pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0083607**
Facility Type	**Municipal**	APS ID	**277994**
Major / Minor	**Minor**	Authorization ID	**1331653**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Union Township**	Facility Name	**Union Township Lickdale STP**
Applicant Address	3111 State Route 72	Facility Address	3111 State Route 72
	Jonestown, PA 17038-8741		Jonestown, PA 17038-8741
Applicant Contact	Brent McFeaters	Facility Contact	Brent McFeaters
Applicant Phone	(717) 865-4039	Facility Phone	(717) 865-4039
Client ID	74576	Site ID	237555
Ch 94 Load Status	Not Overloaded	Municipality	Union Township
Connection Status	No Limitations	County	Lebanon
Date Application Received	October 21, 2020	EPA Waived?	No
Date Application Accepted	November 03, 2020	If No, Reason	DEP Discretion

Purpose of Application: NPDES permit renewal for discharge of treated sewage

Summary of Review

1.0 General Discussion

This fact sheet supports the renewal of an existing NPDES permit for discharge of treated sewage from Union Township's Lickdale sewage treatment plant that serves Union Township. Union Township owns, operates, and maintains the wastewater treatment plant located in Union Township, Lebanon County. The treatment plant is a sequential batch reactor (SBR) with Integrated fixed film activated sludge (IFAS) treatment process. The facility discharge treated municipal wastewater to Forge Creek which is classified for warm water fishes. The collection system has no combined sewers. The facility has a design average annual flow of 0.15 MGD, a hydraulic design of capacity of 0.21MGD and an organic design capacity of 524lbs/day. The plant was upgraded and expanded from 0.1mgd to 0.150MGD in 2012 to meet development pressure in the area. The original sewage planning approval was for the expanded facility to discharge to Swatara Creek to prevent effluent dominated situation in Forge creek. However, due to difficulties in getting the flow to Swatara Creek, the permittee proposed to meet very stringent effluent limits to assure the Department there will be no negative impact on Forge Creek. The Department agreed to an updated sewage plan and approved the relocation of the discharge to Forge Creek which is much smaller than Swatara Creek. The existing limit in the permit were the proposed limits from the permittee in agreement with the Department. These limits are more stringent than the minimum technology limit required by Federal and State regulations. These BPJ limits will be compared with water quality-based limits and the technology-based limits to establish effluent limitations for the discharge. A WQM permit issued for the expansion to 0.3MGD could not be built and the permittee proposed to build a smaller treatment plant with design capacity of 0.150 MGD. It is anticipated that the plant will eventually be expanded to 0.3MGD in the future. The existing NPDES permit was issued on April 26, 2016 with an effective date of May 1, 2016 and expiration date of April 30, 2021 The applicant submitted a timely NPDES renewal application to the Department and is currently operating under the

Approve	Deny	Signatures	Date
X		*J. Pascal Kwedza* J. Pascal Kwedza, P.E. / Environmental Engineer	November 16, 2021
X		*Maria D. Bebenek for Daniel W. Martin* Daniel W. Martin, P.E. / Environmental Engineer Manager	November 29, 2021
X		*Maria D. Bebenek* Maria D. Bebenek, P.E. / Program Manager	November 29, 2021

Summary of Review

terms and conditions in the existing permit under administrative extension provisions pending Department action on the renewal application. A topographic map showing the discharge location is presented in attachment A.

1.1 Sludge use and disposal description and location(s):

Sludge is periodically hauled out by a licensed hauler (Walters Environmental Services) to a permitted disposal site.

1.2 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.

1.3.0 Changes to the existing permit

- Quarterly monitoring of E. Coli has been added
- Monthly monitoring of Total Copper and Total Zinc has been added

