pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Northwest Regional Office**
**CLEAN WATER PROGRAM**

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0040878** |
| Facility Type | **Non-Municipal** | APS ID | **1109875** |
| Major / Minor | **Minor** | Authorization ID | **1477577** |

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Gentile Enterprises, LLC** | Facility Name | **Keystone Adolescent Center** |
| Applicant Address | 95 South Race Street | Facility Address | 270 Sharon Road |
| | Greenville, PA 16125 | | Greenville, PA 16125-8109 |
| Applicant Contact | Robert Gentile, President | Facility Contact | Rod Donghia, Operator (rdonghia@gmail.com) |
| Applicant Phone | (724) 589-5546 | Facility Phone | (724) 813-8838 |
| Client ID | 111062 | Site ID | 481697 |
| Ch 94 Load Status | Not Overloaded | Municipality | West Salem Township |
| Connection Status | No Limitations | County | Mercer |
| Date Application Received | February 16, 2024 | EPA Waived? | Yes |
| Date Application Accepted | March 20, 2024 | If No, Reason | - |

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

## 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 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. Little or No Assimilative Capacity

SPECIAL CONDITIONS:
- II. Solids Management

There are no open violations in efacts associated with the subject Client ID (111062) as of 1/30/2025.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | Stephen A. McCauley<br>Stephen A. McCauley, E.I.T. / Project Manager | 1/30/2025 |
| X | | Adam Olesnanik<br>Adam Olesnanik, P.E. / Environmental Engineer Manager | 2/7/2025 |

| Discharge, Receiving Waters and Water Supply Information | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | 0.0043 |
| Latitude | 41° 22’ 5.10” | Longitude | 80° 24’ 10.60” |
| Quad Name | - | Quad Code | - |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | Unnamed Tributary to the Big Run (WWF) | Stream Code | N/A |
| NHD Com ID | 130034271 | RMI | 0.59 |
| Drainage Area | 26.5 | Yield (cfs/mi$^2$) | 0.1 (default) |
| $Q_{7-10}$ Flow (cfs) | 2.65 | $Q_{7-10}$ Basis | calculated |
| Elevation (ft) | 1010 | Slope (ft/ft) | 0.005769 |
| Watershed No. | 20-A | Chapter 93 Class. | WWF |
| 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 | - | Name | - |

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

| Nearest Downstream Public Water Supply Intake | Sharpsville Municipal Water Authority | | |
|---|---|---|---|
| PWS Waters | Shenango River | Flow at Intake (cfs) | 94.3 |
| PWS RMI | 33.2 | Distance from Outfall (mi) | 17.0 |

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.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.0043 MGD of treated sewage from an existing discharge in West Salem Township, Mercer County.

Treatment under Water Quality Management Permit No. 4372412 consists of: A comminutor with bypass bar screen, a 5,025 gallon aeration tank, a 1,145 gallon settling tank, a 354 gallon dosing tank, two intermittent 189 square foot sand filters, and tablet chlorine disinfection with a 302 gallon chlorine contact tank.

**1. Streamflow:**

Unnamed Tributary to the Big Run @ Outfall 001:

Drainage Area: 26.5 sq. mi.
Yieldrate: 0.1 cfsm (default)

$Q_{7-10}$: 2.65 cfs

**2. Wasteflow:**

Maximum discharge: 0.0043 MGD = 0.0066 cfs

Runoff flow period: 16 hours Basis: small non-municipal STP

24 hour flow: 0.0043 MGD x 24/16 = 0.0064 MGD = 0.0099 cfs

In accordance with the SOP, since there is greater than 3 parts stream flow (Q7-10) to 1 part effluent (design flow), 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 not evaluated.

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, E. Coli, Total Phosphorus, Total Nitrogen, $NH_3$-N, $CBOD_5$, Dissolved Oxygen, and Disinfection.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits.

The measurement frequency was set to 4/week during the previous renewal. Since the sampling is being performed, and the Permit is in compliance, the frequency will not be increased 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).

b. Total Suspended Solids

Limits are 30.0 mg/l as a monthly average and 60.0 as an instantaneous maximum.

