Pennsylvania Department of Environmental Protection

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0095478**
Facility Type	**Non-Municipal**	APS ID	**1123760**
Major / Minor	**Minor**	Authorization ID	**1503056**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Jefferson Estates Sewer Treatment Plant Inc.**	Facility Name	**Jefferson Estates STP**
Applicant Address	75 Somers Road PO 474	Facility Address	Rt 201 & Jefferson Drive
	Somers, MT 59932-9779		Fayette City, PA 15401
Applicant Contact	Justin Ahmann	Facility Contact	Same as Applicant
Applicant Phone	(712) 790-3145	Facility Phone	Same as Applicant
Client ID	355036	Site ID	253424
Ch 94 Load Status	Not Overloaded	Municipality	Jefferson Township
Connection Status	No Limitations	County	Fayette
Date Application Received	October 15, 2024	EPA Waived?	Yes
Date Application Accepted	October 17, 2024	If No, Reason	

Purpose of Application: Renewal of NPDES permit for the discharge of treated sewage.

Summary of Review

DEP received a renewal application for the NPDES permit PA0095478, which was renewed on May 1, 2020 and will expire on April 30, 2025. The application was received on October 15, 2024 which is considered timely.

The design discharge flow rate is 0.021 MGD, and the discharge is to an unnamed tributary of Little Redstone Creek, which is classified as warm water fisheries (WWF) and located in the State Watershed 19-C.

The WQM permit No. 2674404 issued on November 25, 1974 authorized the construction of this facility to serve 80 residential units and consist of: a comminutor with bypass bar screen, equalization tank with blower, aeration-settling tank, a sludge holding tank, and a chlorine contact tank.

An Operations Compliance Check Summary Report was completed by DEP's Operations Section on November 8, 2024 and concluded that this facility is generally in compliance with no open violations or pending enforcements. Checking on last time this facility was inspected, the inspection report on October 19, 2023 stated that several limits exceedances were noticed for the period of March, 2021 – October, 2023. Also, this report noted that the Operator failed to submit eDMRs data on multiple occasions. Checking on eDMRs values for the period of January, 2024- February, 2025, no limits exceedances were noticed.

The application stated that there were no changes to the facility conditions regarding discharge, receiving stream, or treatment technology. No changes are foreseen for the next five years, and therefore, Act 537 was not needed.

No industrial users are discharging to this facility per the application.

The applicant provides a proof of Act 14, P.L. 834 compliance with the October 7, 2024 letters, no comments were received.

Approve	Deny	Signatures	Date
X		Hazim Aldalli / Environmental Engineering Specialist	April 4, 2025
X		Mahbuba Iasmin / Mahbuba Iasmin, Ph.D., P.E. / Environmental Engineering Manager	April 16, 2025

Summary of Review
Sludge use and disposal description and location(s): Off site at Allegheny Valley JSA STP. 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.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.021
Latitude	40º 4' 40.3"	Longitude	-79º 48' 33.2"
Quad Name	Fayette City	Quad Code	40079A7
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to Little Redstone Creek (WWF)	Stream Code	39858
NHD Com ID	99424770	RMI	1.66
Drainage Area	3.71	Yield (cfs/mi^2)	0.0105
Q_{7-10} Flow (cfs)	0.0392	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	1092	Slope (ft/ft)	0.01
Watershed No.	19-C	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Attaining: Supporting Aquatic Life		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	**None**	Name	**None**

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

Nearest Downstream Public Water Supply Intake		Washington Township Municipal Authority	
PWS Waters	Monongahela River	Flow at Intake (cfs)	530
PWS RMI	46.3	Distance from Outfall (mi)	3.1

Changes Since Last Permit Issuance:

- Q_{7-10} flow, elevation, drainage area, and low flow yield were all updated to match USGS Stream Stats new data (see Attachment A).
- DEP updated its WQM 7.0 criteria for Ammonia-Nitrogen (NH_3-N) in 2019. Limits and conditions of this permit need to be redeveloped to an adequate level to protect water quality.
- *E. Coli* monitoring requirements will be introduced to this renewal which is in compliance with DEP SOP No. BCW-PMT-033 revised February 5, 2024.

