pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0025445**
Facility Type	**Municipal**	APS ID	**1028510**
Major / Minor	**Minor**	Authorization ID	**1336260**

Applicant and Facility Information

Applicant Name	**Wampum Borough**	Facility Name	**Wampum Borough STP**
Applicant Address	PO Box 65	Facility Address	101 Water Street
	Wampum, PA 16157-0065		Wampum, PA 16157
Applicant Contact	Karolee Loughhead	Facility Contact	Charles G. Kelly Jr, Operator
Applicant Phone	(724) 333-3929	Facility Phone	(724) 535-8203
Applicant E Mail	wampumboro@zoominternet.net	Contact E Mail	ckellyjr@zoominternet.net
Client ID	38145	Site ID	262492
Municipality	Wampum Borough	County	Lawrence
Ch 94 Load Status	Not Overloaded	Connection Status	No Limitations
SIC Code	**4952**	SIC Description	Sewage treatment
Application Received	November 30, 2020	EPA Waived?	Yes
Application Accepted	December 30, 2020	If No, Reason	
Application Purpose	NPDES permit renewal		

Summary of Review

No violations are listed in WMS. Dan Pudlick inspected on August 5, 2019 and reported Overflow Outfall 002 as plugged.

Daily DO, pH and TRC monitoring is proposed. It was previously proposed then relaxed to 5/week.

This facility is listed for a sanitary sewer overflow (Outfall 002) with electronic reporting. This outfall is reported as not in use as of the 1973 construction when it was plugged. As this is raw sewage discharge it cannot be legally discharged and must be reported as an illegal (non-complying) discharge on the Department's Non-Compliance Reporting Form (3800-FM-BPNPSM0440 3/2012). Also, there should be no need to provide Outfall 002 eDMR reporting.

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.

Approve	Deny	Signatures	Date
X		William H. Mentzer William H. Mentzer, P.E. Environmental Engineering Specialist	January 27, 2021
X		Justin C. Dickey Justin C. Dickey, P.E. Environmental Engineer Manager	March 1, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.208
Latitude DP	40º 53' 23.00"	Longitude DP	-80º 20' 17.00"
Latitude NHD	40º 53' 26.66"	Longitude NHD	-80º 20' 15.49"
Quad Name	New Castle South	Quad Code	1103
Wastewater:	Treated municipal sanitary sewer wastes		

Receiving Waters	Beaver River	Stream Code	33953
NHD Com ID	134449658	RMI	15.47
Drainage Area	2 237.70	Yield (cfs/mi^2)	0.23
Q_{7-10} Flow (cfs)	515	Q_{7-10} Basis	Beaver River at Wampum
Elevation (ft)	739.14	Slope (ft/ft)	=1.72
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use	statewide	Existing Use Qualifier	none
Exceptions to Use	none	Exceptions to Criteria	none

Comments: The 2014 Pa Integrated Water Quality Monitoring & Assessment. Report lists the basin as Attaining some uses. The outfall is 0.07 mile above Snake Run.

Assessment Status	Impaired		
Cause(s) of Impairment	unknown and polychlorinated biphenyls (PCBS)		
Source(s) of Impairment	unknown		
TMDL Status	**pending**	Name	
Comments	**Impairments linked to organics & PCB through fish consumption and aquatic life.**		

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
TDS	450	90% of the 500 mg/L in stream criteria at Beaver Falls

Nearest Downstream Public Water Supply Intake	Beaver Falls Municipal Authority at Eastvale		
PWS Waters	Beaver River	Flow at Intake (cfs)	~428
PWS RMI	5.39	Distance from Outfall (mi)	10.15

Changes Since Last Permit Issuance: none

Other Comments: This discharge should not impact any downstream intakes.