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

c. Fecal Coliform

05/01 - 09/30: 200 No./100ml (monthly average)
1,000 No./100ml (instantaneous maximum)

10/01 - 04/30: 2,000 No./100ml (monthly average)
10,000 No./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/year.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows between 0.002 MGD and 0.05 MGD.

e. Total Phosphorus

Chapter 96.5 does not apply. However, the previous monitoring for Total Phosphorus 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: | 7.1 | Standard Units (S.U.) |
| | | Basis: Average pH value from DMR summary |
| Discharge temperature: | 25°C | (Default value used for modeling purposes) |
| Median stream pH to be used: | 7.0 | Standard Units (S.U.) |
| | | Basis: Default value used for modeling purposes |
| Stream Temperature: | 20˚C | (Default value used for CWF modeling purposes) |
| Background $NH_3$-N concentration: | 0.1 | mg/l |
| | | Basis: Default value used for modeling purposes |
| $NH_3$-N Summer limits: | 25.0 | mg/l (monthly average) |
| | 50.0 | mg/l (instantaneous maximum) |
| $NH_3$-N Winter limits: | 25.0 | mg/l (monthly average) |
| | 50.0 | mg/l (instantaneous maximum) |

Result: WQ modeling resulted in the summer limits calculated above (see Attachment 1), which are the same as the previous permit. The winter limits are set as three times the summer limits, but since the technology-based limits are more protective, they will be used.

h. $CBOD_5$

| | | |
|---|---|---|
| Median discharge pH to be used: | 7.1 | Standard Units (S.U.) |
| | | Basis: Average pH value from DMR summary |
| Discharge temperature: | 25°C | (Default value used for modeling purposes) |
| Median stream pH to be used: | 7.0 | Standard Units (S.U.) |
| | | Basis: Default value used for modeling purposes |
| Stream Temperature: | 20˚C | (Default value used for CWF modeling) |

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value used for modeling purposes

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

Result: WQ modeling resulted in the calculated CBOD5 limits above (see Attachment 1), which are the same as the previous NPDES Permit.

i. Dissolved Oxygen (DO)

The Dissolved Oxygen technology-based minimum of 4.0 mg/l will be retained as recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61.

The measurement frequency was set to 4/week during the previous renewal. Since the sampling is being performed, and the Permit is in compliance, the frequency will not be increased 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).

j. Disinfection

☐ Ultraviolet (UV) light monitoring
☒ Total Residual Chlorine (TRC) limits: 0.5 mg/l (monthly average)
1.2 mg/l (instantaneous maximum)

Basis: The TRC limits above are technology-based using the TRC_Calc Spreadsheet (see Attachment 2). The instantaneous maximum limit was previously set as 1.2 mg/l. Since the Permittee is meeting the more restrictive limit, it will be retained to comply with antibacksliding requirements.

The measurement frequency was set to 4/week during the previous renewal. Since the sampling is being performed, and the Permit is in compliance, the frequency will not be increased 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).

**4. Reasonable Potential Analysis for Receiving Stream:**

A Reasonable Potential Analysis was not performed in accordance with State practices for Outfall 001 using the Department's Toxics Management Spreadsheet 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 Department's Toxics Management Spreadsheet does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). Since no relevant sampling was provided, mass-balance calculations were not performed.

Nearest Downstream potable water supply (PWS): Sharpsville Municipal Water Authority
Distance downstream from the point of discharge: 17.0 miles (approximate)

