pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0033871**
Facility Type	**Non-Municipal**	APS ID	**1025204**
Major / Minor	**Minor**	Authorization ID	**1330436**

Applicant and Facility Information

Applicant Name	**Frank T Perano**	Facility Name	**Northview Estates MHP**
Applicant Address	P.O. Box 677	Facility Address	4 Bayberry Circle
	Morgantown, PA 19543-0677		Indiana, PA 15701
Applicant Contact	James Perano	Facility Contact	James Perano
Applicant Phone	(610) 286-0490	Facility Phone	(610) 286-0490
Client ID	93185	Site ID	252054
Ch 94 Load Status	Not Overloaded	Municipality	White Township
Connection Status	No Limitations	County	Indiana
Date Application Received	September 25, 2020	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater from a MHP.

Summary of Review

Act 14 - Proof of Notification was submitted and received.

A Part II Water Quality Management permit is not required at this time.

The applicant should be able to continue to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

A. Stormwater into sewers
B. Right of way
C. Solids handling
D. Public sewerage availability
E. Effluent Chlorine Optimization and Minimization
F. Dry Streams (should add this to the NPDES Permit)

SPECIAL CONDITIONS:

II. Solids Management

Public Participation

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

Approve	Deny	Signatures	Date
X		Emily Voorhees Emily C. M. Voorhees / Civil Engineer	10/7/2021
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	10/8/221

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.0575
Latitude	40º 38' 34.58"	Longitude	-79º 8' 35.37"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary of McKee Run (CWF)	Stream Code	46788
NHD Com ID	123858868	RMI	2.5
Drainage Area	0.036	Yield (cfs/mi^2)	0.1
Q_{7-10} Flow (cfs)	0.0036	Q_{7-10} Basis	calculated
Elevation (ft)	1,268	Slope (ft/ft)	0.01151
Watershed No.	17-E	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final	Name	Crooked Creek Watershed*

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

Nearest Downstream Public Water Supply Intake		New Kensington City Municipal Authority	
PWS Waters	Allegheny River	Flow at Intake (cfs)	------
PWS RMI	20.98	Distance from Outfall (mi)	64.94

* - The TMDL for the Crooked Creek Watershed is for siltation, Total Suspended Solids, and turbidity. This discharge is not expected to be a source, so no additional monitoring will be added with this renewal.

Sludge use and disposal description and location(s): Sludge is not used; it is hauled to Johnstown WWTP.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.0575 MGD of treated sewage from a MHP in White Township, Indiana County.

Treatment permitted under Water Quality Management Permit No. 3273405 and 3278406 consists of the following: Waste enter the comminutor/bar screen then discharges to the flow equalization tank. The water is then pumped from a duplex pumping chamber to a flow splitter box that distributes the flow to two train, parallel extended aeration zones. Each aeration zone discharges the effluent to duplex parallel clarifiers. The clarified effluent from each clarifier is discharged to a single chlorine contact chamber for disinfection. Settled solids from each clarifier are wasted to two aerobic digester tanks (one for each clarifier). Activated sludge is returned to each respective aeration zone to feed incoming flow.

1. Streamflow:

Crooked Creek at Idaho, PA - USGS Gage 03038000 (1970-2008):

Q_{7-10}:	19.9	cfs	(USGS StreamStats)
Drainage Area:	191	sq. mi.	(USGS StreamStats)
Yieldrate:	0.1	cfsm	calculated

Tributary 46788 of the McKee Run at Outfall 001:

Yieldrate:	0.1	cfsm	calculated above
Drainage Area:	0.036	sq. mi.	(USGS StreamStats)
Q_{7-10}:	0.0036	cfs	calculated

% of stream allocated: 100% Basis: No nearby discharges

2. Wasteflow:

Maximum discharge: 0.0575 MGD = 0.089 cfs

Runoff flow period: 24 hours Basis: Runoff flow with flow equalization

There is less than 3 parts stream flow (Q7-10) to 1 part effluent (design flow). In accordance with the SOP, the treatment requirements in document number 391-2000-014, titled, "Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers", dated April 12, 2008, were evaluated for this facility. Since this is an existing discharge, the more stringent treatment requirements cannot be achieved, and the receiving stream is not impaired by the discharge, the standards in DEP guidance (391-2000-014) will not be applied with this renewal.