This is a minor POTW discharge in a known high TDS basin with no reported TDS sources.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	002	Design Flow (MGD)	0
Latitude	40º 53' 32.29"	Longitude	-80º 20' 19.33"
Latitude	40º 53' 31.14"	Longitude	-80º 20' 18.55"
Quad Name	New Castle south	Quad Code	1103
Wastewater Description:	Sanitary Sewer Overflow		

Receiving Waters	Beaver River	Stream Code	33953
NHD Com ID	134449658	RMI	15.57
Drainage Area	2234.60	Yield (cfs/mi^2)	023
Q_{7-10} Flow (cfs)	520	Q_{7-10} Basis	Beaver River at Wampum
Elevation (ft)	739.30	Slope (ft/ft)	1.72
Watershed No.	20-B	Chapter 93 Class.	WWF
Existing Use	statewide	Existing Use Qualifier	none
Exceptions to Use	none	Exceptions to Criteria	none
Comments	The SSO is reported as plugged		

Assessment Status	Impaired		
Cause(s) of Impairment	unknown and polychlorinated biphenyls		
Source(s) of Impairment	unknown		
TMDL Status	**pending**	Name	
Comments	**An approved lower Beaver River PCB is dated April 9, 2001**		

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

Nearest Downstream Public Water Supply Intake	Beaver Falls MA		
PWS Waters	Beaver River	Flow at Intake (cfs)	NA
PWS RMI	5.39	Distance from Outfall (mi)	10.19

Changes Since Last Permit Issuance: none

Other Comments: Outfall 002 is reported as plugged

Treatment Facility Summary

Treatment Facility Name: Wampum Borough STP

WQM No.	Issuance		
6425	19390128		superseded requirements
6425 A1	19700128		superseded requirements
3771403	19710625		superseded requirements
3777403	19771026	grinder pumps/wet well, aeration, settling, chlorination	superseded requirements
3777403 A1	20140725	Headworks grinder fine screen and compactor	2003 Sewerage Conditions

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Extended Aeration	Gas Chlorine	0.208

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.208	361	Not Overloaded	Holding Tank	Landfill

Changes Since Last Permit Issuance: none. Note that all of the above permits except 2777404 A-1 include superceded NPDES program requirements.

Treatment: comminution (grinder, fine screen, and compactor), flow splitting (diversion), aeration, settling, chlorination, and sludge holding.

TREATMENT

The aeration system is two parallel aeration tanks with cross-connected settlers. Sludge can be returned to either aeration tank. No sludge dewatering reported.

377403 A-1: 5/2003 Sewerage Conditions: 1, 4, 7, 9, 10, 11 (PA0025445), 12, 13, 14, 17, 21, 22, 23, 24, 25, 26, and 27. The additional equipment (amendment 1) design flow is 0.5-MGD. The treatment facility mean flow is 0.066-MGD with a maximum 0.48-MGD design flow.

Other Comments: Sludge is currently removed monthly and hauled by Dalton Sanitary, Ellwood City. Disposal is at New Castle and Beaver Falls. Facility has been enrolled in eDMR since July 2011.

Wayne Twp. Flow measured at influent site with a Doppler meter. This unit was installed 11/1/13 to replace a pulsonic meter. Influent monitoring is with a magmeter and ultrasonic meter; Effluent with an ultrasonic meter. New effluent meters were installed on April 4, 2012.

Sludge treatment and storage is provided in a 12000-gallon tank sludge holding tank.

The reported 0.25/0.26-MGD hydraulic design flow source is not in the WQM permit or supporting documentation.

3777403 is for an extended aeration treatment facility with 0.110-MGD average flow and 0.206-MGD monthly maximum flow. This facility replaced an Imhoff tank-based system.

3771402 is for an extended aeration treatment facility with for a 0.15-MGD design flow. This facility may have been resized and replaced prior to be being built.

SS BYPASS

The separate sanitary sewer system includes an overflow on Orchard Street at the STP. Minimum required treatment is according to the EPA POTW secondary treatment definition. As no treatment is installed compliance with the federal requirements is not possible and any discharge is a secondary treatment requirement violation. As of September 27, 2000, this outfall has not been included in the NPDES permit due to Chapter 94 requirements.

The discharge is to be used only for equipment failure or flooding which may not justify the discharge or preclude any legal action by the Department. Any discharge is to be reported on the Non-Compliance Reporting Form.