**6. 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.

**7. 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 December 1, 2023 to November 30, 2024)**

| Parameter | NOV-24 | OCT-24 | SEP-24 | AUG-24 | JUL-24 | JUN-24 | MAY-24 | APR-24 | MAR-24 | FEB-24 | JAN-24 | DEC-23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.0007 | 0.0009 | 0.0007 | 0.0006 | 0.0007 | 0.0005 | 0.0008 | 0.0009 | 0.0009 | 0.0006 | 0.0006 | 0.0006 |
| Flow (MGD) Daily Maximum | 0.0009 | 0.0010 | 0.0008 | 0.0008 | 0.0008 | 0.0006 | 0.0010 | 0.0010 | 0.0010 | 0.0007 | 0.0007 | 0.0008 |
| pH (S.U.) Instantaneous Minimum | 6.9 | 7.0 | 7.0 | 7.0 | 6.7 | 7.0 | 6.8 | 6.9 | 7.0 | 7.1 | 7.1 | 7.1 |
| pH (S.U.) Instantaneous Maximum | 7.4 | 7.4 | 7.5 | 7.4 | 7.4 | 7.4 | 7.3 | 7.6 | 7.4 | 7.4 | 7.4 | 7.4 |
| DO (mg/L) Instantaneous Minimum | 6.7 | 7.0 | 7.1 | 7.0 | 6.9 | 6.8 | 6.9 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 |
| TRC (mg/L) Average Monthly | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| TRC (mg/L) Instantaneous Maximum | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 |
| CBOD5 (mg/L) Average Monthly | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 |
| TSS (mg/L) Average Monthly | 16 | 16 | 12 | 16 | 18 | 17 | 16 | 16 | 15 | 16 | 16 | 17 |
| 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 |
| Total Nitrogen (mg/L) Average Monthly | 20.7 | 24.4 | 21.3 | 20.8 | 19.4 | 20.5 | 20.6 | 21 | 21.7 | 20.7 | 21.1 | 21.0 |
| Ammonia (mg/L) Average Monthly | 9.15 | 12.4 | 10.0 | 10.0 | 9.8 | 9.9 | 10.0 | 9.64 | 9.62 | 9.88 | 9.87 | 9.94 |
| Ammonia (mg/L) Instantaneous Maximum | 9.98 | 15.1 | 10.1 | 10.0 | 9.9 | 10.0 | 10.1 | 9.96 | 9.84 | 9.99 | 9.89 | 10.1 |
| Total Phosphorus (mg/L) Average Monthly | 5.300 | 5.325 | 5.235 | 5.210 | 5.230 | 5.300 | 5.135 | 4.960 | 3.030 | 5.465 | 4.955 | 5.180 |

## 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 | 4/week | Grab |
| DO | XXX | XXX | 4.0 Inst Min | XXX | XXX | XXX | 4/week | Grab |
| TRC | XXX | XXX | XXX | 0.5 | XXX | 1.2 | 4/week | Grab |
| CBOD5 | XXX | XXX | XXX | 25.0 | XXX | 50 | 2/month | 8-Hr Composite |
| TSS | XXX | XXX | XXX | 30.0 | XXX | 60 | 2/month | 8-Hr Composite |
| 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 | Report | XXX | XXX | 2/month | Grab |
| Ammonia Nov 1 - Apr 30 | XXX | XXX | XXX | Report | XXX | Report | 2/month | 8-Hr Composite |
| Ammonia May 1 - Oct 31 | XXX | XXX | XXX | 25.0 | XXX | 50.0 | 2/month | 8-Hr Composite |
| Total Phosphorus | XXX | XXX | XXX | Report | XXX | XXX | 2/month | Grab |

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow is monitor only. The limits for pH are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limit is technology-based on Chapter 92a.48. The limits for $CBOD_5$, Total Suspended Solids, Dissolved Oxygen, and Fecal Coliform are technology based on Chapter 92a.47. The summer limits for Ammonia-Nitrogen are technology-based on Chapter 93.7. Monitoring for Total Nitrogen, Total Phosphorus, and winter Ammonia-Nitrogen is based on Chapter 92a.61.

Attachment 1

## WQM 7.0 Effluent Limits (Perennial Reach)

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20A | 35482 | SHENANGO 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) |
|---|---|---|---|---|---|---|---|
| 51.000 | Perennial | PA0040878p | 0.004 | CBOD5 | 2 | | |
| | | | | NH3-N | 1 | 2 | |
| | | | | Dissolved Oxygen | | | 8.09 |

Since the calculated limits are equal to the dry reach outputs, the dry reach inputs are protective.

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20A | 35482 | SHENANGO RIVER |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 51.000 | 0.004 | 20.013 | 7.000 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 25.977 | 0.619 | 41.967 | 0.165 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.00 | 0.000 | 0.00 | 0.701 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.243 | 3.525 | Tsivoglou | 6 |
| **Reach Travel Time (days)** | | | |
| 0.999 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.100 | 2.00 | 0.00 | 8.24 |
| 0.200 | 2.00 | 0.00 | 8.24 |
| 0.300 | 2.00 | 0.00 | 8.24 |
| 0.399 | 2.00 | 0.00 | 8.24 |
| 0.499 | 2.00 | 0.00 | 8.24 |
| 0.599 | 2.00 | 0.00 | 8.24 |
| 0.699 | 2.00 | 0.00 | 8.24 |
| 0.799 | 2.00 | 0.00 | 8.24 |
| 0.899 | 2.00 | 0.00 | 8.24 |
| 0.999 | 2.00 | 0.00 | 8.24 |