Other Comments: PA eMAP showing that the receiving stream is attaining its uses, which is different compared to the previous determination of stream organic impairment.

Treatment Facility Summary

Treatment Facility Name: Jefferson Estates STP

WQM Permit No.	Issuance Date
2674404	November 25, 1974
2674404 A-1	November 1, 2002
2674404 A-2	April 13, 2004
2674404 T-1	April 22, 2020

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Extended Aeration	No Disinfection	0.008

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.021	59.0	Not Overloaded	Activated Sludge	Off Site/Landfill

Changes Since Last Permit Issuance: The inspection report on October 19, 2023 stated that the STP EQ tank was drained, cleaned, and repaired. Both EQ tank pumps have been rebuilt and the aerators have been replaced in the aeration tank, however, the metal dividing wall between the sludge holding tank and aeration tank, as well as the left exterior wall of the aeration tank are in need of major repair and possible replacement. This may be the cause of fecal violations (see page 6).

Other Comments: None.

Compliance History

Operations Compliance Check Summary Report

Facility: Jefferson Estates STP

NPDES Permit No.: PA0095478

Compliance Review Period: 11/1/19-11/5/24

Inspection Summary:

INSPECTED DATE	INSP TYPE	AGENCY	INSPECTION RESULT DESC
12/28/2023	Administrative/File Review	PA Dept of Environmental Protection	Violation(s) Noted
10/19/2023	Compliance Evaluation	PA Dept of Environmental Protection	Violation(s) Noted
03/11/2021	Compliance Evaluation	PA Dept of Environmental Protection	Violation(s) Noted

Violation Summary:

VIOLATION DATE	VIOLATION TYPE	VIOLATION TYPE DESC	RESOLVED DATE	VIOLATION COMMENT
12/28/2023	302.202	Operator Certification - Failure to submit annual system fee	01/24/2024	Received 2023 Chapter 302 Fees
10/19/2023	92A.44	NPDES - Violation of effluent limits in Part A of permit	01/26/2024	05/31/2021 Fecal Coliform 1986 > 100 CFU/100 ml. Instantaneous Maximum 06/30/2021 Fecal Coliform 307 > 200 CFU/100 ml Geometric Mean 06/30/2021 Fecal Coliform. 2420 > 100 CFU/100 ml. Instantaneous Maximum 07/31/2021 Ammonia 29.7 > 10 mg/L Instantaneous Maximum 07/31/2021 Ammonia 15.2 > 5 mg/L Average Monthly 7/31/2021 Fecal Coliform 242 > 1000 CFU/100 ml. Instantaneous Maximum 08/31/2021 CBOD 60 > 25 mg/L Average Monthly 08/31/2021 CBOD 60 > 50 mg/L Instantaneous Maximum 9/30/2021 Fecal Coliform 43 > 200 CFU/100 ml Geometric Mean 8/31/2022 Fecal Coliform 2420 > 1000 CFU/100 ml. Instantaneous Maximum 6/30/2023 Fecal Coliform 1730 > 1000 CFU/100 ml. Instantaneous Maximum 7/31/2023 Fecal Coliform 1986 > 1000 CFU/100 ml. Instantaneous Maximum
10/19/2023	92A.41(A)12B	NPDES - Failure to submit monitoring report(s) or properly complete monitoring reports	01/26/2024	Daily effluent and influent sheets are n being utilized and uploaded with the eDMRs. Record influent flow, DO from the aeration tank, and any sludge wasted on the daily influent sheet.