No current discharge is reported.

LOCATION

NHD places the STP Outfall 001 at 0.07-miles (eMAP RMI 15.47) above Snake Run

NHD also places Overflow Outfall 002 at 0.16-miles (eMAP RMI 15.57) above Snake Run at the treatment facility.

Changes Since Last Permit Issuance: none

Other Comments:

The facility serves Wampum Borough (76% contribution, 100% sanitary sewers and 717 people) and Wayne Township (24% contribution, 100% sanitary sewers and 350 people).

APPLICATION DATA

			Influent							Effluent		
	Year	Month	Mean MGD	Min PPD	Mean PPD	Max PPD	Min mg/L	Mean mg/L	Max mg/L	Min mg/L	Mean mg/L	Max mg/L
Average Design			0.208									
Hydraulic Design			0.250									
Organic Design					361							
Annual average	2019		0.085									
	2018		0.093									
	2017		0.064									
Highest Monthly Average	previous	February	0.127									
BOD					139	426		183	426			
TSS					113	152		195	206			
pH										6.7		7.1
TRC										0.5		
DO										4.0	4.8	
Fecals											16	73
CBOD5											4	15
TSS											15	31
NH3N											0.56	7.54
NH3N											28.9*	
N											19.2	32
P											3	17
P											6.09*	
Cu											0.024	
Lead											< 0.007*	
Zinc											0.049*	
Nitrite											0.16*	
Nitrate											< 2.0*	
TDS											1070*	
TKN											45.3*	

Previous year sludge production 16 790-dry tons\

* From supplemental report

Compliance History

Compliance History

DMR Data for Outfall 001 (from December 1, 2019 to November 30, 2020)

Parameter	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19
Flow (MGD) Ave Mon	0.054	0.049	0.062	0.064	0.048	0.048	0.068	0.086	0.111	0.088	0.087	0.081
Flow (MGD) Wkly Ave	0.077	0.120	0.182	0.104	0.084	0.061	0.118	0.113	0.194	0.131	0.116	0.123
pH (S.U.) Inst Min	6.9	6.9	6.8	6.8	6.7	6.6	6.7	6.7	6.8	6.8	6.9	6.8
pH (S.U.) Inst Max	7.1	7.1	7.0	7.0	7.0	7.0	7.1	7.0	7.0	7.1	7.2	7.0
DO (mg/L) Minimum	4.7	4.9	4.5	4.9	4.4	4.2	4.0	4.1	5.0	4.9	4.6	4.4
TRC (mg/L) Ave Mon	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TRC (mg/L) Inst Max	0.7	0.7	0.6	0.7	0.7	0.8	0.9	1.0	0.7	0.7	0.7	0.8
CBOD5 (PPD) Ave Mon	3.5	3.7	4.5	4.0	2.8	3.5	4.2	5.4	4.4	4.0	3.3	2.6
CBOD5 (PPD) Wkly Ave	3.9	4.7	5.3	5.1	3.7	4.0	5.5	7.5	6.1	6.2	6.9	5.6
CBOD5 (mg/L) Ave Mon	9	9	9	10	7	9	15	8	6	6	5	4
CBOD5 (mg/L) Wkly Ave	11	9	11	12	11	10	11	9	8	9	8	7
BOD5 (PPD) Infl Ave Mon	180	149	176	171	143	142	145	188	119	96	74	66
BOD5 (PPD) Infl Wkly Ave	251	224	208	201	169	152	165	206	190	145	92	87
BOD5 (mg/L) Infl Ave Mon	350	284	302	320	313	301	275	282	196	173	129	111
BOD5 (mg/L) Infl Wk Ave	502	302	321	399	333	303	305	303	291	212	149	133
TSS (PPD) Ave Mon	5.9	9.3	4.6	4.3	2.8	3.0	2.0	3.6	4.5	6.2	4.5	8.8
TSS (PPD) Infl Ave Mon	97	122	108	64	64	77	77	127	93	90	71	118
TSS (PPD) Infl Wkly Ave	109	181	116	136	77	110	94	226	147	126	91	164
TSS (PPD) Wkly Ave	8.2	15.6	6.5	6.5	3.7	4.4	4.6	9.4	17.7	12.8	7.4	12.8
TSS (mg/L) Ave Mon	14	20	9	11	8	7	5	5	8	8	6	12
TSS (mg/L) Infl Ave Mon	189	232	188	112	138	164	149	180	153	156	120	216
TSS (mg/L) Infl Wkly Ave	208	258	212	192	168	244	208	312	200	192	156	240
TSS (mg/L) Wkly Ave	19	27	12	19	10	10	13	13	20	19	10	16
F Col (#/100 ml) Geo Ave	225	27	113	75	14	145	18	24	78	30	54	12
F Col (#/100 ml) Inst Max	44	64	30	32	42	20	11	17	102	40	126	22
T N (mg/L) Ave Mon	23.6	25.5	31.2	32.3	16.0	29.0	24.5	22.0	20.5	17.0	20.0	21.0
Am (mg/L) Ave Mon	0.72	< 0.30	< 0.42	< 1.65	0.28	0.19	0.37	0.27	0.19	1.69	0.23	0.21
T P (mg/L) Ave Monthly	2.80	3.25	3.38	3.35	3.60	3.20	3.55	2.25	2.60	1.23	2.60	2.65