1.3.1 Existing Limitations and Monitoring Requirements

DISCHARGE LIMITATIONS								MONITORING REQUIREMENTS	
	Mass Units lbs/day			Concentrations mg/l					
Discharge Parameter	Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily	Inst. Maximum	Monitoring Frequency	Sample Type
Flow (mgd)	Monitor & Report	XXX	Monitor & Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	XXX	From 6.0 to 9.0 inclusive				1/day	Grab
D.O.	XXX	XXX	XXX	Minimum of 5.0 mg/l at all times				1/day	Grab
TSS	13	19	XXX	10	15	XXX	20	1/week	24-hour comp
$CBOD_5$	13	19	XXX	10	15	XXX	20	1/week	24-hour comp
NH_3-N (5/1 to 10/31)	1.3	XXX	XXX	1.0	XXX	XXX	2.0	1/week	24-hour comp
NH_3-N (11/1 to 4/30)	3.8	XXX	XXX	3.0	XXX	XXX	6.0	1/week	24-hour comp
Fecal Col. (5/1 to 9/30)	XXX	XXX	XXX	200	XXX	XXX	1,000	1/week	Grab
Fecal Col. (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	XXX	10,000	1/week	Grab
Total Phosphorus	1.3	XXX	XXX	1.0	XXX	XXX	2.5	1/week	24-hour comp
TRC	XXX	XXX	XXX	0.07	XXX	XXX	0.24	1/day	Grab

Summary of Review

1.3.2 Chesapeake Bay Limits

Discharge Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Load(lbs)		Concentrations (mg/l)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia---N	Report	Report	XXX	Report	XXX	1/week	24-hr Comp
Kjeldahl---N	Report	XXX	XXX	Report	XXX	1/Week	24-hr Comp
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	1/Week	24-hr Comp
Total Nitrogen	Report	Report	XXX	Report	XXX	1/Month	Calculate
Total Phosphorus	Report	Report	XXX	Report	XXX	1/week	24-hr Comp
Net Total Nitrogen	Report	7,306	XXX	XXX	XXX	1/Month	Calculate
Net Total Phos.	Report	974	XXX	XXX	XXX	1/Month	Calculate

1.4.0 Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.15
Latitude	40º 27' 8.51"	Longitude	-76º 30' 53.06"
Quad Name	Indiantown Gab	Quad Code	1533
Wastewater Description:	Sewage Effluent		
Receiving Waters	Forge Creek	Stream Code	09978
NHD Com ID	56396011	RMI	0.28
Drainage Area	1.75	Yield (cfs/mi^2)	0.06
Q_{7-10} Flow (cfs)	0.105	Q_{7-10} Basis	USGS Gage Station
Elevation (ft)	420	Slope (ft/ft)	
Watershed No.	7-D	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Flow Alterations, Siltation		
Source(s) of Impairment	Agriculture, Agriculture		
TMDL Status		Name	

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

Nearest Downstream Public Water Supply Intake	City of Lebanon		
PWS Waters	Swatara Creek	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	<4

Changes Since Last Permit Issuance: None

1.4.1 Closest Water Supply Intake

The closest water supply intake located downstream from the discharge is the City of Lebanon in Swatara Township, Lebanon County. The distance downstream from the discharge to the intake is approximately 4 miles. No impact is expected from this discharge on the intake

2.0 Treatment Facility Summary

Treatment Facility Name: Union Township Lickdale STP

WQM Permit No.	Issuance Date
3811403	October 27, 2011

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Total Nitrogen Reduction	Sequencing Batch Reactor	Hypochlorite	0.15

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.21	524	Not Overloaded	Aerobic Digestion	

Changes Since Last Permit Issuance: None

2.1 Treatment Facility Description

Influent pump station receives flow via gravity and pumps flow to the headworks which consist of a mechanical fine screen and grit removal with a bar screen as back-up. Screened effluent enters EQ tank which can be aerated if needed. Soda ash is sometimes added to the EQ tank for alkalinity enhancement. EQ tank is pumped to either or both of the two treatment trains. The treatment trains utilize different zones (pre-anoxic zone; Hybas zone; aeration zone; post anoxic zone and post aeration zone) to provide IFAS process. The pre-anoxic zone receives RAS and nitrate recycle from aeration zone and mixes it with influent. Sodium hydroxide is added to this zone. The Hybas zone has media and activated sludge and is aerated. The aeration zone has activated sludge with no media and contain nitrate recycle pumps. The post anoxic zone is essentially for ammonia polishing. Post aeration is for ammonia gas stripping and re-aeration. GPAC 2070 is added to the post aeration tank for phosphorus removal. There are two circular final clarifiers, ten aerated sludge holding tanks, five tanks per train operated in series and one digester tank. There are six chlorine contact tanks and one de-chlorination tank. Sodium hypochlorite is used for disinfection and sodium bisulfite is added for de-chlorination

