

Application Type Renewal
Facility Type Municipal
Major / Minor Minor

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application No. PA0046418
APS ID 1067569
Authorization ID 1403407

Applicant and Facility Information

Applicant Name <u>Middleboro Municipal Authority</u>	Facility Name <u>Middleboro STP</u>
Applicant Address <u>P O Box 189</u>	Facility Address <u>West Road</u>
<u>Mc Kean, PA 16426-0189</u>	<u>Mc Kean, PA 16426-1422</u>
Applicant Contact <u>Frederick Dylewski, Business Manager</u>	Facility Contact <u>Douglas Burdick</u>
Applicant Phone <u>(814) 476-7788</u>	Facility Phone <u>(814) 476-7788</u>
Applicant E Mail <u>rickyracoon2@aol.com</u>	Facility E Mail _____
Client ID <u>44319</u>	Site ID <u>244576</u>
Municipality <u>McKean Borough</u>	County <u>Erie</u>
Ch 94 Load Status <u>Projected Hydraulic and Organic Overload</u>	Connection Status <u>No Limitations</u>
Date Application Received <u>July 11, 2022</u>	EPA Waived? <u>Yes</u>
Date Application Accepted <u>July 28, 2022</u>	If No, Reason _____
Purpose of Application <u>NPDES permit renewal</u>	

Summary of Review



No violations since December 4, 2017. No open violations listed. 11/28/2023 CWY A few self-monitoring violations are reported.

Municipalities	Flow Contribution	Separate Sewers	Population
Borough of McKean	96%	100%	490
McKean Township	4%	100%	20

Sludge use and disposal description and location(s): Solid sludge is landfilled. Liquid sludge is transported to a DEP approved facility for treatment and disposal. Don Green Sanitation hauled 4.2 dry tons sludge to the Lake View Landfill.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Approve	Deny	Signatures	Date
		<i>William H. Mentzer</i> William H. Mentzer, P.E. Environmental Engineering Specialist	November 22, 2023
		Chad W. Yurisc Chad W. Yurisc, P.E. Environmental Engineer Manager	11/28/2023

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.112
Latitude DP	41° 59' 59.00"	Longitude DP	-80° 8' 48.66"
Latitude NHD	42° 0' 0.71"	Longitude NHD	-80° 8' 48.54"
Quad Name	Edinboro North	Quad Code	0304
Wastewater Description: Treated municipal sanitary sewer waste waters			
Receiving Waters	Elk Creek	Stream Code	62491
NHD Com ID	123926048	RMI	21.98
Drainage Area	19.6	Yield (cfs/mi²)	0.019
Q ₇₋₁₀ Flow (cfs)	0.35	Q ₇₋₁₀ Basis	Elk Creek
Elevation (ft)	982.29	Slope (ft/ft)	0.00872
Watershed No.	15-A	Chapter 93 Class.	WWF, MF
Existing Use	statewide	Existing Use Qualifier	none
Exceptions to Use	See below for the main stem.	Exceptions to Criteria	none
Comments	Main stem Elk Creek: DO ₂ and Temp ₂ deleted and DO ₁ and Temp ₁ added. Discharge is 0.32 mile above Lamson Run at NHD RMI is 0.09.		
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Background/Ambient Data		Data Source	
pH (SU)	7.6	WQ sampling; previous modelled discharge pH is 7.45 SU.	
Temperature (°F)	68	default	
Hardness (mg/L)	100	default	
Other:			
Nearest Downstream Public Water Supply Intake	City of Erie		
PWS Waters	Lake Erie	Flow at Intake (cfs)	NA
PWS RMI	915	Distance from Outfall (mi)	34.48

Changes Since Last Permit Issuance: Facility expansion

Other Comments: none

Treatment Facility Summary				
Treatment Facility Name: Municipal Authority Of Middleboro				
WQM Permit No.	Issuance Date			
Facility expansion	3 February 1976			
2574407 A1	27 December 2004			
2574407 A2	25 October 2005			
2574407 A3	19 December 2016			
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Extended Aeration	Gas Chlorine	0.061
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.112	178	Projected Hydraulic and Organic Overload	Aerobic Digestion	Other WWTP

Changes Since Last Permit Issuance: facility expansion

The original permit was for a 0.1-MGD activated sludge contact stabilization facility. This was the design flow from 1975 to 2004. The permit included municipal sewers and alum (chemical) addition for phosphorus control. No pump stations are discussed in the application, but three pressure sewer areas are mentioned. One pressure sewer was temporary lasting until such time a gravity sewer connection could be made. The other two pressure sewer systems were considered permanent. In 2004 amendment 1 changed the waste treatment operation from activated sludge contact stabilization to activated sludge extended aeration with a design flow reduction from 0.100-MGD to 0.081-MGD.

A bar screen, Parshall flume for effluent flow measurement, two aerated equalization tanks, and two open sludge drying beds are installed.

