pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0111937**
Facility Type	**Non-Municipal**	APS ID	**1103469**
Major / Minor	**Minor**	Authorization ID	**1466734**

Applicant and Facility Information

Applicant Name	**Patriot Treatment Plant, Inc.**	Facility Name	**Patriot Treatment Plant**
Applicant Address	6009 Columbia Boulevard Bloomsburg, PA 17815-8800	Facility Address	10 Baker Lane Bloomsburg, PA 17815
Applicant Contact	Frank Baker	Facility Contact	Frank Baker
Applicant Phone	(570) 387-0902	Facility Phone	(570) 387-0902
Client ID	95554	Site ID	465344
Ch 94 Load Status	Not Overloaded	Municipality	South Centre Township
Connection Status	No Limitations	County	Columbia
Date Application Received	December 26, 2023	EPA Waived?	Yes
Date Application Accepted	January 2, 2024	If No, Reason	

Purpose of Application: Renewal of a NPDES Permit.

Summary of Review

This facility is a sewage treatment plant serving residential and commercial establishments in South Centre Township, Columbia County. A map showing the discharge location is attached.

Sludge use and disposal description and location(s): The facility's sludge is sent to Berwick Area Joint Sewer Authority for further processing.

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
✓		Keith C. Allison Keith C. Allison / Project Manager	June 5, 2024
✓		N. W. H. Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	June 10, 2024

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.02
Latitude	41º 1' 27.27"	Longitude	-76º 21' 57.85"
Quad Name	Mifflinville, PA	Quad Code	1035
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary of Susquehanna River (CWF)	Stream Code	28075
NHD Com ID	65639969	RMI	0.7
Drainage Area	0.90 mi^2	Yield (cfs/mi^2)	0.0613
Q_{7-10} Flow (cfs)	0.0549	Q_{7-10} Basis	Gage 01539000, Fishing Creek at Bloomsburg (1940-2008)
Elevation (ft)	596.5	Slope (ft/ft)	0.00775
Watershed No.	5-D	Chapter 93 Class.	CWF
Existing Use	N/A	Existing Use Qualifier	N/A
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Attaining Use(s)		
Nearest Downstream Public Water Supply Intake	Danville Municipal Authority		
PWS Waters	Susquehanna River	Distance from Outfall (mi)	16

Changes Since Last Permit Issuance: None. The stream characteristics determined for previous reviews remain adequate.

Other Comments:

The receiving stream is known locally as Campbells Run but is not specifically listed in Chapter 93.

The discharge is not expected to affect any downstream water supply at this time with the limitations and monitoring proposed

Treatment Facility Summary

Treatment Facility Name: Patriot Treatment Plant

WQM Permit No.	Issuance Date
1984406-T1	Original - 11/28/1984 Transfer - 10/24/1997 Amendment No. 1 – 12/01/2016

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Extended Aeration	Chlorine With Dechlorination	0.02

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.02	10	Not Overloaded	Holding Tank	Other WWTP

Changes Since Last Permit Issuance: None

Other Comments: The treatment facility, as permitted under WQM 1984406 consists of two equalization tanks, three extended aeration tanks, two clarifiers, one erosion chlorinator, two chlorine contact tanks, erosion dechlorination, and a sludge holding tank.

Compliance History

DMR Data for Outfall 001 (from May 1, 2023 to April 30, 2024)

Parameter	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23
Flow (MGD) Average Monthly	0.0124	0.0110	0.0109	0.0097	0.0110	0.0087	0.0082	0.0081	0.0091	0.01	0.0072	0.0091
Flow (MGD) Daily Maximum	0.0159	0.0114	0.0113	0.0107	0.0127	0.0108	0.0095	0.0104	0.0102	0.0115	0.0102	0.0097
pH (S.U.) Instantaneous Minimum	7.1	6.2	6.0	6.2	6.4	6.3	6.2	6.3	6.3	6.3	6.4	6.1
pH (S.U.) Instantaneous Maximum	7.7	7.9	8.4	8.9	7.5	7.3	7.3	7.6	8.6	7.1	6.9	6.8
DO (mg/L) Instantaneous Minimum	5.0	5.1	5.0	5.1	5.9	5.0	5.0	5.7	5.0	5.1	5.2	7.1
TRC (mg/L) Average Monthly	0.08	0.12	0.09	0.17	0.20	0.24	0.22	0.27	0.09	0.09	0.08	0.10
TRC (mg/L) Instantaneous Maximum	0.21	0.21	0.25	0.44	0.37	0.64	0.47	0.59	0.29	0.30	0.32	0.43
CBOD5 (mg/L) Average Monthly	< 1.7	1.7	< 1.7	3	< 1.4	< 1.5	< 1.75	< 1.85	1.7	< 1.8	< 1	< 2
TSS (mg/L) Average Monthly	< 4	< 4	5	6.5	4.5	< 4	< 4	7	< 4	< 4	< 4	4.5
Fecal Coliform (No./100 ml) Geometric Mean	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Fecal Coliform (No./100 ml) Instantaneous Maximum	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Ammonia (lbs/day) Average Monthly	0.03	0.07	0.68	0.16	0.01	0.13	0.01	0.07	0.06	0.05	0.02	0.01
Ammonia (mg/L) Average Monthly	0.31	0.86	2.7	2.1	0.13	1.9	0.25	1.1	0.84	0.68	0.41	0.17