3.0 Compliance History

3.1 DMR Data for Outfall 001 (from October 1, 2020 to September 30, 2021)

Parameter	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20
Flow (MGD) Average Monthly	0.1053	0.0952	0.0875	0.0865	0.0802	0.0775	0.0845	0.075	0.0669	0.0762	0.0701	0.0695
Flow (MGD) Daily Maximum	0.2362	0.1541	0.1091	0.1121	0.1199	0.1314	0.134	0.1043	0.0952	0.1558	0.0889	0.0833
pH (S.U.) Minimum	7.67	7.72	7.77	7.73	7.59	7.55	7.48	7.54	7.59	7.51	7.43	7.41
pH (S.U.) Maximum	8.06	8.04	8.02	8.08	8.05	8.05	8.1	8.16	7.99	8.21	8.05	8.07
DO (mg/L) Minimum	8.56	8.18	8.48	8.61	9.02	10.09	10.91	10.6	9.65	9.81	9.40	8.90
TRC (mg/L) Average Monthly	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02
TRC (mg/L) Instantaneous Maximum	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.05	0.05	0.04	0.03	0.07
CBOD5 (lbs/day) Average Monthly	< 2	< 2	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
CBOD5 (lbs/day) Weekly Average	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 1	< 1	< 1
CBOD5 (mg/L) Average Monthly	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
CBOD5 (mg/L) Weekly Average	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
BOD5 (lbs/day) Raw Sewage Influent Ave. Monthly	148	132	127	126	192	139	121	121	129	134	98	107
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	234	166	146	160	213	173	148	152	140	180	131	123
BOD5 (mg/L) Raw Sewage Influent Ave. Monthly	154	182	182	187	254	200	179	179	216	220	152	175
TSS (lbs/day) Average Monthly	< 5	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 2	< 2	< 3	< 3
TSS (lbs/day) Raw Sewage Influent Ave. Monthly	173	142	119	109	323	162	110	164	146	172	96	102

TSS (lbs/day) Raw Sewage Influent Daily Maximum	282	257	168	257	447	186	149	195	193	249	111	139
TSS (lbs/day) Weekly Average	12	< 4	< 3	< 3	< 4	< 3	< 4	4	< 3	< 3	3	3
TSS (mg/L) Average Monthly	< 4.4	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.2	< 4.0	< 4.0	< 4.2	< 4.8
TSS (mg/L) Raw Sewage Influent Ave. Monthly	178	199	172	162	447	231	162	242	247	285	150	167
TSS (mg/L) Weekly Average	6.0	< 4.0	< 4.0	4.0	4.0	< 4.0	4.0	5.0	< 4.0	< 4.0	5.0	6.0
Fecal Coliform (CFU/100 ml) Geometric Mean	25	18	13	< 4	3	< 2	< 1	< 1	< 1	< 1	< 6	7
Fecal Coliform (CFU/100 ml) Instant. Maximum	2000	32	20	9	11	3	1	2	1	2	228	16
Nitrate-Nitrite (mg/L) Average Monthly	9.1	7.68	6.53	5.81	7.55	8.7	13	14.7	20.7	13.4	9.5	9.82
Nitrate-Nitrite (lbs) Total Monthly	275	184	147	122	176	173	293	276	377	255	176	181
Total Nitrogen (mg/L) Average Monthly	< 9.91	8.38	< 7.31	< 6.85	< 8.05	9.33	< 13.6	< 15.3	< 21.5	< 14.0	< 10.23	10.9
Total Nitrogen (lbs) Effluent Net Total Monthly	< 308	200	< 165	< 144	< 188	186	< 307	< 288	< 392	< 267	< 190	201
Total Nitrogen (lbs) Total Monthly	< 308	200	< 165	< 144	< 188	186	< 307	< 288	< 392	< 267	< 190	201
Ammonia (lbs/day) Average Monthly	< 0.1	< 0.08	< 0.07	< 0.07	< 0.08	< 0.07	< 0.07	< 0.07	< 0.06	< 0.06	< 0.06	< 0.06
Ammonia (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (lbs) Total Monthly	< 3.01	< 2.38	< 2.26	< 2.13	< 2.38	< 2.06	< 2.2	< 1.89	< 1.85	< 1.89	< 1.86	< 1.85
TKN (mg/L) Average Monthly	< 0.82	0.71	< 0.78	< 1.03	< 0.5	0.63	< 0.64	< 0.61	< 0.75	< 0.63	< 0.72	1.1
TKN (lbs) Total Monthly	< 34	17	< 17	< 22	< 12	13	< 14	< 12	< 14	< 12	< 13	20
Total Phosphorus (lbs/day) Ave. Monthly	0.6	0.4	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Total Phosphorus (mg/L) Ave. Monthly	0.49	0.52	0.52	0.52	0.28	0.21	0.17	0.14	0.17	0.16	0.29	0.36