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, Total Phosphorus, Total Nitrogen, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits. The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

b. Total Suspended Solids

Limits are 30 mg/l as a monthly average and 60 as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits.

c. Fecal Coliform

05/01 - 09/30:	200/100ml	(monthly average geometric mean)
	1,000/100ml	(instantaneous maximum)
10/01 - 04/30:	2,000/100ml	(monthly average geometric mean)
	10,000/100ml	(instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/quarter.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows between 0.05 and 1.0 MGD.

e. Total Phosphorus

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61.

g. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used:	7.0	Standard Units (S.U.)
	Basis:	eDMR data
Discharge temperature:	25°C	(default value used in the absence of data)
Median stream pH to be used:	7.0	Standard Units (S.U.)
	Basis:	default value used in the absence of data
Stream Temperature:	25˚C	(default value used for WWF modeling)
Background NH_3-N concentration:	0.1	mg/l
	Basis:	Default value.
Calculated NH_3-N Summer limits:	25.0	mg/l (monthly average)
	50.0	mg/l (instantaneous maximum)
Calculated NH_3-N Winter limits:	25.0	mg/l (monthly average)
	50.0	mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1). The winter limits are calculated as three times the summer limits, but since the technology-based limits would govern, they will be used. Since the previous NH3-N limits are more restrictive, and are being attained, they will be retained.

h. $CBOD_5$

Median discharge pH to be used:	7.0	Standard Units (S.U.)
	Basis:	eDMR data
Discharge temperature:	25°C	(default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

$CBOD_5$ Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

$CBOD_5$ Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1), which are the same as in the previous permit. The winter limits are calculated as three times the summer limits, but since the technology-based limits would govern, they will be used. Since the summer and winter limits are technology-based, per the SOP, the year-round limit of 25.0 mg/l monthly average and 50.0 mg/l instantaneous maximum will be retained with this renewal.

i. Dissolved Oxygen (DO)

☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life
☐ 5.0 mg/l - desired in effluent for CWF, WWF, or TSF
☐ 6.0 mg/l - minimum required due to discharge falling under guidance document 391-2000-014
☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: The technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61. However, since the previous minimum of 5.0 mg/l is being attained, it will be retained with this renewal. The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

j. Total Residual Chlorine (TRC)

☐ No limit necessary

Basis: N/A

☒ TRC limits: 0.38 mg/l (monthly average)
1.25 mg/l (instantaneous maximum)

Basis: The TRC limits above are water quality-based using the TRC_Calc Spreadsheet at the first point of use (see Attachment 2). The limits are more restrictive than the previous permit. However, based on the eDMR data, the new limits are attainable, so a compliance schedule will not be necessary. The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

k. Anti-Backsliding

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

4. Reasonable Potential Analysis for Receiving Stream:

A Reasonable Potential Analysis was not performed in accordance with State practices for Outfall 001 since no sampling other than sewage-related parameters was performed for this facility with the renewal application.

5. Reasonable Potential for Downstream Public Water Supply (PWS):

The Reasonable Potential Analysis performed above does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). However, since no data was provided, mass-balance calculations were not able to be performed.

Nearest Downstream potable water supply (PWS): New Kensington City Municipal Authority
Distance downstream from the point of discharge: 64.94 miles (approximate)

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available.

6. Attachment List:

Attachment 1 - WQ Modeling Printouts

Attachment 2 - TRC_Calc Spreadsheet

(The Attachments above can be found at the end of this document)

Compliance History

DMR Data for Outfall 001 (from August 1, 2020 to July 31, 2021)

Parameter	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20
Flow (MGD) Average Monthly	0.0136	0.0167	0.0257	0.0170	0.0209	0.0265	0.0146	0.0201	0.0074	0.0077	0.0052	0.0051
pH (S.U.) Minimum	7.0	7.0	7.1	6.7	6.7	6.8	6.3	6.8	6.8	6.3	6.6	7.0
pH (S.U.) Maximum	7.6	7.5	7.6	7.4	7.3	7.1	7.1	7.1	7.4	6.9	7.3	7.8
DO (mg/L) Minimum	6.9	6.7	7.1	7.3	8.6	6.1	6.8	5.2	5.1	5.2	5.2	5.2
TRC (mg/L) Average Monthly	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.31	0.3	0.3
TRC (mg/L) Instantaneous Maximum	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6
CBOD5 (mg/L) Average Monthly	5.4	4.3	3.0	3.3	3.1	3.6	4.6	7.4	3.0	8.7	3.5	3.1
CBOD5 (mg/L) Instantaneous Maximum	7.8	5.5	< 3.0	3.5	3.2	4.2	6.2	8.8	3.0	14.3	4.0	3.2
TSS (mg/L) Average Monthly	3.5	5.0	3.0	3.0	3.0	4.0	4.0	5.0	6.5	7.5	3.5	8.5
TSS (mg/L) Instantaneous Maximum	4.0	6.0	< 3.0	3.0	< 3.0	5.0	5.0	7.0	10.0	12.0	4.0	14
Fecal Coliform (CFU/100 ml) Geometric Mean	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1	1.0	1
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	< 1.0	< 1.0	< 1.0	1.0	< 1.0	1.0	1.0	1.0	1.0	1	1.0	1
Total Nitrogen (mg/L) Daily Maximum								37.0				
Ammonia (mg/L) Average Monthly	0.2	0.2	0.1	0.15	0.23	0.10	0.13	0.32	1.4	0.27	0.17	0.14
Ammonia (mg/L) Instantaneous Maximum	0.2	0.2	< 0.1	0.15	0.36	0.10	0.13	0.34	1.5	0.36	0.19	0.17
Total Phosphorus (mg/L) Daily Maximum								5.96				