Compliance History	
Summary of Inspections:	The facility has been inspected approximately annually over the past permit term. The most recent inspection on March 31, 2023 identified no violations at the time of inspection.
Other Comments:	A query in WMS found no open violations in eFACTS for Patriot Treatment Plant, Inc.

Existing Limitations and Monitoring Requirements								
Parameter	**Effluent Limitations**						**Monitoring Requirements**	
	Mass Units (lbs/day) (1)		**Concentrations (mg/L)**				**Minimum (2) Measurement Frequency**	**Required Sample Type**
	Average Monthly	**Average Weekly**	**Minimum**	**Average Monthly**	**Maximum**	**Instant. Maximum**		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.27	XXX	0.88	1/day	Grab
CBOD5	XXX	XXX	XXX	25	XXX	50	2/month	Grab
TSS	XXX	XXX	XXX	30	XXX	60	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
Ammonia Nov 1 - Apr 30	Report	XXX	XXX	5	XXX	10	2/month	Grab
Ammonia May 1 - Oct 31	Report	XXX	XXX	3.0	XXX	6	2/month	Grab

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.02
Latitude 41º 1' 33.70" **Longitude** -76º 21' 57.50"
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)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
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: The above limitations are applicable and are included in the existing permit.

Water Quality-Based Limitations

DO, CBOD5 and NH3-N

The WQM7.0 model allows the Department to evaluate point source discharges of dissolved oxygen (DO), carbonaceous BOD ($CBOD_5$), and ammonia-nitrogen (NH_3-N) into free-flowing streams and rivers. To accomplish this, the model simulates two basic processes: the mixing and degradation of NH_3-N in the stream and the mixing and consumption of DO in the stream due to the degradation of $CBOD_5$ and NH_3-N. WQM7.0 modeling was performed including both the Columbia-Montour Area Vo-Tech (PA0041131) and the Central Columbia School District (PA0031852) because these facilities are within a mile of each other on the same receiving stream. The attached modeling verifies that the existing limitations are adequate (Attachment B).

Total Residual Chlorine

The Department uses a modeling spreadsheet to analyze the toxicity of a discharge's Total Residual Chlorine (TRC) in a receiving stream. The attached modeling shows that the existing water quality-based limit of 0.27 mg/L is adequate to protect the receiving stream. See Attachment B.

Water Quality Toxics Management

No further "Reasonable Potential Analysis" has been performed at this time to determine whether additional toxic pollutants are candidates for monitoring or limitations for this minor sewage treatment plant with no industrial contributors.

Chesapeake Bay/Nutrient Requirements

According to the Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, this facility is considered a Phase 5 Chesapeake Bay sewage discharger, and as such requires no nutrient loading limits. The permittee performed regular nutrient sampling under a previous permit term and the Total Nitrogen averaged 19.0 mg/L and the Total Phosphorus averaged 3.5 mg/L. Because the nutrients levels in the discharge have adequately been characterized through at least two (2) years of nutrient monitoring, existing annual Total Nitrogen and Total Phosphorus monitoring will not be included in this proposed draft permit.

Best Professional Judgment (BPJ) Limitations

Comments: No BPJ limitations are necessary at this time beyond the technology and water quality-based limits listed above.

Anti-Backsliding

No limitations in this proposed draft permit have been made less stringent consistent with the anti-backsliding requirements of the Clean Water Act and 40 CFR 122.44(l).

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.27	XXX	0.88	1/day	Grab
CBOD5	XXX	XXX	XXX	25	XXX	50	2/month	Grab
TSS	XXX	XXX	XXX	30	XXX	60	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
Ammonia Nov 1 - Apr 30	Report	XXX	XXX	5	XXX	10	2/month	Grab
Ammonia May 1 - Oct 31	Report	XXX	XXX	3.0	XXX	6	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	Report Daily Max	XX	1/year	Grab