Total Phosphorus (lbs) Effluent Net Total Monthly	17.05	12.37	11.85	11.14	6.72	4.24	3.84	2.68	3.01	3.05	5.26	6.66
Total Phosphorus (lbs) Total Monthly	17.05	12.37	11.85	11.14	6.72	4.24	3.84	2.68	3.01	3.05	5.26	6.66

3.2 Effluent Violations for Outfall 001, from: November 1, 2020 To: September 30, 2021

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Fecal Coliform	09/30/21	IMAX	2000	CFU/100 ml	1000	CFU/100 ml

3.3 Summary of Discharge Monitoring Reports (DMRs)**:**

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1 indicate permit limits have been met most of the time. One Fecal Coliform effluent violation was noted on DMRs during the period reviewed presented in section 3.2 above. The violation appears to be a onetime occurrence.

3.4 Summary of Inspections:

The facility has been inspected a couple times during last permit cycle. A notice of violation (NOV) was sent on June 18, 2017 for TSS and Total Phosphorus violations noted during plant inspection on April 20, 2017. Response to the NOV indicates the violation was due to plant upset from a discharge from an industrial user.

4.0 Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .15
Latitude 40º 27' 8.64" **Longitude** -76º 30' 52.94"
Wastewater Description: Sewage Effluent

4.1 Basis for Effluent Limitations

In general, the Clean Water Act (AWA) requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

4.3 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)

Comments: None

4.4 Existing Best Professional Judgment (BPJ) Limits

To address the department's concerns and to protect Forge Creek from becoming effluent dominated, the following effluent limits have been agreed upon at a meeting between the permittee's engineers and the Department on April 7, 2011 based on BPJ. The proposed limits were to allow the expanded flow to be discharged to Forge Creek instead of going directly to Swatara Creek.

Parameter	Monthly Avg (mg/l)
Total Suspended Solids	10
$CBOD_5$	10
NH_3-N (5/1 to 10/31)	1
NH_3-N (11/1 to 4/30)	3
Total Phosphorus	1

4.5 Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass-based limits are expressed in pounds per day and are calculated as follows:

Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

4.6 Water Quality-Based Limitations

4.6.1 Receiving Stream

The receiving stream is the Forge Creek. According to 25 PA § 93.9o, Forge Creek is protected for Warm Water Fishes (WWF) and Migratory Fishes (MF). It is located in Drainage List O and State Watershed 7-D. It has been assigned stream code 09978. According to the Department's Pennsylvania Integrated Water Quality Monitoring and Assessment Report, this stream is impaired for flow alteration and siltation. The source of the impairment is agriculture.

4.6.2 Streamflow:

Streamflow will be correlated with past streamflow records taken from the nearby USGS gage station on the Swatara Creek at Harper's Tavern. Q_{7-10}, and Q_{30-10}, will be calculated by using 0.06cfs/mi. Q_{1-10} will be calculated using a factor of 0.64 x Q_{7-10}, which was derived by Central Office in their February 1987 NH_3 Implementation Guidance. The drainage area at the discharge is 1.75 sq mi. The resulting streamflows are as follows:

Q_{7-10} = 0.06 x 1.75 = 0.105 cfs
Q_{30-10} = 1.47 x 0.105 = 0.154cfs
Q_{1-10} = 0.64 x 0.105 = 0.067 cfs

. NH_3N calculations will be based on the Department's Implementation Guidance of Section 93.7 Ammonia Criteria, dated 11/4/97 (ID No. 391-2000-013). The following data is necessary to determine the instream NH_3N criteria used in the attached computer model of the stream:

- STP pH = 7.6 (DMR average July – Sept.)
- STP Temperature = 25 ^{o} C (default)
- Stream pH = 7.8 (Previous factsheet)
- Stream Temperature = 20 ^{o} C (Previous factsheet)
- Background NH_3-N = 0.0 (default)

4.6.3 $CBOD_5$:

The attached results of WQM 7.0 stream model presented in attachment B indicates that for a maximum discharge of 0.3MGD, secondary treatment is adequate to protect the water quality of the stream. But the existing BPJ limit of 10 mg/l is recommended for this permit due to anti-backsliding restrictions and to protect Forge Creek from becoming effluent dominated. Mass limitations were calculated using the equations presented in section 4.5.