A-1 application is dated 26 July 2004 and revised on 8 December 2004. The annual average flow is 0.061-MGD, the hydraulic design flow is 0.081-MGD, daily peak flow is 0.205-MGD, and the Organic design is for 112-lb.day 5 Day BOD. Issued with 2004 Sewerage conditions 1, 6, 8, 9, 10 (PA0046418), 12, 13, 16, 18, 20, 21, 22, 23, 24, 25, and 26. For an upgrade including: equalization tank flow rerouting; existing, circular steel extended aeration tank reconfiguration; a new rectangular, reinforced concrete treatment tank with a 50,000-gallons aeration capacity and 23,600-gallons sludge holding capacity, and 200 square foot (25 131-gallon) clarifier; and a new 2,853-gallon chlorine contact tank. Also provided is three 240 scfm new control building aeration blowers, and chlorine gas will replace liquid sodium hypochlorite as the disinfecting agent. Aeration required is 477 scfm based on 233 scfm for aeration, 190 scfm for sludge digestion and 24 scfm for sludge air lifts. Two conventional activated sludge operation treatment trains are provided. One train is adequate for flows up to 56,000-gpd and the two-train operation is adequate for up to 81,000-gpd.

A-2 is not listed as such but amounts to a chlorine contact tank as built revision. The 1974 aeration tank was left as originally specified and the 1974 chlorine contact tank was converted to aerated sludge storage. The chlorine contact tank volume is not clearly stated but is specified in A-1 as at least 2 135-gallons. Aeration capacity increases from 50,000 to 62,600-gallons and aerated sludge holding decreases from 23,600 to 16,500-gallons.

A-3 listed as A-2 changes to the existing plant include: Replacing the EQ tank pumps with larger units, upsizing the aeration piping to reduce friction in the air delivery line and adding a de-chlorination tank (sodium bisulfite feed).

A-3 added dichlorination *and rerated the hydraulic capacity of the plant to 0.112 MGD and the organic capacity to 178 lb/day BOD5.*

Service area is McKean Borough (96%) and Township (4%).

Disinfection is chlorine gas

Chemical addition: Alum at 4-gallons/day (control mechanism effluent aluminum and pH)

Anticipated changes: equalization pump and air piping upgrade. Water-quality adds TRC to the upgrade.

Other Comments:

**NPDES Permit Fact Sheet
Middleboro STP**

NPDES Permit No. PA0046418

Treatment: Bar screen, equalization, extended aeration with clarification, gas chlorination, dichlorination, aerobic sludge digestion and dewatering (drying beds). Solid sludge is landfilled. Liquid sludge is transported to a DEP approved facility for treatment and disposal.

Alum is applied for phosphorus control.

		Influent					Effluent						
		Ave MGD	Ave PPD	Max PPD	#	Min mg/L	Ave mg/L	Max mg/L	#	Min mg/L	Ave mg/L	Max mg/L	#
Annual Average Design		0.067											
Hydraulic Design Capacity		0.112											
Organic Design Capacity			178										
Annual Average	2019	0.039											
	2020	0.044											
	2021	0.048											
Previous Year Highest Month	November	0.061											
pH										7.0		7.7	1462
TRC										0.03	0.65	73	
Fecal Coliform										< 54.8	980	104	
BOD5			52	143	24		140	428	24				
CBOD5										5.08	14.96	104	
TSS			42	82	24		115	192	24	6.2	12.8	104	
NH3										< 1.1	5.45	104	
N										< 11.98	23.30	24	
P										0.60	0.84	24	
DO										7.36		731	
Copper										< 0.01		1	
Lead										< 0.008		1	
Zinc										< 0.02		1	

Effluent Violations for Outfall 001, from: November 1, 2022 To: September 30, 2023

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
CBOD5	07/31/23	Wkly Avg	18.6	mg/L	15.0	mg/L
Fecal Coliform	05/31/23	IMAX	1419.6	No./100 ml	1000	No./100 ml
Fecal Coliform	06/30/23	IMAX	2419.5	No./100 ml	1000	No./100 ml
Ammonia	06/30/23	Avg Mo	2.85	lbs/day	2.3	lbs/day
Ammonia	06/30/23	Avg Mo	7.0	mg/L	2.5	mg/L
Ammonia	05/31/23	Avg Mo	3.40	mg/L	2.5	mg/L
Ammonia	05/31/23	IMAX	5.242	mg/L	5.0	mg/L
Ammonia	06/30/23	IMAX	13.09	mg/L	5.0	mg/L

The violations do not appear in eFACTS.