03/11/2021	92A.44	NPDES - Violation of effluent limits in Part A of permit	07/14/2022	12 effluent violations
03/11/2021	252.4(A)	NPDES - Failure to utilize an accredited environmental laboratory for testing or analysis of environmental samples	07/14/2022	Jefferson Estates STP will need to register the on-site lab with the department.
03/11/2021	92A.47(C)	NPDES - Illegal discharge to waters of the Commonwealth from a sanitary sewer overflow (SSO)	07/14/2022	
03/11/2021	91.33(A)	CSL - Failure to immediately report to DEP a pollution incident	07/14/2022	Please notify the DEP immediately for each sewer overflow that occurs and submit a written report within 5 days of incident. Please notify plant operator so that he can record it in his daily log and comments on his eDMR.

Open Violations by Client ID:

No open violations for Client ID 355036

Enforcement Summary:

ENF TYPE	ENF TYPE DESC	EXECUTED DATE	VIOLATIONS	AMOUNT RECEIVED	ENF FINALSTATUS	ENF CLOSED DATE
NOV	Notice of Violation	12/28/2023	302.202		Comply/Closed	01/24/2024
NOV	Notice of Violation	10/30/2023	92A.44, 92A.41(A)12B		ACO	10/30/23

Effluent Violation Summary:

MON_PD	OUTFALL	PARAMETER	SAMPLE_VALUE	PERMIT_VALUE	UNIT	STAT_BASE_CODE
Jul-23	001	Fecal Coliform	1986	1000	No./100 ml	Instantaneous Maximum
Jun-23	001	Fecal Coliform	1733	1000	No./100 ml	Instantaneous Maximum
Aug-22	001	Fecal Coliform	2420	1000	No./100 ml	Instantaneous Maximum
Sep-21	001	Fecal Coliform	439	200	No./100 ml	Geometric Mean
Aug-21	001	Carbonaceous Biochemical Oxygen Demand (CBOD5)	60	25.0	mg/L	Average Monthly
Aug-21	001	Carbonaceous Biochemical Oxygen Demand (CBOD5)	60	50.0	mg/L	Instantaneous Maximum
Jul-21	001	Ammonia-Nitrogen	15.2	5.0	mg/L	Average Monthly
Jul-21	001	Ammonia-Nitrogen	29.7	10.0	mg/L	Instantaneous Maximum

Jul-21	001	Fecal Coliform	2420	1000	No./100 ml	Instantaneous Maximum
Jun-21	001	Fecal Coliform	2420	1000	No./100 ml	Instantaneous Maximum
Jun-21	001	Fecal Coliform	307	200	No./100 ml	Geometric Mean
May-21	001	Fecal Coliform	1986	1000	No./100 ml	Instantaneous Maximum
Oct-20	001	Ammonia-Nitrogen	6.1	5.0	mg/L	Average Monthly
Aug-20	001	Ammonia-Nitrogen	5.9	5.0	mg/L	Average Monthly
Jul-20	001	Ammonia-Nitrogen	11.2	10.0	mg/L	Instantaneous Maximum
Jul-20	001	Ammonia-Nitrogen	5.75	5.0	mg/L	Average Monthly
May-20	001	Fecal Coliform	24196	1000	No./100 ml	Instantaneous Maximum
May-20	001	Fecal Coliform	7935	200	No./100 ml	Geometric Mean
Apr-20	001	Fecal Coliform	4426	2000	CFU/100 ml	Geometric Mean
Mar-20	001	Fecal Coliform	6582	2000	CFU/100 ml	Geometric Mean
Jan-20	001	Fecal Coliform	11199	10000	CFU/100 ml	Instantaneous Maximum
Dec-19	001	Fecal Coliform	24195	10000	CFU/100 ml	Instantaneous Maximum
Nov-19	001	Fecal Coliform	13000	10000	CFU/100 ml	Instantaneous Maximum

Compliance Status: Facility is generally in compliance with no open violations or pending enforcements.