4.6.4 NH_3N

The attached results of WQM 7.0 stream model also (attachment B) indicates that a limit of 1.5 mg/l NH_3 as a monthly average is necessary to protect the aquatic life from toxicity effects. But the existing BPJ limit of 1.0 mg/l will remain in the permit due to anti-backsliding restrictions and to protect Forge Creek from becoming effluent dominated. Mass limitations were calculated using the equations presented in section 4.5.

4.6.5 Dissolved Oxygen

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since

the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l, this limit will be continued in the renewed permit with a daily monitoring requirement.

4.6.6 Total Suspended Solids:

There are no water quality criteria for TSS. A limit of 30 mg/l is the required minimum level of effluent quality attainable by secondary treatment as defined in EPA's 40 CFR Chapter 1, Part 133, Section 133.102(b), but less stringent than the existing BPJ limit of 10mg/l. Therefore, the existing BPJ limit will remain in the permit to protect water quality of the creek. Mass limitations were calculated using the equations presented in section 4.5.

4.6.7 Total Phosphorus:

The existing monthly average limit of 1.0 mg/l based on BPJ will remain in the permit. Mass limitations were calculated using the equations presented in section 4.5.

4.6.8 Chesapeake Bay Strategy:

The Department formulated a strategy in April 2007, to comply with the EPA and Chesapeake Bay Foundation requirements to reduce point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP) to Chesapeake Bay (Bay). In the Strategy, sewage dischargers have been prioritized by Central Office based on their delivered TN loadings t effluent violation for o the Bay. The highest priority (Phases 1, 2, and 3) dischargers received annual loading caps based on their design flow of August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. Phase 4 (0.2 -0.4mgd) and Phase 5(below 0.2mdg) will be required to monitor and report TN and TP during permit renewals. Any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load at the time of expansion.

EPA published the Chesapeake Bay TMDL in December of 2010. In order to address the TMDL, Pennsylvania developed Chesapeake Watershed Implementation Plan (WIP) Phase 1, Phase 2 and currently Phase 3 WIP and a supplement to the WIPs in addition to the original Chesapeake Bay Strategy. As outlined in the current Phase 3 WIP and supplement to the WIP, re-issuing permits for significant dischargers would follow the same phased approach formulated in the original Bay strategy.

The facility is a phase 5 facility and was expanded from 0.1MGD to 0.15MGD. The facility received planning approval for expanded flow of 0.3MDG in 2003 before the August 29, 2005 CBS reference date. The Pennsylvania's Chesapeake Bay Tributary Strategy Point Source Implementation Plan is requiring cap load based on the design flow before August 29, 2005 and the facility's existing performance or default values of 4mg/l TP and 22mg/l TN but in no case will this load exceed 974lbs TP and 7306lbs TN annually. This results in a total maximum annual phosphorus loading cap of 974 lbs/year based on a design annual wasteflow of 0.3MGD and 1.067 mg/l of TP and a total maximum annual nitrogen loading cap of 7,306lbs/year based a design flow of 0.3MGD and 8mg/l TN. Since the capacity of the plant at this point is 0.150MGD and cap load was based on 0.3MGD, this facility is not allowed to sell credits until a treatment plant to treat 0.3MDG is operational. The permittee is in compliance with the Bay Cap load.

4.6.9 Total Residual Chlorine (TRC)

The attached TRC result presented in attachment C utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92a, Section 92a.48 (b) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached result indicates that a monthly water quality limit of 0.07 mg/l and 0.24 mg/l IMAX would be needed to prevent toxicity concerns. This is consistent with the existing permit. DMR and inspection reports indicate the facility has been meeting this limit. Therefore, it is recommended that a TRC limit of 0.07 mg/l monthly average and 0.24 mg/l IMAX be applied for this permit cycle.

4.6.10 Influent BOD and TSS Monitoring

The permit will include influent BOD5 and TSS monitoring at the same frequency as is done for effluent in order to implement Chapter 94.12 and assess percent removal requirements.

