POTWs, as authorized under Chapter 92a.61. Monitoring will be set at Outfall 001, which is the discharge from the STP.

4. Additional Information:

The Slippery Rock STP receives 66% of its flow from the Slippery Rock Township and 34% of its flow from the Slippery Rock Borough. All sanitary sewers flowing to the Slippery Rock STP are 100% separate sewers.

5. Reasonable Potential Analysis:

A Reasonable Potential Analysis was performed in accordance with State practices for Outfall 001 by first using the Toxics Screening Analysis Spreadsheet (see Attachment 3) to determine which parameters should be modeled using the Pentox program (see Attachment 4). The parameters modeled are listed as follows for Outfall 001:

Benzene (Acrolein and Acrylonitrile sampling results (see Attachment 7) excluding them from modeling)

Based on the PentoxSD modeling (see Attachment 4), no WQBELs are required at this time.

6. Attachment List:

Attachment 1 - Topographical Map of the Facility Area
Attachment 2 - Aerial Map of the STP
Attachment 3 - Toxics Screening Analysis Spreadsheet for Outfall 001
Attachment 4 - Pentox Modeling Printouts for Outfall 001
Attachment 5 - Toxics Screening Analysis Spreadsheet for Outfall 002
Attachment 6 - Pentox Modeling Printouts for Outfall 002
Attachment 7 - Acrolein and Acrylonitrile Sampling Results

If viewing this electronically, please refer to the following PDF to view the above Attachments:

Adobe Acrobat 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" (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 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Inst Min	XXX	XXX	XXX	1/day	Grab
CBOD5	250	400	XXX	25.0	40.0	50	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TSS Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TSS	300	450	XXX	30.0	45.0 Daily Max	60	2/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000	XXX	10000	2/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200	XXX	1000	2/week	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/day	Recorded
Total Nitrogen	Report Avg Qrtly	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	250	XXX	XXX	25.0	XXX	50	2/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	94	XXX	XXX	9.4	XXX	18.8	2/week	24-Hr Composite

Outfall 001, Continued (from Permit Effective Date through July 31, 2021)

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 Phosphorus	Report Avg Qrtly	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Chronic WET - Ceriodaphnia Survival (TUc)	XXX	XXX	XXX	7.1 Daily Max	XXX	XXX	See Permit	24-Hr Composite
Chronic WET - Ceriodaphnia Reproduction (TUc)	XXX	XXX	XXX	7.1 Daily Max	XXX	XXX	See Permit	24-Hr Composite

Compliance Sampling Location: at Outfall 001, after Ultraviolet (UV) light disinfection, prior to mixing with any other wastewaters.

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 Coliforms are technology-based on Chapter 92a.47. Monitoring for influent BOD5 and Total Suspended Solids is based on Chapter 92a.61. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for Ultraviolet (UV) light intensity, Total Nitrogen, and Total Phosphorus are based on Chapter 92a.61. The WET limits are water quality-based.

Compliance History

DMR Data for Outfall 001 (from October 1, 2018 to September 30, 2019)