Completed by: Amanda Illar **Completed date:** 11/8/24

Other Comments: **None.**

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.021
Latitude 40º 4' 40.3" **Longitude** -79º 48' 33.2"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

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

Pollutant	Limit (mg/L)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)
E. Coli (No./100 ml)	Report	IMAX	-	92a.61
D.O. (mg/L)	4.0	Min	-	BPJ
NH_3-N (mg/L)	25	Average Monthly	-	BPJ
	50	IMAX		
Total N (mg/L)	Report	Average Monthly	-	92a.61
Total P (mg/L)	Report	Average Monthly	-	92a.61

Comments: The existing discharge was evaluated using WQM 7.0 to develop $CBOD_5$, NH_3-N, and D.O. parameters.

The Total Suspended Solids (TSS), pH, and Fecal Coliform parameters are not evaluated using WQM 7.0. The bases for the proposed technology-based limitations are listed in the above table.

Water Quality-Based Limitations

The following limitations were determined through water quality modeling (see Attachment B&C):

Parameter	Limit (mg/l)	SBC	Model
TRC	0.25	Average Monthly	DEP TRC
$CBOD_5$ (May1-Oct 31)	25	Average Monthly	WQM7.0
$CBOD_5$ (Nov 1- Apr 30)	25	Average Monthly	WQM7.0
NH_3-N (May1-Oct 31)	4.0	Average Monthly	WQM7.0
NH_3-N (Nov 1- Apr 30)	10.7	Average Monthly	WQM7.0
Dissolved Oxygen	4.0	Minimum	WQM7.0

Comments: WQM 7.0 was used to determine the newly imposed seasonal limits for Ammonia-Nitrogen (NH_3-N). After applying DEP's regulation and applying *Implementation Guidance of Section 93.7 Ammonia Criteria, 1997*, the new limits will be AML of 4.0 mg/L for the warm period and AML of 10.7 mg/L for the cold period.

Per renewal application's effluent sampling and eDMR values, the facility can meet the newly imposed Ammonia-Nitrogen limits as this plant has achieved lower than the new proposed limits. No compliance schedule is necessary. Twice a month monitoring shall be required.

For the Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), the WQM 7.0 model generated a WQBEL AML of 25 mg/L a year around, which matches the previous permit limits. Twice a month monitoring shall be required.

Best Professional Judgment (BPJ) Limitations

A minimum Dissolved Oxygen (DO) limit of 4.0 mg/L should be established based on DEP water quality model WQM 7.0 Version 1.1 (Attachment B) and based on Best Professional Judgment (BPJ) to ensure adequate operation and maintenance as listed in the table under Technology-Based Limitations section (see page 8).

Anti-Backsliding

The previously imposed limits for pH Effluent Limitations (6.0 Minimum, and 9.0 Maximum SIU), Fecal Coliform AML Geo Mean seasonal limits of 200 CFU/100 ml & 2000 CFU/100 ml, and TSS AML, Weekly Average, and Ins. Max of 30 mg/L, 45 mg/L, and 60 mg/L, respectively will be all unchanged due to anti-backsliding as stated in 40 CFR Section 122.44(l).

TN and TP Monitoring

Per SOP (No. BCW-PMT-033, *Establishing Effluent Limitations for Individual Sewage Permits, ver 2.0*):

- Nutrient monitoring is required, at a minimum, to establish the nutrient load from the wastewater treatment facility and the impacts that load may have on the quality of the receiving stream(s). Sewage discharges with design flows > 2,000 gpd require monitoring, at a minimum, for Total Nitrogen and Total Phosphorus in new and reissued permits.

The receiving stream (UNT of Little Redstone Creek) is not impaired for nutrients (per PA eMAP and the reviewed eDMRs), and therefore, advanced treatment requirements for TN, and TP will not be imposed

Annual monitoring is recommended per 25 PA Code §92a.61(b).