4.6.11 Toxics

A reasonable potential (RP) analysis was done for pollutants sampled in support of the permit renewal application. All pollutants that were presented in the application sampling data were entered into DEP's Toxics Management Spreadsheet (TMS) which combines the logic in the previous Toxics Screening Analysis Spreadsheet and PENTOXSD Model to calculate WQBELs. The results of the TMS are presented in attachment D. The discharge levels for all parameters analyzed except Total Copper and Total Zinc were well below DEP's target quantitation limits (TQL) and calculated WQBELs, therefore no limitation or monitoring is required in the permit. Monitoring is recommended for Total Copper and Total Zinc. Monthly monitoring of Total Copper and Total Zinc will be added to the permit to collect more data for further analysis at the next permit renewal.

The recommended limitations follow the logic presented in DEPs SOP, to establish limits in the permit where the maximum reported concentration exceeds 50% of the WQBEL, or for non-conservative pollutants to establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL, or to establish monitoring requirements for conservative pollutants where the maximum reported concentration is between 10% - 50% of the WQBEL.

4.6.12 Stormwater

There is no stormwater outfall associated with this facility.

4.6.13 Industrial Users

The Lickdale Wastewater Treatment Plant does not receive wastewater from any significant industrial users.

4.6.14 Biosolids Management

Sludge is wasted to old aeration tanks and flow backwards through the five tanks of both trains. Aerated sludge from the tanks eventually reaches the existing digester where it is hauled out periodically. Polymer is added to the digester with some level of mixing and aeration to optimize reduction in nitrates retuned to the plant when the digester is decanted.

4.6.15 Pretreatment Requirements

The design annual average flow of the treatment plant is 0.15 MGD and the facility receives no flow from significant Industrial users. EPA does not require development of pretreatment program for facilities with design flow less than 5MGD. However, the permit contains standard conditions requiring the permittee to monitor and control industrial users if applicable.

4.4.16 Fecal Coliform and E. Coli

The existing Fecal Coliform limit is consistent with the technology limits recommended in 92a.47(a)(4) and (a)(5) and will remain in the permit. Quarterly monitoring of E. Coli is required in the permit following DEP recommendation of 1/quarter monitoring of E. Coli at a minimum for this type of facility.

5.0 Other Requirements

5.1 Anti-backsliding

Not applicable to this permit

5.2 Anti-Degradation (93.4)

The effluent limits for this discharge have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High-Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

5.3 Class A Wild Trout Fisheries

No Class A Wild Trout Fisheries are impacted by this discharge.

5.4 303d Listed Streams

The discharge is located on a 303d listed stream segment as impaired due to agricultural siltation and flow alteration not requiring TMDL. No action is warranted at this time.

5.5 Special Permit Conditions

The permit contains the following special conditions:

- Stormwater Prohibition, Approval Contingencies, Solids Management, Restriction on receipt of hauled in waste under certain conditions, and chlorine minimization.

5.6 Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs).

5.7 Effluent Monitoring Frequency

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

6.0 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	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.07	XXX	0.24	1/day	Grab
CBOD5	13	19	XXX	10.0	15.0	20	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS	13	19	XXX	10.0	15.0	20	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	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
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Nitrate-Nitrite (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Total Nitrogen (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Nitrogen (lbs) Effluent Net	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Ammonia Nov 1 - Apr 30	3.8	XXX	XXX	3.0	XXX	6	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	1.3	XXX	XXX	1.0	XXX	2	1/week	24-Hr Composite
Ammonia (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
TKN	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TKN (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus	1.3	XXX	XXX	1.0	XXX	2.5	1/week	24-Hr Composite
Total Phosphorus (lbs) Effluent Net	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