Parameter	SEP-19	AUG-19	JUL-19	JUN-19	MAY-19	APR-19	MAR-19	FEB-19	JAN-19	DEC-18	NOV-18	OCT-18
Flow (MGD) Average Monthly	0.63473	0.53672	0.70304	0.78562	0.69019	0.8277	0.68405	0.93712	0.68748	0.71127	0.89411	0.72163
Flow (MGD) Daily Maximum	0.88833	0.76275	1.53038	1.49508	1.16812	1.37674	0.85774	1.78365	1.71323	1.23915	1.20492	1.03488
pH (S.U.) Instantaneous Minimum	7.02	7.03	7.08	7.0	6.99	7.09	7.09	7.08	7.06	7.09	7.02	7.19
pH (S.U.) Instantaneous Maximum	7.93	7.4	7.44	7.53	7.26	7.33	7.44	7.45	7.42	7.81	7.5	7.87
DO (mg/L) Instantaneous Minimum	4.14	4.14	4.42	4.05	4.15	4.14	4.61	4.75	5.61	5.16	4.33	4.15
CBOD5 (lbs/day) Average Monthly	< 16	< 15	< 16	< 20	< 18	< 30	< 22	< 46	< 29	< 16	< 24	< 18
CBOD5 (lbs/day) Weekly Average	< 18	< 17	< 22	< 29	< 22	< 42	36	62	< 84	< 19	< 29	< 23
CBOD5 (mg/L) Average Monthly	< 3	< 3	< 3	< 3	< 3	< 5	< 4	< 5	< 4	< 3	< 3	< 3
CBOD5 (mg/L) Weekly Average	< 3	< 3	< 3	< 3	< 3	< 6	6	7	< 7	< 3	< 3	< 3
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	1234	1045	752	691	836	1348	1320	1530	1050	1018	1341	18868
BOD5 (mg/L) Raw Sewage Influent Average Monthly	231	210	145	111	140	211	241	183	167	186	178	242
TSS (lbs/day) Average Monthly	< 47	< 26	< 26	< 28	< 37	< 46	< 38	< 69	< 24	< 18	< 43	< 31
TSS (lbs/day) Raw Sewage Influent Average Monthly	804	560	503	483	668	1203	732	1011	739	653	1002	7554
TSS (lbs/day) Weekly Average	62	30	< 36	32	< 45	72	52	92	< 50	< 28	< 44	< 34
TSS (mg/L) Average Monthly	< 9	< 6	< 4	< 5	< 6	< 7	< 7	< 8	< 4	< 3	< 5	< 5
TSS (mg/L) Raw Sewage Influent Average Monthly	152	1262	93	78	111	188	128	127	128	109	127	172
TSS (mg/L) Daily Maximum	25	13	8	9	< 8	17	11	12	11	7	9	< 3
Fecal Coliform (No./100 ml) Average Monthly	< 4	< 2	< 1	< 1	< 2	< 1	< 2	2	< 1	< 1	< 2	< 1

Fecal Coliform (No./100 ml) Instantaneous Maximum	870	7	1	6	178	3	12	4	4	7	201	16
UV Intensity (mW/cm²) Daily Maximum	65	63	62	64	64	64	65	32	32	64	64	64
Total Nitrogen (lbs/day) Average Quarterly	20.22			76.8			18.91			47.53		
Total Nitrogen (mg/L) Average Quarterly	3.96			14			4.23			8.56		
Ammonia (lbs/day) Average Monthly	3	0.9	1	2	11	40	20	25	4	1	3	2
Ammonia (mg/L) Average Monthly	0.4	0.2	0.2	0.2	1.9	6.0	4.0	3.0	1.0	1.0	0.4	0.2
Total Phosphorus (lbs/day) Average Quarterly	7.05			10.6			8.36			18.82		
Total Phosphorus (mg/L) Average Quarterly	1.38			1.93			1.87			3.39		
Acrolein (lbs/day) Average Monthly	< 0.006	< 0.004	< 0.004	< 0.008	< 0.005	< 0.006	< 0.005	< 0.01	< 0.005	< 6	< 9	< 7
Acrolein (mg/L) Average Monthly	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 1	< 1	< 1
Acrylonitrile (lbs/day) Average Monthly	< 0.003	< 0.002	< 0.002	< 0.004	< 0.003	< 0.003	< 0.003	< 0.005	< 0.003	< 3	< 5	< 4
Acrylonitrile (mg/L) Average Monthly	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.5	< 0.5	< 0.5
Chronic WET - Ceriodaphnia Survival (TUc) Daily Maximum	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chronic WET - Ceriodaphnia Reproduction (TUc) Daily Maximum	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Discharge, Receiving Waters and Water Supply Information

Outfall No.	002	Design Flow (MGD)	1.20
Latitude	41º 03' 20.81"	Longitude	-80º 03' 38.19"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent - Emergency Outfall of treated sanitary wastewater from the Slippery Rock STP		
Receiving Waters	Unnamed Tributary to the Slippery Rock Creek (CWF)	Stream Code	N/A
NHD Com ID	126222141	RMI	N/A
Drainage Area	0.33	Yield (cfs/mi^2)	0.13
Q_{7-10} Flow (cfs)	0.0429	Q_{7-10} Basis	calculated
Elevation (ft)	1246	Slope (ft/ft)	0.00742
Watershed No.	20-C	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation and Turbidity		
Source(s) of Impairment	Surface Mining		
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 amendment of an NPDES permit to remove the monitoring/limits for Acrolein and Acrylonitrile for an existing discharge of 1.2 MGD of treated sewage from an existing Publicly Owned Treatment Works (POTW) in Slippery Rock Borough, Butler County.