Compliance History	
Summary of DMRs:	See below
Summary of Inspections:	None

Compliance History

DMR Data for Outfall 001 (from July 1, 2021 to June 30, 2022)

Parameter	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21
Flow (MGD) Ave Mon	0.0467	0.0595	0.067	0.048	0.065	0.0368	608	0.061	0.045	0.0467	0.041	0.055
Flow (MGD) Daily Max	0.068	0.096	0.104	0.063	0.110	0.057	0.110	0.092	0.111	0.099	0.078	0.101
pH (S.U.) Minimum	7.0	7.2	7.3	7.2	7.1	7.2	7.3	7.2	7.3	7.3	7.2	7.2
pH (S.U.) Maximum	7.4	7.5	7.6	7.5	7.6	7.6	7.7	7.6	7.6	7.5	7.4	7.5
DO (mg/L) Minimum	7.76	8.80	8.5	8.45	8.75	8.87	8.5	8.45	8.42	8.5	8.11	8.75
TRC (mg/L) Ave Mon	0.02	0.02	0.05	0.03	0.11	0.14	0.11	0.06	0.02	0.02	0.02	0.02
TRC (mg/L) Inst Max	0.62	0.02	0.15	0.16	0.26	0.30	0.18	0.18	0.55	0.02	0.52	0.50
CBOD5 (PPD) Ave Mon	3.39	2.68	1.73	1.00	2.28	1.20	2.59	1.37	1.2	1.52	1.13	1.56
CBOD5 (PPD) Wkly Ave	5.60	3.52	2.40	1.57	2.52	2.70	4.69	1.71	1.29	1.7	2.22	2.72
CBOD5 (mg/L) Ave Mon	8.7	5.40	3.1	2.5	4.20	3.9	5.1	2.7	3.2	3.9	3.3	3.4
CBOD5 (mg/L) Wkly Ave	14.37	7.10	4.29	3.93	4.64	8.81	9.24	3.36	3.43	4.56	6.48	5.93
BOD5 (PPD) Infl Ave Mon	50	99	85	28	83	42	118	115	143	45	23	40
BOD5 (PPD) Infl Wkly Ave	50	99	85	28	83	42	118	115	143	45	23	40
BOD5 (mg/L) Infl Ave Mon	102	215	140	66	57	194	197	63	428	149	86	161
BOD5 (mg/L) Infl Wkly Ave	102	215	140	66	57	194	197	63	428	149	86	161
TSS (PPD) Ave Mon	3.74	4.68	2.51	1.44	4.88	1.63	1.52	1.42	1.69	1.17	1.71	2.43
TSS (PPD) Infl Ave Mon	59	63	58	54	20	40	82	40	26	34	41	33
TSS (PPD) Infl Wkly Ave	59	63	58	54	20	40	82	40	26	34	41	33
TSS (PPD) Weekly Ave	7.40	6.05	2.79	2.8	7.05	2.46	2.03	2.54	3.38	2.7	2.05	3.21
TSS (mg/L) Ave Mon	9.6	8.5	4.5	3.6	9.0	5.3	3.0	2.8	4.5	3.0	5.0	5.3
TSS (mg/L) Influent Ave Mon	120	138	96	130	62	184	136	72	78	114	152	130
TSS (mg/L) Infl Wkly Ave	120	138	96	130	62	184	136	72	78	114	152	130
TSS (mg/L) Weekly Ave	19.0	11.0	5.0	7.0	13.0	8.0	4.0	5.0	9.0	5.0	6.0	7.0
F Coliform (#100 ml) Geo Mn	< 13	20.1	< 10	< 33.3	100.8	490	655	138.9	< 25.7	13.5	< 27.5	< 16.8
F Coli (#/100 ml) Inst Max	29	86.0	< 10	810	440.0	920	980	910	< 61.0	24.0	72	31.0
T Nitrogen (mg/L) Ave Mon	4.375	11.45	8.24	7.56	20.0	21.1	5.91	12.5	14	11.8	2.97	4.07
Ammonia (PPD) Ave Mon	< 0.47	0.99	0.50	< 0.56	< 0.33	0.98	2.03	0.25	< 0.18	< 0.19	< 0.17	< 0.87
Ammonia (mg/L) Ave Mon	< 1.2	2.0	0.9	< 1.4	< 0.6	3.2	4.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.9
Ammonia (mg/L) Instant Max	2.06	2.86	1.21	3.61	0.86	4.38	5.45	< 0.5	< 0.5	< 0.5	< 0.5	2.75
T Phosphor (PPD) Ave Mon	0.39	0.27	0.44	0.27	0.40	0.21	0.26	0.31	0.21	0.12	0.06	0.29
T Phosph (mg/L) Ave Mon	0.64	0.55	0.78	0.68	0.73	0.69	0.51	0.61	0.56	0.31	0.16	0.63

The December mean flow appears to be a typographical error.