pH median summer 6.9-SU annually 6.95-SU mean summer 6.88-SU annually 6.92-SU
TSS/BOD ratio 1.2

Compliance History

No violations listed.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.208
Latitude 40º 53' 23.00" **Longitude** -80º 20' 17.00"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)
DO	4.0	Daily minimum		BPJ

Comments: Previously the 4.0-mg/L minimum daily DO limitation was added.

Water Quality-Based Limitations

A Sewerage Program "Reasonable Potential Analysis" determined the following parameters were candidates for limitations: CBOD5, TSS, phosphorus, nitrogen, ammonia, dissolved oxygen, and pH.

The Beaver River is listed as partially attaining statewide uses. In North Beaver Township, Wayne Township and Wampum Borough the Beaver River was classified as aquatic life impaired in 2006

Local background at Moravia in mg/L

Zinc	0.013	TDS	282	Sulfate	29.8	Potassium	3.57	Sodium	40.5	Manganese	0.14
Magnesium	7.23	Lead	0.005	Iron	1.14	Chloride	70.2	Calcium	32.1	Barium	0.038
Aluminum	0.425	Copper	< 0.01	Barium	0.038						

Sub--basin Copper is also reported at 0.004

Downstream

Hardness 128 186.87 mean 157.44

The following limitations were determined through water quality modeling (output files attached):

Parameter		Limit (mg/l)			SBC	Technology			WQ Model		
CBOD5			25	50	NA		25	50		25	50
TSS			30	60			30	60		NA	NA
Nitrogen							NA	NA		NA	NA
Ammonia as N	summer		25	50			NA	NA		25	50
	Winter		25	50			NA	NA		25	50
Phosphorus			NA				NA	NA		NA	NA
DO		4.0				4.0			4.0		
TRC			0.5	1.6			0.5	1.6		0.5	1.6
pH		6.0		9.0					6.0		9.0

Comments:

Secondary treatment is controlling.

Best Professional Judgment (BPJ) Limitations

Comments: NA

Anti-Backsliding

Comments: NA

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	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	43.5	70.0	XXX	25.0	40.0	50	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
TSS	52.5	78.8	XXX	30.0	45.0	60	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Ammonia	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite

Compliance Sampling Location: Outfall 001 after disinfection

Model Results

Wampum Borough, NPDES Permit No. PA0025445, Outfall 001

Instructions | *Results* | RETURN TO INPUTS | SAVE AS PDF | PRINT | (●) All ( ) Inputs ( ) Results ( ) Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.037 Analysis Hardness (mg/l): 156.48 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	
Total Copper	4	0		0	20.493	21.3	1,047	Chem Translator of 0.96 applied
Total Lead	5	0		0	104.781	144	8,384	Chem Translator of 0.726 applied
Total Zinc	13	0		0	171.250	175	9,758	Chem Translator of 0.978 applied