Outfall 002 is only used as an Emergency discharge in the event the main Outfall 001 needs maintenance. There is no monitoring equipment in place at Outfall 002. It has only discharged between 2014 and 2015, after the new SBRs were constructed. The discharge line for Outfall 001 would air lock and some of the effluent would discharge out of the manhole to Outfall 002. In the summer of 2015, the UV effluent was rerouted from the SBR plant to an old final clarifier tank to temper the discharge and eliminate the air lock. There has not been a discharge from Outfall 002 since that time.

Treatment permitted by WQM Permit no. 1012402 for the STP consists of:

Coarse bar screen with bypass, fine bar screen with bypass, grit removal, SBR basins, and UV disinfection. Sludge treatment consists of aerobic sludge digestion, sludge conditioning, and belt filter press.

Facility Area: See the topographical map (Attachment 1) and the aerial map (Attachment 2)

1. Streamflow:

The yieldrate for the Slippery Rock Creek was calculated from the drainage area and the Q_{7-10} low flow at the nearest gage station:

Slippery Rock Creek at Wurtemburg, PA:	Q_{7-10}:	30.4	cfs	(StreamStats - Attachment 3)
USGS Gage no. 03106500	Drainage Area:	398	sq. mi.	(StreamStats - Attachment 3)
	Yield Rate:	0.076	cfsm	(calculated)

The drainage area for the receiving stream was then computed using the USGS StreamStats website in order to calculate the Q_{7-10} at Outfall 001.

Unnamed Tributary to the Slippery	Drainage Area:	0.33	sq. mi.	(from StreamStats)
Rock Creek at Outfall 002:	Yieldrate:	0.076	cfsm	(calculated above)
	% of stream allocated:	100%	Basis:	no nearby discharges
	Q_{7-10}:	0.025	cfs	(calculated)

2. Wasteflow: Outfall 002:

Maximum discharge: 1.2 MGD = 1.85 cfs

Runoff flow period: 24 hours Basis: Runoff flow for a Municipal STP

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, Phosphorus, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine. NH_3-N, $CBOD_5$, and Dissolved Oxygen were evaluated using WQM 7.0 at the discharge point.

NO_2-NO_3, Fluoride, Phenolics, Sulfates, and Chlorides can be evaluated using PentoxSD at the nearest downstream potable water supply (PWS). Since there is significant dilution available, no modeling was performed for this facility.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits

b. Total Suspended Solids

Limits are 30 mg/l as a monthly average and 60 as a daily maximum.

Basis: Application of Chapter 92a47 technology-based limits

c. Fecal Coliform

05/01 - 09/30:	200 No./100ml	(monthly average)
	1,000 No./100ml	(instantaneous maximum)
10/01 - 04/30:	2,000 No./100ml	(monthly average)
	10,000 No./100ml	(instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. Phosphorus

☐ Limit necessary due to:

☐ Discharge to lake, pond, or impoundment
☐ Discharge to stream

☒ Limit not necessary

Basis: Chapter 96.5 does not apply. However, a Total Phosphorus and a Total Nitrogen monitoring requirement will be added as recommended by the SOP to provide data for review during the next renewal application to ensure the discharge is not high in nutrients.

e. NO_2-NO_3, Fluoride, Phenolics, Sulfates, and Chlorides

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

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

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available.

Based on the Toxics Screening Analysis Spreadsheet (see Attachment 4), Total Dissolved Solids and Chlorides were determined to have a reasonable potential.

Since PentoxSD does not calculate WQBELs for PWS-related parameters, Total Dissolved Solids and Chlorides were evaluated using a mass-balance calculation.