Compliance History

DMR Data for Outfall 001 (from October 1, 2022 to September 30, 2023)

Parameter	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22	OCT-22
Flow (MGD) Ave Mon	0.0485	0.055	0.055	0.0489	0.064	0.073	0.086	0.077	0.098	0.0555	0.0559	0.065
Flow (MGD) D Max	0.072	0.086	0.098	0.120	0.123	0.114	0.121	0.106	0.180	0.119	0.111	0.149
pH (S.U.) Minimum	7.2	7.3	7.0	7.0	7.2	7.2	7.1	7.2	7.2	7.2	7.1	7.1
pH (S.U.) Maximum	7.5	7.6	7.6	7.4	7.6	7.5	7.7	7.6	7.6	7.5	7.4	7.4
DO (mg/L) Minimum	8.48	8.8	7.98	7.85	8.47	8.85	8.5	9.1	9.07	9.01	8.85	8.67
TRC (mg/L) Ave Mon	0.02	0.02	0.02	0.02	0.02	0.02	0.20	0.14	0.13	0.14	0.22	0.21
TRC (mg/L) Inst Max	0.02	0.02	0.02	0.02	0.02	0.48	0.34	0.22	0.25	0.28	0.32	0.28
CBOD5 (ppd) Ave Mon	1.29	1.10	3.30	2.04	1.17	1.28	2.58	1.73	1.80	1.34	1.12	3.58
CBOD5 (ppd) Wk Ave	1.80	1.23	8.53	3.51	1.30	1.46	4.30	2.47	1.99	2.10	1.30	4.50
CBOD5 (mg/L) Ave Mon	3.20	2.4	7.2	5.0	2.2	2.1	3.60	2.7	2.2	2.9	2.40	6.6
CBOD5 (mg/L) Wk Ave	4.46	2.69	18.6	8.60	2.43	2.4	6.00	3.84	2.44	4.54	2.79	8.30
BOD5 (ppd) Infl Ave Mon	197	91	85	61	187	172	163	81	228	47	62	70
BOD5 (ppd) Infl Wk Ave	197	91	85	61	187	172	163	81	228	47	62	70
BOD5 (mg/L) Infl Ave Mon	464	144	209	147	182	234	162	137	224	226	164	199
BOD5 (mg/L) Infl Wk Ave	464	144	209	147	182	234	162	137	224	226	164	199
TSS (lbs/day) Ave Mon	2.50	2.06	2.0	3.79	4.16	3.1	8.97	3.21	2.86	1.9	1.82	1.08
TSS (ppd) Infl Ave Mon	149	147	59	53	230	229	242	81	285	47	38	29
TSS (ppd) Infl Wk Ave	149	147	59	53	230	229	242	81	285	47	38	29
TSS (ppd) Wk Ave	4.44	3.44	4.49	5.91	8.81	4.87	15.59	4.82	3.68	2.78	2.56	1.63
TSS (mg/L) Ave Mon	6.2	4.5	4.9	9.3	7.8	5.1	12.5	5.0	3.5	4.1	3.9	2.0
TSS (mg/L) Infl Ave Mon	350	232	144	128	224	312	240	136	280	224	100	82
TSS (mg/L) Infl Wk Ave	350	232	144	128	224	312	240	136	280	224	100	82
TSS (mg/L) Wk Ave	11.0	7.5	11.0	14.5	16.5	8.0	21.0	7.5	4.5	6.0	5.5	3.0
F Coliform (#/100 ml) Geo Mn	3.0	1.0	< 1	24.2	32.9	29.1	33.7	145.9	< 45.3	542.5	3.0	214
F Coliform (#/100 ml) Inst Max	80.9	1.0	< 1	2419.5	1419.6	228.2	1553.1	2419.6	2419.6	2420	21.8	680
T N (mg/L) Ave Mon	15.53	13.68	5.3196	20.266	8.8666	10.411	10.613	17.48	13.28	19.55	26.01	11.93
Am (ppd) Ave Mon	0.24	0.09	0.24	2.85	1.81	0.06	< 0.07	< 0.06	0.08	1.43	< 0.05	< 0.27
Am (mg/L) Ave Mon	0.6	0.20	0.6	7.0	3.40	< 0.1	< 0.1	< 0.1	< 0.1	3.1	< 0.1	< 0.5
Am (mg/L) Inst Max	1.489	0.34	1.575	13.09	5.242	< 0.1	< 0.1	< 0.1	< 0.1	11.19	< 0.1	< 0.5
T P (ppd) Ave Mon	0.31	0.24	0.11	0.40	0.17	0.34	0.37	0.28	0.11	0.088	0.17	0.28
T P (mg/L) Ave Mon	0.78	0.535	0.27	0.99	0.31	0.556	0.498	0.43	0.132	0.19	0.375	0.51

The monthly maximum flow is approaching the design flow,

July CBOD5 was high.

Ammonia was high in May and June.

Fecal coliform maximum was high in June

Development of Effluent Limitations

Outfall No.	001	Design Flow (MGD)	.112
Latitude	41° 59' 59.00"	Longitude	-80° 8' 48.66"
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©	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
E Coli	Report	annually		BPJ

Facility design is tertiary treatment at 95% summer BOD₅ reduction, 90% rest of the year BOD₅ reduction and less than 10-mg/L ammonia nitrogen. Later tertiary treatment was re-defined as 10-mg/L BOD₅, 10-mg/L TSS and 4-mg/L ammonia-nitrogen. The last tertiary definition is 10-mg/L CBOD₅, 30-mg/L TSS and 2.5-mg/L ammonia.