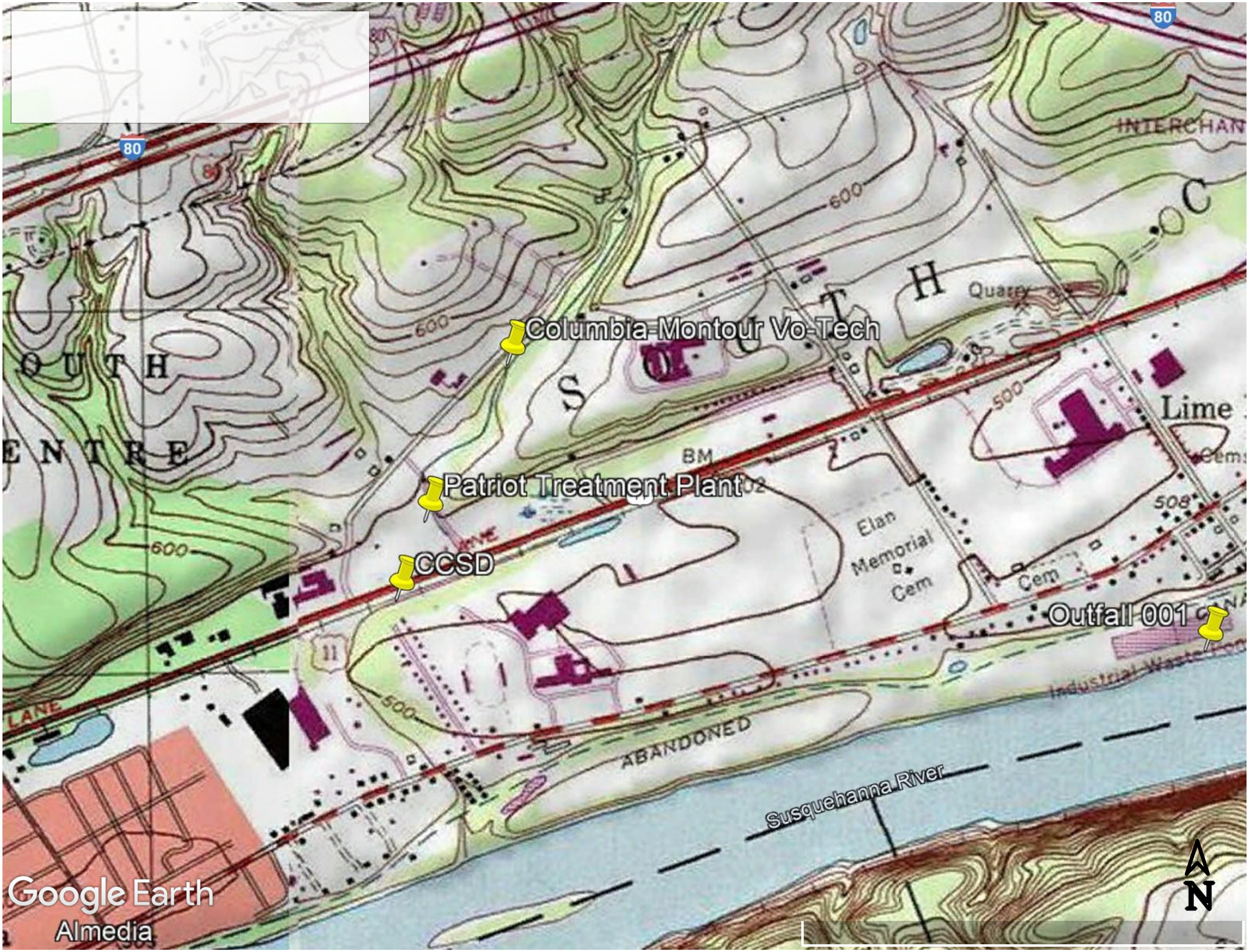
Compliance Sampling Location: Outfall 001

Other Comments: E. Coli monitoring is new consistent with recent changes to Chapter 93 of the Department's regulations and current Department policy.

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, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☒	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☒	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☒	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
☒	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

Attachments:

A. Discharge Location Map
B. WQM7.0 Model
C. TRC Model


Columbia-Montour Vo-Tech
Patriot Treatment Plant
CCSD
Outfall 001
Susquehanna River
Elan Memorial Cem
Quarry
Lime
Cem
ABANDONED
Industrial Waste
INTERCHAN
80
11
600
500
508
BM
Google Earth
Almedia
N

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
05D	28075	Trib 28075 to Susquehanna River	**1.200**	520.00	0.53	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	0.061	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
Vo-tech	PA0041131	0.0150	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	3.00	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
05D	28075	Trib 28075 to Susquehanna River	**0.700**	496.50	0.90	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.061	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
Patriot TP	PA0111937	0.0200	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	3.00	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
05D	28075	Trib 28075 to Susquehanna River	**0.590**	492.00	1.53	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	0.061	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
Central Col SD	PA0031852	0.0280	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	5.50	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
05D	28075	Trib 28075 to Susquehanna River	**0.010**	460.00	1.65	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	0.031	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
		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 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	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
05D	28075	Trib 28075 to Susquehanna River