# 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 | | |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 20A | 35482 | SHENANGO RIVER | **51.000** | 952.00 | 26.50 | 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 |
|---|---|---|---|---|---|---|---|
| Perennial | PA0040878p | 0.0043 | 0.0000 | 0.0000 | 0.000 | 25.00 | 7.10 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 2.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 8.09 | 8.24 | 0.00 | 0.00 |
| NH3-N | 1.00 | 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 |
|---|---|---|---|---|---|---|---|---|
| 20A | 35482 | SHENANGO RIVER | **48.300** | 920.00 | 340.00 | 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 |
|---|---|---|
| 20A | 35482 | SHENANGO 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 (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 51.000 | 2.65 | 0.00 | 2.65 | .0067 | 0.00224 | .619 | 25.98 | 41.97 | 0.17 | 0.999 | 20.01 | 7.00 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 51.000 | 1.70 | 0.00 | 1.70 | .0067 | 0.00224 | NA | NA | NA | 0.13 | 1.281 | 20.02 | 7.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 51.000 | 3.60 | 0.00 | 3.60 | .0067 | 0.00224 | NA | NA | NA | 0.20 | 0.841 | 20.01 | 7.00 |

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20A | 35482 | SHENANGO 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 |
|---|---|---|---|---|---|---|---|
| 51.000 | Perennial | 16.73 | 2 | 16.73 | 2 | 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 |
|---|---|---|---|---|---|---|---|
| 51.000 | Perennial | 1.89 | 1 | 1.89 | 1 | 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) | | |
| 51.00 | Perennial | 2 | 2 | 1 | 1 | 8.09 | 8.09 | 0 | 0 |

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

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20A | 35482 | SHENANGO RIVER |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 0.590 | 0.004 | 21.003 | 7.018 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 5.761 | 0.340 | 16.927 | 0.017 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 6.62 | 0.536 | 5.02 | 0.756 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 7.392 | 10.610 | Owens | 2 |
| **Reach Travel Time (days)** | | | |
| 2.132 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.213 | 5.87 | 4.27 | 7.08 |
| 0.426 | 5.21 | 3.63 | 7.29 |
| 0.640 | 4.62 | 3.09 | 7.52 |
| 0.853 | 4.10 | 2.63 | 7.72 |
| 1.066 | 3.64 | 2.24 | 7.90 |
| 1.279 | 3.23 | 1.91 | 8.05 |
| 1.492 | 2.86 | 1.62 | 8.09 |
| 1.706 | 2.54 | 1.38 | 8.09 |
| 1.919 | 2.25 | 1.18 | 8.09 |
| 2.132 | 2.00 | 1.00 | 8.09 |

# 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 |
|---|---|---|---|---|---|---|---|---|
| 20A | 35482 | SHENANGO RIVER | **0.590** | 1010.00 | 26.50 | 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** | 0.001 | 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 Reach | PA0040878d | 0.0043 | 0.0000 | 0.0000 | 0.000 | 25.00 | 7.10 |

### 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 |
|---|---|---|---|---|---|---|---|---|
| 20A | 35482 | SHENANGO RIVER | **0.000** | 952.00 | 27.00 | 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** | 0.001 | 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 | 0.00 | 7.00 |

### Parameter Data

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

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20A | 35482 | SHENANGO 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 (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 0.590 | 0.03 | 0.00 | 0.03 | NA | 0.01862 | .34 | 5.76 | 16.93 | 0.02 | 2.132 | 21.00 | 7.02 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 0.590 | 0.02 | 0.00 | 0.00 | NA | 0.01862 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 0.590 | 0.04 | 0.00 | 0.00 | NA | 0.01862 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |

Attachment 2

## TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

| | | | |
|---|---|---|---|
| 0.1652 | = Q stream (cfs) | 0.5 | = CV Daily |
| 0.006 | = 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 = 5.697 | 1.3.2.iii | WLA cfc = 5.546 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | 5.1c | LTAMULT cfc = 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= 2.123 | 5.1d | LTA_cfc = 3.224 |

| Source | | Effluent Limit Calculations | |
|---|---|---|---|
| PENTOXSD TRG | 5.1f | AML MULT = 1.231 | |
| PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.500 | BAT/BPJ |
| | | INST MAX LIMIT (mg/l) = 1.635 | |

| | |
|---|---|
| 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)** |