The Middleboro proposal and the then existing Georgetown Heights discharges were evaluated together as a single discharge. The combined discharge modelled with a 16-hour run-off still requires advanced treatment. Together the Middleboro and Georgetown Heights discharges total 0.36-MGD with an 0.54-MGD 24-hour discharge. The requirements are supported by one-page water quality summary that does not clearly state why tertiary requirements were established. The Georgetown Heights facility has since ceased operations.

Meanwhile The McKean Township STP was added downstream and for a time the sub-basin had three sewage discharges. For three basin discharges with equalization and equal percent reduction. CBOD₅ is 17.94, 17.94, and 17.62 while ammonia is 4.3, 4.3 and 4.85-mg/L Without Georgetown CBOD₅ is 17.92 and 16.68-mg/L while ammonia is 4.50 and 4.74-mg/L With a 16-hour runoff CBOD₅ is 14.36 and 13.96-mg/L while ammonia is 3.37 and .8-mg/L.

Currently advanced (tertiary) treatment is controlling at 10-mg/L CBOD and TSS with ammonia at 2.5-mg/L.

Other Considerations

Except for Park Run (62492), the basin is classified as a warm water and migratory fishery with the Fish and Boat Commission classifying the basin as trout approved waters

The basin is not classified for trout reproduction which has an 8-mg/L October through May dissolved oxygen minimum.

For trout protection, the statewide warm water dissolved oxygen and temperature requirements have been replaced by the cold water dissolved oxygen and temperature.

DO Criteria

DO₁ For flowing waters, 7-day average 6.0 mg/l; minimum 5.0 mg/l.

For naturally reproducing salmonid early life stages, applied in accordance with subsection (b), 7-day average 9.0 mg/l; minimum 8.0 mg/l.

For lakes, ponds and impoundments, minimum 5.0 mg/l. (CWF) DO₂ 7-day average 5.5 mg/l; minimum 5.0 mg/l. (WWF)

DO₃ For the period February 15 to July 31 of any year, 7-day average 6.0 mg/l; minimum 5.0 mg/l. For the remainder of the year, 7-day average 5.5 mg/l; minimum 5.0 mg/l. (TSF)

For naturally reproducing salmonids, protected early life stages include embryonic and larval stages and juvenile forms to 30 days after hatching. The DO₁ standard for naturally reproducing salmonid early life stages applies October 1 through May 31. The DO₁ standard for naturally reproducing salmonid early life stages applies unless it can be demonstrated to the Department's satisfaction, that the following conditions are documented: 1) the absence of young of the year salmonids measuring less than 150 mm in the surface water; and 2) the absence of multiple age classes of salmonids in the surface water. These conditions only apply to salmonids resulting from natural reproduction occurring in the surface waters. Additional biological information may be considered by the Department which evaluates the presence or absence of early life stages.

This daily minimum dissolved oxygen is essentially the assumed ambient dissolved oxygen. For small streams no assimilative capacity is available and the effluent DO should be the DO criteria.

Water Quality-Based Limitations

The effluent quantity and quality has not changed. The water quality requirements are based on previous modelling which has not been changed significantly.

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

Parameter	Limit (mg/l)			SBC	Existing Limits		
	1 day	30 day	1 day		1 day	30 day	1 day
	Minimum	mean	Maximum		Minimum	mean	Maximum
Ammonia-nitrogen summer		2.5	5.0	NA		2.5	5.0
Ammonia-nitrogen winter		7.0	15.0	NA		7.0	15.0
Dissolved Oxygen	4.0			NA	4.0		
Total Residual Chlorine		0.3	1.0	NA		0.3	1.0
Total Phosphorus		1		NA		1	
CBOD 5 day		10	20	NA		10	20

Note the above requirements are for a cold-water fishery only. For a migratory fishery with salmonid reproduction the minimum daily dissolved oxygen requirement increases to 8-mg/L.

Best Professional Judgment (BPJ) Limitations

Comments: The 4.0-mg/L daily DO minimum is based on BPJ requirements

Anti-Backsliding

The 10-mg/L CBOD₅ and 2.5-mg/L Ammonia-nitrogen are best technology available limitations.