6.1 Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

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

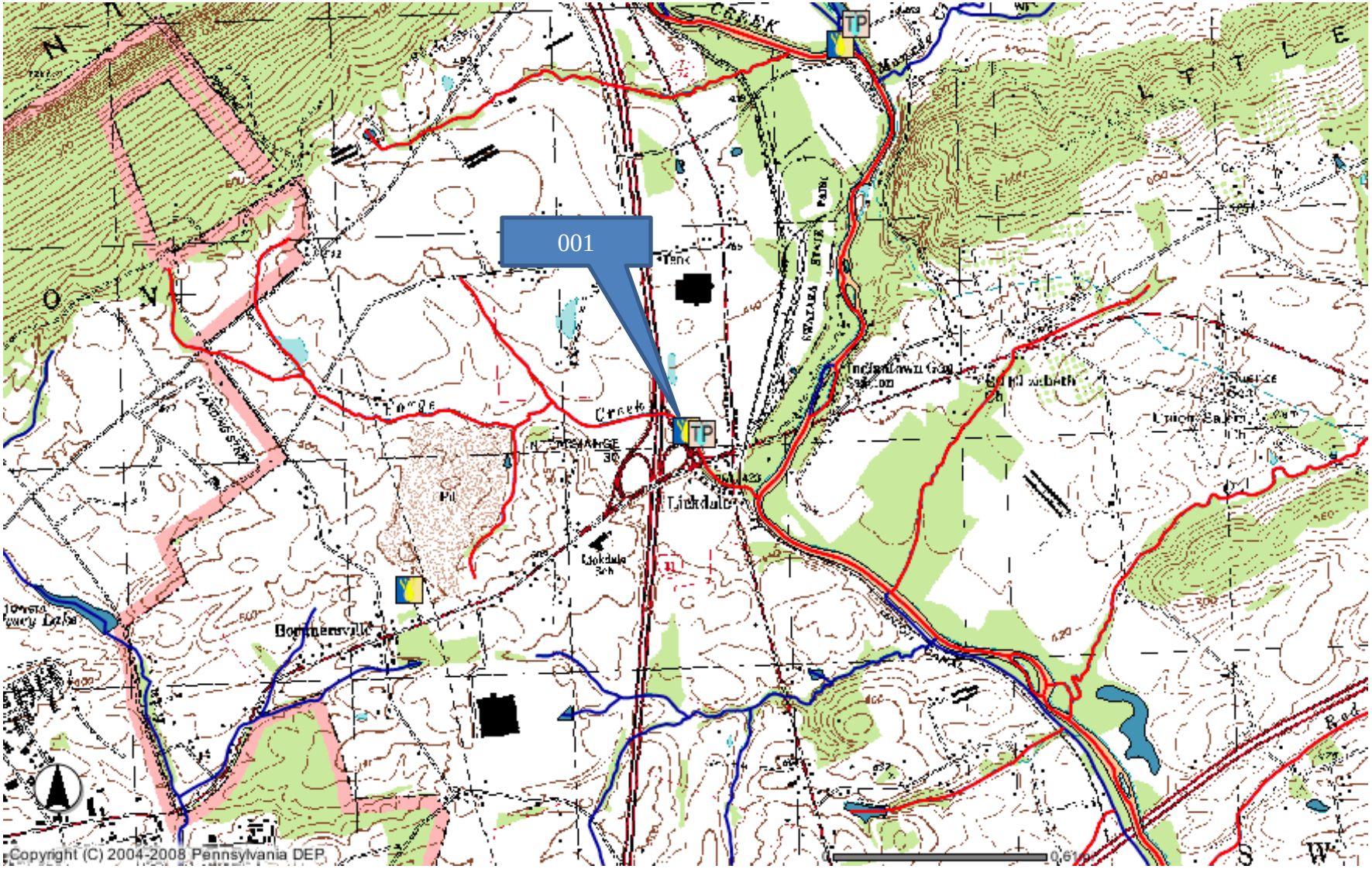
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Total Nitrogen (lbs) Effluent Net	XXX	7306 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Nitrogen (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Ammonia (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs) Effluent Net	XXX	974 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation

Compliance Sampling Location: Outfall 001

7.0 Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **B**)
☐	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment C)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☒	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☒	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☒	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: Establishing effluent limitation for individual sewage permit
☐	Other:

8. Attachments

A. Topographical Map



B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07D	9978	FORGE 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)
0.280	Union Twp	PA0083607	0.300	CBOD5	25		
				NH3-N	1.27	2.54	
				Dissolved Oxygen			5

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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
07D	9978	FORGE CREEK	0.280	420.00	1.75	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.060	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.80	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
Union Twp	PA0083607	0.3000	0.3000	0.3000	0.000	25.00	7.60

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	5.00	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
07D	9978	FORGE CREEK	**0.010**	403.00	1.89	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.060	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.80	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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07D	9978	FORGE 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
0.280	Union Twp	5.33	6.1	5.33	6.1	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
0.280	Union Twp	.96	1.27	.96	1.27	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
0.28	Union Twp	25	25	1.27	1.27	5	5	0	0