PWS Evaluation:

Stream flow (sf) at the potable water supply intake = 53.1 cfs
Waste flow (wf) from the STP = 1.2 MGD = 1.85 cfs
Total flow = 54.95 cfs

Background Concentrations: No data available

Mass balance for TDS at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (1.85 cfs)(x) = (54.95 cfs)(500 mg/l)

x = 14,851 mg/l (renewal application maximum was 667 mg/l - ok)

Mass balance for Chlorides at the potable water supply intake:

(sf @ PWS)(bkrd. conc.) + (wf)(x) = (tot. flow)(criteria)
(53.1 cfs)(0 mg/l) + (1.85 cfs)(x) = (54.95 cfs)(250 mg/l)

x = 7,425 mg/l (renewal application maximum was 272 mg/l - ok)

f. Ammonia-Nitrogen (NH_3-N) - Outfall 002

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (Default value used for modeling purposes)

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

Basis: Default value used for modeling purposes

Stream Temperature: 20˚C (Default value used for modeling purposes)

Background NH_3-N concentration: 0.00 mg/l

Basis: Default value used for modeling purposes

NH_3-N Summer limits: 1.2 mg/l (monthly average)
2.4 mg/l (instantaneous maximum)

NH_3-N Winter limits: 3.6 mg/l (monthly average)
7.2 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated summer limits above (see Attachment 5). Since the summer limits are water quality-based, the winter limits will be set as three times the summer limits. The calculated limits are more restrictive than the previous NPDES Permit. However, since the limits can be met based on the eDMR data, the limits will be set without a compliance schedule.

g. $CBOD_5$ - Outfall 002

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (Default value used for modeling purposes)

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

Basis: Default value used for modeling purposes

Stream Temperature: 20˚C (Default value used for modeling purposes)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value used for modeling purposes

$CBOD_5$ Summer limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

$CBOD_5$ Winter limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the above summer limits (see Attachment 5), which are the same as the previous NPDES Permit. Since the summer limits are technology-based, the winter limits will also be technology-based, so they will also be the same as in the previous NPDES Permit.

h. Dissolved Oxygen (DO)

☐ 4.0 mg/l - minimum desired in effluent to protect all aquatic life.
☒ 5.0 mg/l - required in effluent for CWF, WWF, or TSF based on WQ Model.
☐ 6.0 mg/l - minimum required due to discharge going to a drainage swale or ditch.
☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: A new Dissolved Oxygen water quality-based minimum of 5.0 mg/l will be added with this renewal for Outfall 002 as recommended by the WQ modeling (see Attachment 5), under the authority of Chapter 92a.61. A three-year compliance schedule was put in place to provide the Permittee time to collect samples and to adjust to the new limit.

i. Total Residual Chlorine (TRC)

☒ No limit necessary
☐ TRC limits: _____ mg/l (monthly average)
_____ mg/l (instantaneous maximum)

Basis: No TRC limits are required as the chlorine disinfection was replaced with Ultraviolet (UV) light disinfection equipment in 2015/2016. Monitoring for UV Intensity was added with this renewal for Outfall 002 per the SOP.

4. Reasonable Potential Analysis:

Outfall 002 is an emergency discharge consisting of the same wastewater as Outfall 001. While it has rarely discharged, it was modeled in PentoxSD using the same parameters as Outfall 001. A Reasonable Potential Analysis was performed in accordance with State practices for Outfall 002 by using the Toxics Screening Analysis Spreadsheet (see Attachment 5) to determine which parameters should be modeled using the PentoxSD program (see Attachment 6). The parameters modeled are listed as follows for Outfall 002:

Benzene (Acrolein and Acrylonitrile sampling results (see Attachment 7) excluding them from modeling)

Based on the PentoxSD modeling (see Attachment 6), a WQBEL for Benzene is still required. The three-year compliance schedule will remain in place from the previous NPDES Permit renewal.

5. Attachment List:

Attachment 1 - Topographical Map of the Facility Area
Attachment 2 - Aerial Map of the STP
Attachment 3 - Toxics Screening Analysis Spreadsheet for Outfall 001
Attachment 4 - Pentox Modeling Printouts for Outfall 001
Attachment 5 - Toxics Screening Analysis Spreadsheet for Outfall 002
Attachment 6 - Pentox Modeling Printouts for Outfall 002
Attachment 7 - Acrolein and Acrylonitrile Sampling Results

If viewing this electronically, please refer to the following PDF to view the above Attachments:

Adobe Acrobat 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" (362-0400-001), SOPs and/or BPJ.