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	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	XXX	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily 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	0.38	XXX	1.25	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
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	25.0	XXX	50.0	2/month	Grab
Ammonia May 1 - Oct 31	XXX	XXX	XXX	25.0	XXX	50.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Compliance Sampling Location: at Outfall 001, after chlorine disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limits are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliforms are technology-based on Chapter 92a.47. Monitoring for Total Nitrogen and Total Phosphorus is based on Chapter 92a.61. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7.

Attachment 1

WQM 7.0 Effluent Limits (Perennial Reach Model)

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

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)
1.640	Perrenial	PA0033871a	0.058	CBOD5	11.35		
				NH3-N	15.94	31.88	
				Dissolved Oxygen			2

Since Perennial Reach Model limits are the same as the limits from the Dry Reach Model, the inputs from the Dry Reach Model below are protective.

CBOD5 = 25.0 mg/l

NH3-N = 25.0 mg/l

DO = 4.0 mg/l

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
1.640	0.058	21.403	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
8.035	0.421	19.105	0.094
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.62	0.729	4.47	0.780
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.491	22.814	Owens	6
Reach Travel Time (days)			
1.068			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.107	4.26	4.12	7.91
0.214	3.92	3.79	8.03
0.321	3.60	3.48	8.03
0.427	3.32	3.21	8.03
0.534	3.05	2.95	8.03
0.641	2.81	2.71	8.03
0.748	2.59	2.50	8.03
0.855	2.38	2.30	8.03
0.962	2.19	2.11	8.03
1.068	2.02	1.94	8.03

WQM 7.0 Modeling Specifications

Parameters	D.O.	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		

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
17E	46788	Trib 46788 of McKee Run	**1.640**	1170.00	2.28	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	0.100	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
Perrenial	PA0033871a	0.0575	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	11.35	2.00	0.00	1.50
Dissolved Oxygen	2.00	8.24	0.00	0.00
NH3-N	15.94	0.00	0.00	0.70

Values from Dry Reach Model

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
17E	46788	Trib 46788 of McKee Run	**0.000**	1116.00	3.42	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	0.100	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 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

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												
1.640	0.23	0.00	0.23	.089	0.00624	.421	8.03	19.11	0.09	1.068	21.40	7.00
Q1-10 Flow												
1.640	0.15	0.00	0.00	.089	0.00624	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
1.640	0.31	0.00	0.00	.089	0.00624	NA	NA	NA	0.00	0.000	0.00	0.00

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

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)		
1.64	Perrenial	11.35	11.35	15.94	15.94	2	2	0	0

WQM 7.0 D.O.Simulation (Dry Reach Model)

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
2.500	0.058	24.804	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1.701	0.419	4.056	0.130
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
24.10	1.493	24.02	1.013
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
3.922	30.932	Owens	2
Reach Travel Time (days)			
0.405			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.040	22.35	23.06	2.00
0.081	20.73	22.13	2.00
0.121	19.23	21.24	2.00
0.162	17.83	20.39	2.00
0.202	16.54	19.57	2.00
0.243	15.34	18.78	2.00
0.283	14.22	18.03	2.00
0.324	13.19	17.30	2.00
0.364	12.23	16.61	2.00
0.405	11.35	15.94	2.00

Use as Dry Model inputs

WQM 7.0 Modeling Specifications

Parameters	D.O.	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	Simulation	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	2		

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
17E	46788	Trib 46788 of McKee Run	**2.500**	1268.00	0.04	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	0.100	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
Dry Stream	PA0033871	0.0575	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	2.00	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
17E	46788	Trib 46788 of McKee Run	**1.640**	1170.00	2.28	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	0.100	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
Perrenial	PA0033871a	0.0575	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	11.35	2.00	0.00	1.50
Dissolved Oxygen	2.00	8.24	0.00	0.00
NH3-N	15.94	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
17E	46788	Trib 46788 of McKee Run

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												
2.500	0.00	0.00	0.00	NA	0.02158	.419	1.7	4.06	0.13	0.405	24.80	7.00
Q1-10 Flow												
2.500	0.00	0.00	0.00	NA	0.02158	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
2.500	0.00	0.00	0.00	NA	0.02158	NA	NA	NA	0.00	0.000	0.00	0.00

Attachment 2

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.228	= Q stream (cfs)	0.5	= CV Daily
0.0575	= 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)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.837	1.3.2.iii	WLA cfc = 0.808
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.312	5.1d	LTA_cfc = 0.470

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.384	AFC
		INST MAX LIMIT (mg/l) = 1.255	

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)**