NPDES Permit Fact Sheet
Middleboro STP

NPDES Permit No. PA0046418

1A	B	C	D	E	F	G	H	I	J	K	L	M
	Discharger Site		Middleboro						Tuesday, November 14, 2023			
	Municipality		Middleboro STP				Revised		Thursday, November 16, 2023			
	County		McKean Borough									
	NPDES Permit		Erie									
	0.5		PA0046418									
2	TRC EVALUATION											
3	Input appropriate values in B4:B8 and E4:E7											
4	0.365	= Q stream (cfs)		0.5	= CV Daily							
5	0.1120	= Q discharge (MGD)		0.5	= CV Hourly							
6	30	= no. samples		1	= AFC_Partial Mix Factor							
7	0.3	= Chlorine Demand of Stream		1	= CFC_Partial Mix Factor							
8	0	= Chlorine Demand of Discharge		16	= AFC_Criteria Compliance Time (min)							
9	0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)							
	0	= % Factor of Safety (FOS)			= Decay Coefficient (K)							
10	Source		Reference		AFC Calculations		Reference		CFC Calculations			
11	TRC		1.3.2.iii		WLA_afc = 0.691		1.3.2.iii		WLA_cfc = 0.666			
12	PENTOXSD TRG		5.1a		LTAMULT_afc = 0.373		5.1c		LTAMULT_cfc = 0.581			
13	PENTOXSD TRG		5.1b		LTA_afc = 0.257		5.1d		LTA_cfc = 0.387			
14												
15	Source		Effluent Limit Calculations									
16	PENTOXSD TRG		5.1f		AML MULT = 1.231							
17	PENTOXSD TRG		5.1g		Δ LIMIT (mg/l) = 0.317		AFC					
18					Δ LIMIT (mg/l) = 1.036							
WLA_afc		$\left(\frac{0.19}{e} \cdot (k \cdot AFC_{tc}) + \left[\frac{AFC_{Yc} \cdot Qs \cdot 0.011}{Qd \cdot e} \cdot (k \cdot AFC_{tc}) \right] \dots \right. \\ \left. \dots + Xd + \left[\frac{AFC_{Yc} \cdot Qs \cdot Xs}{Qd} \right] \cdot (1 - FOS/100) \right)$										
LTAMULT_afc		$EXP \left(\left(0.5 \cdot LN(cvd^2 + 1) \right) - 2.326 \cdot LN(cvd^2 + 1)^{0.5} \right)$										
LTA_afc		wla_afc * LTAMULT_afc										
WLA_cfc		$\left(\frac{0.11}{e} \cdot (k \cdot CFC_{tc}) + \left[\frac{CFC_{Yc} \cdot Qs \cdot 0.011}{Qd \cdot e} \cdot (k \cdot CFC_{tc}) \right] \dots \right. \\ \left. \dots + Xd + \left[\frac{CFC_{Yc} \cdot Qs \cdot Xs}{Qd} \right] \cdot (1 - FOS/100) \right)$										
LTAMULT_cfc		$EXP \left(\left(0.5 \cdot LN(cvd^2 + 1) \right) - 2.326 \cdot LN(cvd^2 + 1)^{0.5} \right)$										
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 * ((avg_mon_limit * AML_MULT) / LTA_afc)										
$\left(\frac{0.011}{EXP(-k \cdot CFC_{tc}/1440)} + \left(\frac{CFC_{Yc} \cdot Qs \cdot 0.011}{(1.547 \cdot Qd)} \right) \dots \right. \\ \left. \dots + \left[\frac{EXP(-k \cdot CFC_{tc}/1440)}{1} \right] + Xd + \left[\frac{CFC_{Yc} \cdot Qs \cdot Xs}{1.547 \cdot Qd} \right] \cdot (1 - FOS/100) \right)$												
Stream	Chlorine Required	=	perennial	Chlorine Demand	+	Chlorine Residual						
Stream	Reach/Node	1	1									
Stream	Flow	Conditions	Perennial									
Stream	Code		62491									
Stream	Function		OUTFALL									
Samples			30									
reach	outfall	RMI	21.98									
reach	Reach End	RMI	21.84									
reach		feet	739.2									
drainage		sq miles	19.6									
TRC	limitation	average	mg/L	0.317								
		maximum	mg/L	1.036								
elevation		modelled	feet	982.29								
elevation		modelled	feet	979.72								
slope		modelled	foot/foot	0.003								
low flow			cfs/sq mi	0.019								
discharge			mgd	0.1120								
Runoff	Period		hours	24.000								
The current requirenefts are 0.3-mg/L monthly average and 0.1-m/L maximum.												
stream	flow		cfs	0.36484								
stream	flow		MGD	0.235802								
stream	flow	total	MGD	0.347802								
stream	chlorine	demand	mg/L	0.3								
discharge	discharge	demand	mg/L									
stream	Total Stream/Waste	ratio		3.1								
BAT	TRC	mean	BAT	0.5								
BAT	TRC	maximum	BAT	1.6								
	B	C	D	E	F	G	H	I	J	K	L	M

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	21.980	982.29	19.60	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Middleboro	PA0046418	0.1120	0.1120	0.1120	0.000	25.00	7.40

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	95.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	8		

WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
15	62491	ELK CREEK

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
21.980	Middleboro	7.7	17.95	7.7	17.95	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
21.980	Middleboro	1.24	4.5	1.24	4.5	1	0

Dissolved Oxygen Allocations

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
21.98	Middleboro	16.24	16.24	4.5	4.5	8	8	0	0