Disinfection

Total Residual Chlorine (TRC) AML limit of 0.25 mg/L and IMAX of 0.6 mg/L were calculated based on the DEP preset values entered in the Department Calculation Sheet (Attachment C) for chlorine stream and discharge demands. A compliance schedule is necessary to have this facility in compliance with the AML of 0.25 mg/L. Twenty four (24) months from the permit effective date will be given to the permittee to implement the necessary upgrades/updates within the facility. Part C 119 – TRC Schedule and Site Specific Studies has been added to the permit.

E. Coli

Pursuant to 25 Pa. code § 92a.61(b), annual monitoring for *E. Coli* will be imposed at Outfall 001 per DEP SOP No. BCW-PMT-033 revised February 5, 2024.

Monitoring Frequency Considerations

For pH, Dissolved Oxygen (DO) and Total Residual Chlorine (TRC), a monitoring frequency of “1/weekday” has been imposed. The monitoring frequency are consistent with current policy and Table 6-3 of DEP’s Technical Guidance (Footnote for the Development and Specification of Effluent Limitations. Once on a weekday monitoring is required for these parameters to provide minimum assurance that the facility is being operated properly.

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 End of Twenty-Fourth (24th) Month Following Permit Issuance.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (µg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
TRC	XXX	XXX	XXX	0.6	XXX	1.5	1/weekday	Grab

Compliance Sampling Location: Outfall 001.

Other Comments: None.

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: Beginning of Twenty Fifth (25th) Month Following Permit Issuance through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (ug/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
TRC	XXX	XXX	XXX	0.25	XXX	0.6	1/weekday	Grab

Compliance Sampling Location: Outfall 001.

Other Comments: None.

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)	0.021	XXX	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/weekday	Grab
DO	XXX	XXX	4.0 Inst Min	XXX	XXX	XXX	1/weekday	Grab
CBOD5	XXX	XXX	XXX	25.0	XXX	50.0	2/month	Grab
TSS	XXX	XXX	XXX	30.0	XXX	60.0	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
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	XXX	XXX	XXX	10.7	XXX	21.4	2/month	Grab
Ammonia-Nitrogen May 1 - Oct 31	XXX	XXX	XXX	4.0	XXX	8.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Compliance Sampling Location: at Outfall 001.

ATTACHMENT A:
USGS StreamStats

StreamStats Report

Region ID: PA
Workspace ID: PA20241206135322267000
Clicked Point (Latitude, Longitude): 40.07810, -79.80945
Time: 2024-12-06 08:53:46 -0500

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.71	square miles
ELEV	Mean Basin Elevation	1092	feet

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.71	square miles	2.26	1400
ELEV	Mean Basin Elevation	1092	feet	1050	2580

Low-Flow Statistics Flow Report [Low Flow Region 4]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	0.116	ft^3/s	43	43
30 Day 2 Year Low Flow	0.209	ft^3/s	38	38
7 Day 10 Year Low Flow	0.0392	ft^3/s	66	66
30 Day 10 Year Low Flow	0.0755	ft^3/s	54	54
90 Day 10 Year Low Flow	0.142	ft^3/s	41	41

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

ATTACHMENT B:
WQM7.0 Model Results (Summer)

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
19C	39858	Trib 39858 to Little Redstone Creek	**1.660**	1092.00	3.71	0.01000	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	0.010	0.04	0.00	0.000	0.000	10.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Jefferson E STP	PA0095478	0.0210	0.0210	0.0210	0.000	20.00	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	0.00	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
19C	39858	Trib 39858 to Little Redstone Creek	**0.950**	1068.00	12.50	0.01000	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	0.014	0.17	0.00	0.000	0.000	10.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Jefferson E STP	PA0095478	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	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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												
1.660	0.04	0.00	0.04	.0325	0.01000	.434	4.34	10	0.04	1.138	22.73	7.00
Q1-10 Flow												
1.660	0.03	0.00	0.03	.0325	0.01000	NA	NA	NA	0.03	1.287	22.18	7.00
Q30-10 Flow												
1.660	0.05	0.00	0.05	.0325	0.01000	NA	NA	NA	0.04	1.029	23.11	7.00