Outfall 002, Effective Period: Permit Effective Date through July 31, 2021.

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	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	2/discharge	Grab
DO	XXX	XXX	Report Inst Min	XXX	XXX	XXX	2/discharge	Grab
CBOD5	250	XXX	XXX	25.0	XXX	50.0	2/discharge	Grab
TSS	300	XXX	XXX	30.0	XXX	60.0	2/discharge	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000	XXX	10000	2/discharge	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200	XXX	1000	2/discharge	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report Daily Max	XXX	XXX	2/discharge	Recorded
Ammonia-Nitrogen Nov 1 - Apr 30	36.0	XXX	XXX	3.6	XXX	7.2	2/discharge	Grab
Ammonia-Nitrogen May 1 - Oct 31	12.0	XXX	XXX	1.2	XXX	2.4	2/discharge	Grab
Benzene (ug/L)	Report	XXX	XXX	Report	XXX	Report	2/discharge	Grab

Compliance Sampling Location: at Outfall 002, after Ultraviolet (UV) light disinfection, prior to mixing with any other wastewaters.

Flow and Dissolved Oxygen are monitor only based on Chapter 92a.61. The limits for pH are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliforms are technology-based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for Ultraviolet (UV) light intensity and Benzene is based on Chapter 92a.61.

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 002, Effective Period: August 1, 2021 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	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	2/discharge	Grab
DO	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	2/discharge	Grab
CBOD5	250	XXX	XXX	25.0	XXX	50.0	2/discharge	Grab
TSS	300	XXX	XXX	30.0	XXX	60.0	2/discharge	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000	XXX	10000	2/discharge	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200	XXX	1000	2/discharge	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report Daily Max	XXX	XXX	2/discharge	Recorded
Ammonia-Nitrogen Nov 1 - Apr 30	36.0	XXX	XXX	3.6	XXX	7.2	2/discharge	Grab
Ammonia-Nitrogen May 1 - Oct 31	12.0	XXX	XXX	1.2	XXX	2.4	2/discharge	Grab
Benzene (µg/l)	0.013	XXX	XXX	1.39	XXX	3.48	2/discharge	Grab

Compliance Sampling Location: at Outfall 002, after Ultraviolet (UV) light disinfection, prior to mixing with any other wastewaters.

Flow is monitor only based on Chapter 92a.61. The limits for pH are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliforms are technology-based on Chapter 92a.47. The limits for Ammonia-Nitrogen and Dissolved Oxygen are water quality-based on Chapter 93.7. Monitoring for Ultraviolet (UV) light intensity is based on Chapter 92a.61. The limits for Benzene are water quality-based on Chapter 16.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	0.00
Latitude	41º 03' 19.19"	Longitude	-80º 03' 37.78"
Quad Name	-	Quad Code	-
Wastewater Description:	Stormwater runoff from the maintenance building area		
Receiving Waters	Unnamed Tributary to the Slippery Rock Creek (CWF)	Stream Code	N/A
NHD Com ID	126222141	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.	20-C	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation and Turbidity		
Source(s) of Impairment	Surface Mining		
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

Changes Since Last Permit Issuance: None.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	004	Design Flow (MGD)	0.00
Latitude	41º 03' 19.38"	Longitude	-80º 03' 39.00"
Quad Name	-	Quad Code	-
Wastewater Description:	Stormwater runoff from the oxidation ditch/final clarifier area		
Receiving Waters	Unnamed Tributary to the Slippery Rock Creek (CWF)	Stream Code	N/A
NHD Com ID	126222141	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.	20-C	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation and Turbidity		
Source(s) of Impairment	Surface Mining		
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

Changes Since Last Permit Issuance: None.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	005	Design Flow (MGD)	0.00
Latitude	41º 03' 19.75"	Longitude	-80º 03' 38.84"
Quad Name	-	Quad Code	-
Wastewater Description:	Stormwater runoff from the northern area of STP site		
Receiving Waters	Unnamed Tributary to the Slippery Rock Creek (CWF)	Stream Code	N/A
NHD Com ID	126222141	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.	20-C	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation and Turbidity		
Source(s) of Impairment	Surface Mining		
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

Changes Since Last Permit Issuance: None.