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WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07D	9978	FORGE CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.280	0.300	24.077	7.631
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
8.511	0.459	18.535	0.146
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
20.76	1.470	1.04	0.958
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.598	27.739	Owens	5
Reach Travel Time (days)			
0.113			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.011	20.34	1.03	5.81
0.023	19.94	1.02	5.97
0.034	19.54	1.00	6.10
0.045	19.15	0.99	6.21
0.057	18.77	0.98	6.30
0.068	18.40	0.97	6.37
0.079	18.03	0.96	6.44
0.091	17.67	0.95	6.49
0.102	17.32	0.94	6.55
0.113	16.98	0.93	6.59

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WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.47	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07D	9978	FORGE CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
0.280	0.10	0.00	0.10	.4641	0.01192	.459	8.51	18.54	0.15	0.113	24.08	7.63
Q1-10 Flow												
0.280	0.07	0.00	0.07	.4641	0.01192	NA	NA	NA	0.14	0.118	24.37	7.62
Q30-10 Flow												
0.280	0.15	0.00	0.15	.4641	0.01192	NA	NA	NA	0.15	0.108	23.75	7.64

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C. TRC Calculations Result

B	C	D	E	F	G
TRC EVALUATION			**Enter Facility Name in E3**		
Input appropriate values in B4:B8 and E4:E7			**PA0083607 Union Township Lickdale STP**		
0.1	= Q stream (cfs)		0.5	= CV Daily	
0.15	= Q discharge (MGD)		0.5	= CV Hourly	
30	= no. samples		1	= AFC_Partial Mix Factor	
0.3	= Chlorine Demand of Strea		1	= CFC_Partial Mix Factor	
0	= Chlorine Demand of Disch		15	= AFC_Criteria Compliance Time (min)	
0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)	
	= % Factor of Safety (FOS)			=Decay Coefficient (K)	
Source	Reference	AFC Calculations		Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.156		1.3.2.iii	WLA cfc = 0.145
PENTOXSD TRC	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
PENTOXSD TRC	5.1b	LTA_afc= 0.058		5.1d	LTA_cfc = 0.084
Source		Effluent Limit Calculations			
PENTOXSD TRC	5.1f	AML MULT = 1.231			
PENTOXSD TRC	5.1g	AVG MON LIMIT (mg/l) = 0.072		AFC	
		INST MAX LIMIT (mg/l) = 0.235			

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)**

D. Toxic Management Spreadsheet (TMS)

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Union Twp Lickdale STP** NPDES Permit No.: **PA0083607** Outfall No.: **001**

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

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.15	100	7.6						

					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		408									
	Chloride (PWS)	mg/L		89.4									
	Bromide	mg/L	<	1									
	Sulfate (PWS)	mg/L		60.9									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L		2									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L		39									
	Total Molybdenum	µg/L											

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

Union Twp Lickdale STP, NPDES Permit No. PA0083607, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: **Forge Creek**

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	009978	0.28	420	1.75			Yes
End of Reach 1	009978	0.01	403	1.89			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	0.28	0.06										100	7.8		
End of Reach 1	0.01	0.06													

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	0.28														
End of Reach 1	0.01														

Model Results

Union Twp Lickdale STP, NPDES Permit No. PA0083607, Outfall 001

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

☑ *Hydrodynamics*

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

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
0.28	0.11		0.11	0.232	0.012	0.423	7.341	17.363	0.109	0.152	0.239
0.01	0.11		0.113								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
0.28	1.04		1.04	0.232	0.012	0.758	7.341	9.691	0.228	0.072	0.685
0.01	1.108		1.11								

☑ *Wasteload Allocations*

☑ ***AFC*** CCT (min): 0.239 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.65

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	13.439	14.0	20.3	Chem Translator of 0.96 applied
Total Lead	0	0		0	64.581	81.6	119	Chem Translator of 0.791 applied
Total Zinc	0	0		0	117.180	120	174	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 0.239 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.65

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

Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	8.956	9.33	13.6	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.517	3.18	4.62	Chem Translator of 0.791 applied
Total Zinc	0	0		0	118.139	120	174	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 0.239 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (ug/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 0.685 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (ug/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	µg/L	13.6	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	120	AFC	Discharge Conc > 10% WQBEL (no RP)