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (ºC)	Analysis pH
Q7-10 Flow												
1.200	0.03	0.00	0.03	.0232	0.00890	.32	3.46	10.81	0.05	0.609	22.09	7.00
0.700	0.05	0.00	0.05	.0541	0.00775	.355	4.76	13.42	0.06	0.104	22.48	7.00
0.590	0.09	0.00	0.09	.0975	0.01045	.386	6.14	15.9	0.08	0.441	22.55	7.00
Q1-10 Flow												
1.200	0.02	0.00	0.02	.0232	0.00890	NA	NA	NA	0.04	0.694	22.64	7.00
0.700	0.04	0.00	0.04	.0541	0.00775	NA	NA	NA	0.06	0.117	23.03	7.00
0.590	0.06	0.00	0.06	.0975	0.01045	NA	NA	NA	0.07	0.491	23.10	7.00
Q30-10 Flow												
1.200	0.04	0.00	0.04	.0232	0.00890	NA	NA	NA	0.06	0.547	21.73	7.00
0.700	0.07	0.00	0.07	.0541	0.00775	NA	NA	NA	0.07	0.095	22.10	7.00
0.590	0.13	0.00	0.13	.0975	0.01045	NA	NA	NA	0.09	0.402	22.17	7.00

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
05D	28075	Trib 28075 to Susquehanna River

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
1.200	0.015	22.089	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
3.458	0.320	10.812	0.050
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
11.61	1.261	1.25	0.822
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.052	25.317	Owens	6
Reach Travel Time (days)			
0.609			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.061	10.67	1.19	7.37
0.122	9.81	1.13	7.72
0.183	9.01	1.08	7.85
0.243	8.28	1.03	7.93
0.304	7.61	0.98	7.93
0.365	6.99	0.93	7.93
0.426	6.43	0.88	7.93
0.487	5.91	0.84	7.93
0.548	5.43	0.80	7.93
0.609	4.99	0.76	7.93

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
0.700	0.035	22.483	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
4.764	0.355	13.416	0.064
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.05	1.337	1.24	0.847
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.598	24.899	Owens	6
Reach Travel Time (days)			
0.104			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.010	9.89	1.23	6.84
0.021	9.74	1.22	7.03
0.031	9.59	1.21	7.18
0.042	9.44	1.20	7.30
0.052	9.29	1.18	7.40
0.063	9.15	1.17	7.48
0.073	9.01	1.16	7.54
0.083	8.87	1.15	7.59
0.094	8.73	1.14	7.63
0.104	8.59	1.13	7.67

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
05D	28075	Trib 28075 to Susquehanna River

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
0.590	0.063	22.554	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
6.141	0.386	15.902	0.080
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.99	1.311	1.90	0.852
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.726	24.763	Owens	6
Reach Travel Time (days)			
0.441			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.044	10.30	1.83	7.24
0.088	9.65	1.76	7.46
0.132	9.04	1.69	7.58
0.176	8.48	1.63	7.66
0.220	7.94	1.57	7.73
0.264	7.44	1.51	7.79
0.308	6.98	1.46	7.84
0.353	6.54	1.40	7.87
0.397	6.13	1.35	7.87
0.441	5.74	1.30	7.87

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
05D	28075	Trib 28075 to Susquehanna River

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
1.200	Vo-tech	13.46	6	13.46	6	0	0
0.700	Patriot TP	13.8	6	13.04	6	0	0
0.590	Central Col SD	14.08	11	12.96	11	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
1.200	Vo-tech	1.69	3	1.69	3	0	0
0.700	Patriot TP	1.72	3	1.65	3	0	0
0.590	Central Col SD	1.74	5.5	1.64	5.5	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)		
1.20	Vo-tech	25	25	3	3	3	3	0	0
0.70	Patriot TP	25	25	3	3	3	3	0	0
0.59	Central Col SD	25	25	5.5	5.5	3	3	0	0

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
05D	28075	Trib 28075 to Susquehanna River

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
1.200	Vo-tech	PA0041131	0.015	CBOD5	25		
				NH3-N	3	6	
				Dissolved Oxygen			3

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)
0.700	Patriot TP	PA0111937	0.020	CBOD5	25		
				NH3-N	3	6	
				Dissolved Oxygen			3

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)
0.590	Central Col SD	PA0031852	0.028	CBOD5	25		
				NH3-N	5.5	11	
				Dissolved Oxygen			3

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.0549	= Q stream (cfs)	0.5	= CV Daily
0.02	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.585	1.3.2.iii	WLA cfc = 0.563
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.218	5.1d	LTA_cfc = 0.327

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.268	AFC
		INST MAX LIMIT (mg/l) = 0.878	

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)