☑ ***CFC***

CCT (min): 720 PMF: 0.256 Analysis Hardness (mg/l): 157.3 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	
Total Copper	4	0		0	13.189	13.7	4,002	Chem Translator of 0.96 applied
Total Lead	5	0		0	4.106	5.66	277	Chem Translator of 0.725 applied
Total Zinc	13	0		0	173.413	176	66,884	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.256 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Total Copper	4	0		0	N/A	N/A	N/A	
Total Lead	5	0		0	N/A	N/A	N/A	
Total Zinc	13	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 720 PMF: 0.256 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 Copper	4	0		0	N/A	N/A	N/A	
Total Lead	5	0		0	N/A	N/A	N/A	
Total Zinc	13	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
Total Copper	671	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	277	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	6,254	µg/L	Discharge Conc ≤ 10% WQBEL

Discharger	Wampum Borough	Wednesday, January 6, 2021
Site	Wampum Borough STP	Revised Thursday, January 7, 2021
Municipality	Wampum Borough	
County	Lawrence	
NPDES Permit	PA0025445	

TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

517.4681	**= Q stream (cfs)**	**0.5**	**= CV Daily**
0.0465	**= Q discharge (MGD)**	**0.5**	**= CV Hourly**
30	**= no. samples**	**1**	**= AFC_Partial Mix Factor**
0.4	**= 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)**		**=Decay Coefficient (K)**

Source	Reference	AFC Calculations		Reference	CFC Calculations	
TRC	**1.3.2.iii**	WLA afc =	3014.096	**1.3.2.iii**	WLA cfc =	2956.540
PENTOXSD TRG	**5.1a**	LTAMULT afc =	0.373	**5.1c**	LTAMULT cfc =	0.581
PENTOXSD TRG	**5.1b**	LTA_afc=	1123.124	**5.1d**	LTA_cfc =	1718.794

Source		Effluent Limit Calculations		
PENTOXSD TRG	5.1f	AML MULT =	1.231	
PENTOXSD TRG	5.1g	LIMIT (mg/l) =	0.500	BAT/BPJ
		X 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)**

(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)).... ....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)

	Chlorine Required		=	perennial	Chlorine Demand	+	Chlorine Residual
Stream	Reach/Node		1	1			
Stream	Flow	Conditions		perennial			
Stream	Code			33953			
	Function						
Samples				30			
reach	outfall		RMI	15.47			
	Reach End		RMI	12.28			
reach			feet	16843.2			
drainage			sq miles	2237.7			
TRC	limitation	average	mg/L	0.500			
		maximum	mg/L	1.635			
elevation		modelled	feet	739.14			
elevation		modelled	feet	721.81			
slope		modelled	foot/foot	0.001			
low flow			cfs/sq mi	0.231			
discharge			mgd	0.0465			
Runoff	Period		hours	24.000			

BAT is adequate

stream	flow		cfs	517.46813
stream	flow		MGD	334.448446
stream	flow	total	MGD	334.494946
stream	chlorine	demand	mg/L	0.4
discharge	discharge	demand	mg/L	
stream	Total Stream/Waste		ratio	7193.4

permitted	TRC	mean	BAT	0.5
permitted	TRC	maximum	BAT	1.6
		AFC	WLA	**PA0239445**

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
33953	BEAVER RIVER	**15.570**	739.30	2234.60	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.230	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
Wampum Boro #2	PA0239445B	0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
33953	BEAVER RIVER	**15.470**	739.14	2237.70	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.230	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
Wampum Boro #1	PA0239445A	0.2080	0.2080	0.2080	0.000	25.00	6.90

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	7.54	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
33953	BEAVER RIVER	**5.390**	721.81	3110.00	0.00000	4.37	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.230	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

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

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
33953	BEAVER RIVER	**0.000**	693.65	22761.90	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.230	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20B	33953	BEAVER RIVER