WQM 7.0 D.O.Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
15	62491	ELK CREEK		
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>	<u>Analysis pH</u>	
21.980	0.112	21.610	7.525	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>	<u>Reach Velocity (fps)</u>	
14.515	0.491	29.591	0.076	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>	<u>Reach Kn (1/days)</u>	
6.59	0.752	1.52	0.792	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>	<u>Reach DO Goal (mg/L)</u>	
8.165	14.922	Owens	8	
<u>Reach Travel Time (days)</u>	Subreach Results			
0.251	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
	0.025	6.45	1.49	8.11
	0.050	6.32	1.46	8.08
	0.075	6.20	1.43	8.07
	0.100	6.07	1.40	8.06
	0.125	5.95	1.37	8.06
	0.150	5.83	1.35	8.07
	0.175	5.71	1.32	8.08
	0.201	5.60	1.29	8.09
	0.226	5.49	1.27	8.10
	0.251	5.38	1.24	8.12

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>	<u>Stream Name</u>				
15		62491	ELK CREEK				
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)
21.980	Middleboro	PA0046418	0.112	CBOD5	25		
				NH3-N	4.5	9	
				Dissolved Oxygen			4

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	21.980	982.29	19.60	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary		Stream	
	(cfsm)	(cfs)	(cfs)						Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Middleboro	PA0046418	0.1680	0.1680	0.1680	0.000	25.00	7.40

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	21.840	979.72	19.65	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary		Stream	
	(cfsm)	(cfs)	(cfs)						Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Georgetown Hts	PA0023957	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	4.00	8.24	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	21.670	975.92	20.20	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	17.850	873.70	34.22	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary		Stream	
	(cfsm)	(cfs)	(cfs)						Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
McKean Twp	PA0222674	0.3750	0.3750	0.3750	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	4.00	8.24	0.00	0.00
NH3-N	25.00	0.10	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	13.870	804.13	42.05	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary		Stream	
	(cfsm)	(cfs)	(cfs)						Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>								
15		62491		ELK CREEK								
RMI	Stream Flow	PWS With	Net Stream Flow	Disc Analysis Flow	Reach Slope	Depth	Width	W/D Ratio	Velocity	Reach Trav Time	Analysis Temp	Analysis pH
	(cfs)	(cfs)	(cfs)	(cfs)	(ft/ft)	(ft)	(ft)		(fps)	(days)	(°C)	
Q7-10 Flow												
21.980	0.36	0.00	0.36	.2599	0.00348	.502	15.3	30.51	0.08	0.105	22.08	7.51
21.840	0.37	0.00	0.37	.2599	0.00423	.5	15.13	30.27	0.08	0.126	22.08	7.50
21.670	0.38	0.00	0.38	.2599	0.00507	.5	15.09	30.17	0.08	2.771	22.04	7.51
17.850	0.64	0.00	0.64	.84	0.00331	.579	21.98	37.99	0.12	2.095	22.84	7.24
Q1-10 Flow												
21.980	0.23	0.00	0.23	.2599	0.00348	NA	NA	NA	0.07	0.120	22.63	7.48
21.840	0.23	0.00	0.23	.2599	0.00423	NA	NA	NA	0.07	0.143	22.63	7.48
21.670	0.24	0.00	0.24	.2599	0.00507	NA	NA	NA	0.07	3.168	22.60	7.48
17.850	0.41	0.00	0.41	.84	0.00331	NA	NA	NA	0.11	2.302	23.37	7.20
Q30-10 Flow												
21.980	0.50	0.00	0.50	.2599	0.00348	NA	NA	NA	0.09	0.094	21.72	7.52
21.840	0.50	0.00	0.50	.2599	0.00423	NA	NA	NA	0.09	0.113	21.72	7.52
21.670	0.51	0.00	0.51	.2599	0.00507	NA	NA	NA	0.09	2.487	21.68	7.52
17.850	0.87	0.00	0.87	.84	0.00331	NA	NA	NA	0.13	1.932	22.46	7.28

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	Uniform Treatme	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	85.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
15	62491	ELK CREEK

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
21.980	Middleboro	NA	50	7.61	14.36	1	71
21.840	Georgetown Hts	NA	NA	7.63	NA	NA	NA
21.670		NA	NA	7.63	NA	NA	NA
17.850	McKean Twp	NA	50	10.37	21.89	4	56

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
21.980	Middleboro	NA	25	1.22	3.37	1	87
21.840	Georgetown Hts	NA	NA	1.23	NA	NA	NA
21.670		NA	NA	1.23	NA	NA	NA
17.850	McKean Twp	NA	25	1.4	3.8	4	85

Dissolved Oxygen Allocations

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
21.98	Middleboro	25	14.36	3.37	3.37	4	4	4	30
21.84	Georgetown Hts	NA	NA	NA	NA	NA	NA	NA	NA
21.67		NA	NA	NA	NA	NA	NA	NA	NA
17.85	McKean Twp	25	13.96	3.8	3.8	4	4	4	30