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	5		

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone Creek

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
1.660	0.021	22.734	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
4.336	0.434	10.000	0.038
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
12.42	1.175	1.83	0.864
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.320	12.171	Owens	5
Reach Travel Time (days)			
1.138			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.114	10.68	1.66	6.30
0.228	9.17	1.51	6.53
0.341	7.88	1.37	6.79
0.455	6.78	1.24	7.03
0.569	5.82	1.12	7.25
0.683	5.00	1.02	7.44
0.797	4.30	0.92	7.60
0.911	3.70	0.84	7.74
1.024	3.18	0.76	7.84
1.138	2.73	0.69	7.84

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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
1.660	Jefferson E STP	8.26	14.65	8.26	14.65	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
1.660	Jefferson E STP	1.53	4.05	1.53	4.05	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)		
1.66	Jefferson E STP	25	25	4.05	4.05	4	4	0	0

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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)
1.660	Jefferson E STP	PA0095478	0.021	CBOD5	25		
				NH3-N	4.05	8.1	
				Dissolved Oxygen			4

ATTACHMENT B:
WQM7.0 Model Results (Winter)

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
19C	39858	Trib 39858 to Little Redstone Creek	**1.660**	1092.00	3.71	0.01000	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	0.021	0.04	0.00	0.000	0.000	10.0	0.00	0.00	5.00	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
Jefferson E STP	PA0095478	0.0210	0.0210	0.0210	0.000	15.00	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	12.51	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
19C	39858	Trib 39858 to Little Redstone Creek	**0.950**	1068.00	12.50	0.01000	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	0.028	0.17	0.00	0.000	0.000	10.0	0.00	0.00	5.00	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
Jefferson E STP	PA0095478	0.0000	0.0000	0.0000	0.000	15.00	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	12.51	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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												
1.660	0.04	0.00	0.04	.0325	0.01000	.434	4.34	10	0.04	1.138	9.53	7.00
Q1-10 Flow												
1.660	0.03	0.00	0.03	.0325	0.01000	NA	NA	NA	0.03	1.287	10.64	7.00
Q30-10 Flow												
1.660	0.05	0.00	0.05	.0325	0.01000	NA	NA	NA	0.04	1.029	8.79	7.00

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	5		

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone Creek

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
1.660	0.021	9.532	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
4.336	0.434	10.000	0.038
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
12.42	1.283	4.88	0.313
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.653	8.899	Owens	5
Reach Travel Time (days)			
1.138			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.114	11.35	4.71	8.90
0.228	10.37	4.55	9.09
0.341	9.48	4.39	9.26
0.455	8.66	4.24	9.41
0.569	7.91	4.09	9.54
0.683	7.23	3.94	9.67
0.797	6.60	3.81	9.78
0.911	6.03	3.67	9.89
1.024	5.51	3.55	9.99
1.138	5.04	3.42	10.08

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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
1.660	Jefferson E STP	19.57	34.69	19.57	34.69	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
1.660	Jefferson E STP	4.08	10.78	4.08	10.78	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)		
1.66	Jefferson E STP	25	25	10.78	10.78	4	4	0	0

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	39858	Trib 39858 to Little Redstone 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)
1.660	Jefferson E STP	PA0095478	0.021	CBOD5	25		
				NH3-N	10.78	21.56	
				Dissolved Oxygen			4

ATTACHMENT C:
DEP Total Residual Chlorine Calculation Sheet

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.0392	= Q stream (cfs)	0.5	= CV Daily
0.021	= Q discharge (MGD)	0.5	= CV Hourly
4	= 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 = 0.404	1.3.2.iii	WLA cfc = 0.386
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.151	5.1d	LTA_cfc = 0.225

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.720	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.259	AFC
		INST MAX LIMIT (mg/l) = 0.606	

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)**