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (ºC)	Analysis pH
Q7-10 Flow												
15.570	513.96	0.00	513.96	NA	0.00030	1.159	415.85	358.82	1.07	0.006	25.00	7.00
15.470	514.67	0.00	514.67	.3218	0.00033	1.157	415.28	358.86	1.07	0.575	25.00	7.00
5.390	715.30	6.76	708.54	.3195	0.00099	1.126	485.63	431.42	1.30	0.254	25.00	7.00
Q1-10 Flow												
15.570	328.93	0.00	328.93	NA	0.00030	NA	NA	NA	0.83	0.007	25.00	7.00
15.470	329.39	0.00	329.39	.3218	0.00033	NA	NA	NA	0.83	0.738	25.00	7.00
5.390	457.79	6.76	451.04	.3195	0.00099	NA	NA	NA	1.01	0.327	25.00	7.00
Q30-10 Flow												
15.570	698.98	0.00	698.98	NA	0.00030	NA	NA	NA	1.27	0.005	25.00	7.00
15.470	699.95	0.00	699.95	.3218	0.00033	NA	NA	NA	1.27	0.484	25.00	7.00
5.390	972.81	6.76	966.05	.3195	0.00099	NA	NA	NA	1.54	0.214	25.00	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	Uniform Treatme	Use Inputted W/D Ratio	☑
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☑
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☐
D.O. Saturation	90.00%	Use Balanced Technology	☐
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20B	33953	BEAVER RIVER

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
15.570	Wampum Boro #	NA	NA	6.76	NA	NA	NA
15.470	Wampum Boro #	NA	50	6.76	50	0	0
5.390		NA	NA	6.76	NA	NA	NA

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
15.570	Wampum Boro #	NA	NA	1.34	NA	NA	NA
15.470	Wampum Boro #	NA	25	1.34	25	0	0
5.390		NA	NA	1.34	NA	NA	NA

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
15.57	Wampum Boro #2	NA	NA	NA	NA	NA	NA	NA	NA
15.47	Wampum Boro #1	25	25	25	25	4	4	0	0
5.39		NA	NA	NA	NA	NA	NA	NA	NA

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20B	33953	BEAVER RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
15.570	0.000	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
415.849	1.159	358.815	1.066
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.00	0.000	0.10	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.243	1.507	Tsivoglou	6
Reach Travel Time (days)			
0.006			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.001	2.00	0.10	7.54
0.001	2.00	0.10	7.54
0.002	2.00	0.10	7.54
0.002	2.00	0.10	7.54
0.003	2.00	0.10	7.54
0.003	2.00	0.10	7.54
0.004	2.00	0.10	7.54
0.005	2.00	0.10	7.54
0.005	2.00	0.10	7.54
0.006	2.00	0.10	7.54

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
15.470	0.208	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
415.277	1.157	358.858	1.072
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.01	0.007	0.12	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.536	1.628	Tsivoglou	6
Reach Travel Time (days)			
0.575			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.057	2.01	0.11	7.54
0.115	2.01	0.10	7.54
0.172	2.01	0.10	7.54
0.230	2.01	0.10	7.54
0.287	2.01	0.10	7.54

0.345	2.01	0.10	7.54
0.402	2.01	0.10	7.54
0.460	2.01	0.10	7.54
0.517	2.01	0.10	7.54
0.575	2.00	0.10	7.54

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20B	33953	BEAVER RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
5.390	0.206	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
485.625	1.126	431.418	1.297
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.00	0.002	0.00	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.731	5.985	Tsivoglou	6
Reach Travel Time (days)			
0.254			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.025	2.00	0.00	7.54
0.051	2.00	0.00	7.54
0.076	2.00	0.00	7.54
0.102	2.00	0.00	7.54
0.127	2.00	0.00	7.54
0.152	2.00	0.00	7.54
0.178	2.00	0.00	7.54
0.203	2.00	0.00	7.54
0.229	2.00	0.00	7.54
0.254	2.00	0.00	7.54

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
20B	33953	BEAVER RIVER

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
15.470	Wampum Boro #1	PA0239445A	0.208	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4