WQM 7.0 D.O.Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
15	62491	ELK CREEK		
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>	<u>Analysis pH</u>	
21.980	0.168	22.080	7.505	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>	<u>Reach Velocity (fps)</u>	
15.303	0.502	30.513	0.081	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>	<u>Reach Kn (1/days)</u>	
7.14	0.715	1.46	0.822	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>	<u>Reach DO Goal (mg/L)</u>	
6.478	15.221	Owens	6	
<u>Reach Travel Time (days)</u>	Subreach Results			
0.105	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
	0.011	7.08	1.45	6.69
	0.021	7.02	1.44	6.87
	0.032	6.97	1.42	7.03
	0.042	6.91	1.41	7.16
	0.053	6.85	1.40	7.27
	0.063	6.80	1.39	7.37
	0.074	6.74	1.38	7.46
	0.084	6.68	1.36	7.49
	0.095	6.63	1.35	7.49
	0.105	6.57	1.34	7.49

<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>	<u>Analysis pH</u>	
21.840	0.168	22.077	7.504	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>	<u>Reach Velocity (fps)</u>	
15.129	0.500	30.275	0.083	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>	<u>Reach Kn (1/days)</u>	
6.57	0.700	1.34	0.821	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>	<u>Reach DO Goal (mg/L)</u>	
7.495	15.494	Owens	6	
<u>Reach Travel Time (days)</u>	Subreach Results			
0.126	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
	0.013	6.50	1.33	7.49
	0.025	6.44	1.31	7.49
	0.038	6.38	1.30	7.49
	0.050	6.32	1.28	7.49
	0.063	6.26	1.27	7.49
	0.075	6.20	1.26	7.49
	0.088	6.14	1.25	7.49
	0.100	6.08	1.23	7.49
	0.113	6.02	1.22	7.49
	0.126	5.96	1.21	7.49

WQM 7.0 D.O.Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>			
15	62491	ELK CREEK			
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
21.670	0.168	22.044		7.505	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
15.089	0.500	30.169		0.084	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>	
5.90	0.355	1.13		0.819	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
7.506	15.644	Owens		6	
<u>Reach Travel Time (days)</u>	Subreach Results				
2.771	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)	
	0.277	5.29	0.90	7.50	
	0.554	4.75	0.72	7.50	
	0.831	4.26	0.57	7.50	
	1.108	3.83	0.46	7.50	
	1.385	3.43	0.36	7.50	
	1.662	3.08	0.29	7.50	
	1.939	2.77	0.23	7.50	
	2.216	2.48	0.18	7.50	
	2.493	2.23	0.15	7.50	
	2.771	2.00	0.12	7.50	

<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
17.850	0.543	22.844		7.243	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
21.982	0.579	37.985		0.116	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>	
6.70	0.506	1.59		0.871	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
6.256	3.907	Tsivoglou		6	
<u>Reach Travel Time (days)</u>	Subreach Results				
2.095	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)	
	0.209	5.94	1.32	6.03	
	0.419	5.26	1.10	6.15	
	0.628	4.66	0.92	6.40	
	0.838	4.13	0.76	6.67	
	1.047	3.66	0.64	6.93	
	1.257	3.24	0.53	7.17	
	1.466	2.87	0.44	7.37	
	1.676	2.55	0.37	7.39	
	1.885	2.26	0.31	7.39	
	2.095	2.00	0.26	7.39	

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>	<u>Stream Name</u>				
15		62491	ELK CREEK				
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)
21.980	Middleboro	PA0046418	0.168	CBOD5	14.36		
				NH3-N	3.37	6.74	
				Dissolved Oxygen			4
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)
17.850	McKean Twp	PA0222674	0.375	CBOD5	13.96		
				NH3-N	3.8	7.6	
				Dissolved Oxygen			4

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
15	62491	ELK CREEK	21.670	975.92	20.20	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.019	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.60	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)	Permitte d Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

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

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>	<u>Stream Name</u>				
15		62491	ELK CREEK				
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)
21.980	Middleboro	PA0046418	0.168	CBOD5	14.36		
				NH3-N	3.37	6.74	
				Dissolved Oxygen			4
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)
17.850	McKean Twp	PA0222674	0.375	CBOD5	13.96		
				NH3-N	3.8	7.6	
				Dissolved Oxygen			4

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 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.3	XXX	1.0	1/day	Grab
CBOD5 Nov 1 - Apr 30	18.7	28.0	XXX	20.0	30.0	40.0	1/week	24-Hr Composite
CBOD5 May 1 - Oct 31	9.0	14.0	XXX	10.0	15.0	20.0	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/month	Grab
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	1/month	Grab
TSS	28.0	42.1	XXX	30.0	45.0	60.0	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
E Coli	XXX	XXX	XXXX	XXX	XXX	Report	1/Quarter	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Ammonia Nov 1 - Apr 30	7.0	XXX	XXX	7.5	XXX	15.0	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	2.3	XXX	XXX	2.5	XXX	5.0	1/week	24-Hr Composite
Total Phosphorus	0.9	XXX	XXX	1.0	XXX	XXX	1/month	24-Hr Composite

Compliance Sampling Location: Outfall 001 after disinfection